



ATLAS OF CLINICAL GASTROINTESTINAL

ENDOSCOPY

Third Edition

C. Mel Wilcox
Miguel Munoz-Navas
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To all those who helped me collect these images as well as to my wonderful family for providing me the time to compile this labor of love.

C. Mel Wilcox, MD, MSPH

This book is dedicated to my wife, Lucia, my children, Miguel, Javier, and Ina, for their love, patience, and support, and my granddaughter, Ema, who has given me so much joy. I must especially thank my parents, Calixto and Maria (may they rest in peace), to whom I owe what I am, and my late father-in law, Antonio, who would be very proud of this publication.

Miguel Muñoz-Navas, MD, PhD

To my wife, Rebecca Wong.

Joseph Sung, MD, PhD

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Miguel Muñoz-Navas, MD, PhD

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Joseph Sung, MD, PhD

Oropharynx and Hypopharynx

INTRODUCTION

The oropharynx is the gateway to the proximal gastrointestinal tract. Although visualized daily by endoscopists, a thorough examination may not be routine. With the expanding patient base of immunocompromised patients, inspection of the oropharynx, particularly in patients with esophageal symptoms, should be part of every examination. Oropharyngeal abnormalities can suggest underlying esophageal disease in these patients, and oropharyngeal lesions may be the first manifestation of an underlying systemic disorder. Asymptomatic malignant disease may also be detected. With increasing appreciation of the extraesophageal manifestations of gastroesophageal reflux disease, hypopharyngeal examination assumes an even greater role. A thorough knowledge of hypopharyngeal anatomy is thus essential for all endoscopists.

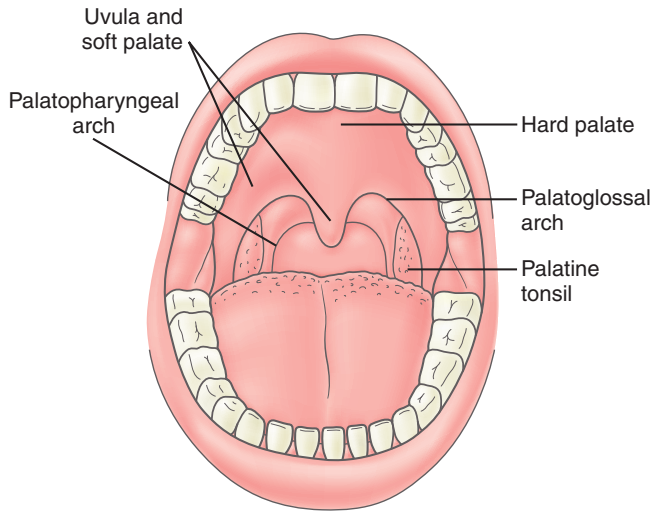


FIGURE 1.1 OROPHARYNX

Normal pharynx as viewed with an endoscope, demonstrating the junction of the hard and soft palate, uvula, and posterior pharynx.

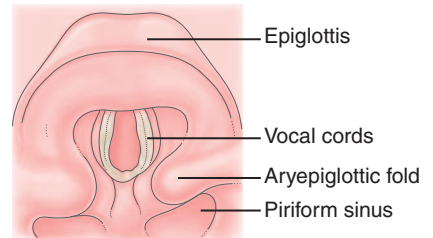
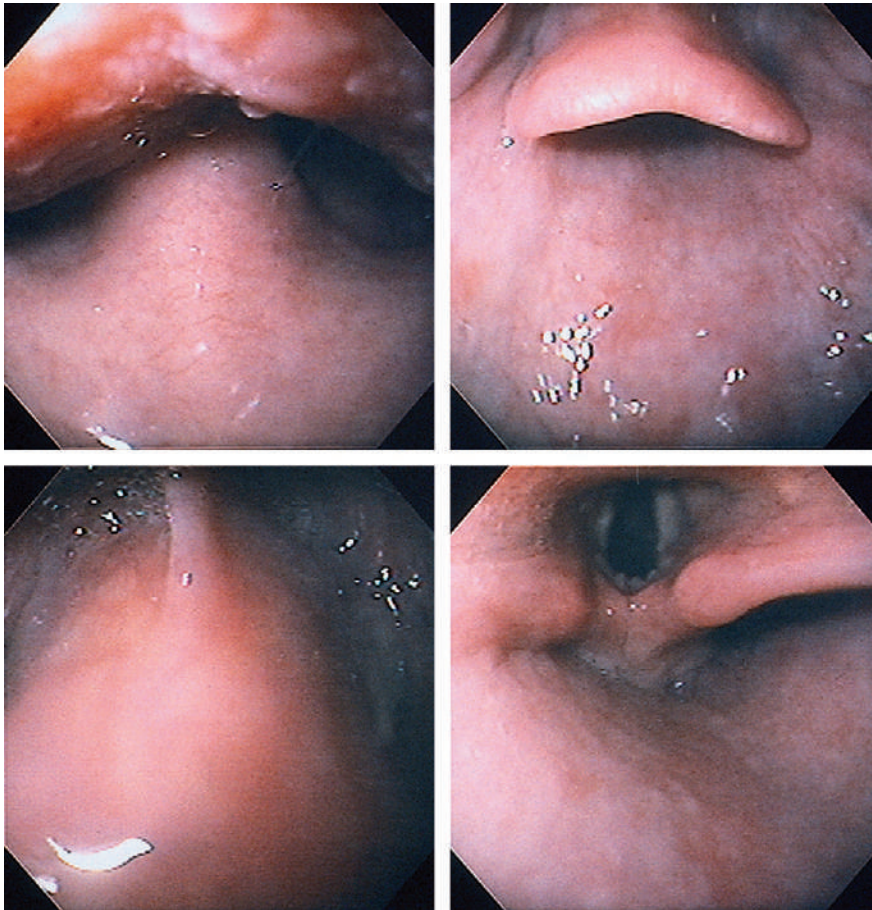


FIGURE 1.2 LANDMARKS OF THE OROPHARYNX AND HYPOPHARYNX

With the endoscope advanced under direct vision, the inferior portion of the uvula is seen at the base of the tongue. Notice that the image is inverted (*top left*). With further advancement, the superior portion of the epiglottis is identified (*top right*). Advancement anteriorly ends at the attachment of the epiglottis, termed the *valleculae* (*bottom left*). To enter the hypopharynx, the endoscope is advanced posteriorly behind the epiglottis into the hypopharynx (*bottom right*). The epiglottis appears to form a roof over the hypopharynx. The vocal cords are surrounded by the aryepiglottic folds anteriorly. In this position, the piriform recesses or sinuses are on the lateral side of the aryepiglottic folds. The cricopharyngeus and entrance to the esophagus are in the midline posteriorly.

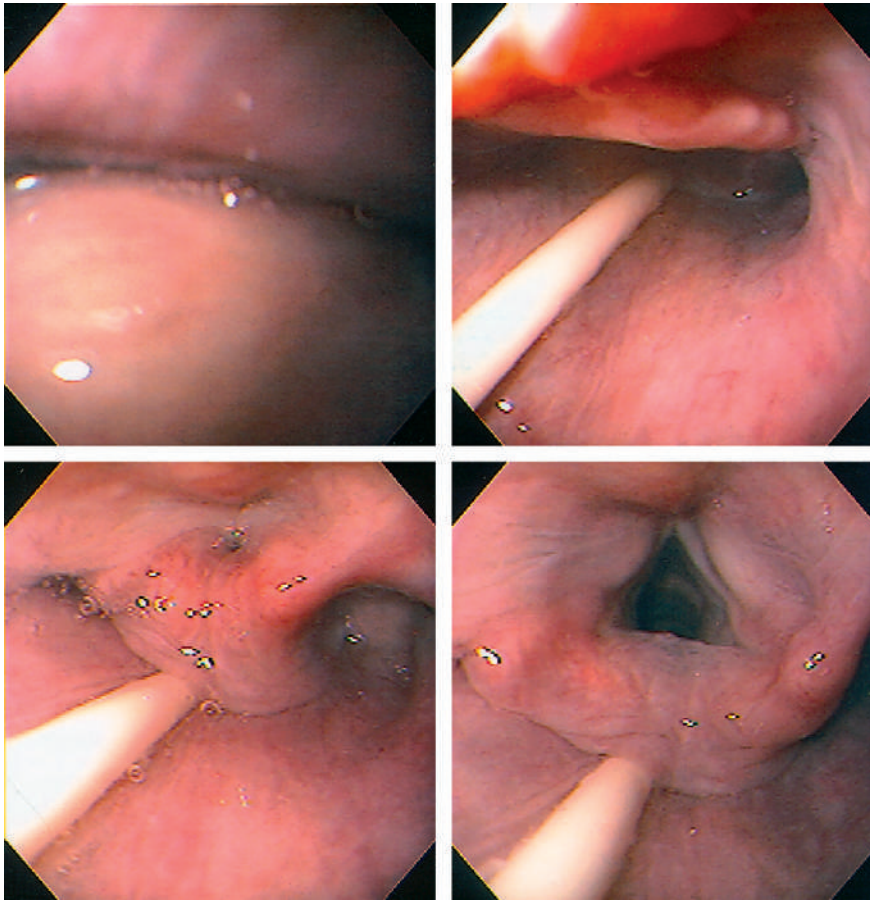


FIGURE 1.3 DIRECTION TO CRICOPHARYNGEUS

The endoscope is passed over the tongue and uvula (*upper left*). Once past the uvula, the epiglottis and hypopharynx are seen in the distance. A nasogastric feeding tube is now present (*upper right*). The arytenoids are now visible with the feeding tube seen posterior in the midline (*bottom left*). The arytenoids are open and the vocal cords visible. Again, the feeding tube is posterior in the midline showing the location of the cricopharynx (*bottom right*).

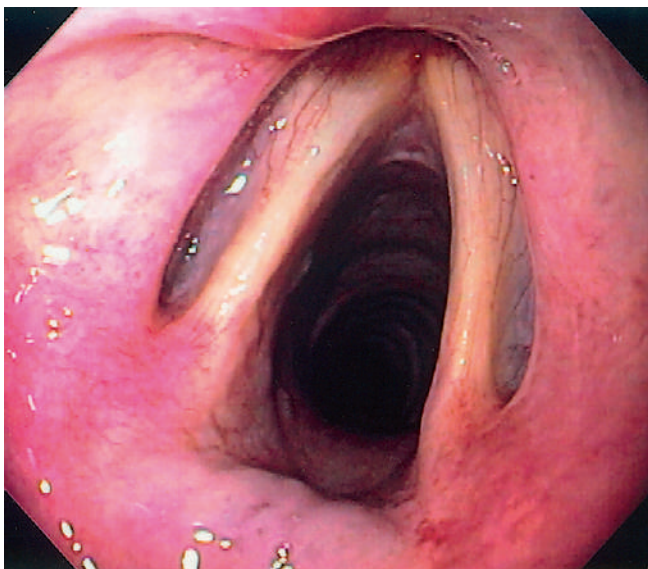


FIGURE 1.4 VOCAL CORDS

Normal vocal cords and surrounding structures as seen from the arytenoids.

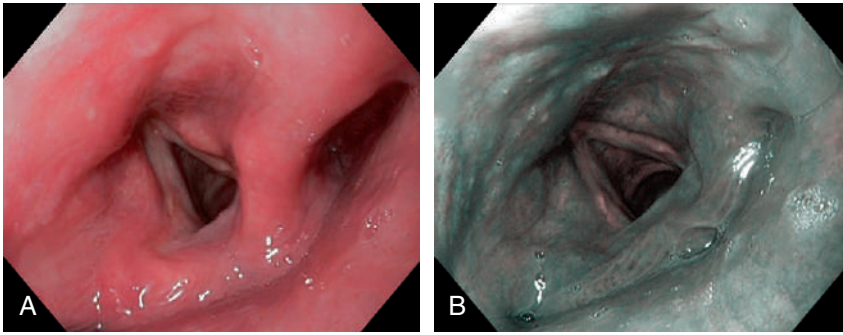


FIGURE 1.5 HYPOPHARYNX

A, Normal-appearing hypopharynx as seen on high-definition endoscopy. **B**, Narrow band imaging of the hypopharynx.

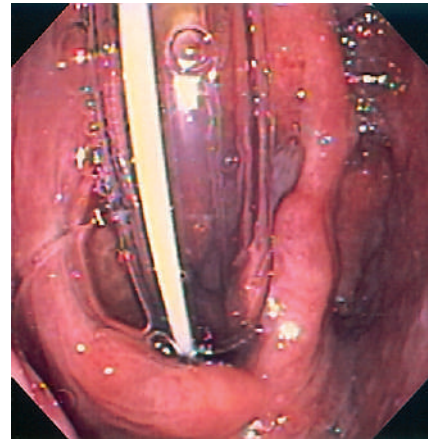


FIGURE 1.6 HYPOPHARYNX WITH ENDOTRACHEAL TUBE

Note the anatomy of the hypopharynx with endotracheal intubation.

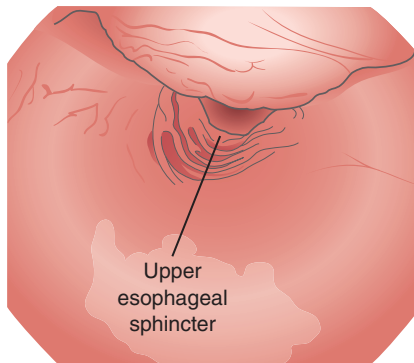


FIGURE 1.7 PATENT UPPER ESOPHAGEAL SPHINCTER

After endoscope removal, the upper esophageal sphincter remained patulous. Note its location relative to the cricopharyngeus, confirming the posterior location of the upper esophageal sphincter. Also note the erythema of the hypopharynx and arytenoids.

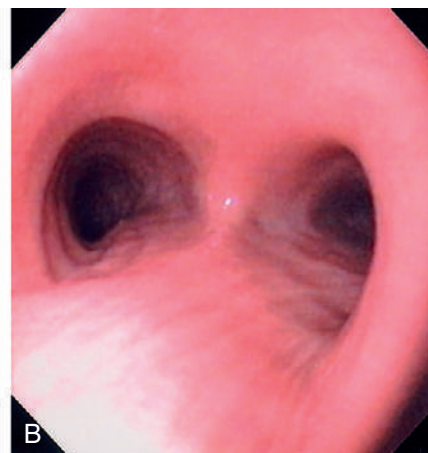
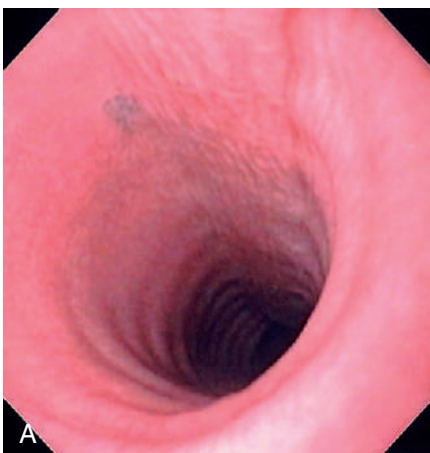


FIGURE 1.8 TRACHEA AND CARINA

View of the **(A)** trachea and **(B)** carina at endoscopy. Note the ringlike architecture of the trachea.

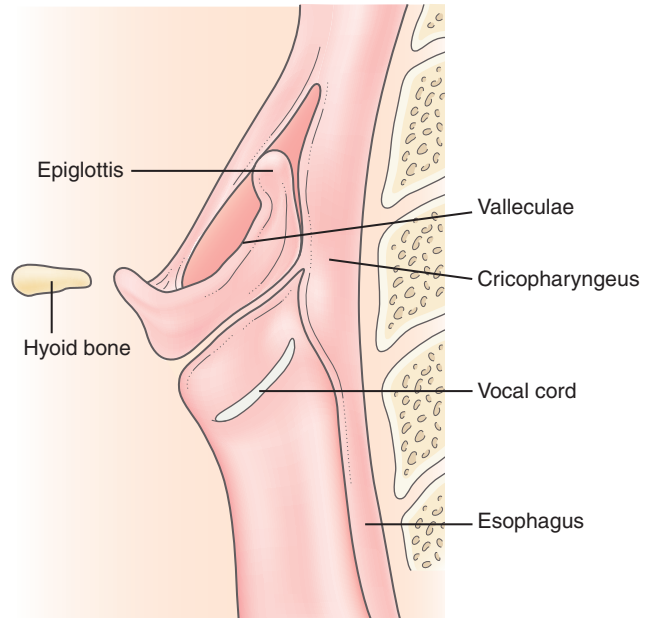
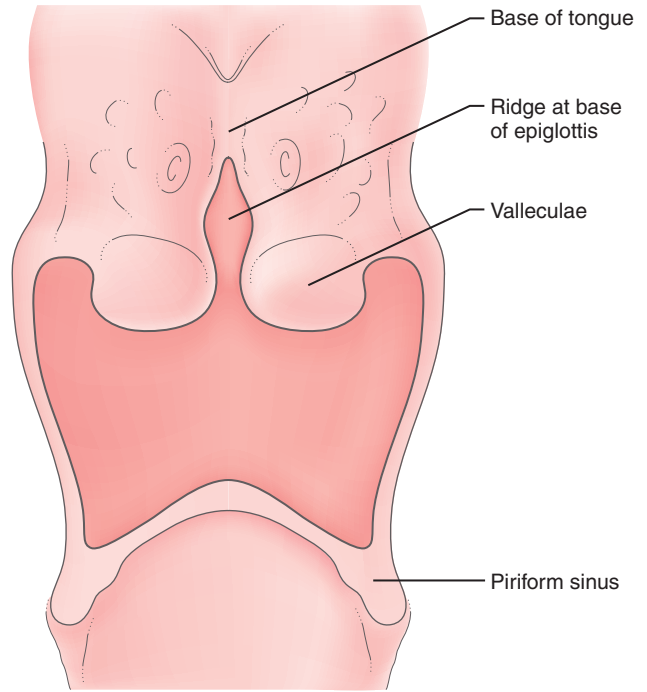


FIGURE 1.9 BARIUM STUDY OF HYPOPHARYNX AND ESOPHAGUS

A, Anteroposterior view demonstrates the base of the tongue, valleculae, piriform sinuses, and ridge at the base of the epiglottis. **B**, Lateral view demonstrates the valleculae; hypopharynx; piriform sinus; cricopharyngeus, with some contrast seen in the esophagus; and hyoid bone.

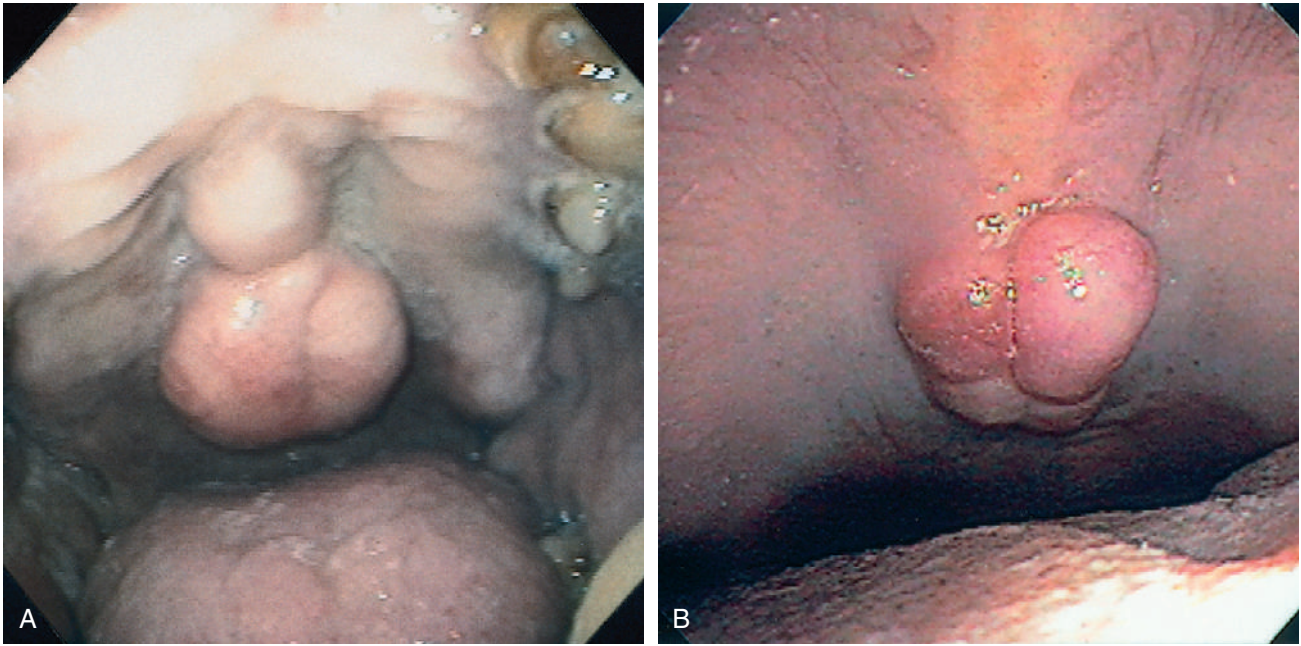


FIGURE 1.10 TORUS PALATINUS

A, This large, masslike abnormality on the hard palate is an exaggeration of a normal structure, resulting from a bony exostosis of the midline palatal suture. **B**, Nodular structure on the distal hard palate.



FIGURE 1.11 APHTHOUS ULCER

Shallow, well-circumscribed ulceration on the hard palate. This patient had active inflammatory bowel disease (see [Figure 5.36](#)).



Differential Diagnosis

Aphthous Ulcer ([Figure 1.11](#))

Infectious causes

Herpes simplex virus

Syphilis

Zoster

Histoplasmosis

Noninfectious causes

Systemic lupus erythematosus

T-cell disorders

Human immunodeficiency virus infection



FIGURE 1.12 HUMAN IMMUNODEFICIENCY VIRUS (HIV)-ASSOCIATED APHTHOUS ULCER

A, This large ulcer extends from the uvula to the soft palate. These lesions are frequent in patients with acquired immunodeficiency syndrome (AIDS) and may occur on the tongue or buccal mucosa or in the hypopharynx. They may become large, simulating an infectious or neoplastic process. **B**, Deep ulcer on the lateral aspect of the tongue. Note in the distance a well-circumscribed, similar-appearing ulcer is present on the hard palate. **C**, Well-circumscribed, clean-based ulcer on the tongue. **D**, Multiple ulcerations on the lower lip. This patient with severe odynophagia also had a large idiopathic esophageal ulceration.

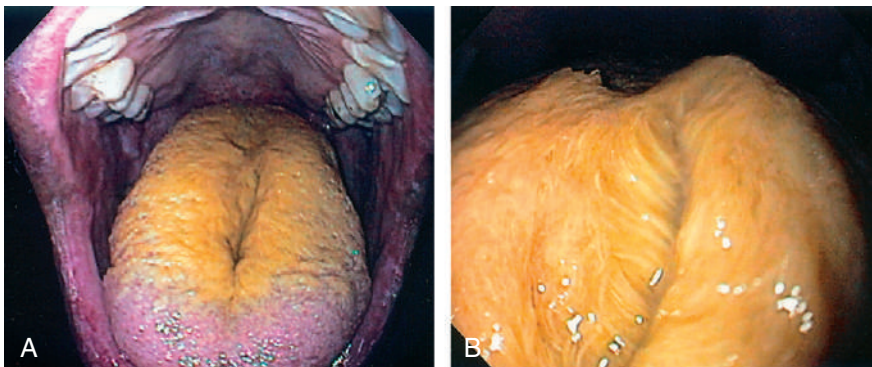


FIGURE 1.13 HAIRY TONGUE

A, Yellowish coating of the tongue. **B**, Close-up shows a furry appearance resembling hair. This disorder, of unknown etiology, is characterized by hypertrophy of the filiform papillae.



FIGURE 1.14 PEUTZ-JEGHERS SYNDROME
Multiple black hyperpigmented lesions of the (A) lips, (B) buccal mucosa, and (C) hard palate.



FIGURE 1.15 OSLER-WEBER-RENDU SYNDROME
Multiple ectasias of the (A) lips and tongue, (B) tongue, (C) palate, and (D) hypopharynx.

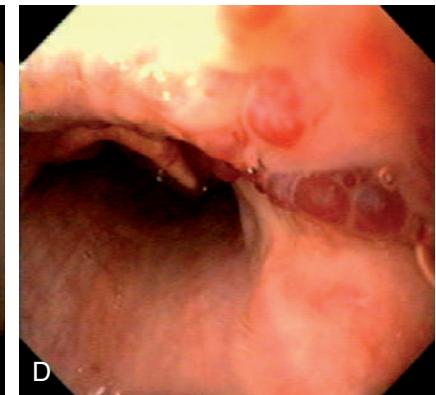
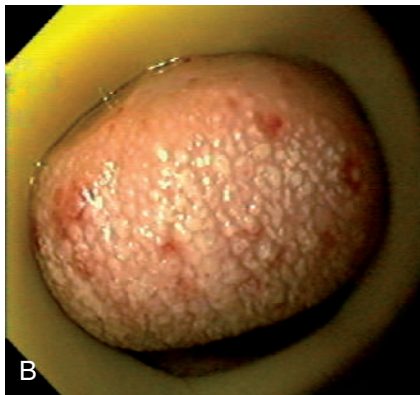




FIGURE 1.16 HERPES SIMPLEX VIRUS STOMATITIS

A, Characteristic lesions of herpes simplex virus stomatitis include diffuse ulceration of the lips (*top left, top right*), tongue (*top right*), hard and soft palate (*bottom left*), and posterior pharynx (*bottom right*). These lesions may also extend into the hypopharynx or to the squamous mucosa surrounding the lips or nares. **B**, Shallow ulceration on the lower lip, tongue, and the angle of the lips on the right (**C**).

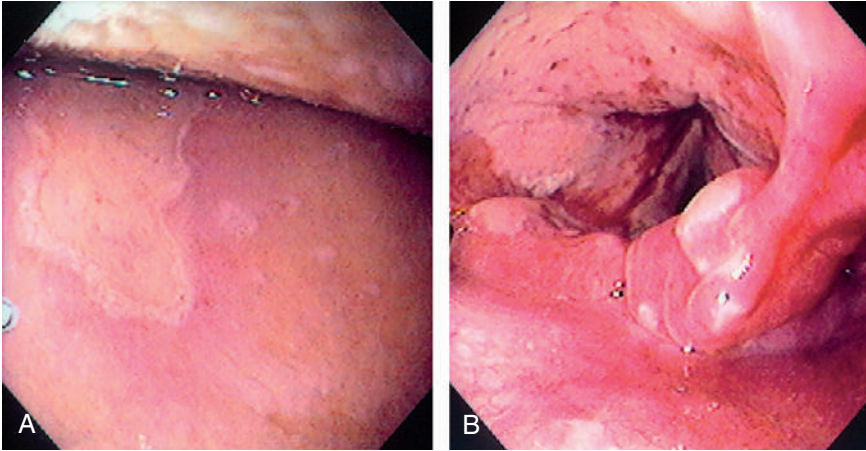


FIGURE 1.17 HERPES SIMPLEX VIRUS STOMATITIS

A, Shallow ulceration on the hard palate associated with several small ulcerations. **B**, The ulceration extends to the epiglottis toward the vocal cords and aryepiglottic folds.



FIGURE 1.18 HERPES SIMPLEX VIRUS STOMATITIS

Shallow ulceration on the lower lip, tongue, and face extending to the nares.

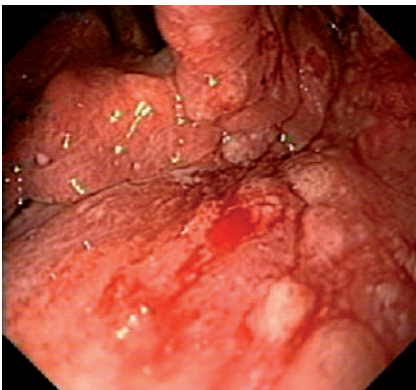


FIGURE 1.19 VARICELLA

Nodularity and shallow ulceration of the hypopharynx involving the arytenoid region of the larynx. Note the friability of the mucosa.



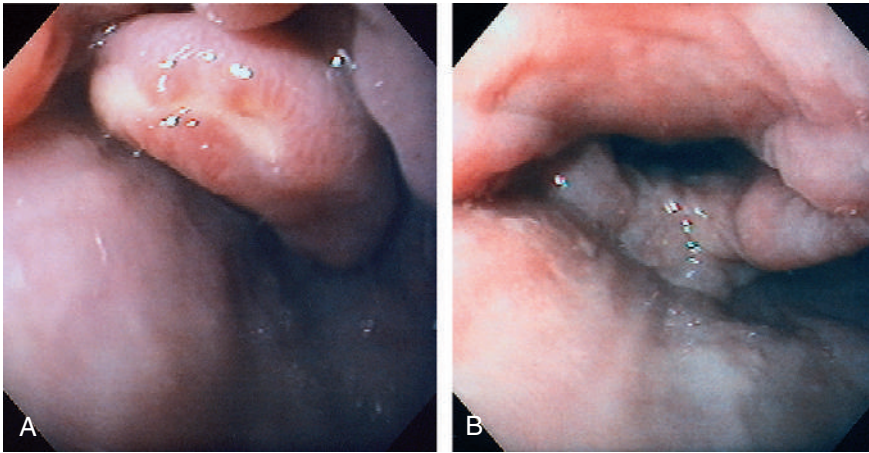
FIGURE 1.20 OROPHARYNGEAL CANDIDIASIS

A, Multiple white and yellow plaques on the hard and soft palate and buccal mucosa. In this patient, the tongue appears to be spared. Occasionally, the lesions will be identified in the hypopharynx when the endoscope is passed under direct vision. **B**, Normal-appearing oropharynx in a patient with *Candida* esophagitis (*top left*). This patient was not receiving antifungal therapy, highlighting the fact that thrush may be absent in patients with esophageal candidiasis. **C**, Erythematous type of oropharyngeal candidiasis. Note the erythematous areas on the hard palate with minimal plaque material seen.

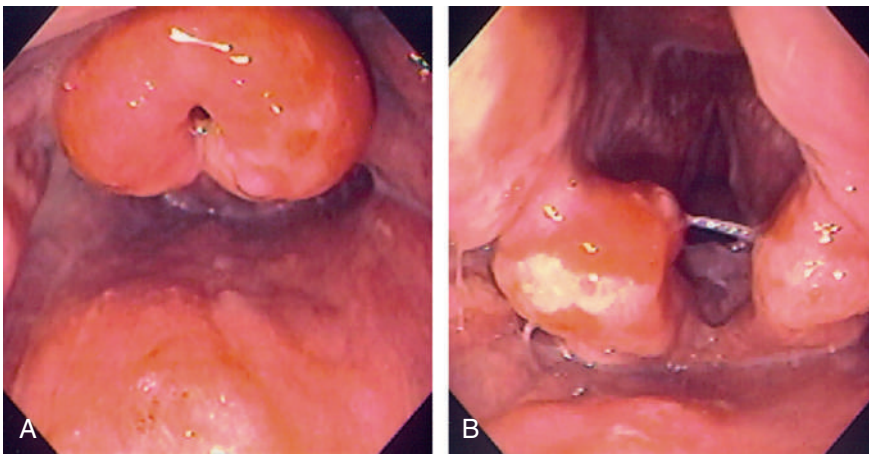


FIGURE 1.21 MUCORMYCOSIS

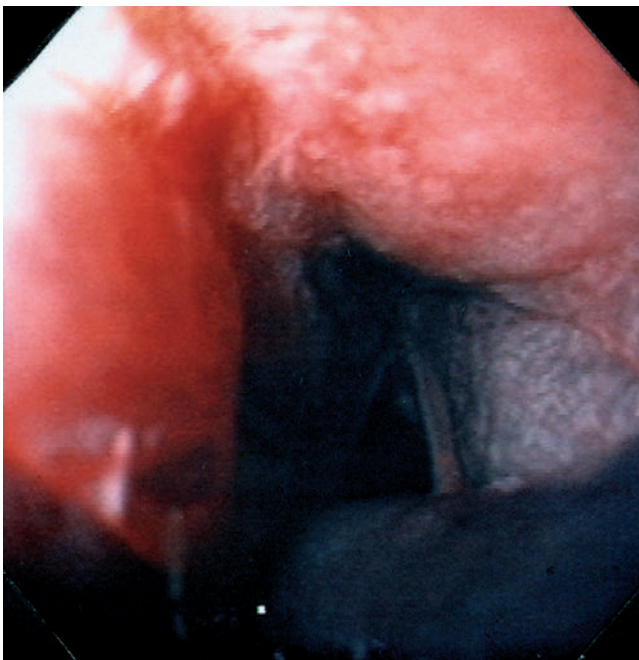
Necrotic-appearing hard and soft palate in this immunocompromised patient. There was also pronounced periorbital and facial swelling.

**FIGURE 1.22** EPIGLOTTITIS

A, An ulcer is identified on the superior portion of a markedly edematous epiglottis. **B**, The distal portion of the epiglottis and the arytenoids are also edematous. Endoscopy was performed for dysphagia and hoarseness. After antibiotic therapy, all symptoms resolved.

**FIGURE 1.23** EPIGLOTTITIS

A, The epiglottis is markedly edematous with overlying erosions. **B**, The arytenoids are also edematous with erosive lesions.

**FIGURE 1.24** CAUSTIC INGESTION

Severe edema and hemorrhage in the hypopharynx. The vocal cords are seen in the distance. The patient had no lesions in the pharynx after ingestion of acetic acid. Further mucosal injury was seen in the esophagus and stomach (see [Figure 2.157](#)).



FIGURE 1.25 CAUSTIC INGESTION

Diffuse ulceration of the lips (A) and hypopharynx (B) 24 hours after caustic ingestion. The patient is intubated. C, Diffuse edema and ulceration of the hypopharynx 4 days later.

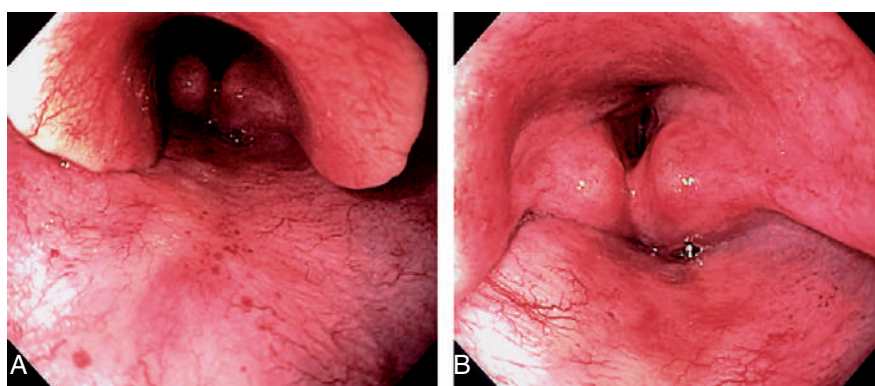


FIGURE 1.26 RADIATION INJURY

Diffuse erythema of the hypopharynx, epiglottis, and aryepiglottic folds. Note the pronounced neovascularization and pinpoint ectasias similar to what occurs in other areas of the gastrointestinal tract after radiation therapy (A, B).

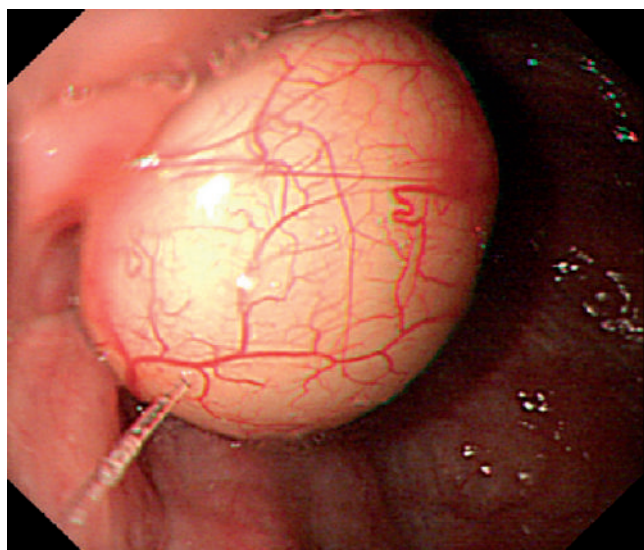


FIGURE 1.27 ARYTENOID CYST

Cystic structure with overlying normal vascular pattern in the hypopharynx.



FIGURE 1.28 CONDYLOMA

Small, whitish, verrucous-appearing lesion on the hard palate.

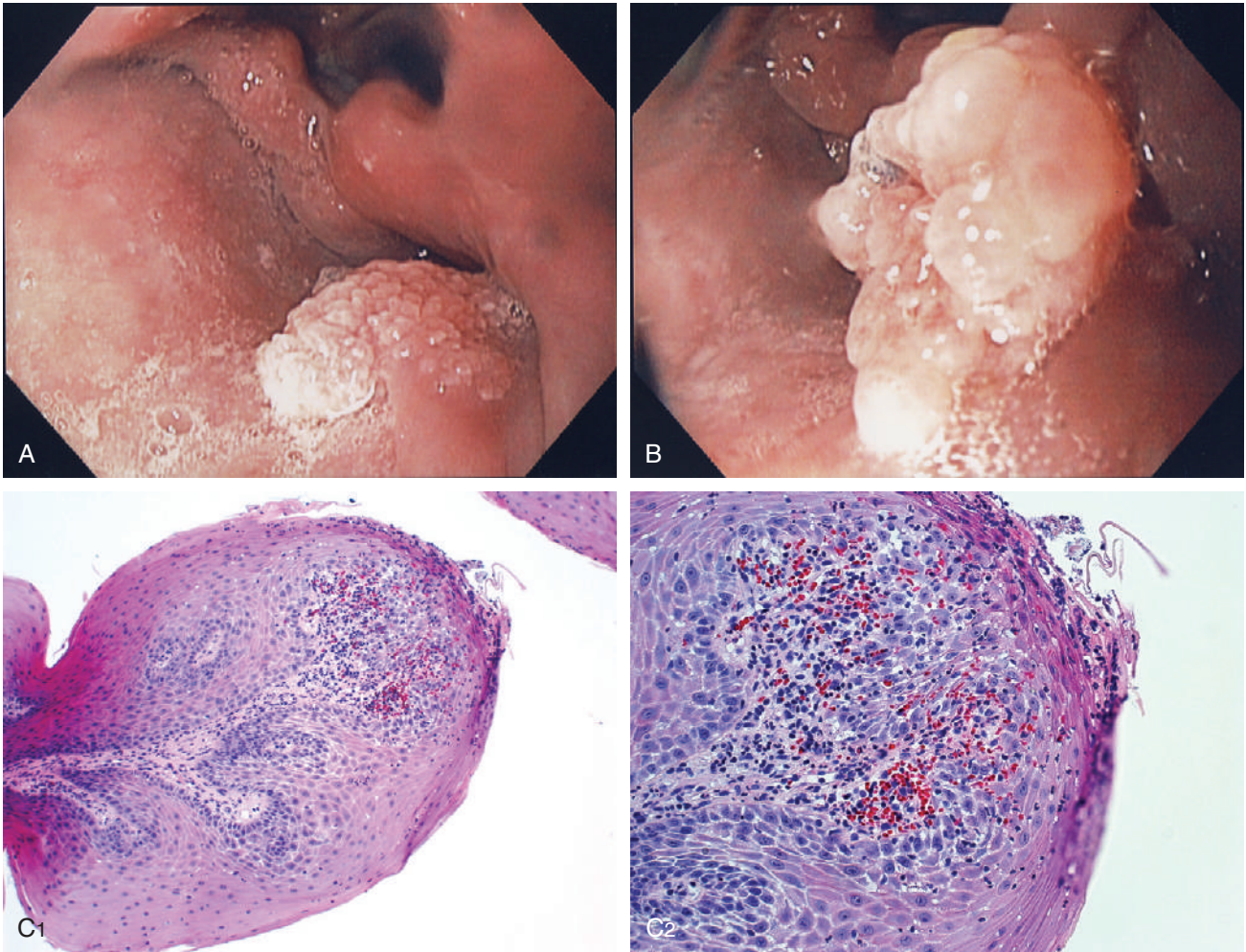


FIGURE 1.29 SQUAMOUS PAPILOMA

A, B, Nodular mass lesion just proximal to the left piriform sinus with overlying verrucous appearance typical for a papilloma. **C1, C2,** Inflamed squamous epithelium with an edematous fibrovascular core consistent with squamous papilloma.

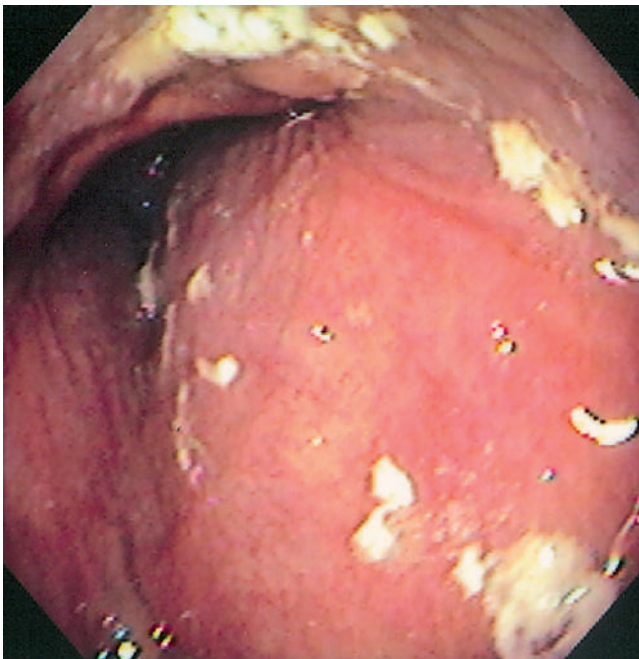


FIGURE 1.30 EXTRINSIC COMPRESSION

Submucosal masslike lesion causing extrinsic compression of the left hypopharynx.



FIGURE 1.31 LICHEN PLANUS
Plaquelike white lesions of the buccal mucosa (A–C).

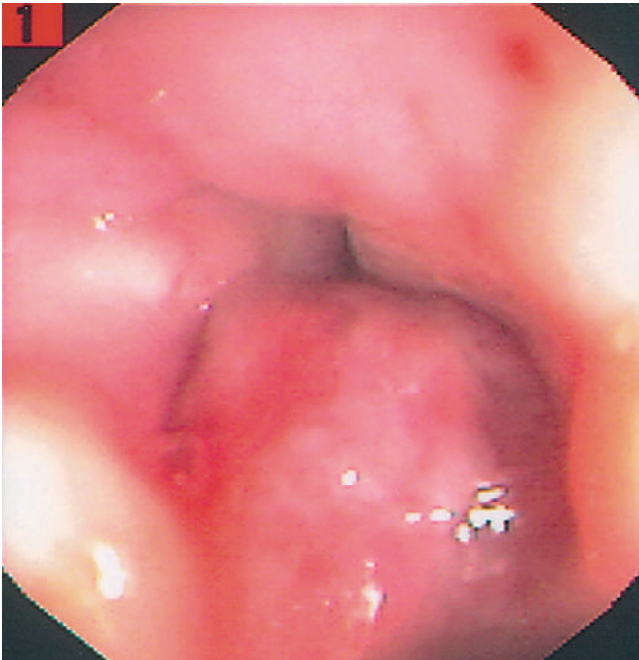
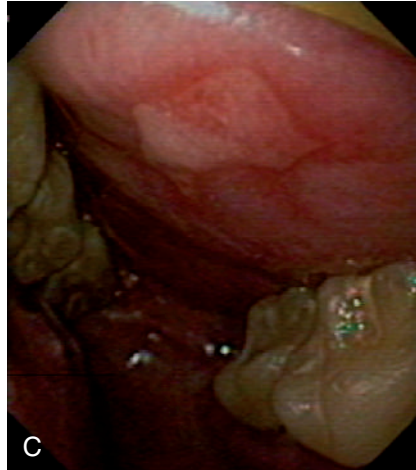
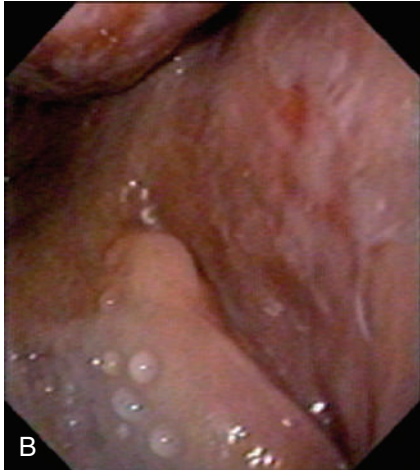


FIGURE 1.32 FIBROSARCOMA
Small, masslike lesion occupying the space just proximal to the vocal cords. The lesion was seen to move with respirations.



FIGURE 1.33 KAPOSI'S SARCOMA

A, Reddish plaquelike lesions of the hard and soft palate. **B**, Verrucous-appearing purple lesion on the hard palate. **C**, Diffuse, flat purple lesion on both the soft and hard palate. Accompanying gastric lesions are typical (see [Figure 3.156](#)). **D**, Kaposi's sarcoma lesion on the superior portion of the epiglottis. Note the associated edema, with loss of vascularity of the epiglottis. **E**, Characteristic skin lesions.

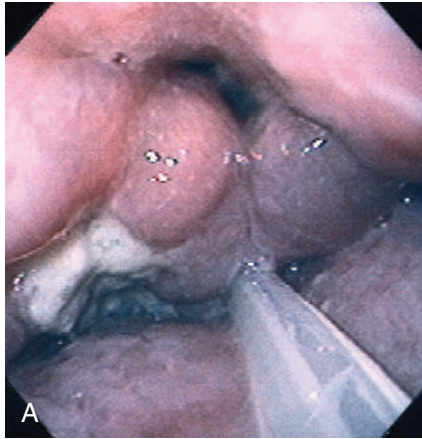


FIGURE 1.34 SQUAMOUS CELL CARCINOMA

A, Ulcerative lesion in the right piriform sinus associated with edema and distortion of the aryepiglottic folds. A nasogastric tube can be seen entering the esophagus, demarcating the normal landmarks. **B**, The arytenoids and aryepiglottic folds are distorted, with fresh blood present (**B1**). A necrotic ulcerated lesion is apparent in the left piriform sinus (**B2**). This patient underwent endoscopy for dysphagia, during which a squamous cell carcinoma of the distal esophagus was also found. **C**, Ulcerated nodular lesion just proximal to the left piriform sinus involving the arytenoids.

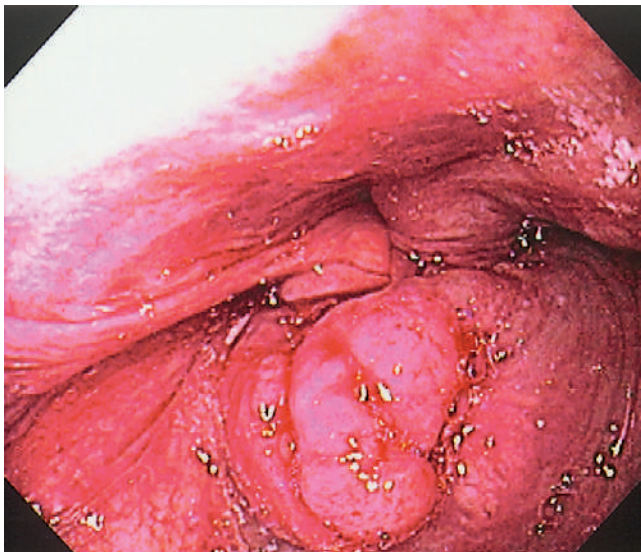
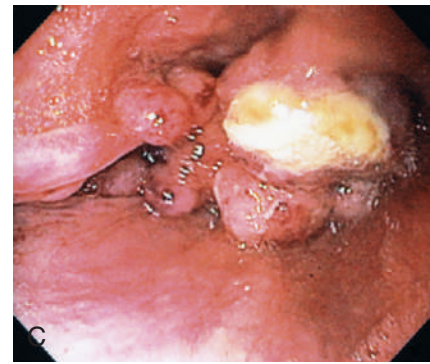
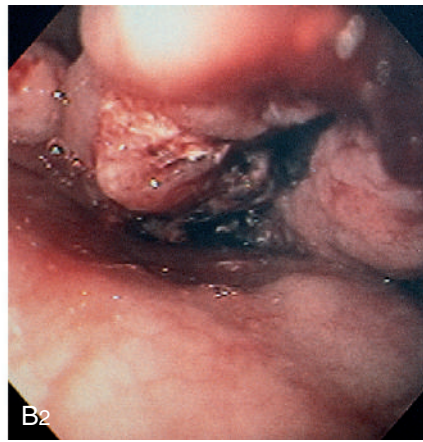
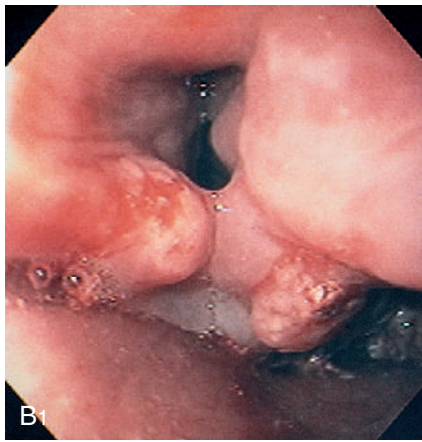


FIGURE 1.35 SQUAMOUS CELL CARCINOMA

Submucosal masslike lesion arising from the piriform sinus at the upper esophageal sphincter. Note the compression on the aryepiglottic folds.

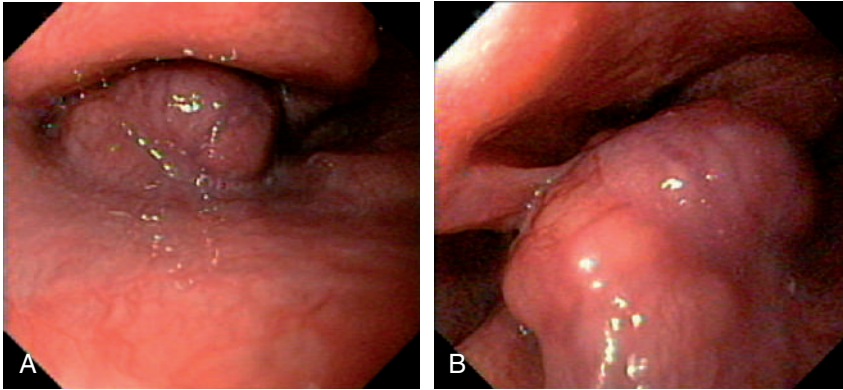


FIGURE 1.36 MELANOMA
Submucosal mass-like lesion just proximal to the aryepiglottic folds (**A, B**).

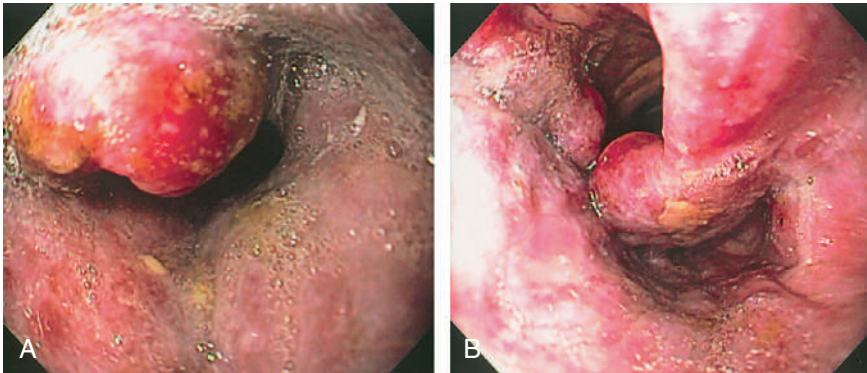


FIGURE 1.37 LEUKEMIA
Diffuse edema and exudate of epiglottis (**A**) and hypopharynx with erosion on the left aryepiglottic fold (**B**). This patient had leukemic infiltrates throughout the gastrointestinal tract (see [Figures 2.74](#) and [5.207](#)).

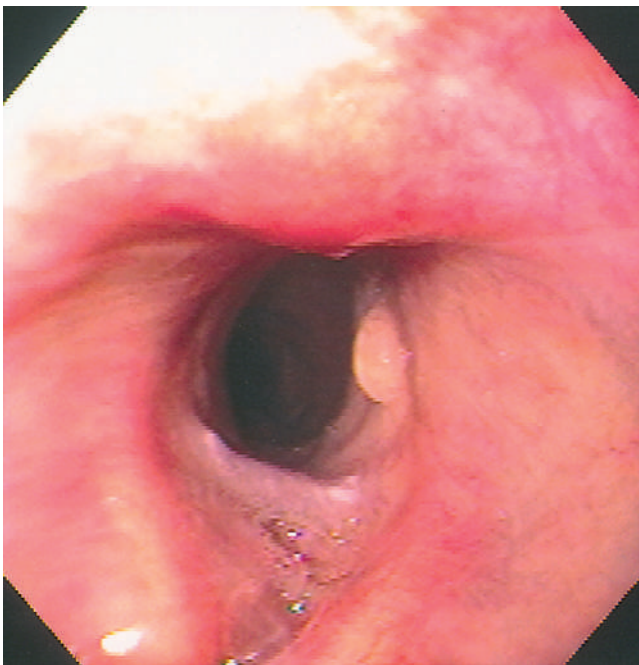


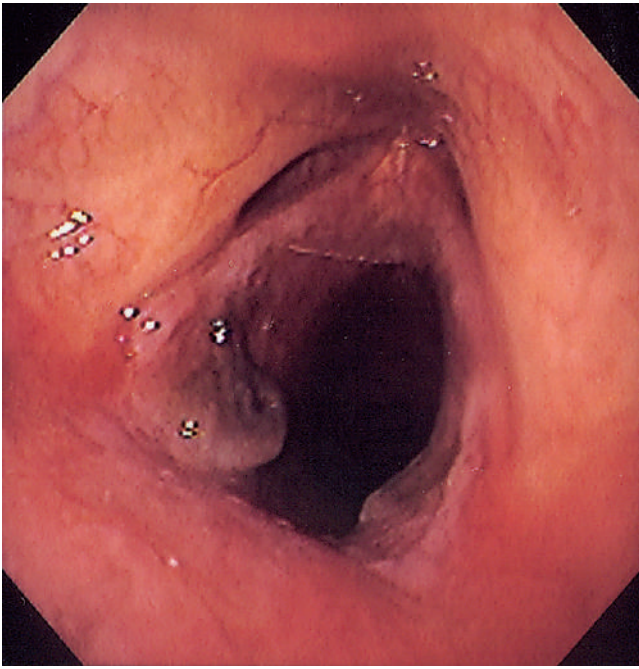
FIGURE 1.38 VOCAL CORD GRANULOMA
A small, benign-appearing lesion on the left true vocal cord diagnostic for a granuloma. There is no overlying epithelium on the lesion.



Differential Diagnosis

Vocal Cord Granuloma ([Figure 1.38](#))

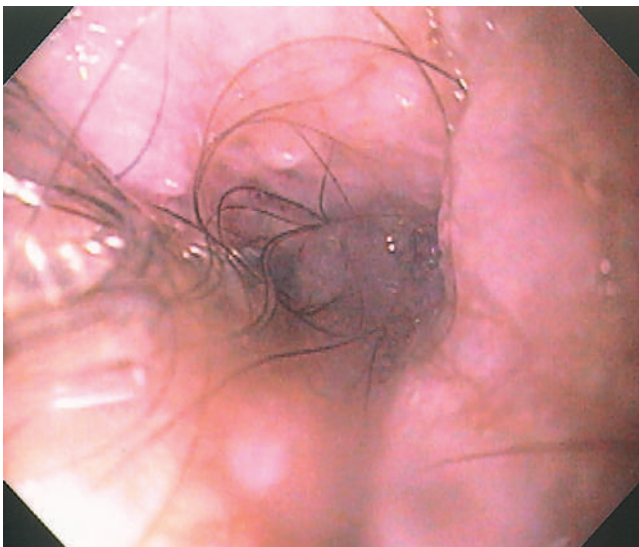
- Differential diagnosis of vocal cord nodules
- Nodules typically are bilateral
- Polyps
- Gastroesophageal reflux disease
- Allergies
- Neoplasm

**FIGURE 1.39** VOCAL CORD INJURY WITH INTUBATION

The vocal cords are edematous with a dark area representing trauma. Note the flame hemorrhages emanating from the cords typical for reflux of acid associated with intubation.

**FIGURE 1.40** VOCAL CORD LEUKOPLAKIA

White, plaquelike lesion involving the true vocal cords.

**FIGURE 1.41** HYPOPHARYNGEAL RECONSTRUCTION

Note the color of the mucosa and associated hair. This patient had hypopharyngeal surgery with a skin flap. This was the area of the upper esophageal sphincter.

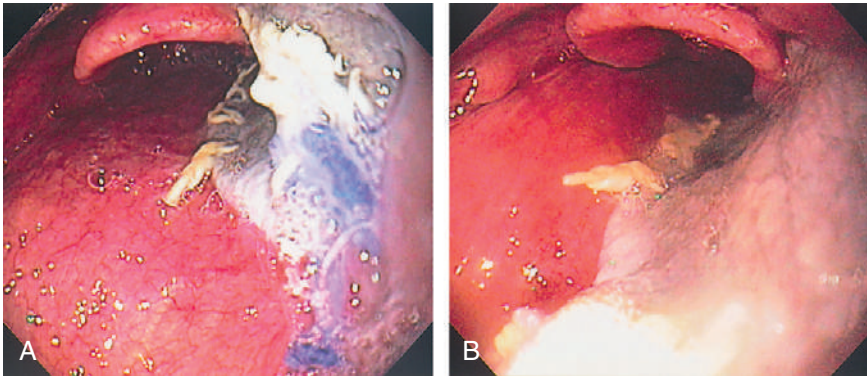


FIGURE 1.42 LATERAL PHARYNGOTOMY WITH FLAP

In the left pharynx, suture material is seen (A). More distally, note the distinction in color between the right and left pharynx (B). Resection was performed and a forearm flap used in this dark skinned individual.

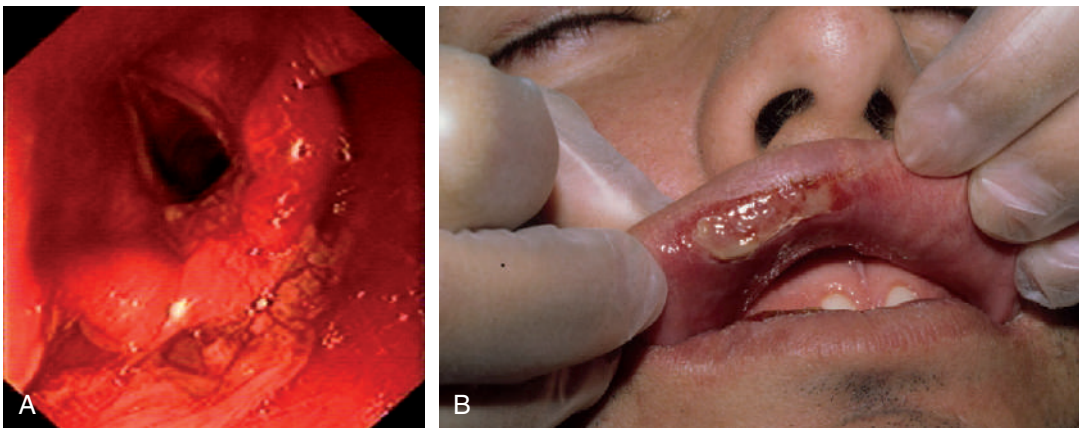


FIGURE 1.43 PEMPHIGUS VULGARIS

A, Marked erythema, exudates, and whitish mucosal changes of the hypopharynx involving the arytenoids. B, Shallow ulcer of the lip. (B courtesy P. Redondo, MD, Pamplona, Spain.)

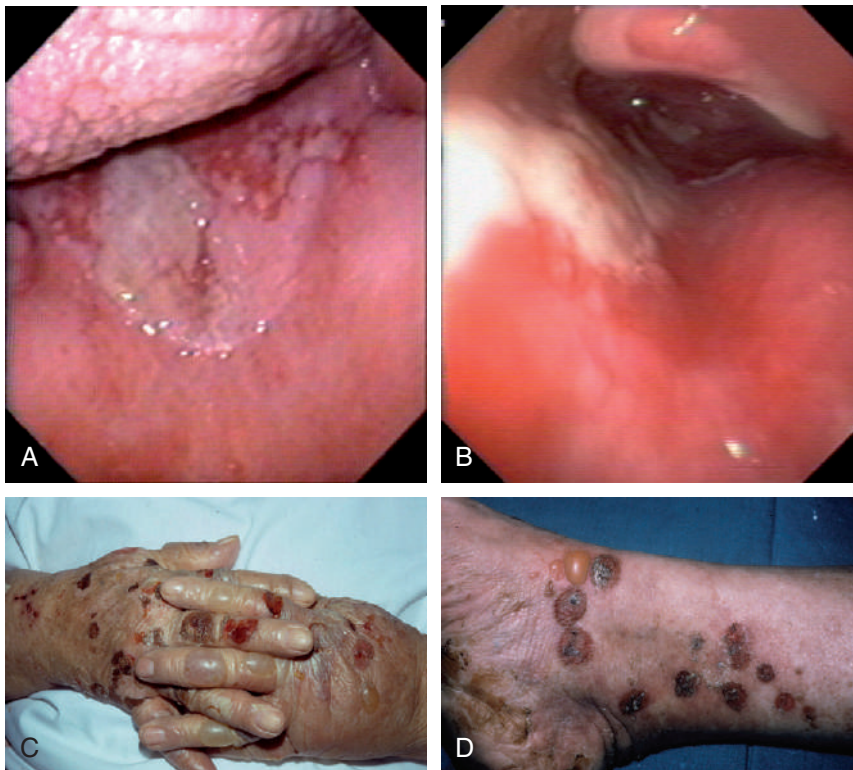


FIGURE 1.44 BULLOUS PEMPHIGOID
A, Erosive lesion at the junction of hard and soft palate. **B**, The erosive lesion extends to the right hypopharynx involving the epiglottis. Bullous lesions of the **(C)** hands and **(D)** feet. (**C, D** courtesy P. Redondo, MD, Pamplona, Spain.)

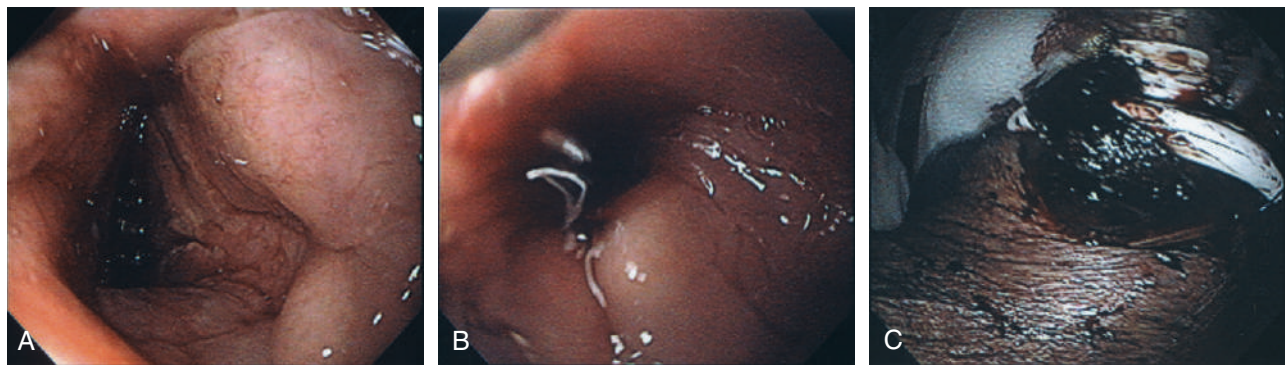


FIGURE 1.45 TRACHEAL BLEEDING

A, B, Fresh blood is seen to emanate from the vocal cords. **C**, Active bleeding from the tracheostomy site.

Esophagus

INTRODUCTION

The esophagus is a muscular tube 20 to 23 cm in length, functioning as a conduit from the oropharynx to the stomach. It begins at the level of the sixth cervical vertebra and at approximately 15 to 17 cm on the standard endoscope. Endoscopically, it is characterized by a whitish color typical for squamous mucosa. Along the course of the esophagus, impressions from the trachea and aortic arch may be identified. Mediastinal abnormalities may also manifest in the esophagus. The gastroesophageal (GE) junction is located 38 to 40 cm from the incisors and is easily recognized. A more proximal location of the junction suggests a hiatal hernia or Barrett's esophagus. The most common esophageal abnormalities encountered by endoscopists relate to reflux disease and its complications, primary neoplasms, and opportunistic infections.

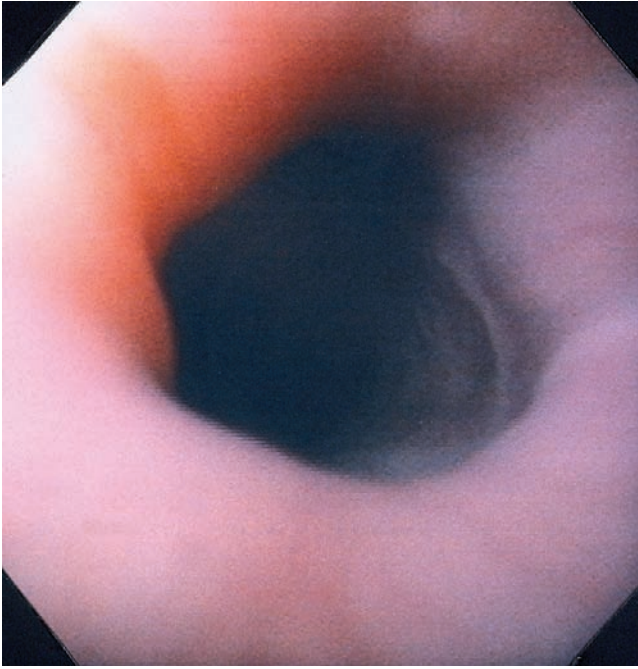


FIGURE 2.1 UPPER ESOPHAGEAL SPHINCTER
The cricopharyngeus muscle is contracting. The proximal esophagus is in the distance.

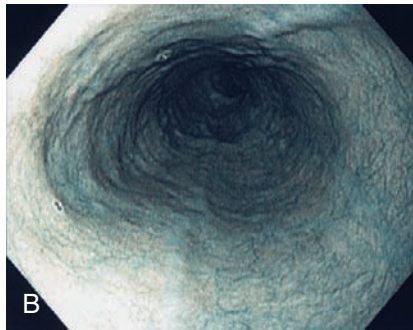
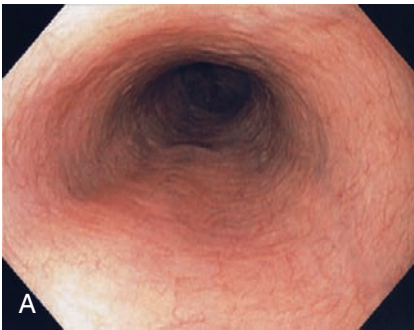


FIGURE 2.2 MIDESOPHAGUS
The esophageal mucosa has a whitish appearance with a delicate vascular pattern (A) highlighted by narrow band imaging (B).

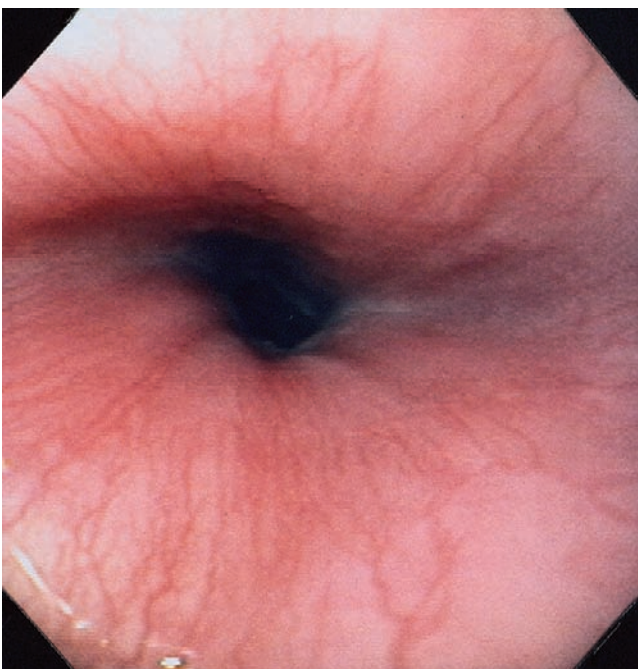


FIGURE 2.3 VASCULAR PATTERN AT THE GASTROESOPHAGEAL JUNCTION
Multiple linearly arranged blood vessels are present proximal to the gastroesophageal junction.

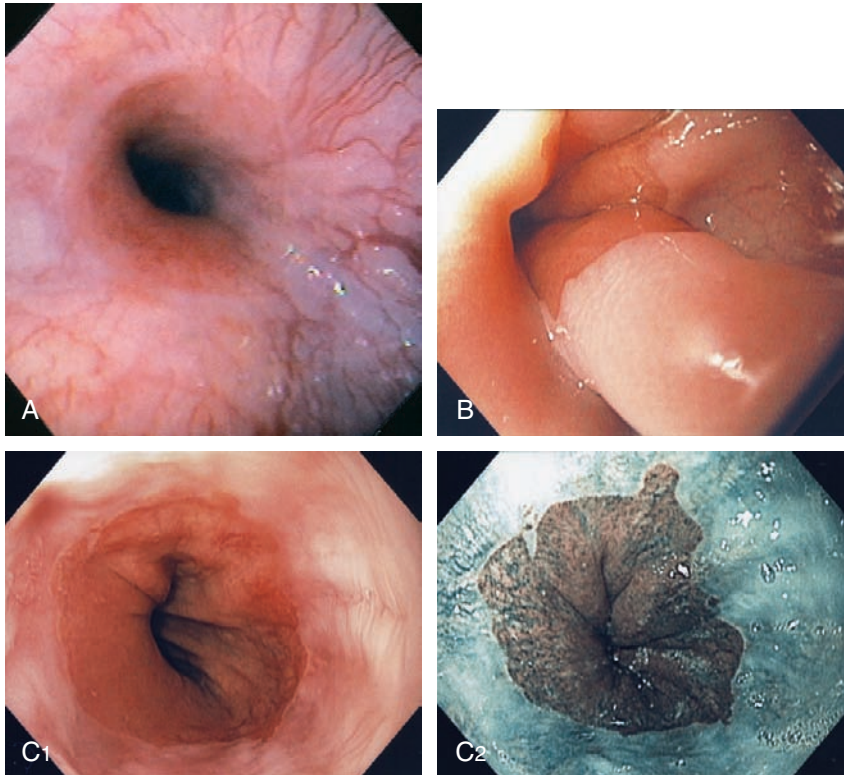


FIGURE 2.4 GASTROESOPHAGEAL JUNCTION

A, The squamous mucosa and blood vessels end abruptly with a well-demarcated margin. The orange mucosa of the stomach is opposite the esophageal mucosa. **B**, Note the crisp distinction between the squamous mucosa and the orange appearance of the gastric mucosa. In this case, a paucity of blood vessels appears in the distal esophageal mucosa. **C1, C2**, The gastroesophageal junction is well delineated by narrow band imaging.

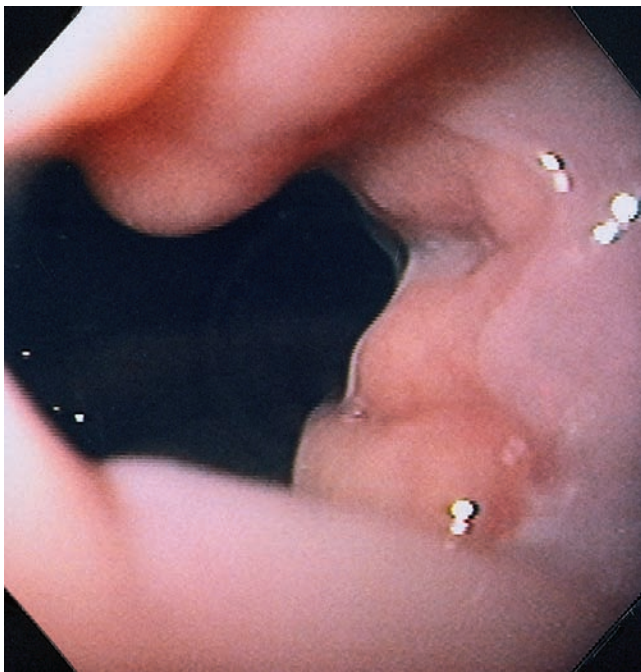


FIGURE 2.5 GASTROESOPHAGEAL JUNCTION WITH OPENING OF THE LOWER ESOPHAGEAL SPHINCTER

The normal demarcation between the white squamous mucosa and pinkish orange gastric mucosa.



FIGURE 2.6 RETROFLEX VIEW OF THE GASTROESOPHAGEAL JUNCTION

Retroflexion demonstrates demarcation of the gastroesophageal junction, where squamous mucosa can be seen encircling the endoscope.

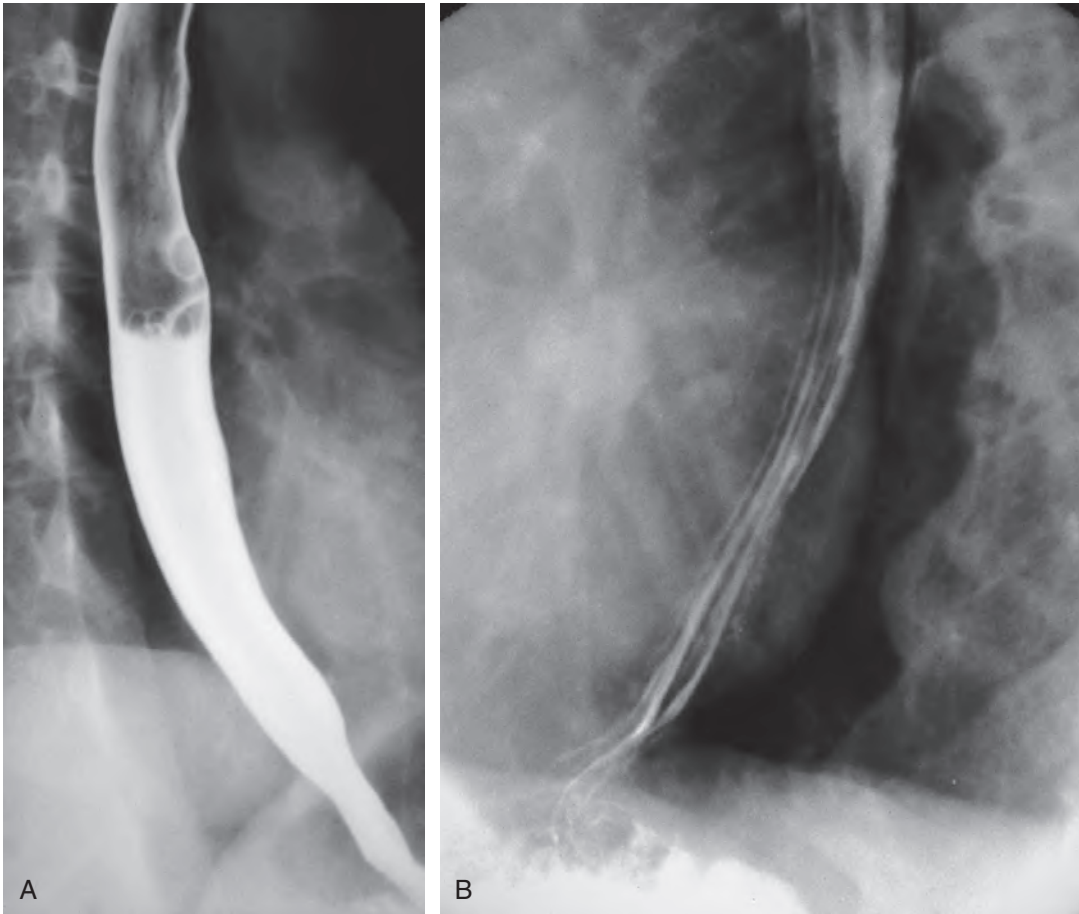


FIGURE 2.7 BARIUM ESOPHAGRAM

A, Barium esophagram shows normal esophageal contour and luminal diameter. The esophageal mucosa is proximal to the barium column. The esophageal walls are smooth and symmetric. Air bubbles are present at the proximal column of barium. The esophagus can be seen entering the stomach at the gastric air bubble. **B**, With the esophagus collapsed, the esophageal folds are delicate and smooth.

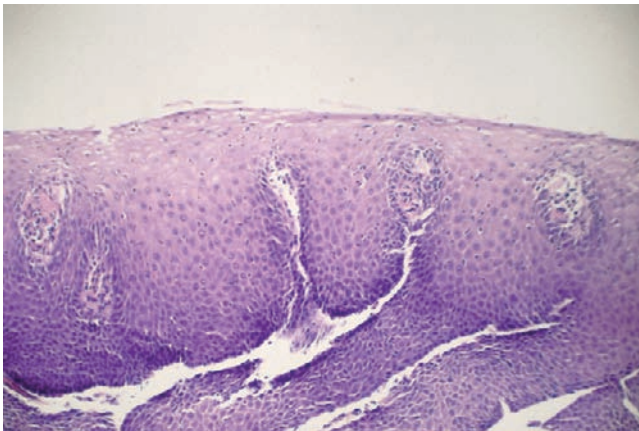


FIGURE 2.8 NORMAL STRATIFIED SQUAMOUS EPITHELIUM
Vascular channels are seen in the epithelium. Portions of the basal epithelium are present.

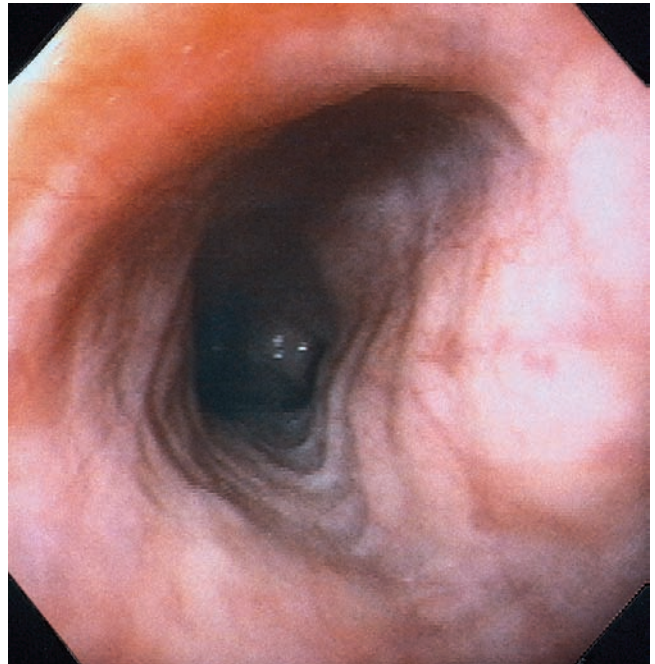


FIGURE 2.9 TRACHEAL IMPRESSION
Tracheal impression on the proximal esophagus.

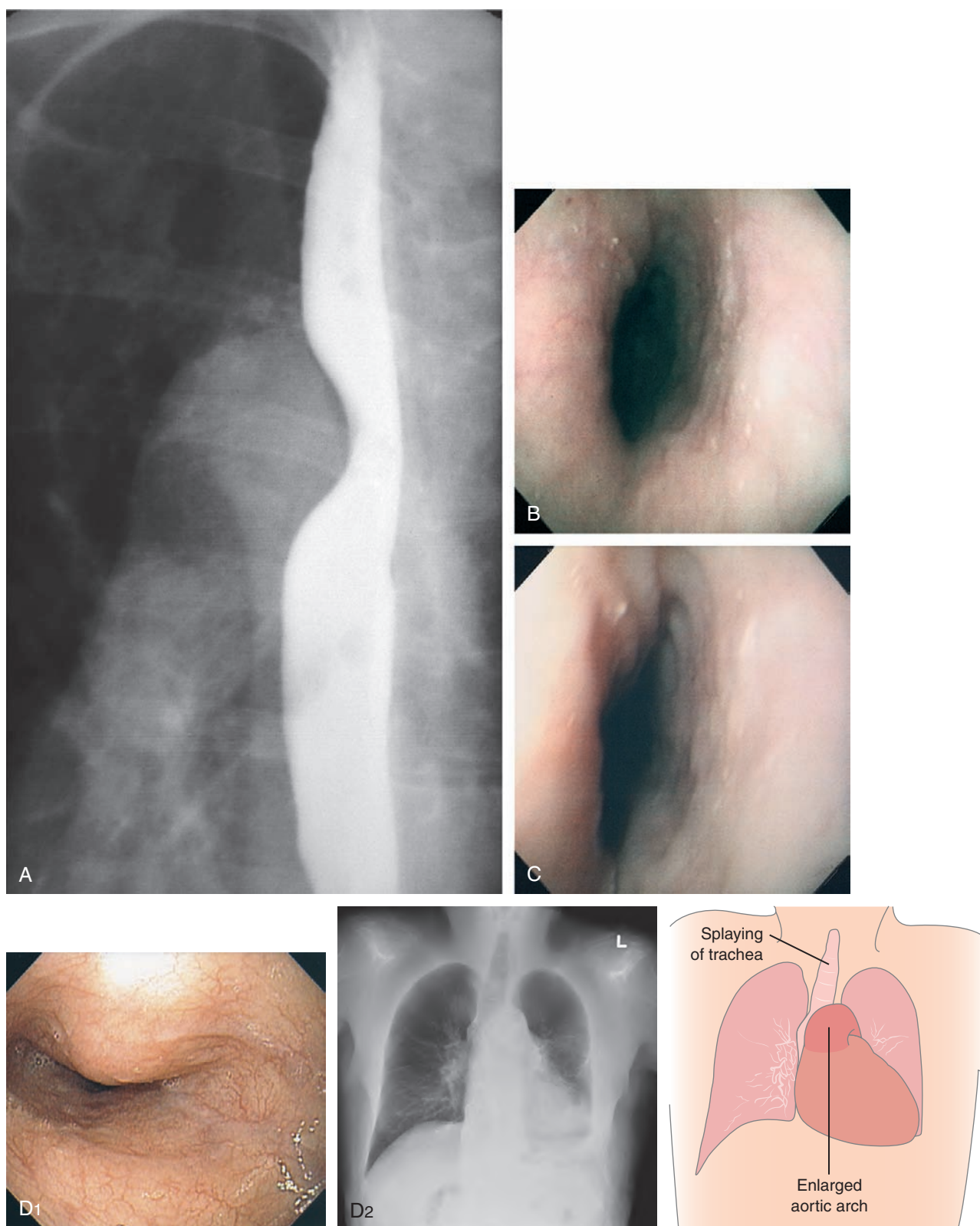


FIGURE 2.10 AORTIC IMPRESSION

A, Indentation on the midesophagus from an ectatic aorta. The indentation is smooth and unilateral. **B**, The normal diameter of the esophageal mucosa is diminished by extrinsic compression; the overlying mucosa is normal. **C**, With systole, the esophageal lumen is further compressed. **D1**, Extrinsic compression in the proximal midesophagus. **D2**, Chest x-ray film demonstrates splaying of the trachea with an enlarged aortic arch. L indicates the left side.

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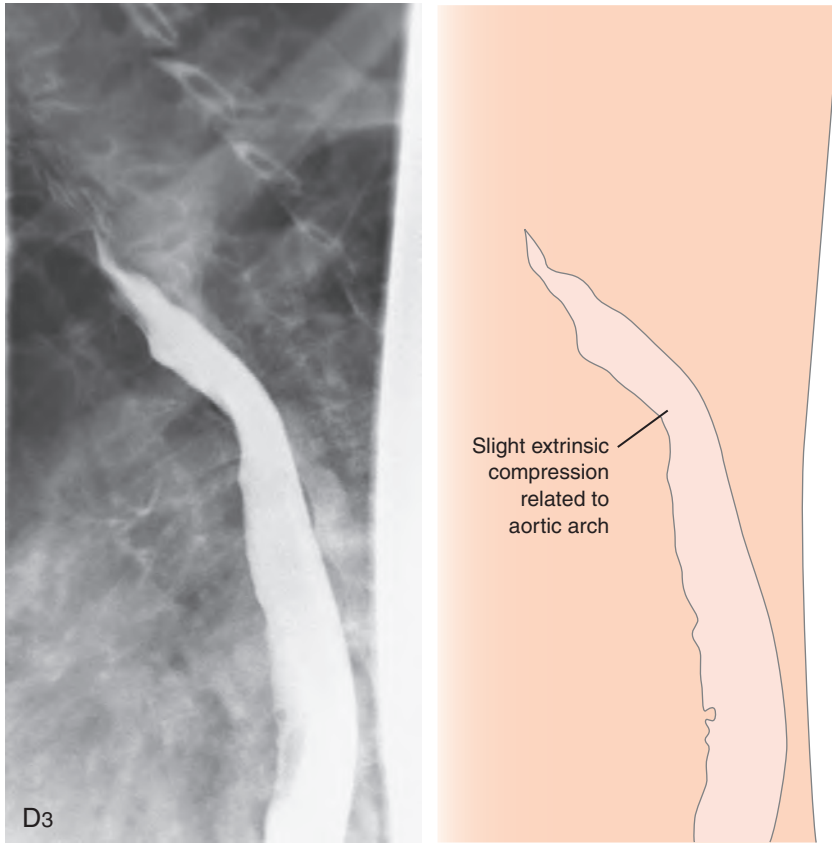


FIGURE 2.10 AORTIC IMPRESSION

D3, Barium swallow shows slight extrinsic compression related to the aortic arch.

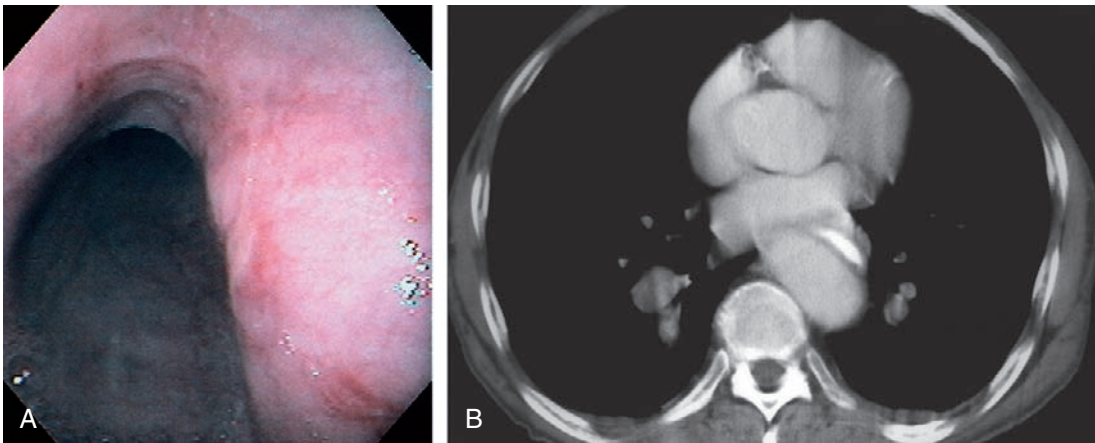


FIGURE 2.11 AORTIC IMPRESSION

A, Extrinsic compression posteriorly in the midesophagus. Erosions are present on the lesion. **B**, The contrast-filled esophagus is compressed posteriorly by an ectatic aorta.

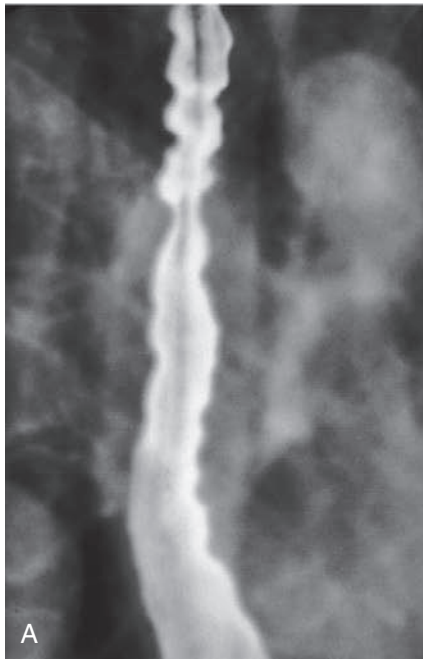


FIGURE 2.12 TERTIARY ESOPHAGEAL CONTRACTIONS

A, Multiple tertiary contractions observed in a patient with dysphagia. **B**, Tertiary contractions occur during endoscopy as well. **C**, Simultaneous contractions on esophageal manometry.

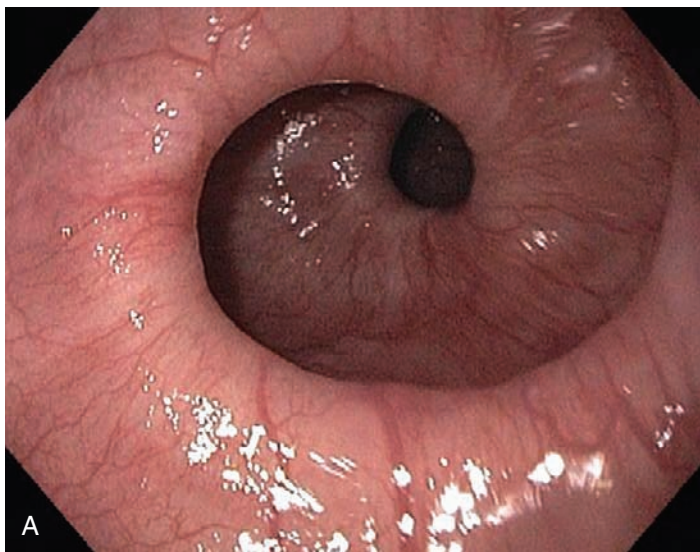
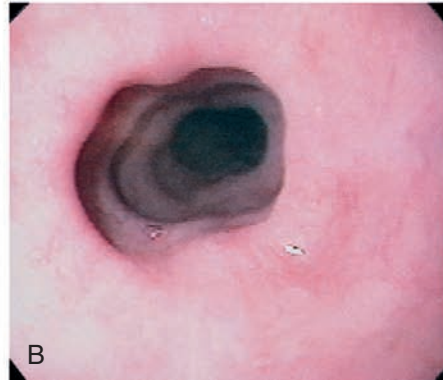


FIGURE 2.13 CORKSCREW ESOPHAGUS

A, Endoscopic images show circular folds resembling a corkscrew. **B**, Corresponding barium esophagram.

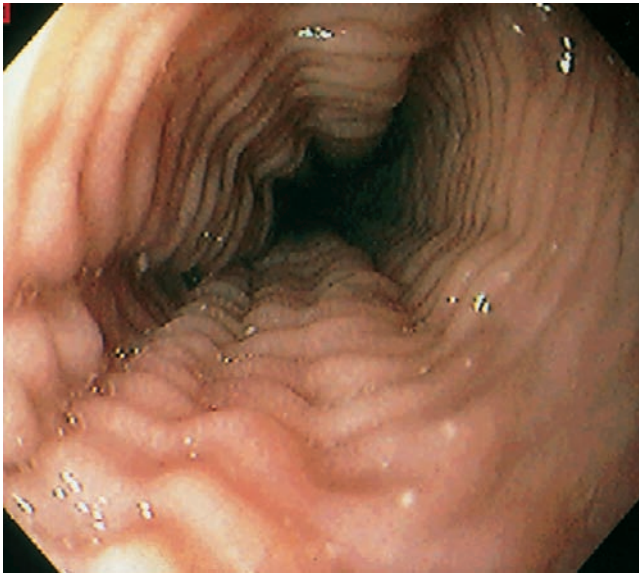


FIGURE 2.14 FELINE ESOPHAGUS

Multiple simultaneous smooth muscle contractions result in this ringlike appearance.

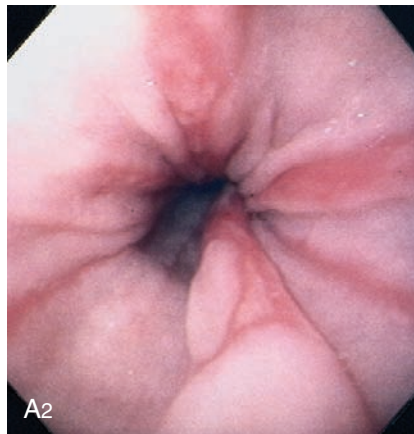
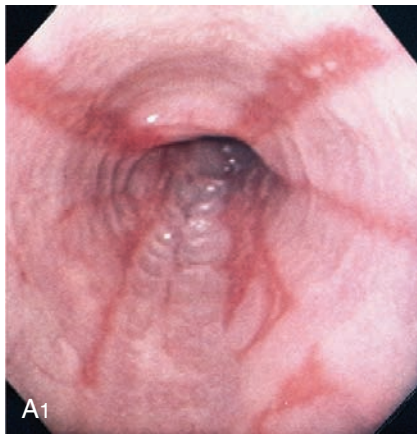
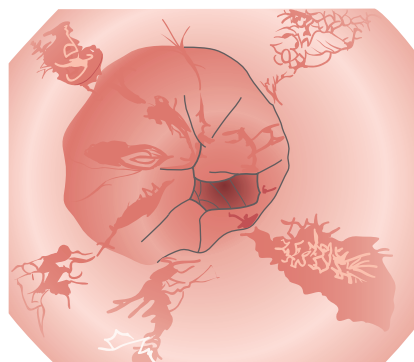
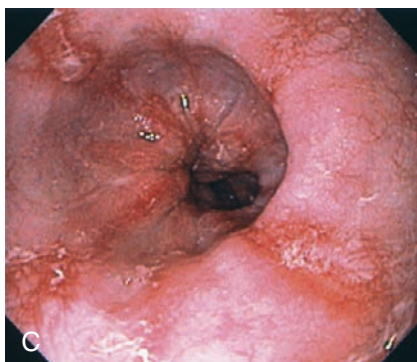
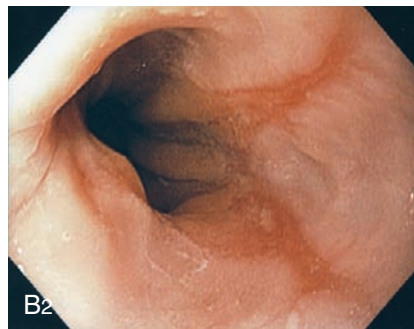
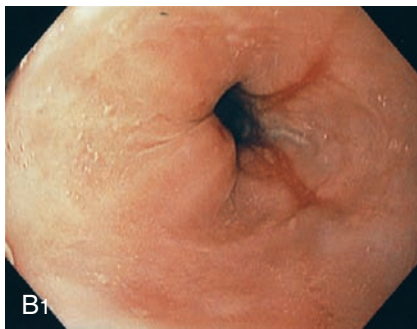


FIGURE 2.15 GASTROESOPHAGEAL REFLUX DISEASE (GERD)

A1, Typical appearance of erosive esophagitis, with linear erythematous streaks and central ulceration emanating from the gastroesophageal junction. Between the lesions, the squamous epithelium is normal. **A2**, With the lumen collapsed, the ulcerations reside primarily on the surface of the normal esophageal folds.

B1, B2, Typical linear ulcerations emanating from the gastroesophageal junction. **C**, Multiple linear ulcerations in the typical pattern.



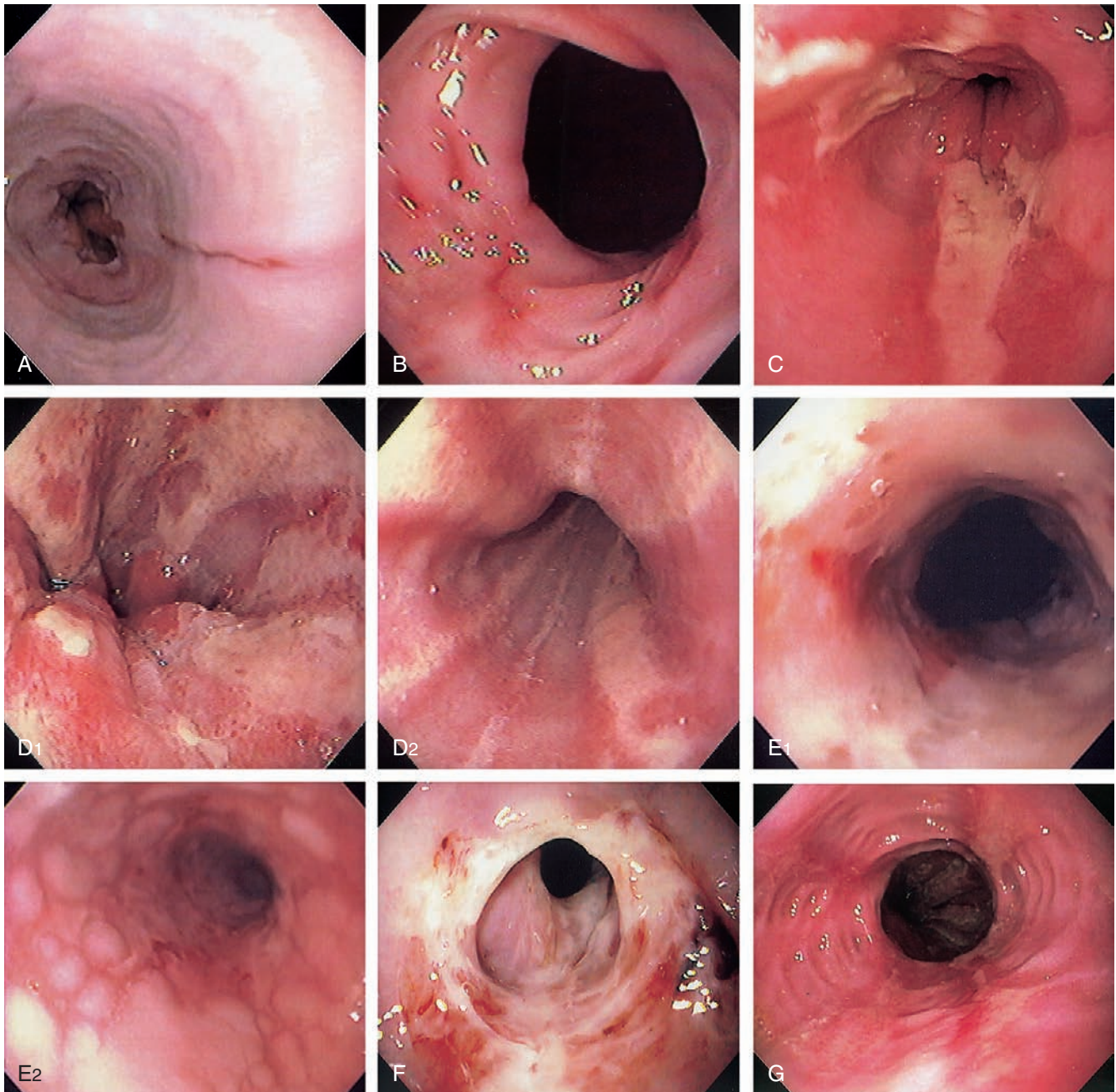


FIGURE 2.16 GASTROESOPHAGEAL REFLUX DISEASE

A, Single linear erosion in the distal esophagus. **B**, Erythematous erosions at the GE junction. Note the patulous sphincter. **C**, Streaks of exudate in the distal esophagus. **D1**, Exudate at the GE junction, which is almost confluent. **D2**, More proximally, the exudate takes on a linear migration typical for GERD. **E1**, Circumferential ulceration at the GE junction above a patulous sphincter. **E2**, More proximally, the mucosa takes on the appearance of multiple, well-circumscribed, squamous "islands" caused by edema with intervening mucosal erosion. **F**, Circumferential ulcer with fresh bleeding and luminal narrowing above a patulous GE junction. **G**, Patulous GE junction above a hiatal hernia associated with multiple scars from prior disease. Note the linear erosions.

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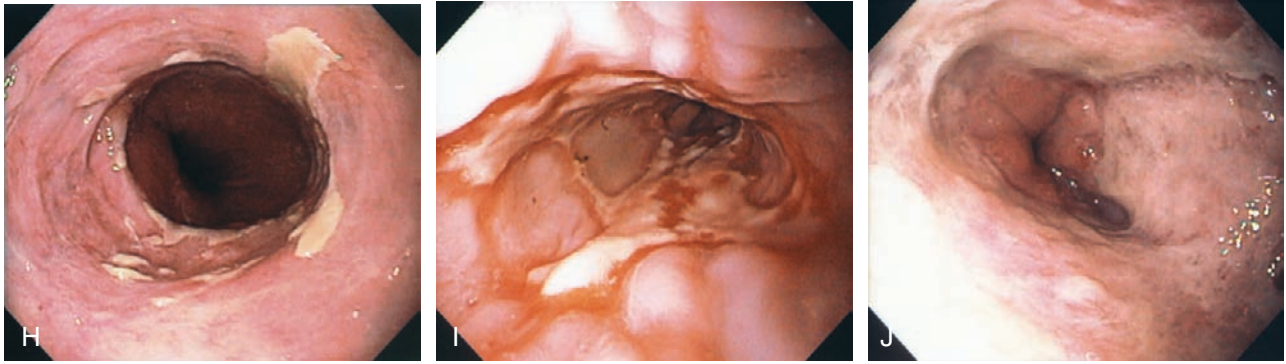


FIGURE 2.16 GASTROESOPHAGEAL REFLUX DISEASE

H, Note that some of the exudate has a plaquelike appearance in this patient with a patulous GE junction and hiatal hernia. **I**, The exudate and ulceration have coalesced. The mucosa has a nodular appearance. **J**, Note the circumferential ulceration ends abruptly at the GE junction.



Differential Diagnosis

Gastroesophageal Reflux Disease (Figure 2.16)

Infection

Cytomegalovirus

Herpes simplex virus

Other infections

Pill-induced esophagitis

Caustic ingestion

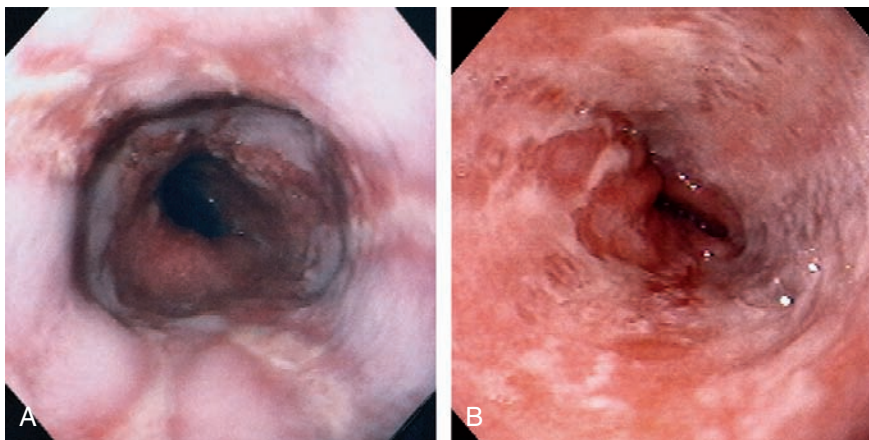


FIGURE 2.17 GASTROESOPHAGEAL REFLUX DISEASE

A, The linear ulcers are becoming circumferential and deep. The gastroesophageal junction seen in the distance is patulous, and the proximal portion of a hiatal hernia is present.

B, Severe disease with circumferential ulceration, overlying exudate, and loss of the normal mucosal pattern. The diffuse abnormality extends proximally from the normal-appearing gastroesophageal junction.

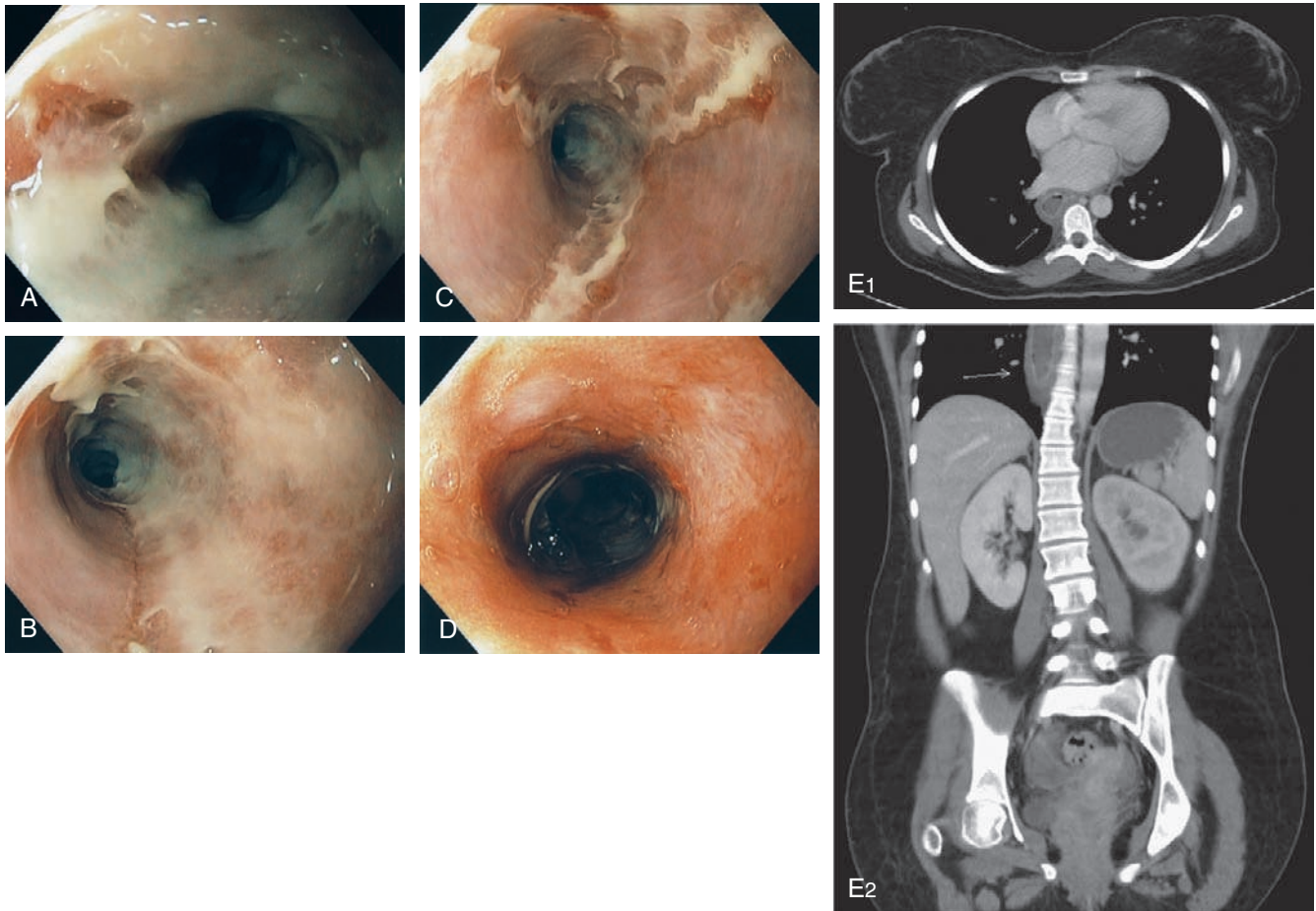


FIGURE 2.18 SEVERE GASTROESOPHAGEAL REFLUX DISEASE

A, Narrowing in the distal esophagus associated with circumferential ulceration. **B**, More proximally the ulceration is hemicircumferential. **C**, In the midesophagus, the ulceration takes on the typical linear ulceration. **D**, Near the upper esophageal sphincter, no exudate is present, but erythema and evidence of scarring exist. **E1**, **E2**, Esophageal wall thickening on CT scan.

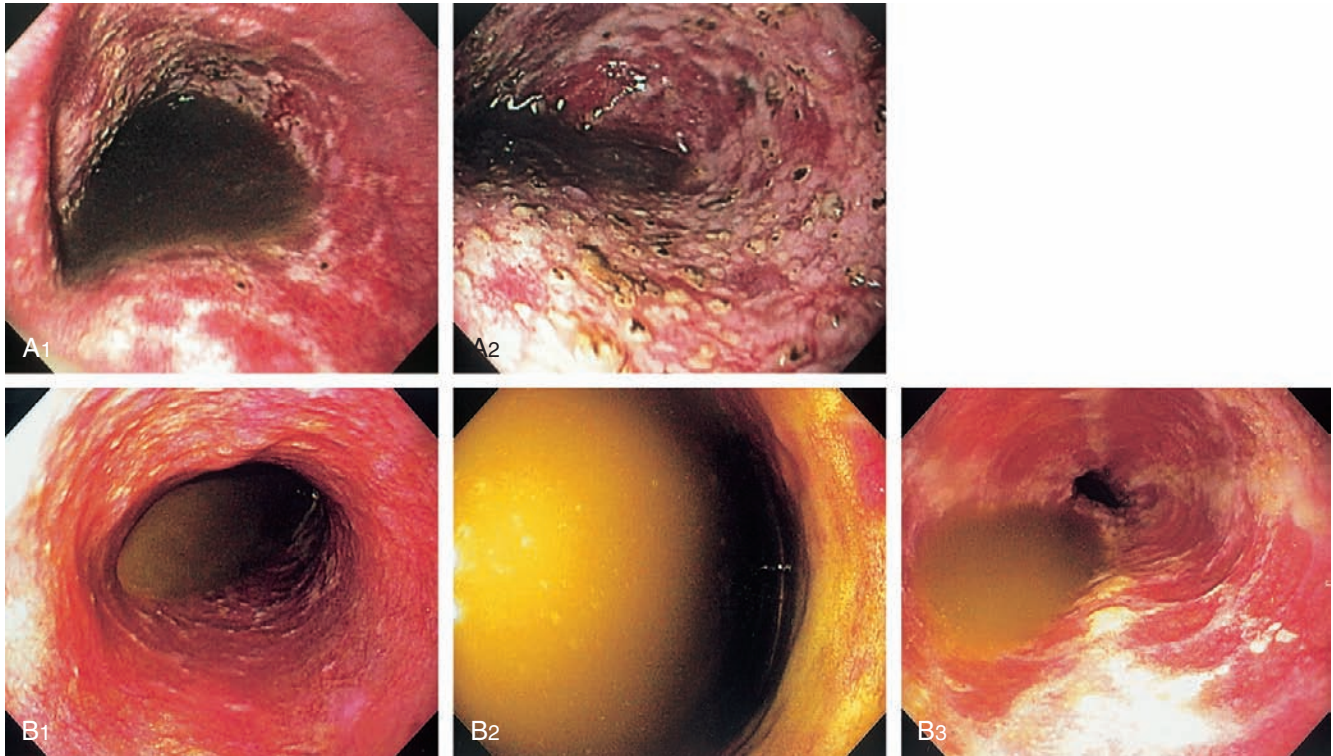


FIGURE 2.19 SEVERE ESOPHAGITIS ASSOCIATED WITH GASTRIC OUTLET OBSTRUCTION

A1, Gastric bile stained fluid present in the distal esophagus. **A2**, After aspiration, the diffuse nodularity and ulceration are evident. **B1**, Bilious fluid is present in the distal esophagus associated with erosions. **B2**, The stomach is full of bilious fluid because of pyloric obstruction. **B3**, After aspiration of the fluid, severe erosive esophagitis is evident.

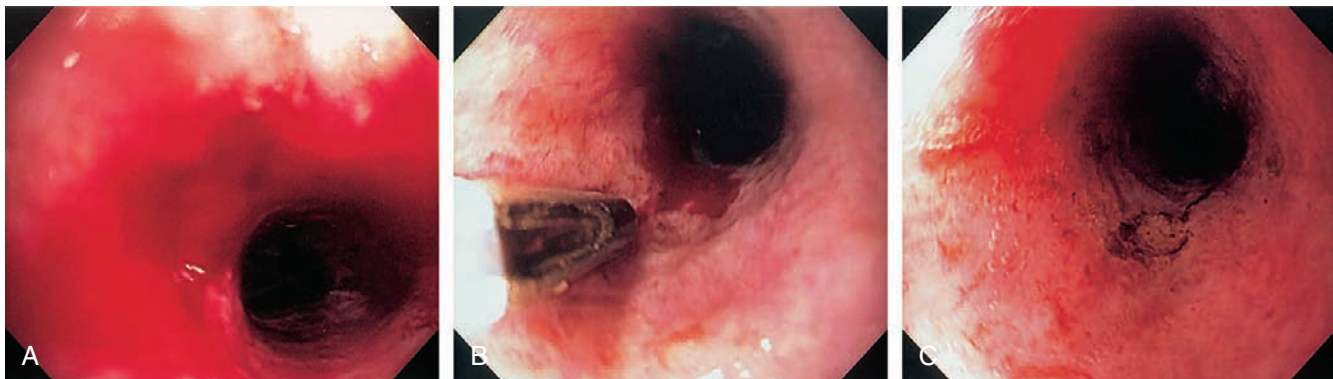


FIGURE 2.20 BLEEDING GASTROESOPHAGEAL REFLUX DISEASE

A, Arterial bleeding in the distal esophagus. **B**, Thermal probe applied to the area of bleeding. Note the circumferential erosive esophagitis. **C**, Hemostasis achieved with a coagulation "footprint" remaining.

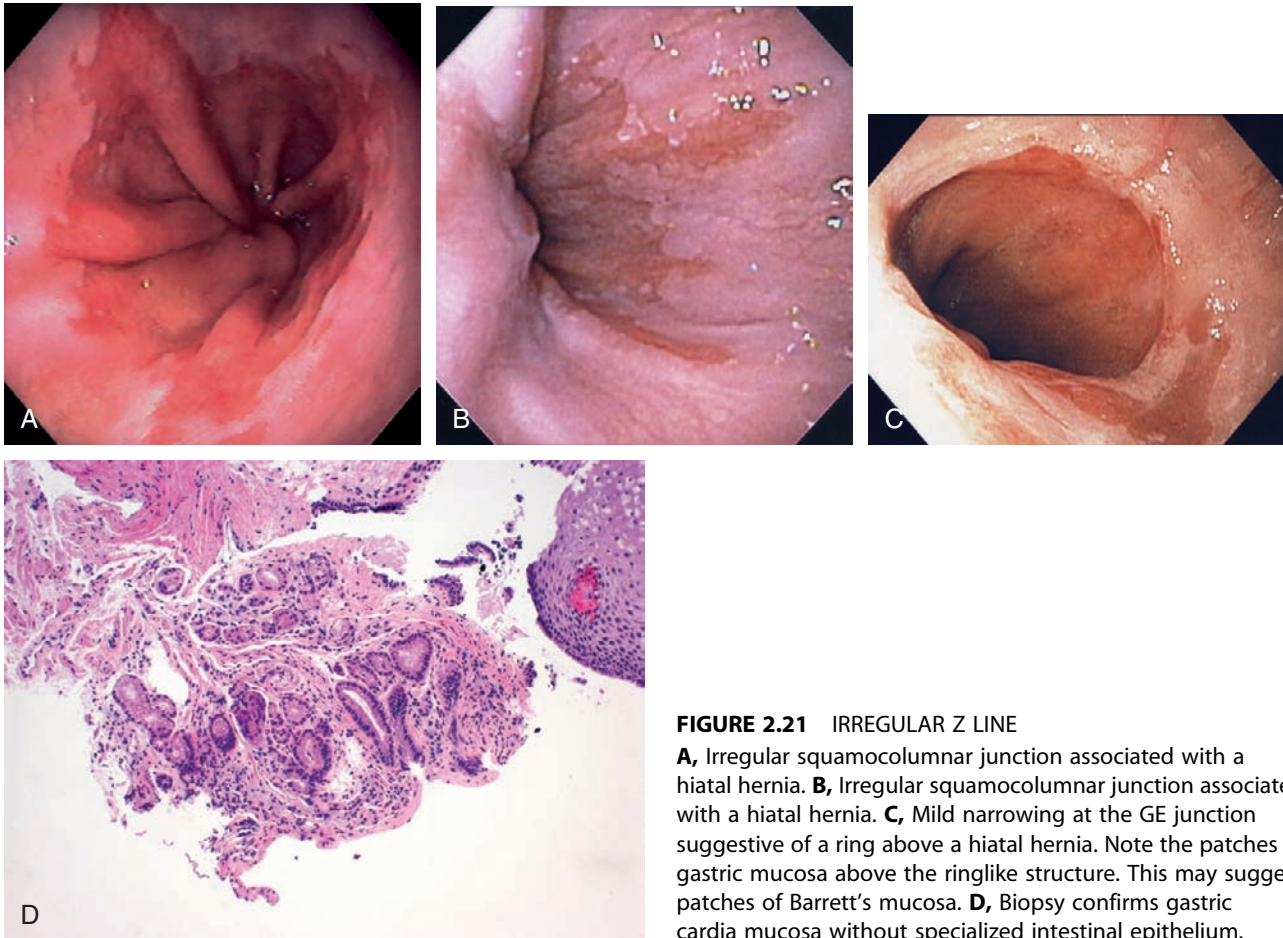


FIGURE 2.21 IRREGULAR Z LINE

A, Irregular squamocolumnar junction associated with a hiatal hernia. **B**, Irregular squamocolumnar junction associated with a hiatal hernia. **C**, Mild narrowing at the GE junction suggestive of a ring above a hiatal hernia. Note the patches of gastric mucosa above the ringlike structure. This may suggest patches of Barrett's mucosa. **D**, Biopsy confirms gastric cardia mucosa without specialized intestinal epithelium.

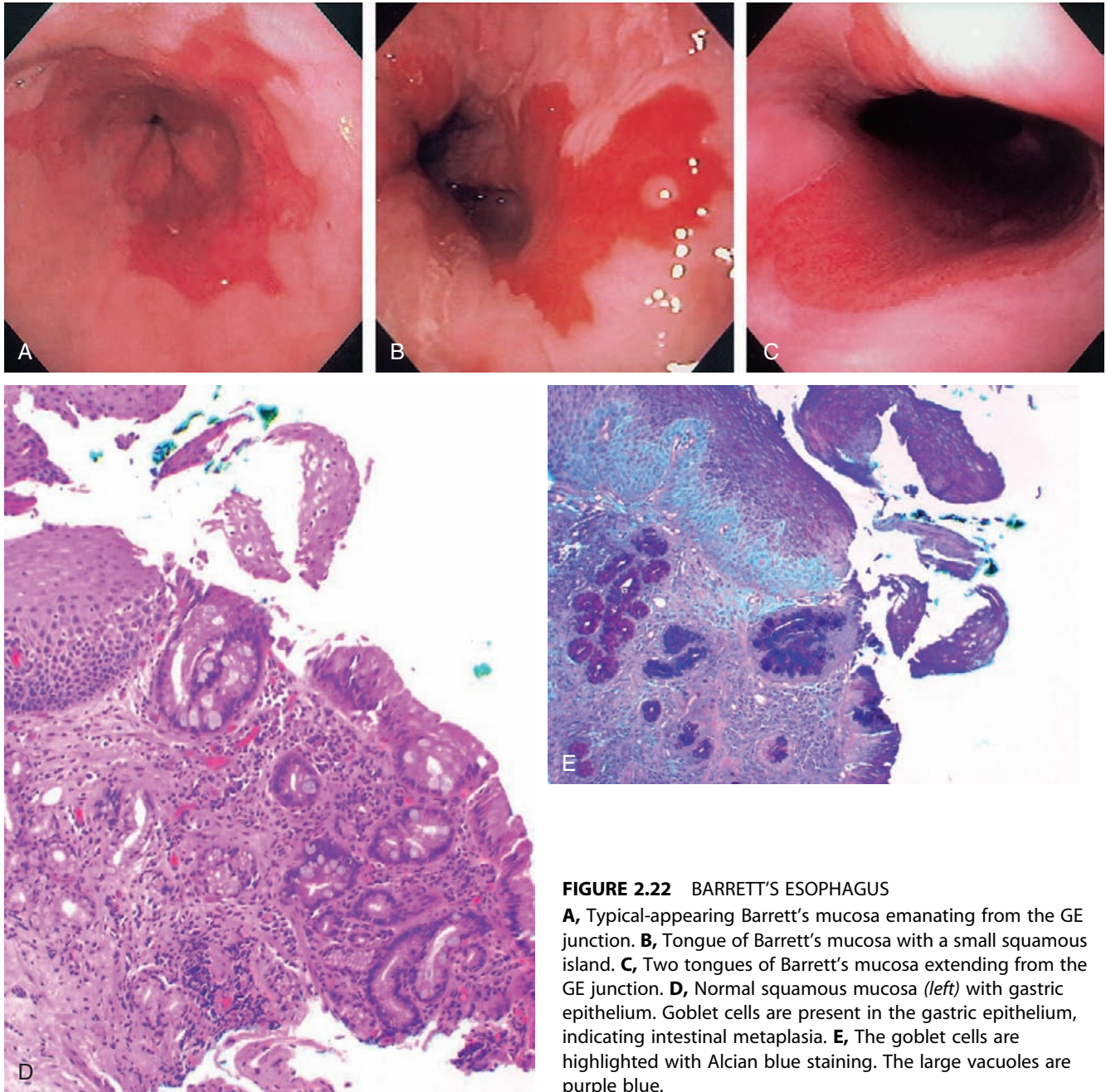


FIGURE 2.22 BARRETT'S ESOPHAGUS

A, Typical-appearing Barrett's mucosa emanating from the GE junction. **B**, Tongue of Barrett's mucosa with a small squamous island. **C**, Two tongues of Barrett's mucosa extending from the GE junction. **D**, Normal squamous mucosa (*left*) with gastric epithelium. Goblet cells are present in the gastric epithelium, indicating intestinal metaplasia. **E**, The goblet cells are highlighted with Alcian blue staining. The large vacuoles are purple blue.

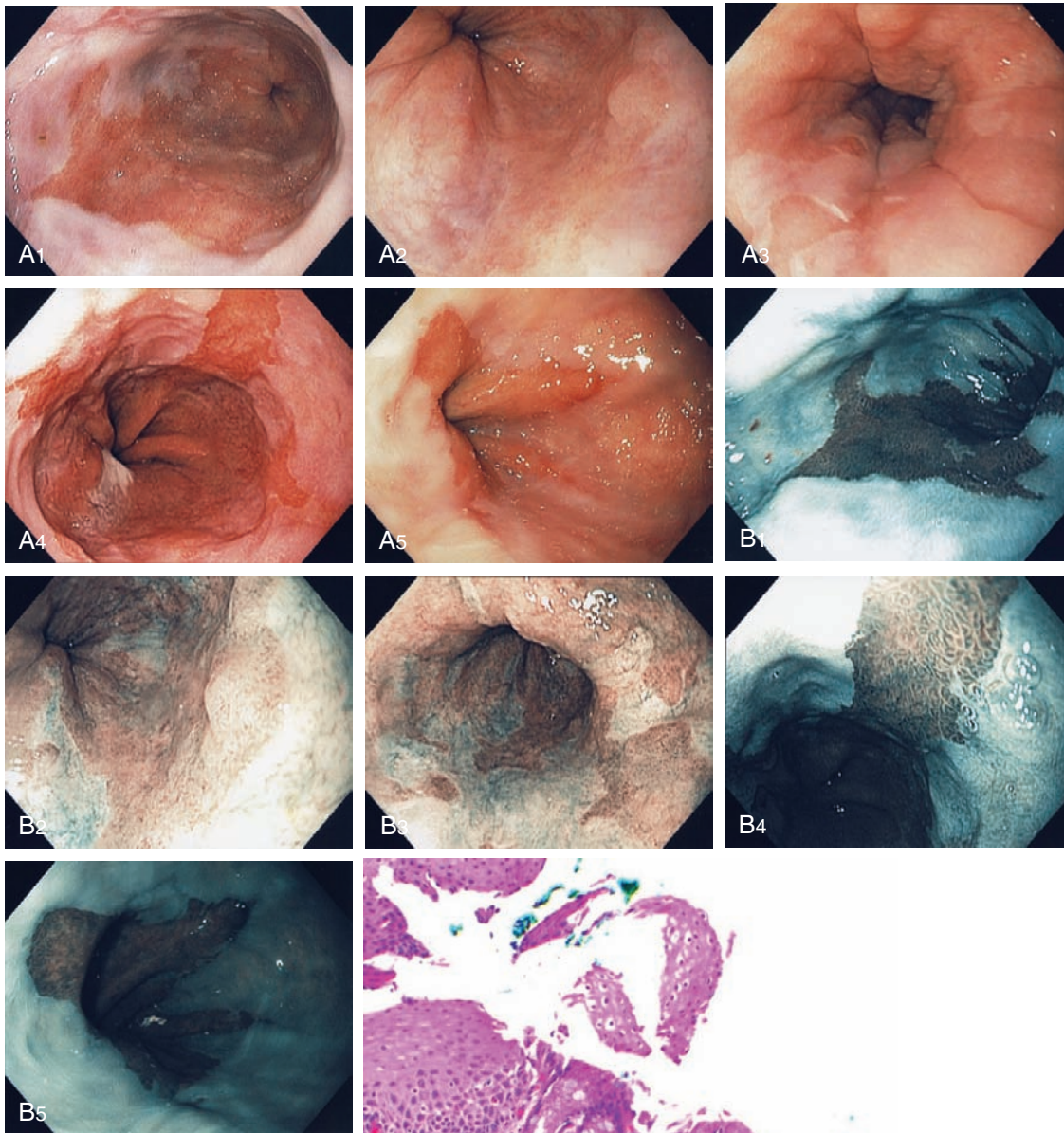


FIGURE 2.23 BARRETT'S MUCOSA

A1-A5, Typical tongues of Barrett's mucosa of variable lengths emanating from the gastroesophageal junction.

B1-B5, The Barrett's mucosa is well delineated by narrow band imaging. **C**, Biopsy of the squamocolumnar junction shows squamous tissue, as well as columnar-lined intestinal mucosa with plentiful goblet cells.

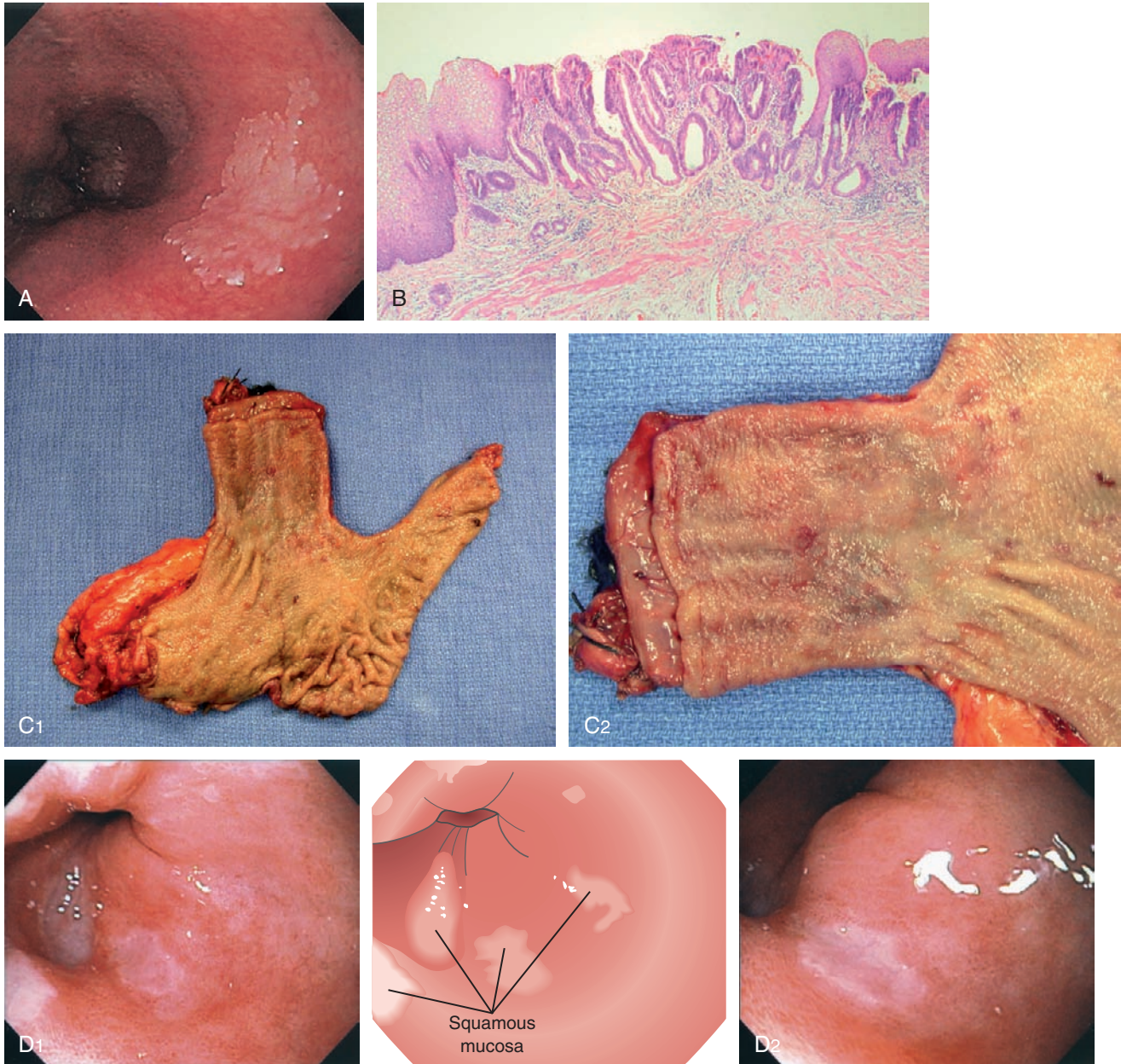


FIGURE 2.24 BARRETT'S MUCOSA WITH SQUAMOUS ISLAND

A, Long-segment Barrett's mucosa with island of squamous mucosa. **B**, Barrett's segment between squamous mucosa. The Barrett's mucosa shows dysplasia. **C1**, **C2**, Postoperative specimen shows the long-segment Barrett's mucosa. **D1**, **D2**, Several areas of squamous mucosa are identified in the Barrett's mucosa.

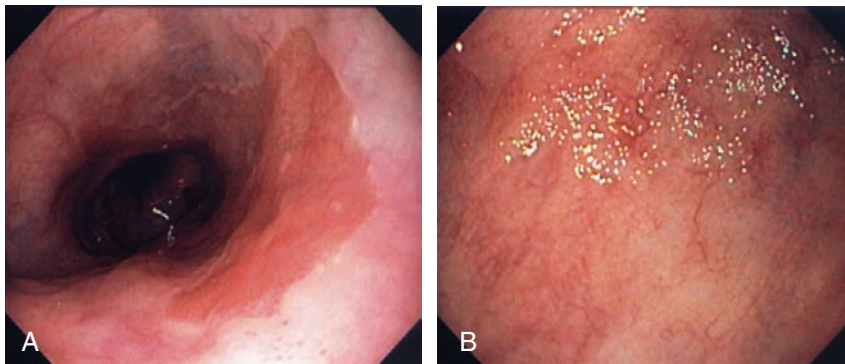


FIGURE 2.25 LONG-SEGMENT BARRETT'S ESOPHAGUS

A, Long segment of Barrett's esophagus extending from the GE junction. **B**, Note the mucosa has a pale appearance with visible blood vessels.

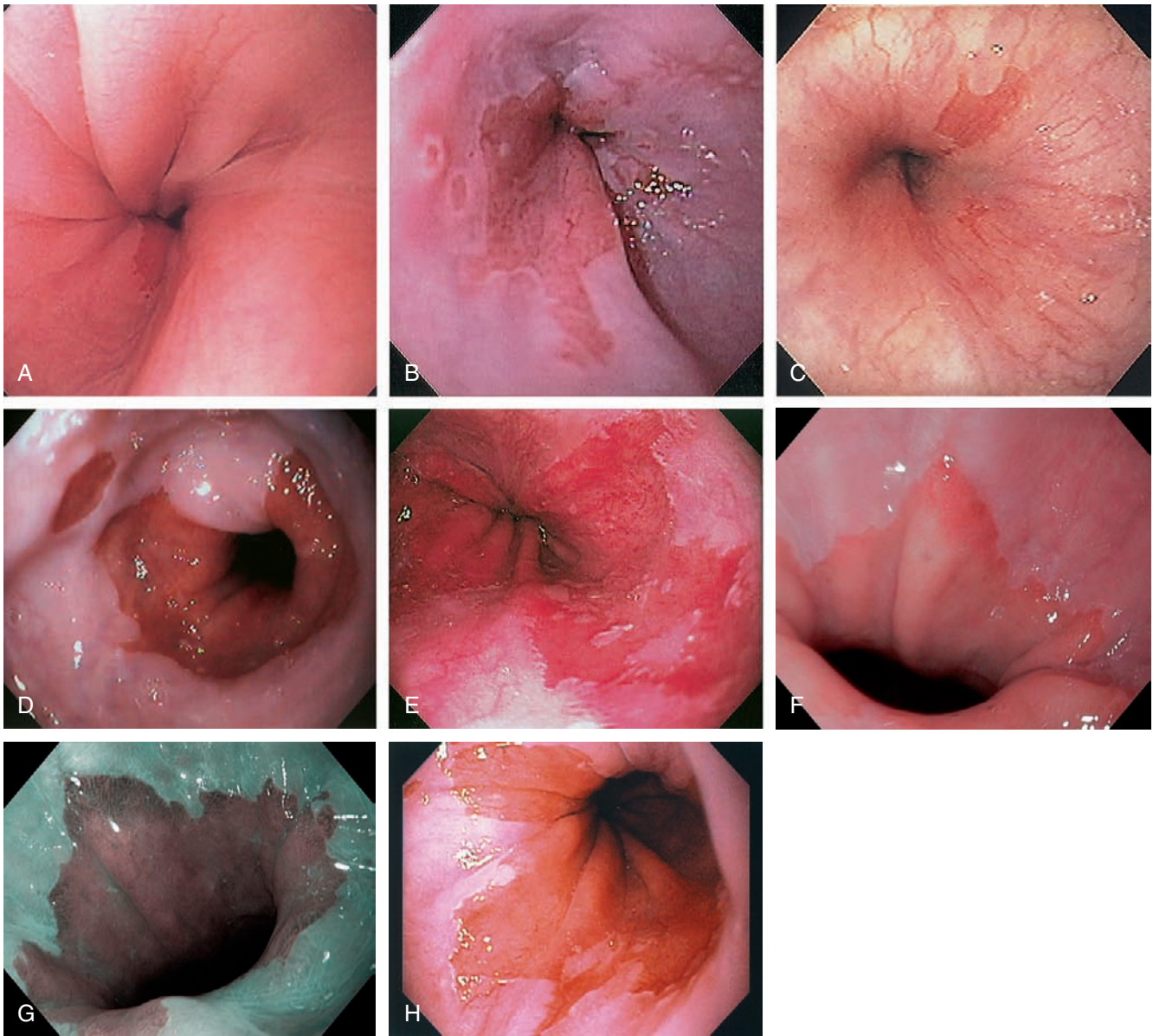
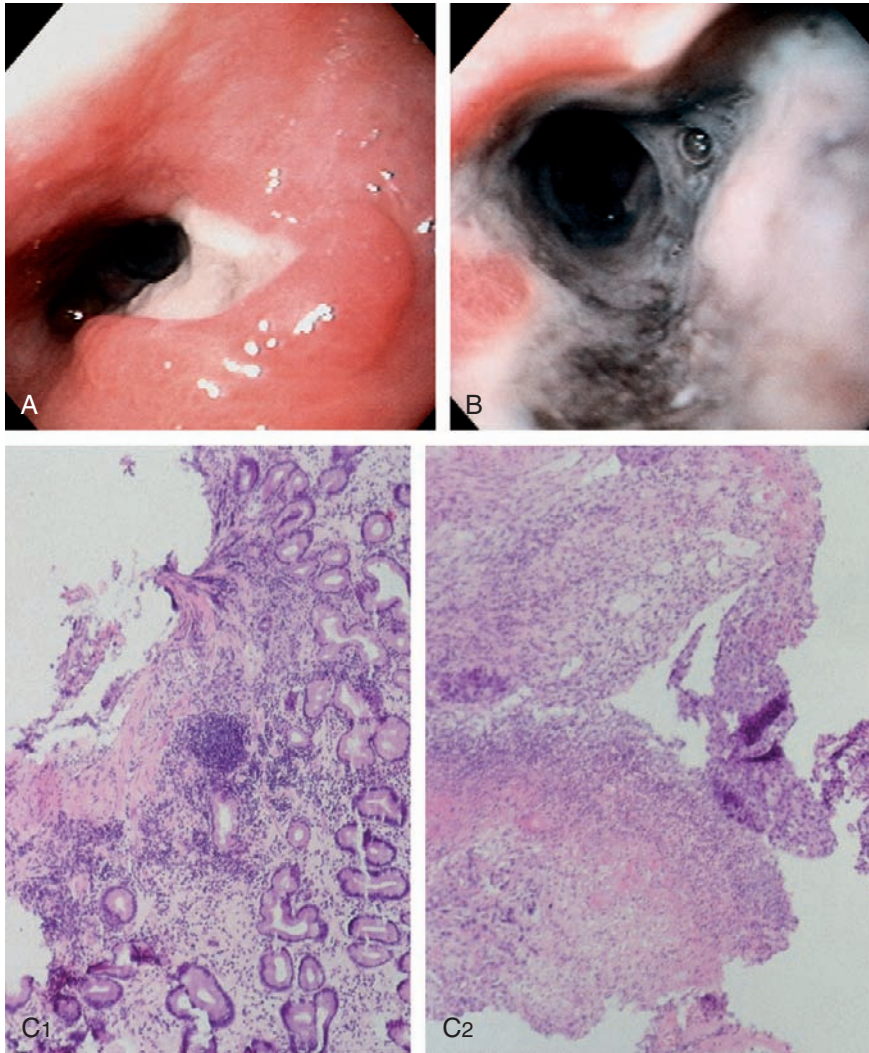
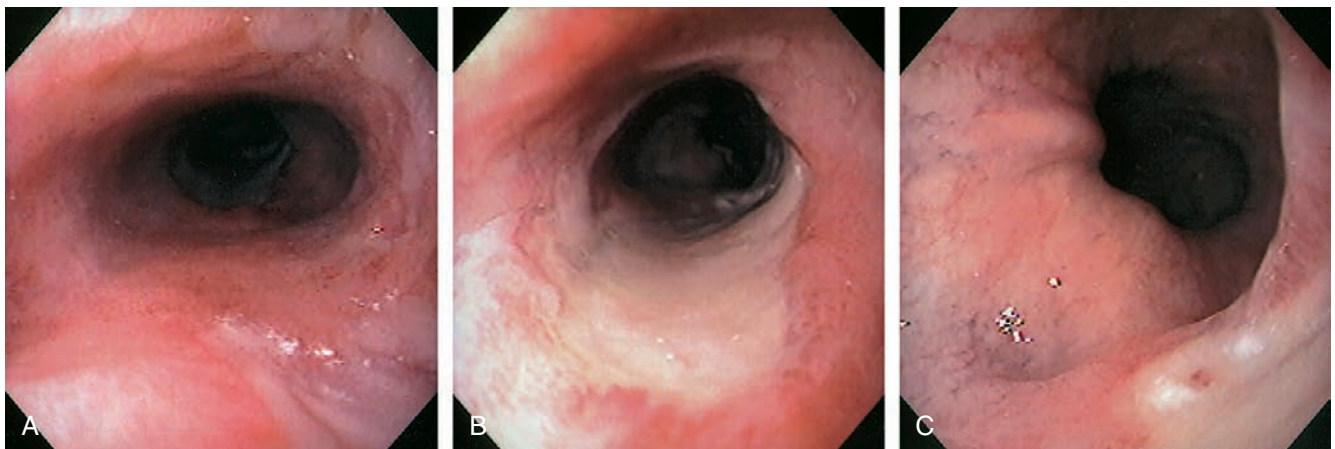


FIGURE 2.26 SHORT-SEGMENT BARRETT'S ESOPHAGUS

A, Short tongue of Barrett's mucosa at the GE junction. **B**, Short-segment Barrett's mucosa extending just proximal to the GE junction. Note the two associated small Barrett's patches. **C**, Small patch of Barrett's mucosa that appears distinct from the GE junction. **D**, Circumferential short-segment Barrett's mucosa with an additional associated patch. **E**, Areas of short-segment Barrett's mucosa above a hiatal hernia. **F**, Short-segment Barrett's mucosa as seen by high-definition endoscopy. **G**, Narrow band imaging also shows a short segment of Barrett's mucosa. **H**, Several areas of Barrett's mucosa above a hiatal hernia proximal to the most proximal portion of the gastric folds.

**FIGURE 2.27** BARRETT'S ULCER

A, Ulceration with heaped-up margins in the distal esophagus. **B**, The ulceration becomes circumferential distally and has a black base, indicating necrosis. The gastroesophageal junction appears in the distance. **C1**, Occasional goblet cells indicate Barrett's metaplasia of the intestinal type. **C2**, Ulcerative esophagitis with granulation tissue and gastric epithelium.

**FIGURE 2.28** BARRETT'S ULCER

A, Proximal extent of long-segment Barrett's mucosa to the midesophagus. **B**, Long midesophageal ulcer on a background of Barrett's mucosa. **C**, The ulcer extends to but does not involve the GE junction. Note the surrounding Barrett's mucosa.

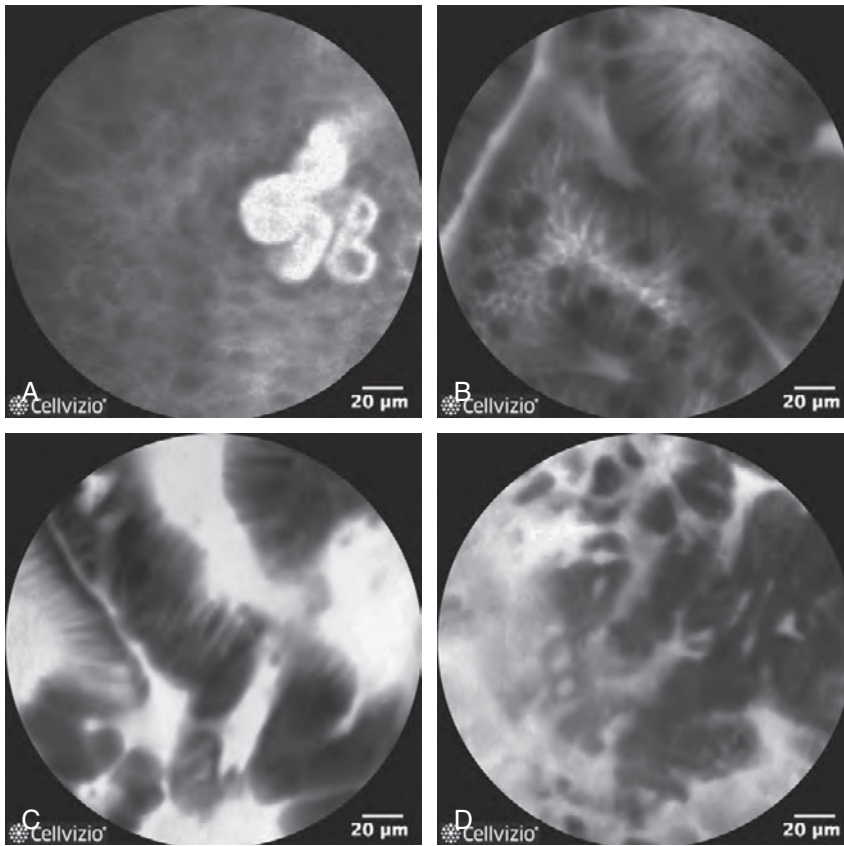


FIGURE 2.29 CONFOCAL ENDOMICROSCOPY OF NORMAL AND ABNORMAL ESOPHAGEAL LESIONS **A**, Normal squamous tissue. **B**, Intestinal metaplasia. Note the presence of goblet cells. **C**, High-grade dysplasia. **D**, Adenocarcinoma (note the disruption of the normal architecture). (**D** courtesy Don't Biopsy Study.)

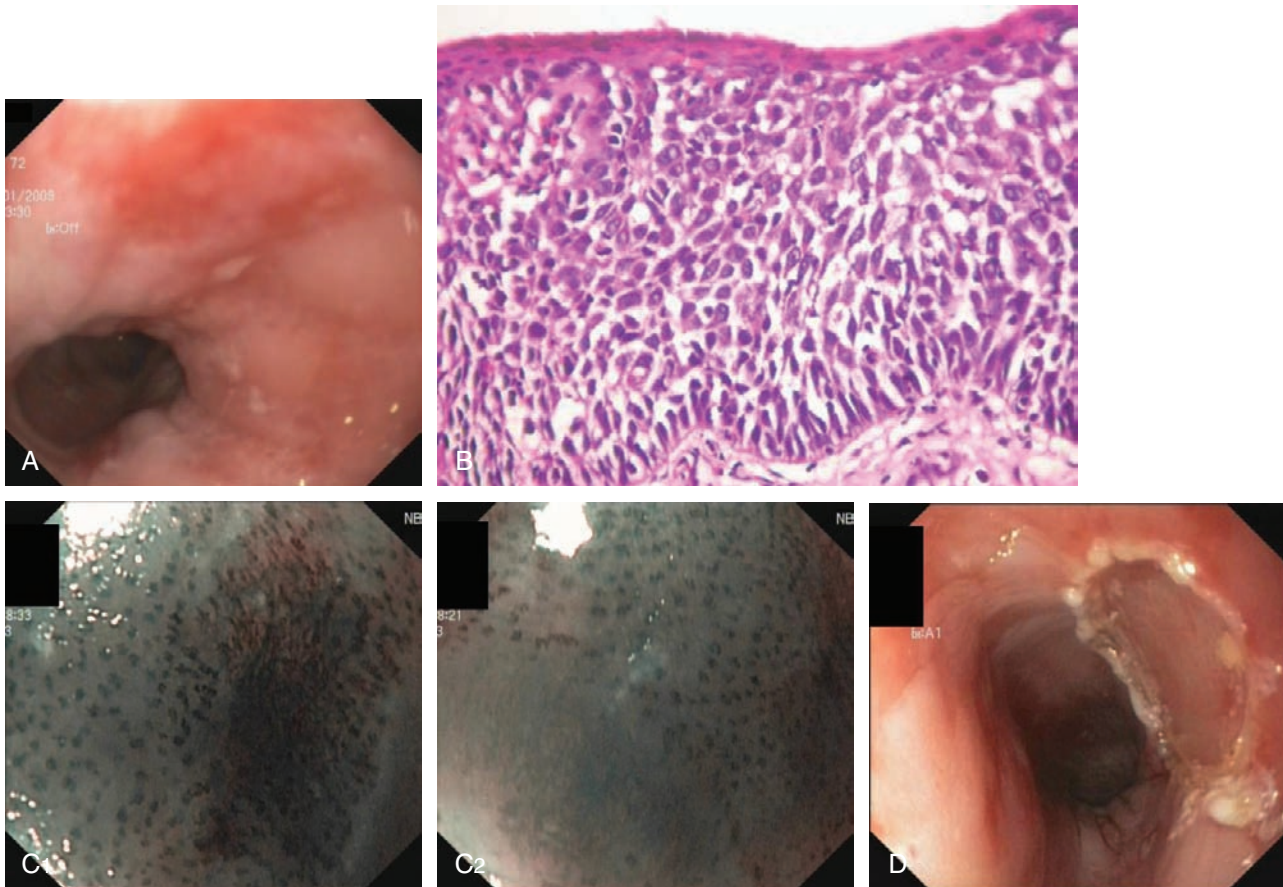


FIGURE 2.30 BARRETT'S MUCOSA WITH DYSPLASIA **A**, Flat hyperemic area in the midesophagus. **B**, The biopsy specimen shows high-grade dysplasia. **C1**, **C2**, Narrow band imaging shows the abnormal tissue with a distinct demarcation. Note the intraepithelial papillary capillary loops. **D**, Mucosal resection was performed. (**C** courtesy Dr. Cristian Gheorghe.)

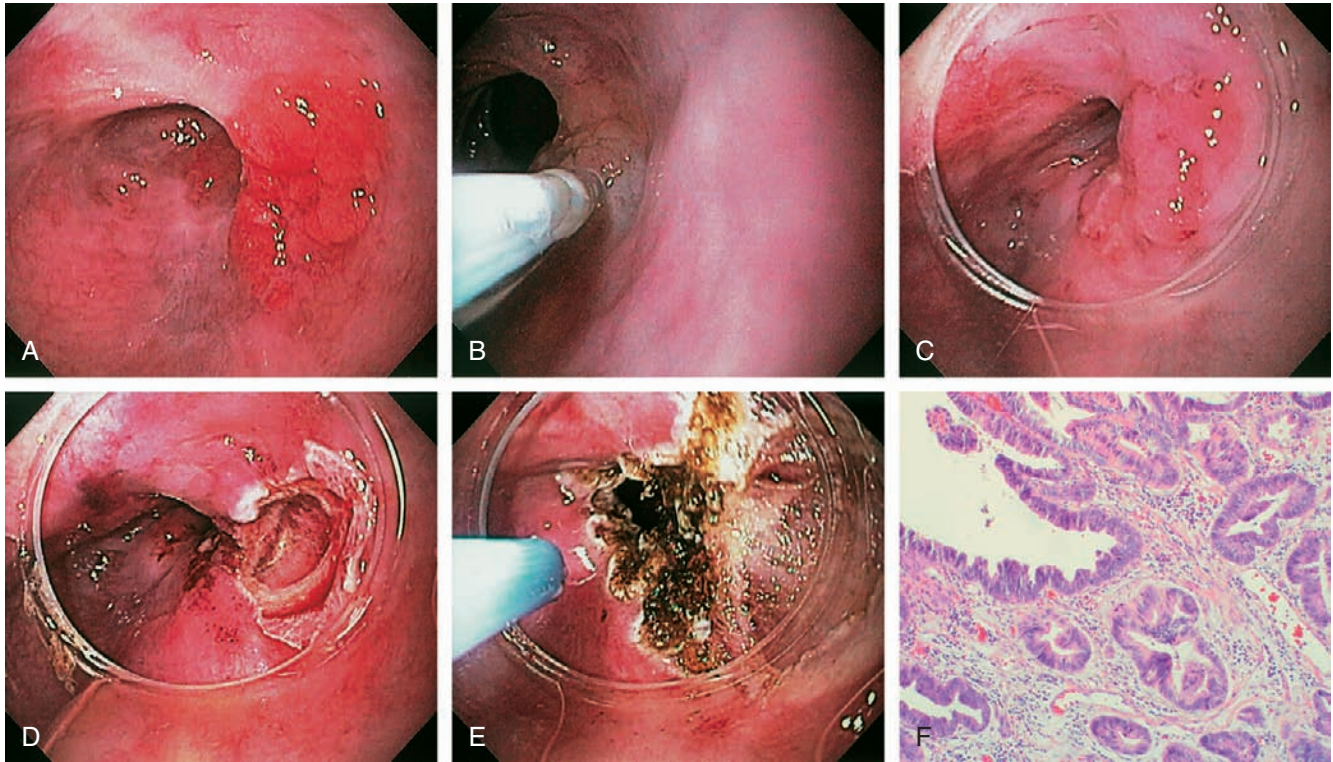


FIGURE 2.31 BARRETT'S MUCOSA WITH HIGH-GRADE DYSPLASIA: ENDOSCOPIC MUCOSAL RESECTION

A, Nodular well-circumscribed area in the distal esophagus. **B**, Dilute saline and epinephrine are injected underneath the lesion. **C**, The cap device is placed on the endoscope and positioned over the lesion for resection. **D**, After endoscopic mucosal resection (EMR), a mucosal defect is produced. **E**, The argon laser is used to ablate any suspicious surrounding mucosa that was not removed with the resection specimen. **F**, High-grade dysplasia in Barrett's mucosa.

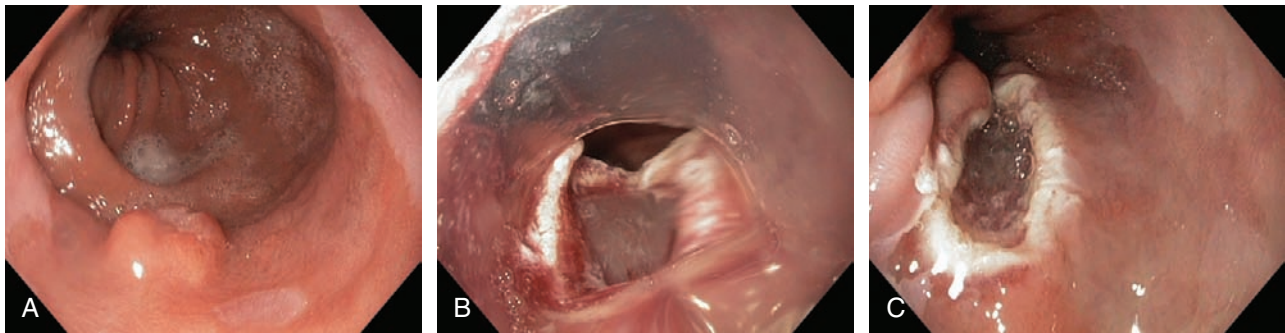


FIGURE 2.32 NODULAR LESION IN BARRETT'S ESOPHAGUS: HIGH-GRADE DYSPLASIA

A, Well-circumscribed nodule in the distal esophagus. **B**, A cap device is used for resection. **C**, Mucosal defect after resection.

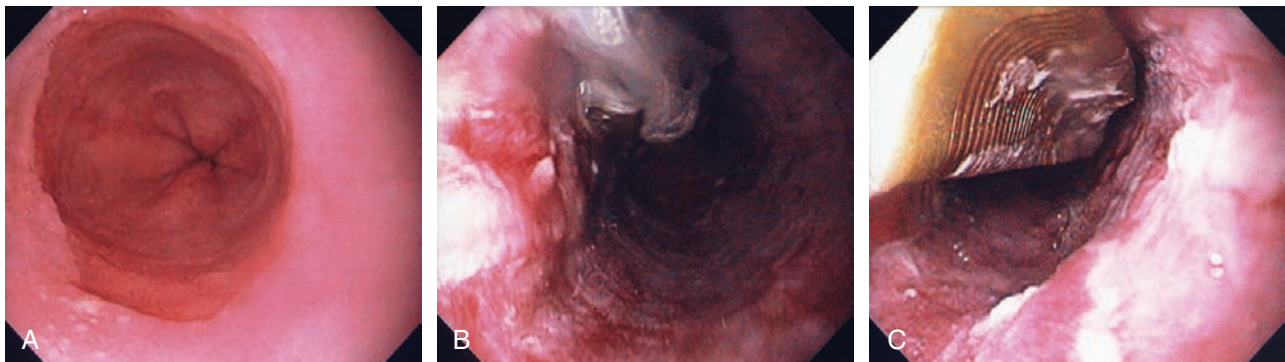


FIGURE 2.33 BARRETT'S MUCOSA UNDERGOING RADIOFREQUENCY ABLATION

A, Typical Barrett's esophagus. This patient had high-grade dysplasia on biopsy. **B**, After therapy, superficial ulceration is seen. **C**, Use of the halo device to ablate additional areas of Barrett's esophagus.

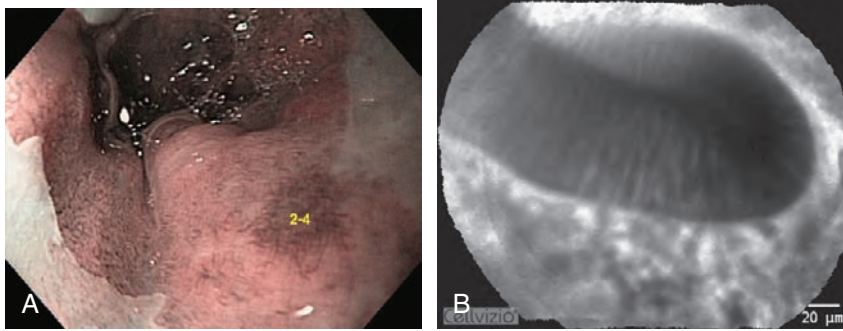


FIGURE 2.34 BARRETT'S ESOPHAGUS WITH ENDOMICROSCOPY

A, Typical Barrett's esophagus as seen on narrow band imaging. Numbers represent the area where endomicroscopy was performed.

B, Esophageal glands with normal architecture and the presence of goblet cells. No dysplasia is present. (Courtesy F. Alberca, MD, Murcia, Spain.)

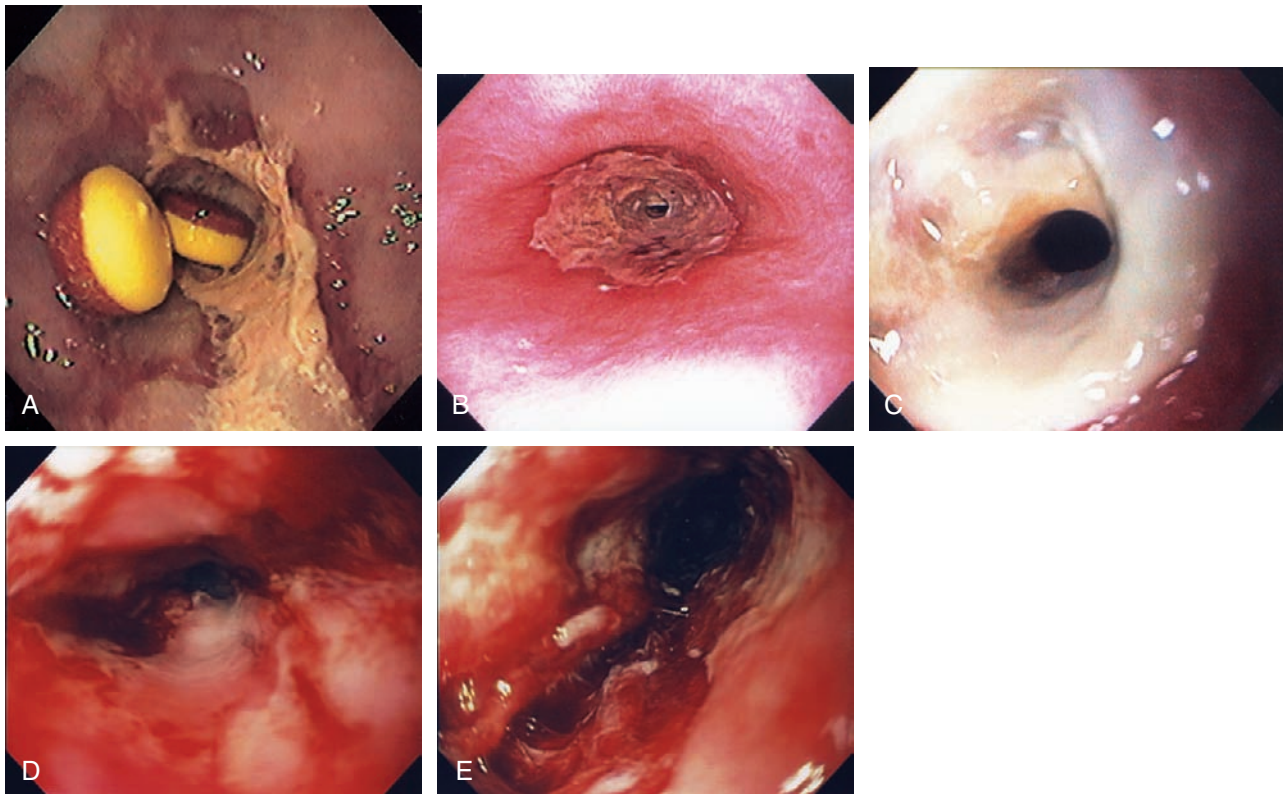


FIGURE 2.35 GASTROESOPHAGEAL REFLUX DISEASE-ASSOCIATED STRICTURE

A, Tight stricture of the distal esophagus associated with proximal ulceration. Note the collection of pills proximal to the stricture. **B, C**, Severe esophagitis with circumferential exudate and an associated tight stricture. **D**, The stricture was dilated and endoscopy performed. Note the luminal caliber is improved and there is underlying ulceration of the dilated area. **E**, After dilation, a large tear is proximal to the stricture.

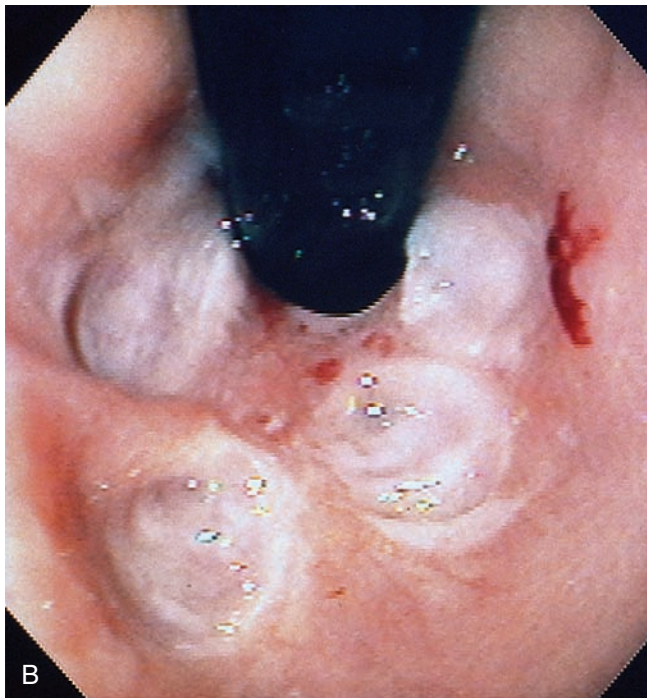
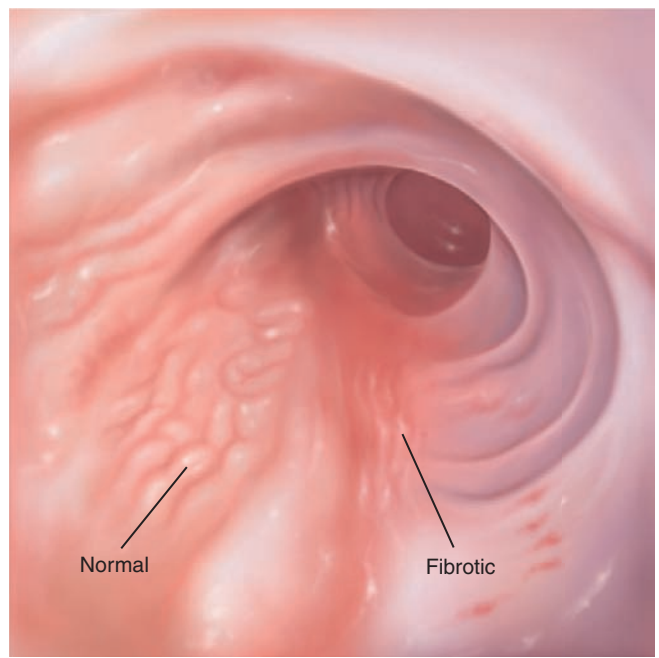
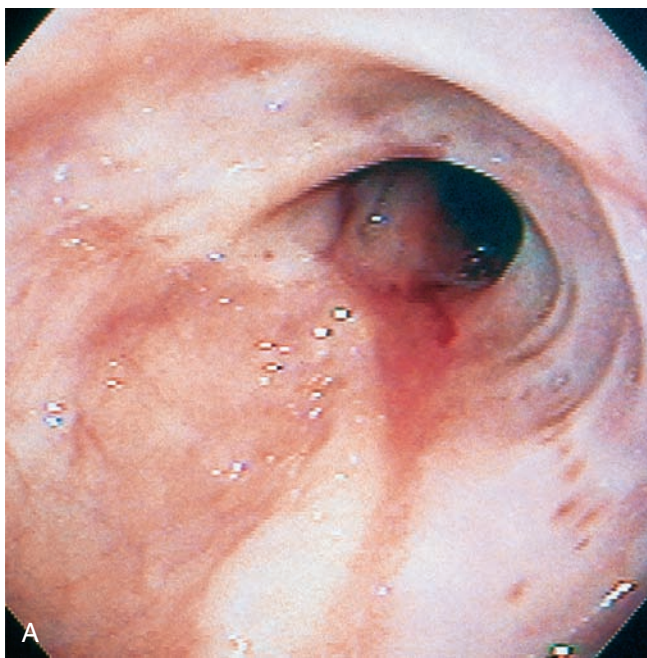


FIGURE 2.36 HEALED SEVERE GASTROESOPHAGEAL REFLUX DISEASE

A, The esophageal mucosa appears thickened, with loss of vascular pattern from fibrosis. A portion of normal mucosa is still present. **B**, Retroflex view in the hiatal hernia shows evidence of prior ulcers, with four well-circumscribed, reepithelialized depressions.

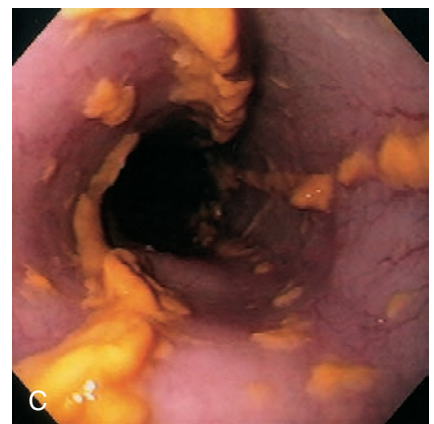
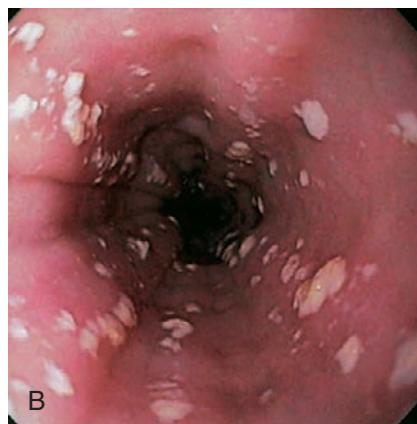


FIGURE 2.37 MILD *CANDIDA* ESOPHAGITIS

A, Small white plaques throughout the mid-esophagus and distal esophagus. **B**, Multiple white plaques stud the distal esophagus. **C**, Linear confluent plaques in the mid-esophagus. The surrounding mucosa is normal.

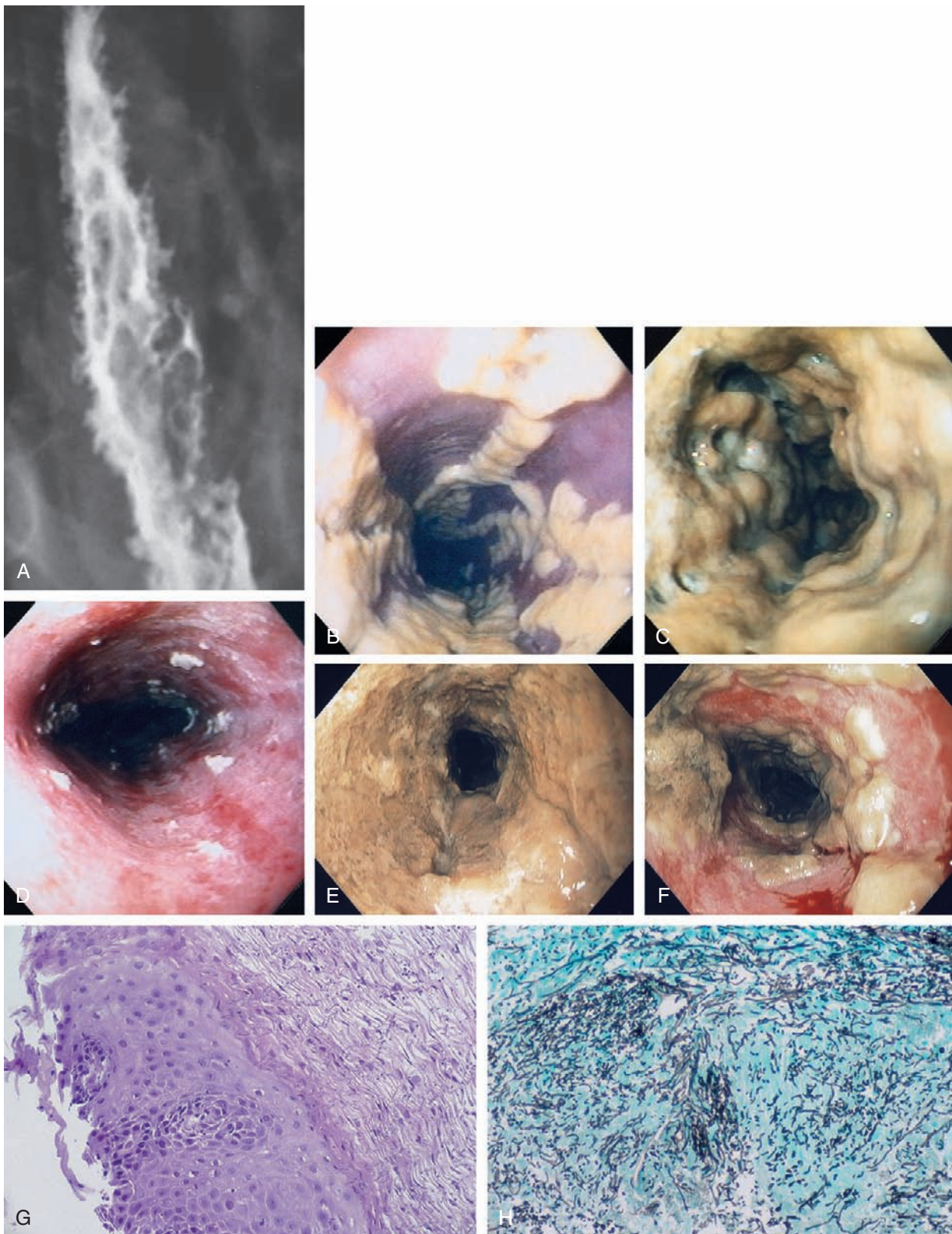


FIGURE 2.38 CANDIDA ESOPHAGITIS

A, Diffuse irregularity of the wall, with multiple filling defects. These abnormalities result from barium intercalating between the confluent candidal plaques. In most cases, these irregularities do not represent ulceration. **B**, Typical-appearing raised, confluent yellow plaques. The yellow plaque assumes a linear pattern in some areas, with normal intervening mucosa. **C**, Severe *Candida* esophagitis, with confluent circumferential yellow plaque and encroachment on the esophageal lumen. **D**, If the candidal plaque is vigorously removed, the underlying mucosa appears relatively intact. Denudation of the surface epithelium is seen in a few areas, with associated hemorrhage resulting from the endoscopic trauma. No frank ulceration is present. **E**, Thick yellow exudate coats the esophagus and results in mild luminal narrowing. **F**, A portion of the exudate is removed showing inflamed underlying mucosa. **G**, Full-thickness squamous epithelium with overlying candidal plaque. The plaque is adherent to the surface epithelium. The plaque is composed of mature squamous epithelial cells, fungal pseudohyphae, and yeast. The *Candida* does not extend into the deep layers of the epithelium. **H**, Gomori methenamine silver (GMS) stain of the candidal plaque demonstrates branching fungal mycelia, including pseudohyphae and true hyphae, characteristic of *C. albicans*.

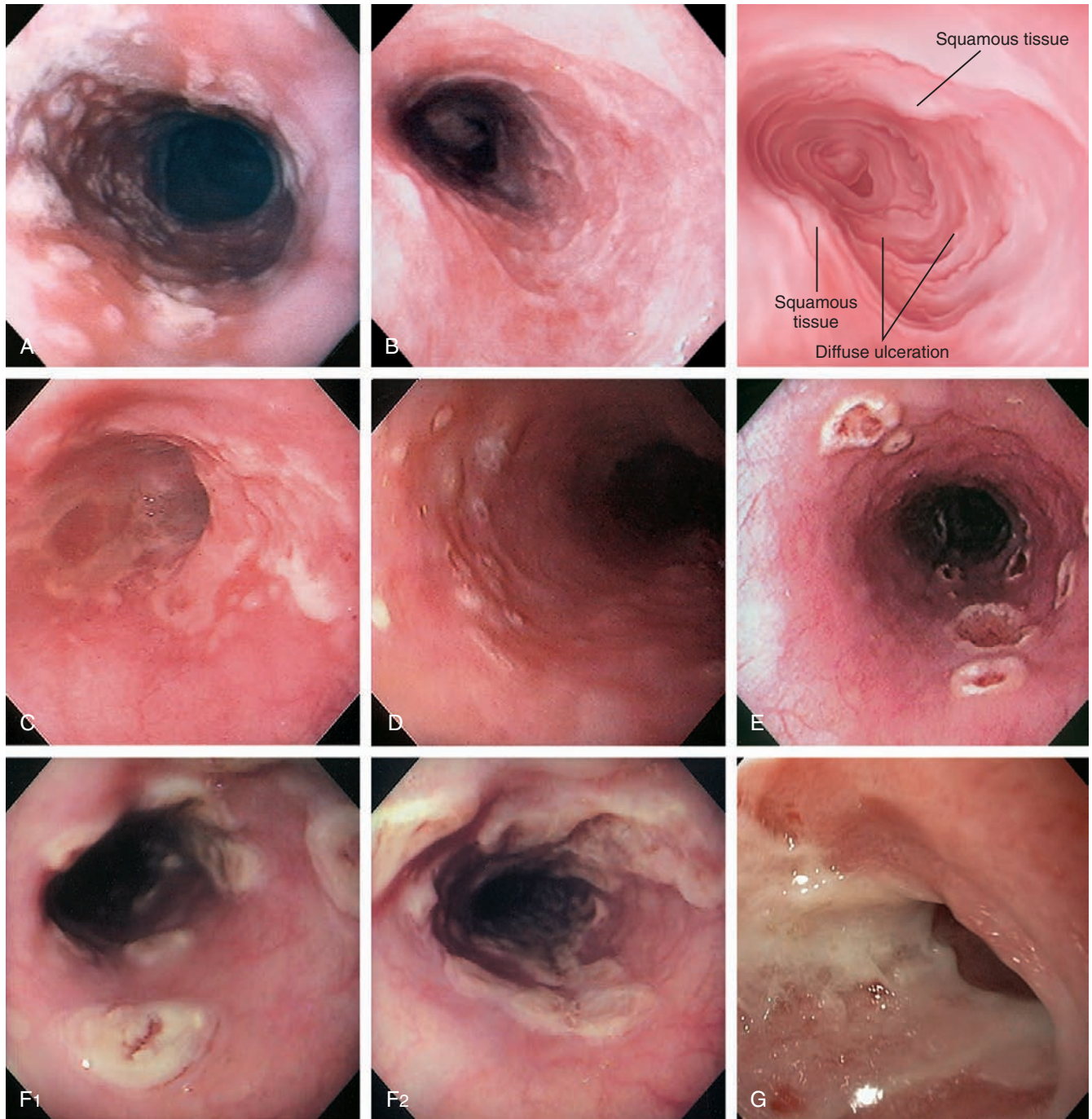


FIGURE 2.39 HERPES SIMPLEX VIRUS ESOPHAGITIS

A, Herpes simplex virus esophagitis manifested by multiple whitish plaques. Diffuse erythema surrounds the plaque, representing shallow ulceration. Islands of normal-appearing esophageal mucosa are still present. **B**, Diffuse shallow ulceration of the entire esophagus, with two areas of normal-appearing squamous tissue present. **C**, Confluent exudate in the distal esophagus. **D**, Vesicular lesions in the midesophagus. **E**, Volcano-like lesions in the midesophagus. **F1**, Large, plaquelike, exudative lesions that become confluent more distally (**F2**). **G**, Ulceration with narrowing at the GE junction. The ulcer has thick exudate resembling GE reflux disease.

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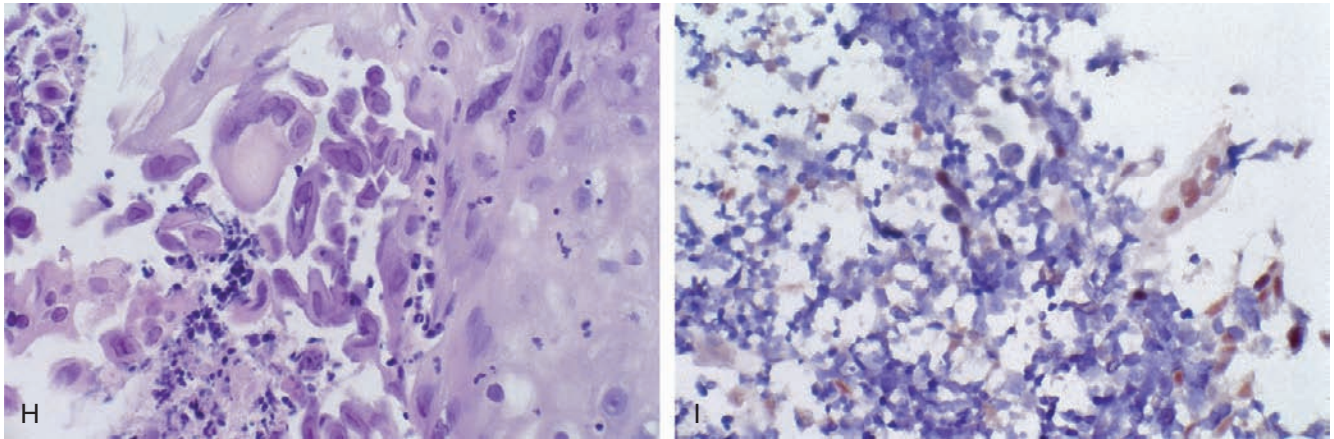


FIGURE 2.39 HERPES SIMPLEX VIRUS ESOPHAGITIS

H, Herpes simplex virus infection of the esophagus, producing characteristic multinucleated inclusions in squamous epithelial cells. **I**, Confirmation of herpes simplex virus by in situ DNA hybridization. The intranuclear viral inclusions are stained brown.



Differential Diagnosis

Herpes Simplex Virus Esophagitis (Figure 2.39)

- Gastroesophageal reflux disease
- Other infections
- Cytomegalovirus
- Varicella
- Pill-induced esophagitis

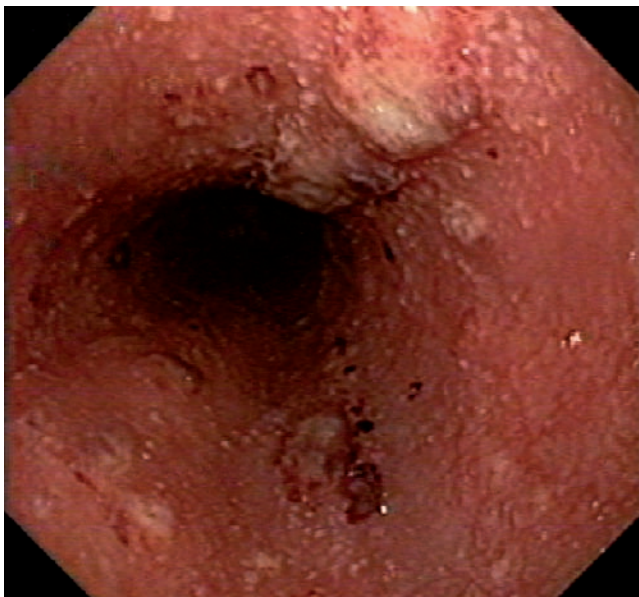


FIGURE 2.40 VARICELLA ESOPHAGITIS

Diffuse nodularity and pinpoint exudates in the esophagus with fresh bleeding.

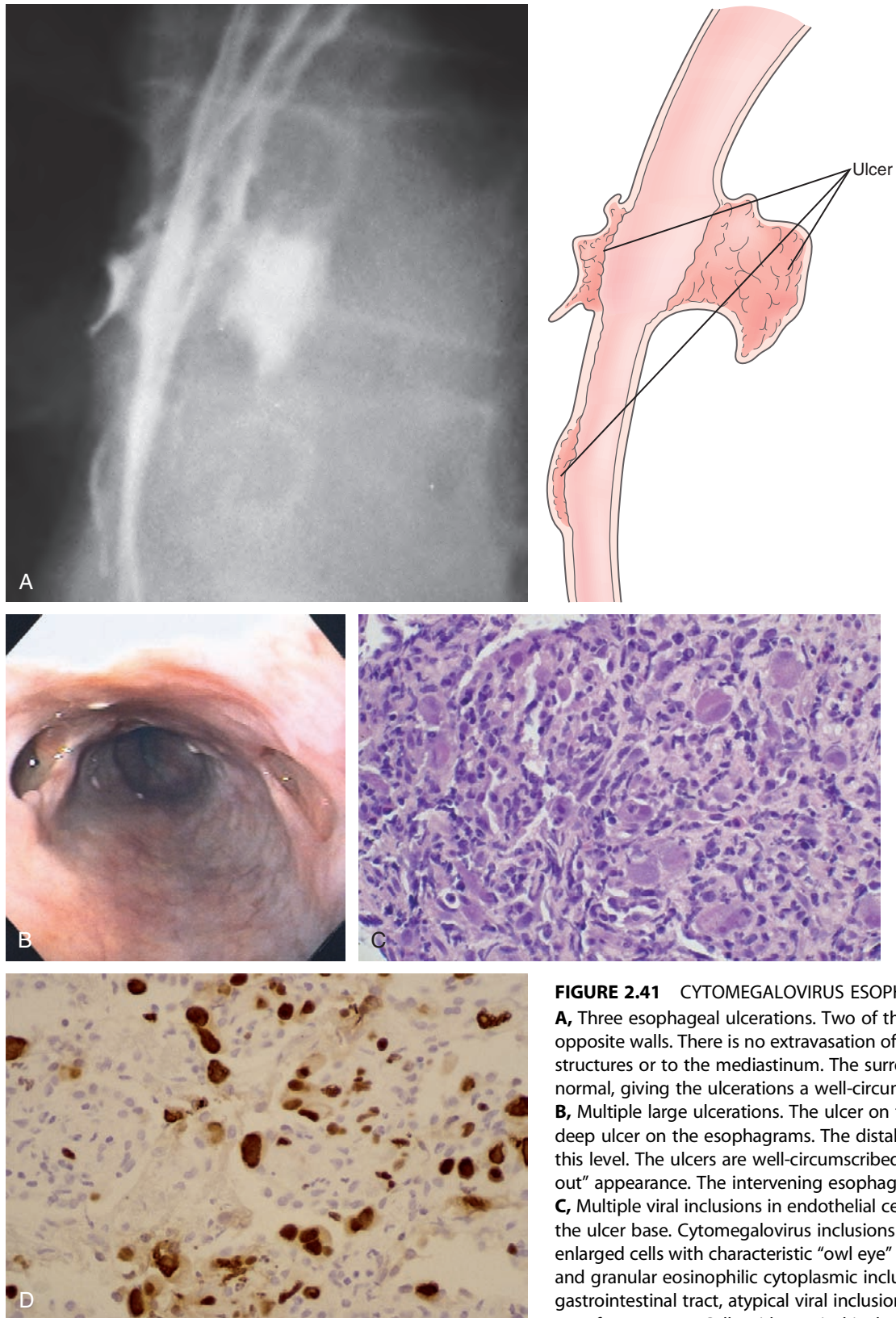


FIGURE 2.41 CYTOMEGALOVIRUS ESOPHAGITIS

A, Three esophageal ulcerations. Two of the lesions are on opposite walls. There is no extravasation of barium to contiguous structures or to the mediastinum. The surrounding mucosa is normal, giving the ulcerations a well-circumscribed appearance. **B**, Multiple large ulcerations. The ulcer on the left represents the deep ulcer on the esophagrams. The distal ulcer is not visible at this level. The ulcers are well-circumscribed, having a “punched-out” appearance. The intervening esophageal mucosa is normal. **C**, Multiple viral inclusions in endothelial cells and stromal cells in the ulcer base. Cytomegalovirus inclusions typically consist of enlarged cells with characteristic “owl eye” intranuclear inclusions and granular eosinophilic cytoplasmic inclusions. In the gastrointestinal tract, atypical viral inclusions (some shown here) are often present. Cells with atypical inclusions may appear smudged or can be similar in appearance to ganglion cells. **D**, Immunostain confirms the viral cytopathic effect to be cytomegalovirus.

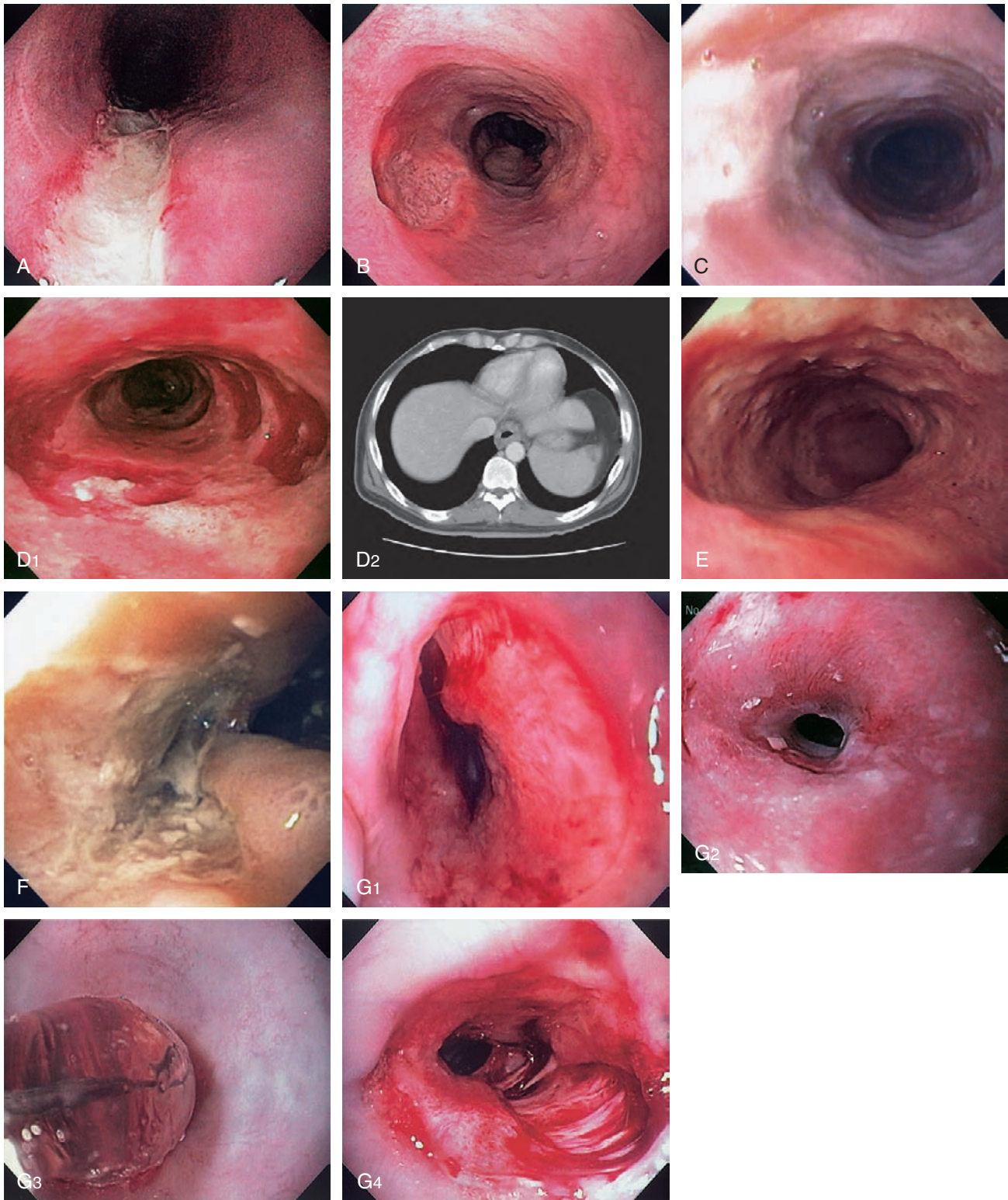


FIGURE 2.42 CYTOMEGALOVIRUS ESOPHAGITIS

A, Long, linear ulcer. **B**, Multiple large, well-circumscribed ulcerations in the midesophagus. **C**, Shallow ulceration in the distal esophagus. **D1**, Diffuse exudate in the midesophagus with areas of depression. **D2**, Markedly thickened distal esophagus. **E**, Circumferential ulceration involving the distal esophagus. **F**, Deep ulceration extending outward from the lumen in the distal esophagus. **G1**, Midesophageal ulcer with mild luminal narrowing. **G2**, After therapy, a stricture has resulted. **G3**, Balloon dilation performed. **G4**, The stricture has torn appropriately, now exposing the submucosa. No perforation resulted.

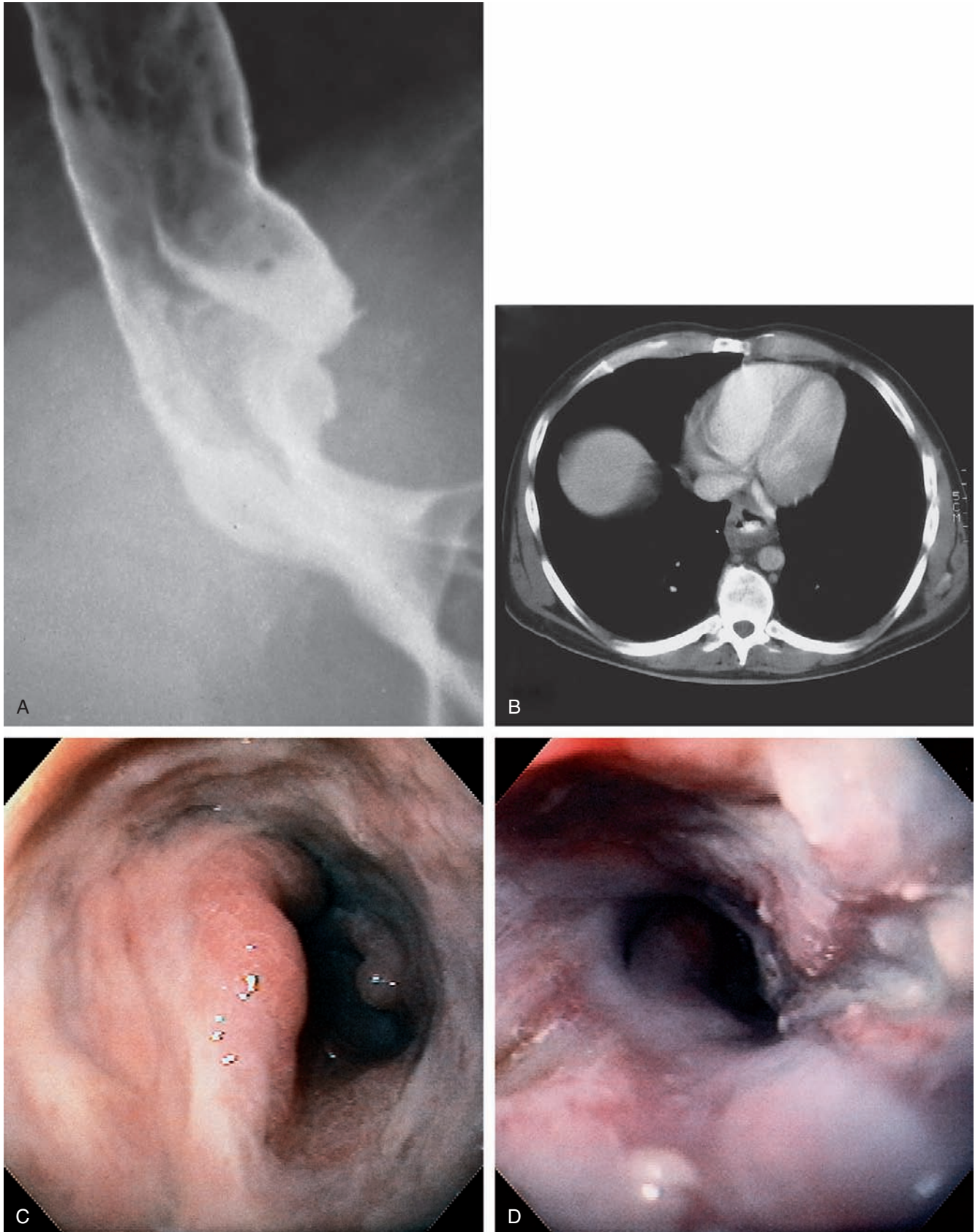
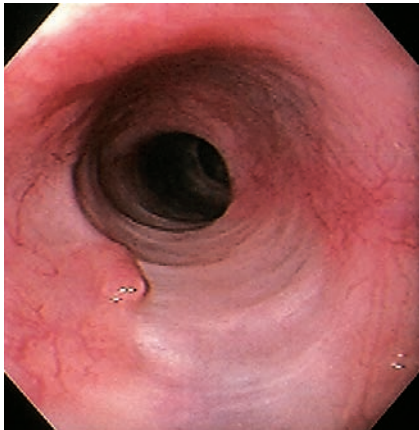


FIGURE 2.43 CYTOMEGALOVIRUS ESOPHAGITIS WITH STRICTURE

A, Large, irregular ulceration at the gastroesophageal junction. There appears to be a mass effect just proximal to the gastroesophageal junction. **B**, The distal esophagus is markedly thickened. **C**, Circumferential ulceration in the distal esophagus, extending into the stomach anteriorly and forming a shelf. The gastric tissue is edematous. **D**, After therapy, the patient reported dysphagia. A circumferential stricture is now present, with persistent active ulceration.

**FIGURE 2.44** HEALED ULCER SCAR

Large scar in the midesophagus representing healing of a large ulcer. Note the characteristic whitish color.

**FIGURE 2.45** TUBERCULOUS ESOPHAGITIS WITH FISTULA

Ulcer in the midesophagus representing a fistula to the mediastinum **(A)**, well shown on barium esophagram **(B)**.



Differential Diagnosis

Tuberculous Esophagitis with Fistula
(Figure 2.45)

Infection
Trauma
Neoplasia

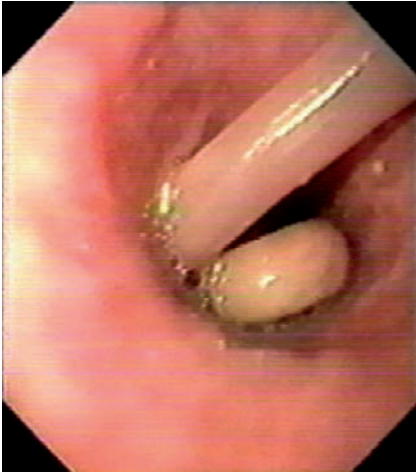


FIGURE 2.46 *ASCARIS LUMBRICOIDES*

Large ascarid in the midesophagus. (Courtesy F. Vida, MD, and A. Tomas, MD, Manresa, Spain.)

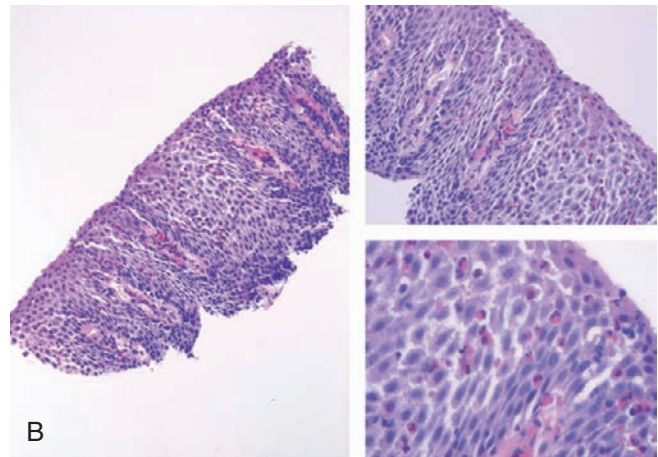
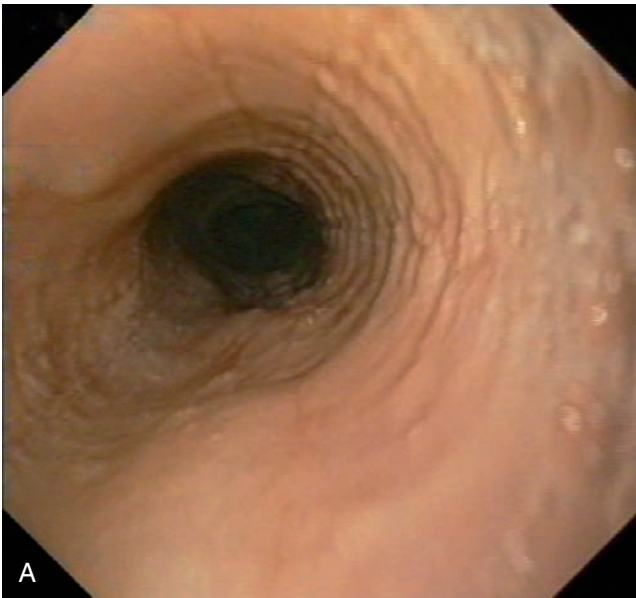


FIGURE 2.47 EOSINOPHILIC ESOPHAGITIS

A, Multiple mild ringlike lesions of the midesophagus are characteristic. **B**, Biopsies show numerous eosinophils in the squamous epithelium.

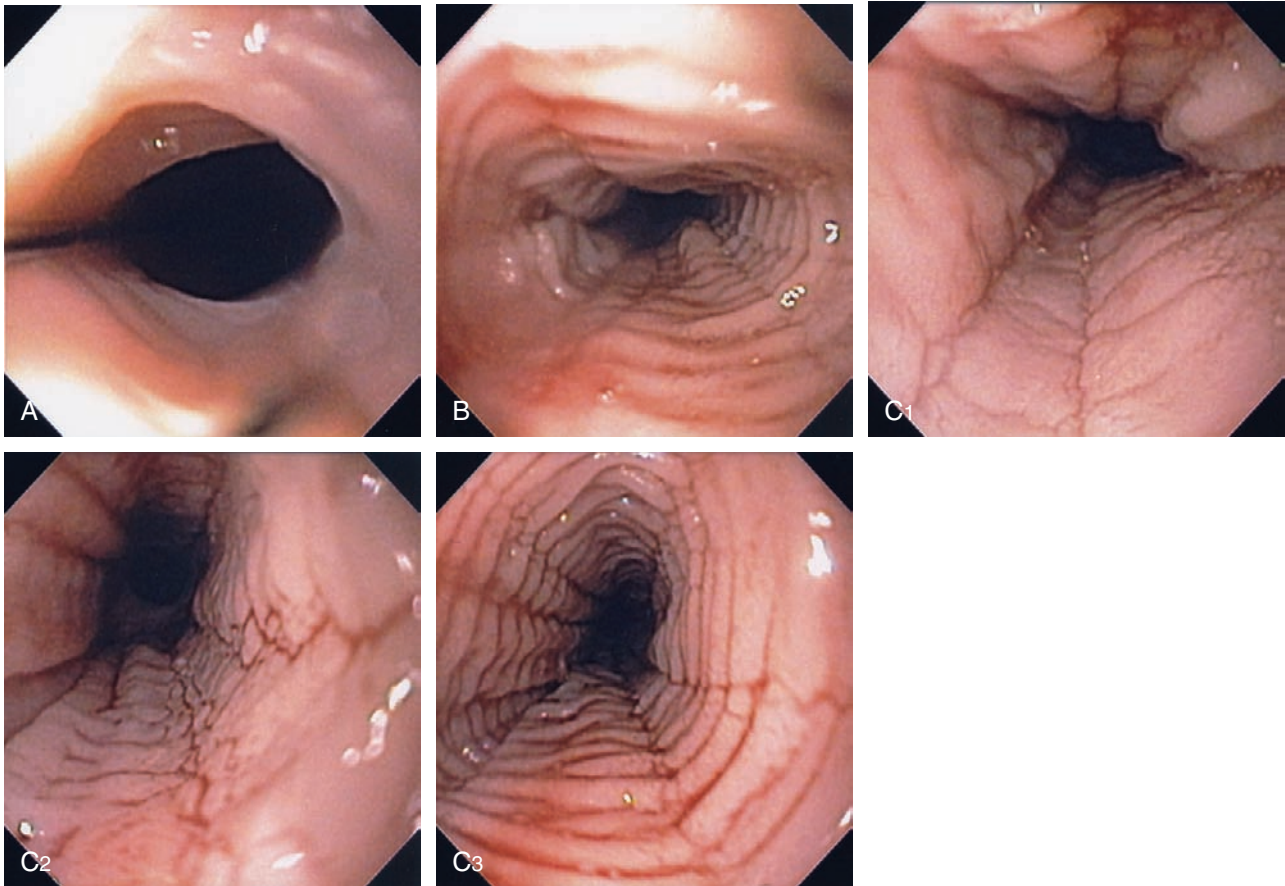


FIGURE 2.48 EOSINOPHILIC ESOPHAGITIS

A, Multiple ringlike structures in the distal esophagus above a mild narrowing. **B**, More proximally, the mucosa has a feline appearance. **C1-C3**, After biopsy, the blood essentially performs chromoendoscopy, and multiple fissures are also now very evident.

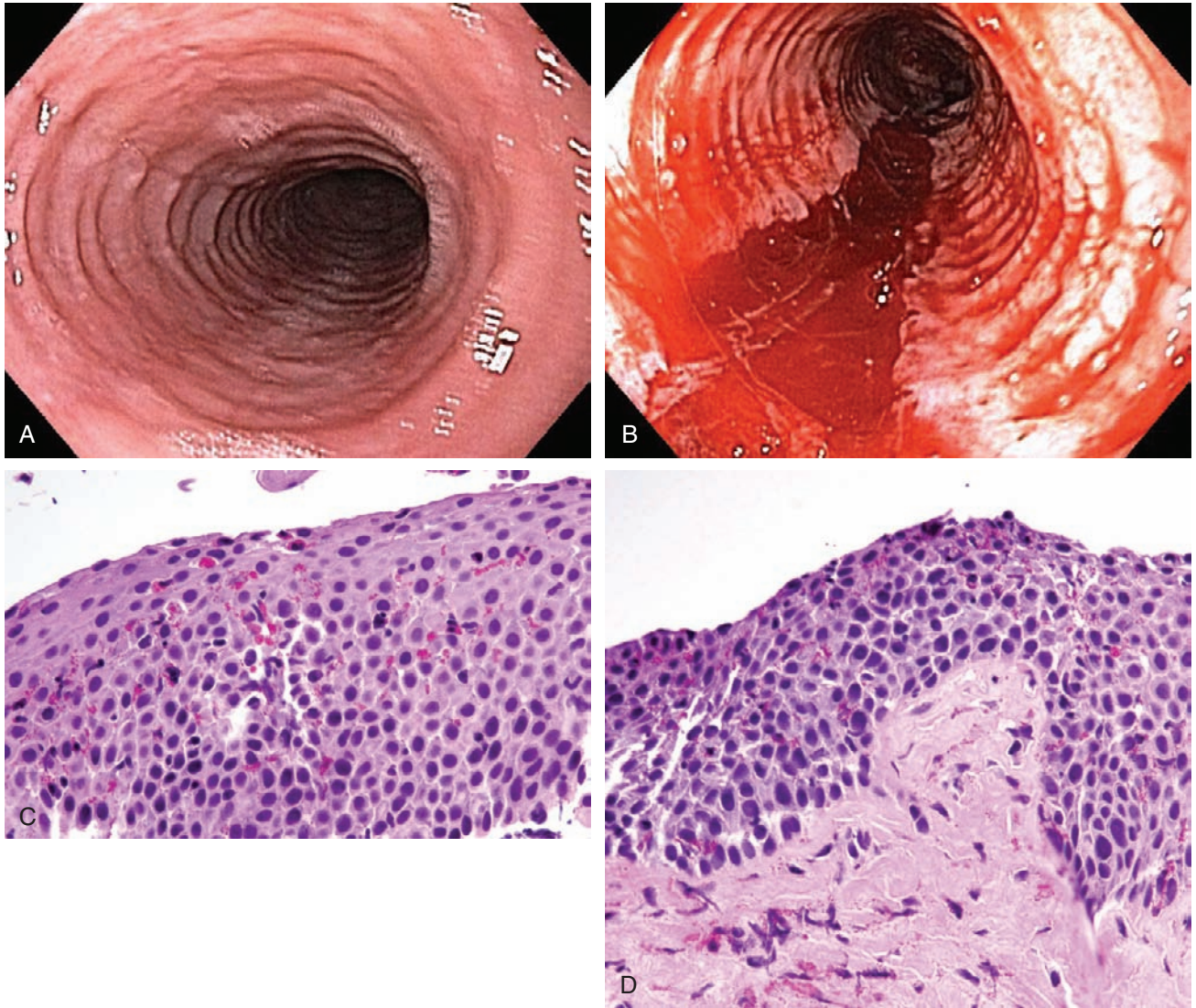


FIGURE 2.49 DILATION OF EOSINOPHILIC ESOPHAGITIS

A, Typical-appearing rings. **B**, Long tear after dilation. **C**, Biopsy shows marked eosinophilia. **D**, Dense fibrosis is also present in the submucosa.

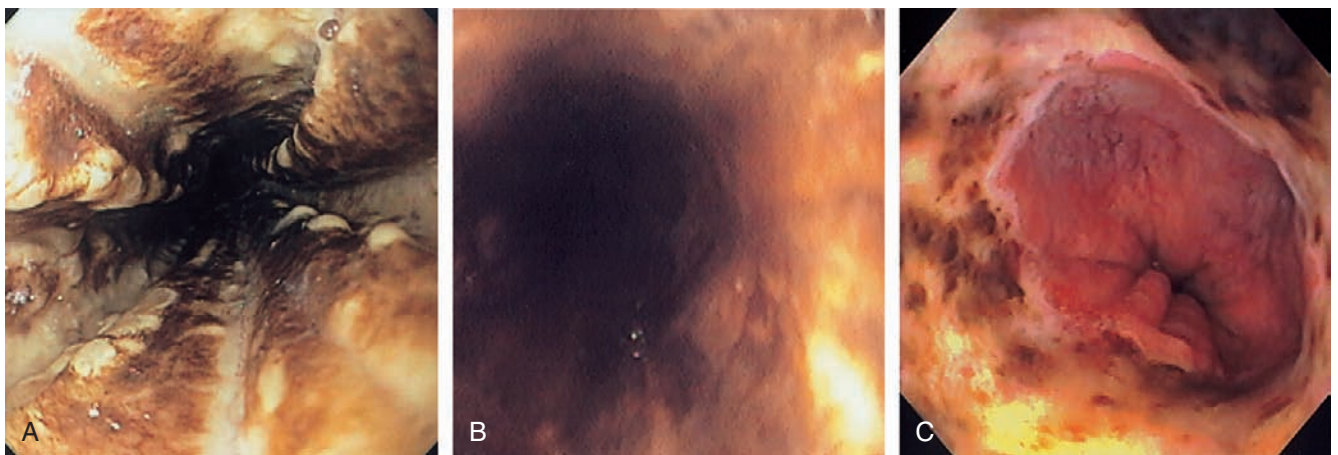


FIGURE 2.50 ACUTE NECROTIZING ESOPHAGITIS

Diffuse black exudates coat the esophagus (**A**, **B**). **C**, Note the abnormalities stop at the GE junction.

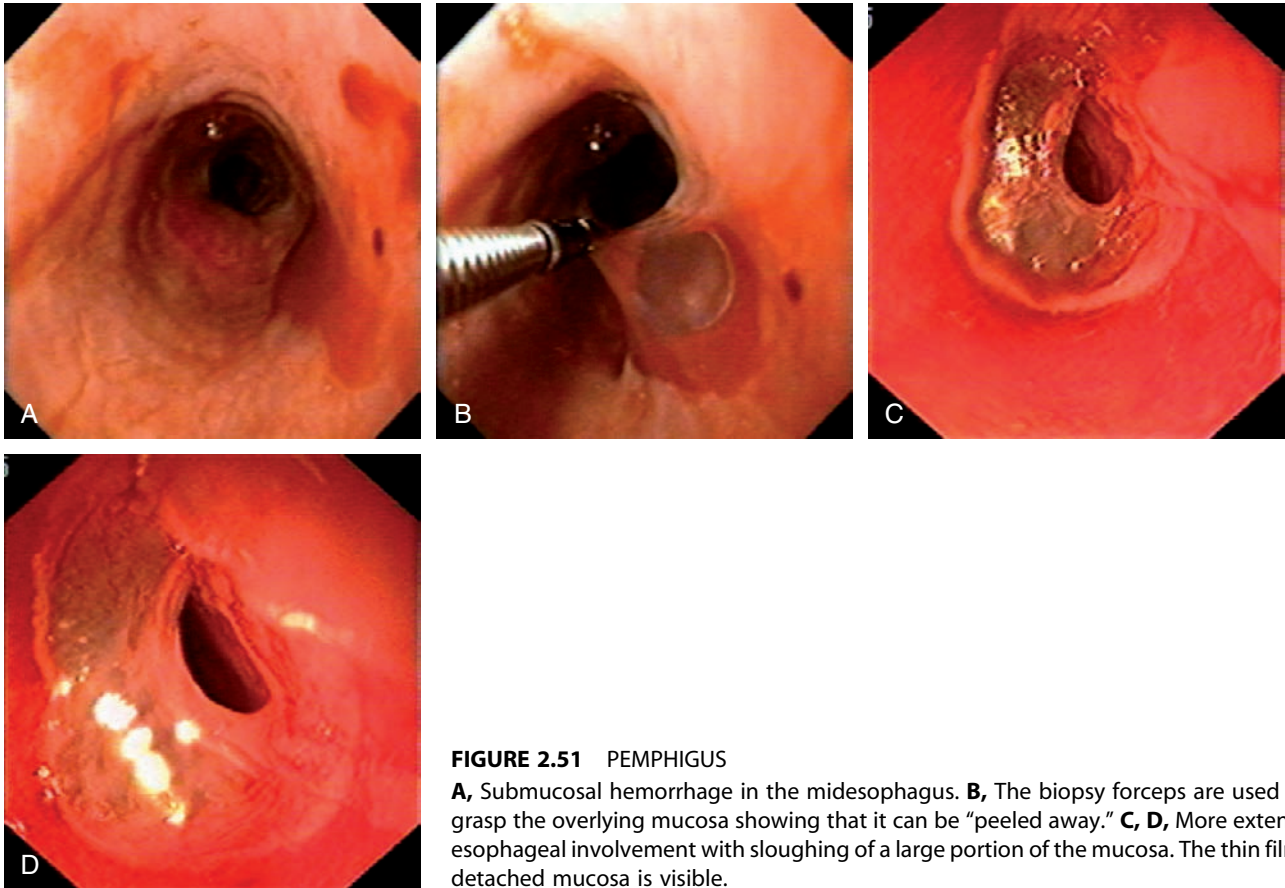


FIGURE 2.51 PEMPHIGUS

A, Submucosal hemorrhage in the midesophagus. **B**, The biopsy forceps are used to grasp the overlying mucosa showing that it can be “peeled away.” **C, D**, More extensive esophageal involvement with sloughing of a large portion of the mucosa. The thin film of detached mucosa is visible.

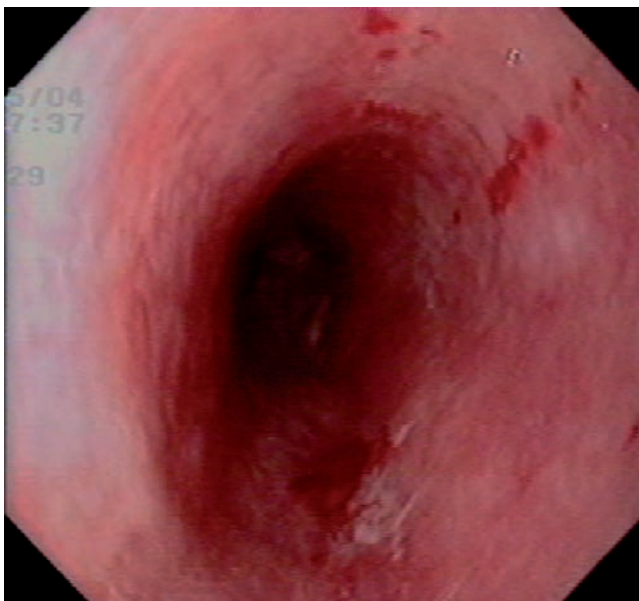


FIGURE 2.52 PARANEOPLASTIC PEMPHIGUS

Diffuse edema and subepithelial hemorrhage.

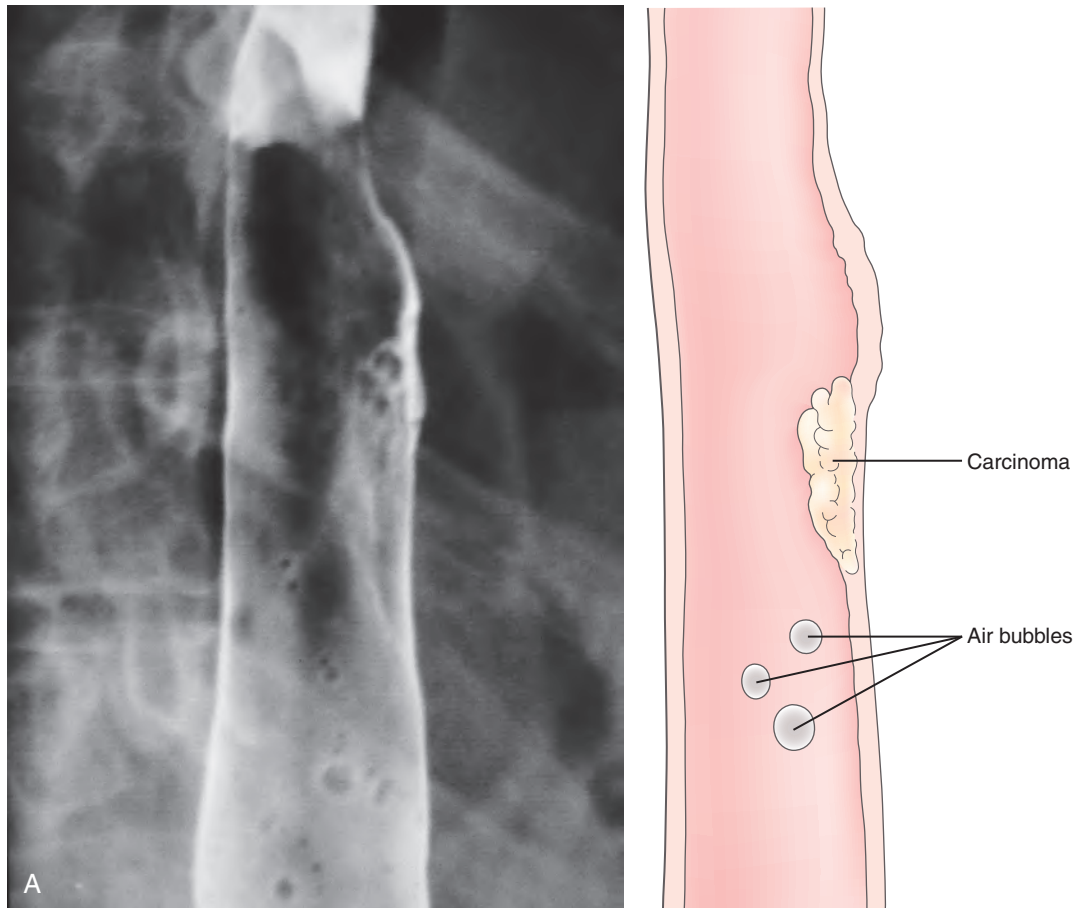


FIGURE 2.53 EARLY SQUAMOUS CELL CARCINOMA

A, Focal area of nodularity. Air bubbles can also be seen on the barium-coated esophagus. **B1, B2**, Verrucous-appearing lesion in the center of a well-demarcated area of erythema. **B3**, After washing of the lesion, it is found not to be fixed to the wall. **B4**, A distal border of erythema is present. Biopsy of the erythematous mucosa demonstrated carcinoma.

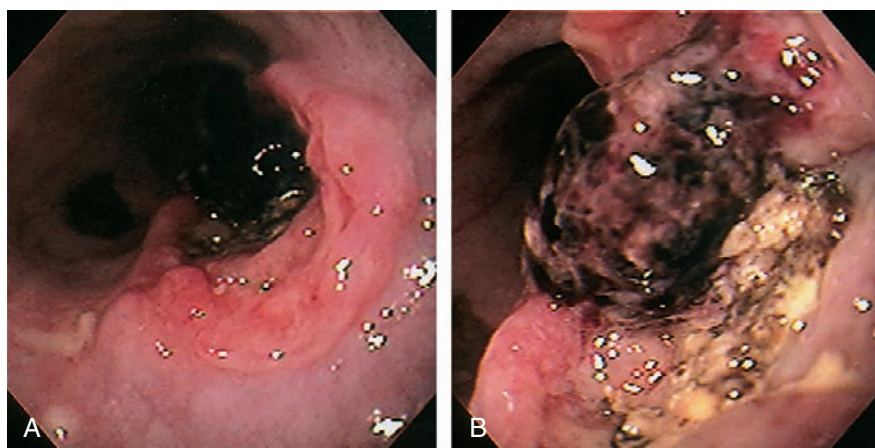


FIGURE 2.54 SQUAMOUS CELL CANCER OF THE ESOPHAGUS WITH RECENT BLEEDING

Raised ulcerative lesion of the midesophagus with overlying blood clot indicating recent bleeding (**A, B**).

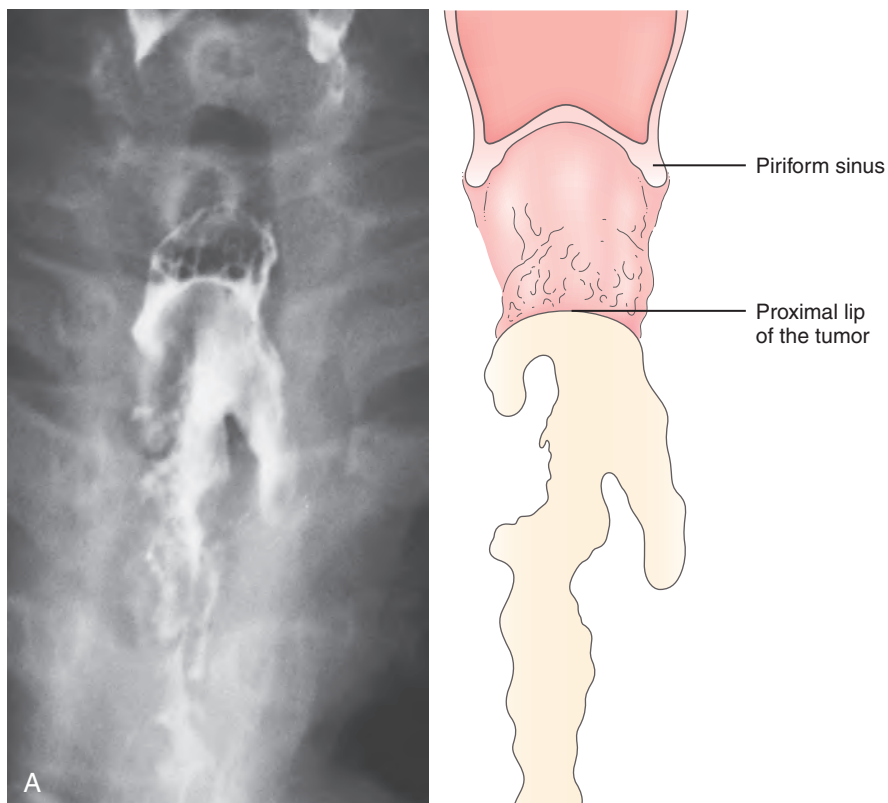


FIGURE 2.55 SQUAMOUS CELL CARCINOMA

A, Anteroposterior view shows a long segmental lesion, with nodular mucosa and luminal narrowing.

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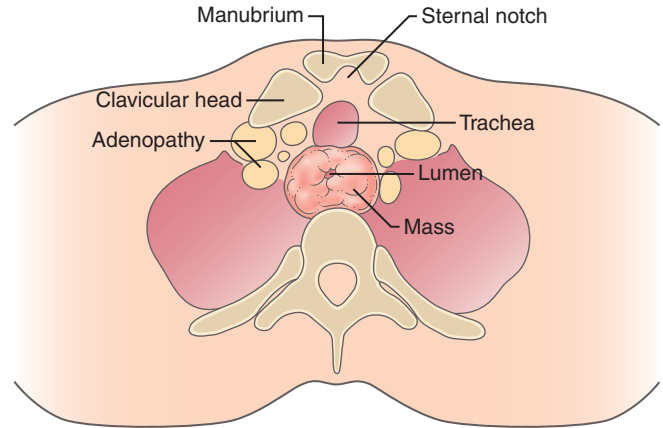
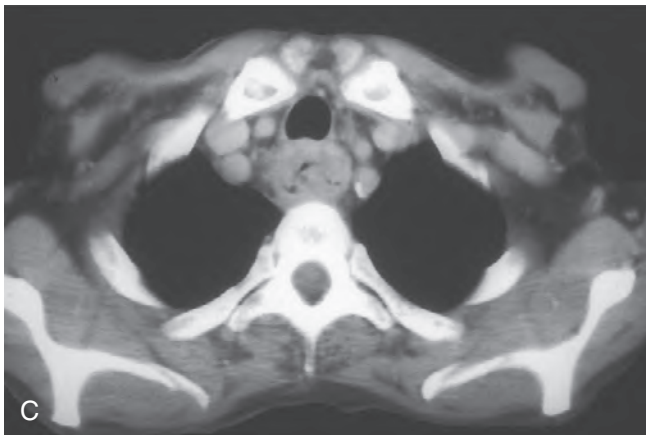
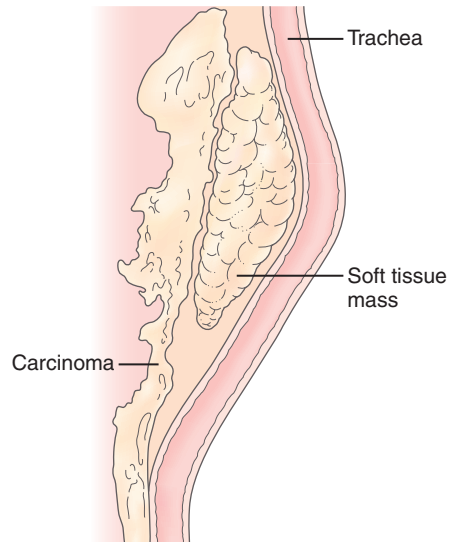


FIGURE 2.55 SQUAMOUS CELL CARCINOMA

B, A soft-tissue mass anteriorly causes a mass effect, with posterior effacement of the trachea. **C,** Mass lesion of the cervical esophagus at the level of the manubrium. The esophageal lumen is severely compromised. Adenopathy is present.

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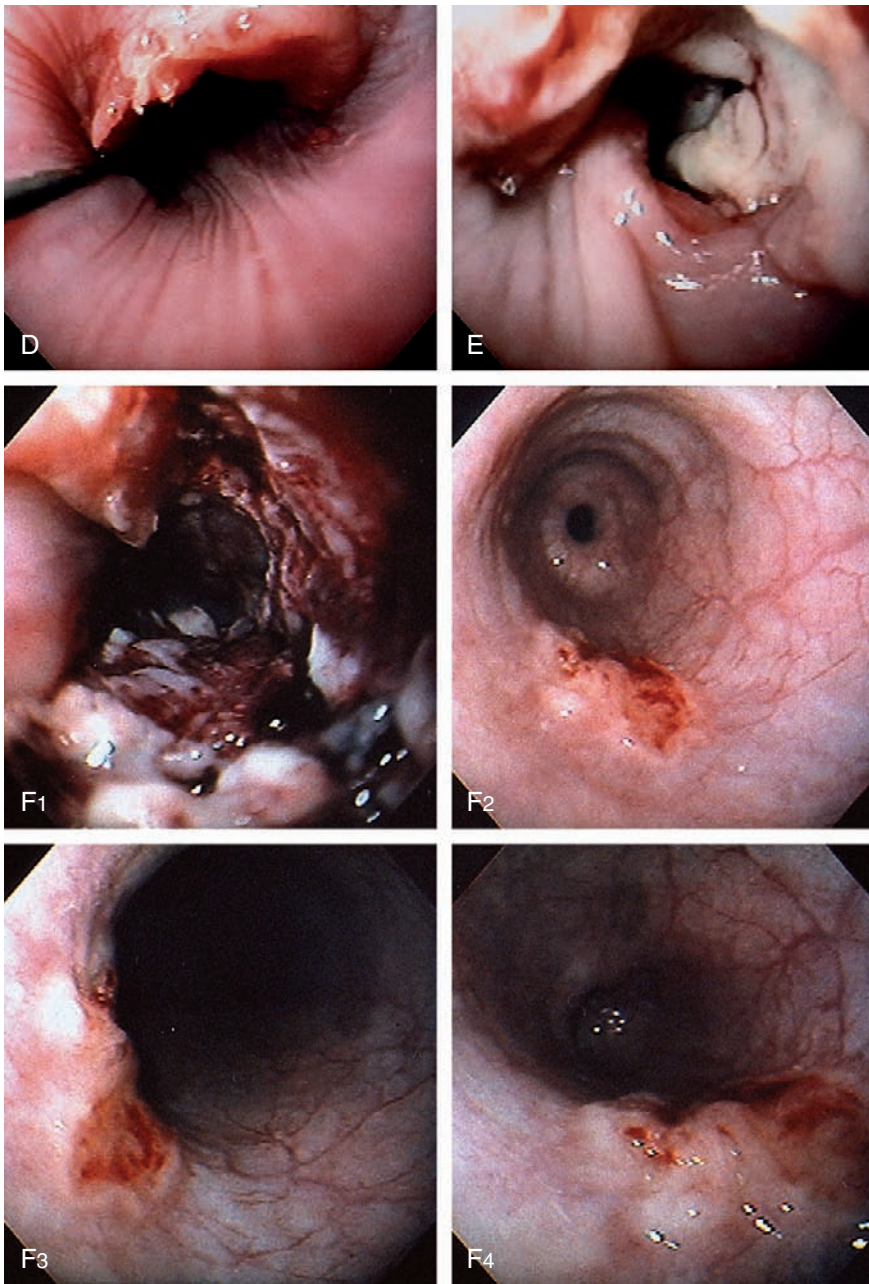


FIGURE 2.55 SQUAMOUS CELL CARCINOMA

D, Proximal lip of the tumor. A guidewire is present. **E**, Hemircumferential ulceration. **F1**, Appearance of the lesion after dilation. **F2-F4**, An ulcer with irregular margins in the distal esophagus was also a squamous cell carcinoma. The lesion was found after dilating the stricture. This could be a second primary carcinoma, which is unusual, or a metastatic lesion.

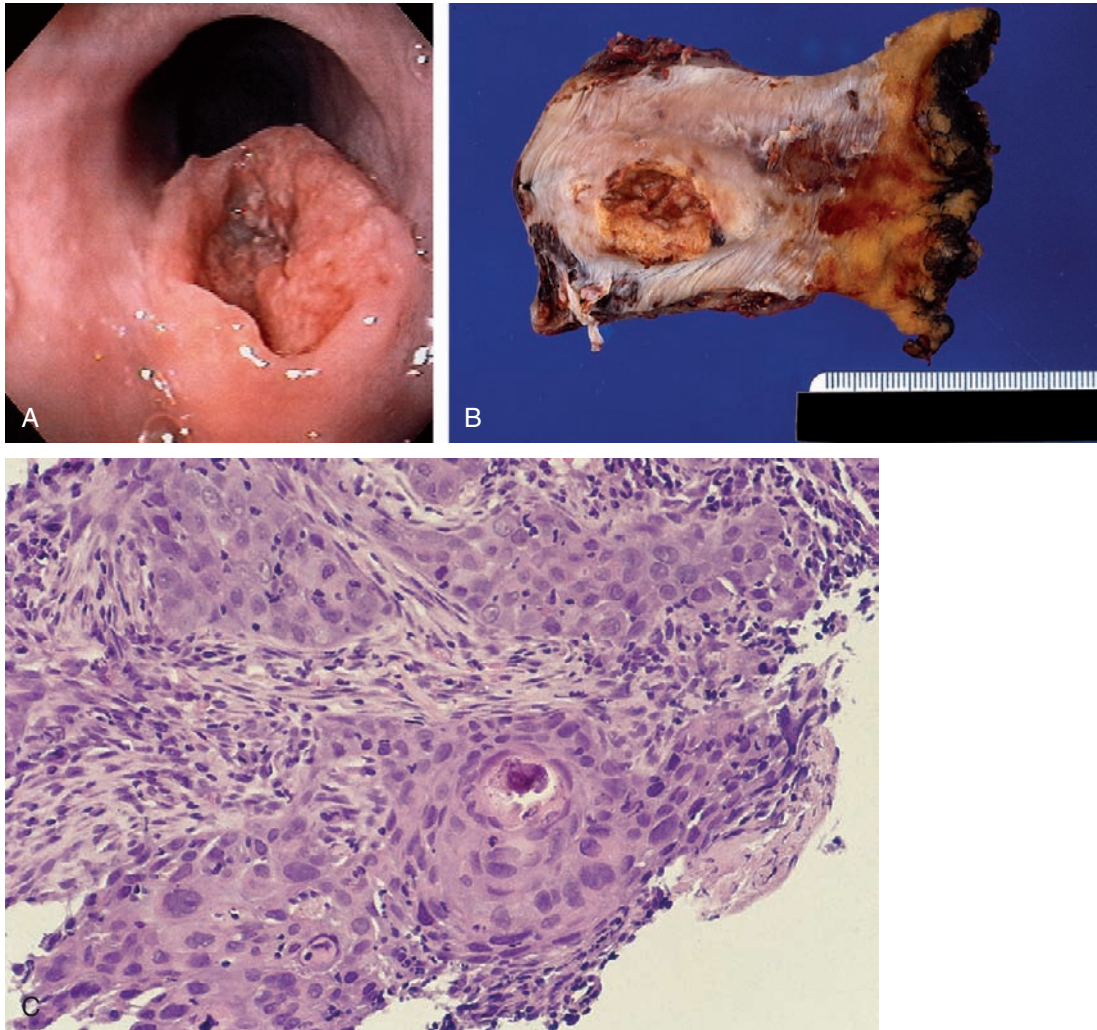


FIGURE 2.56 SQUAMOUS CELL CARCINOMA

A, The cancer has a volcano appearance, with a central area of necrosis surrounded by normal-appearing squamous mucosa. **B**, Surgical specimen demonstrates a mass lesion protruding from normal-appearing squamous mucosa. **C**, Well-differentiated squamous cell carcinoma.

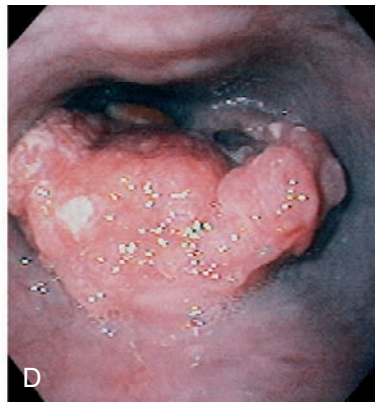
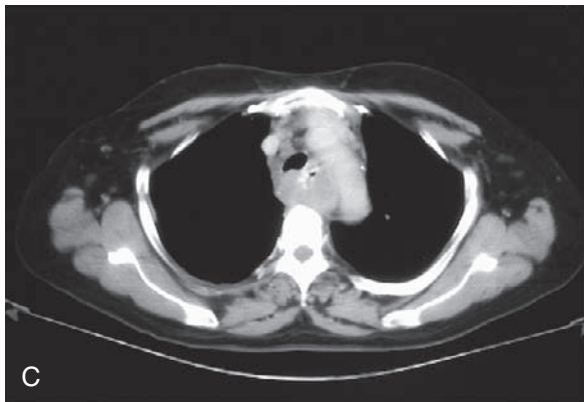
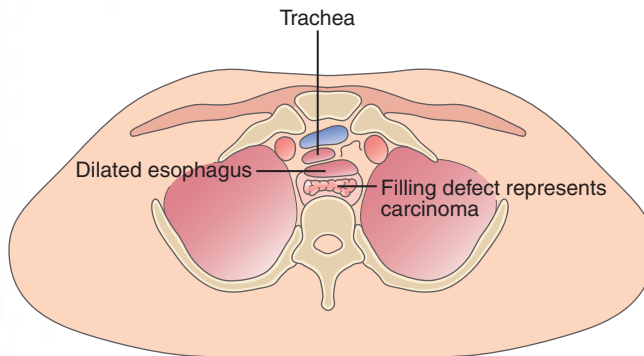
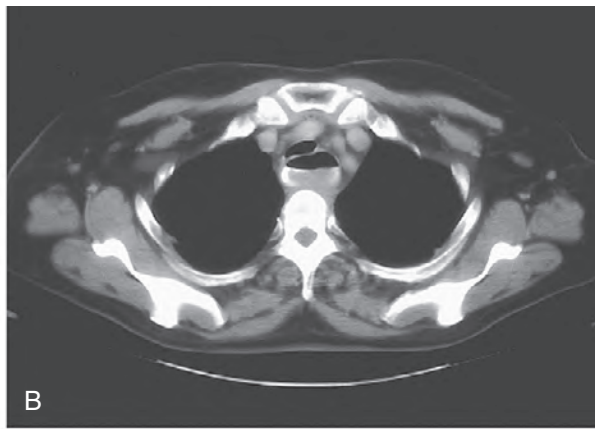
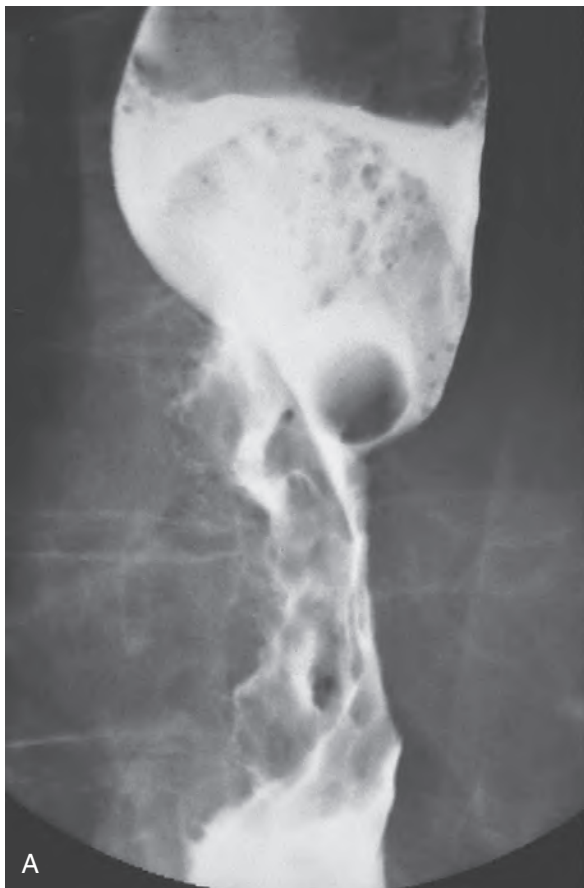


FIGURE 2.57 SQUAMOUS CELL CARCINOMA

A, Irregular, masslike lesion producing high-grade partial obstruction of the esophageal lumen. The proximal esophagus is dilated, and a round nodular intraluminal mass is seen in the barium column, representing proximal luminal tumor extension. A round structure is present at the proximal portion of the carcinoma, suggesting a pill. Note the difference in caliber between the proximal and distal esophagus. **B**, The esophagus is dilated with residual barium. A filling defect is also present in the barium column. The posterior and left posterolateral walls of the trachea are deformed by the lesion. Adenopathy is present anteriorly. **C**, Luminal narrowing of the esophagus outlined by the barium column, with surrounding mass lesion. **D**, Proximal portion of the tumor is hemicircumferential and has a fleshy appearance. A pill is embedded in the tumor. **E**, The resection specimen demonstrates the bulkiness of the tumor and luminal impingement.

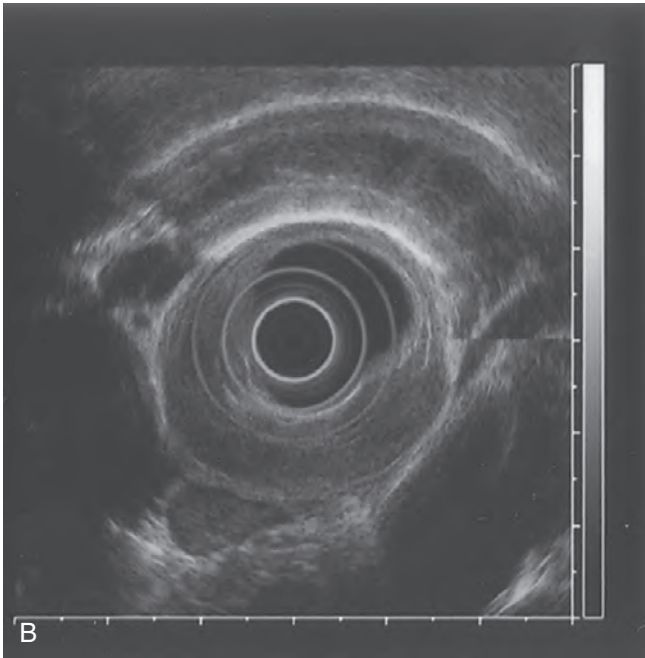
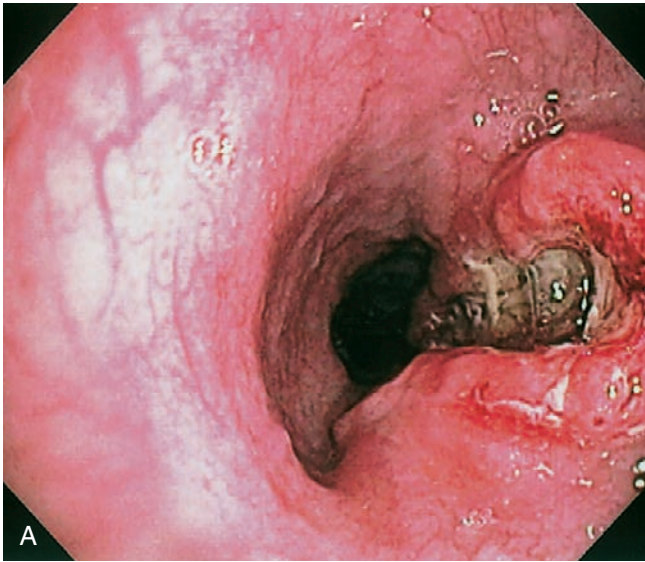


FIGURE 2.58 SQUAMOUS CELL CARCINOMA

A, Ulcerated lesion of the midesophagus with heaped-up margins. **B,** Endoscopic ultrasonography confirms the tumor extent and adjacent lymph nodes.



FIGURE 2.59 SQUAMOUS CELL CARCINOMA WITH TRACHEAL–ESOPHAGEAL FISTULA

An irregular nodular stricture with proximal shelving and a fistulous communication to the right lower lobe bronchus. Other areas of apparent fistula formation represent sinus tracts in the tumor mass.

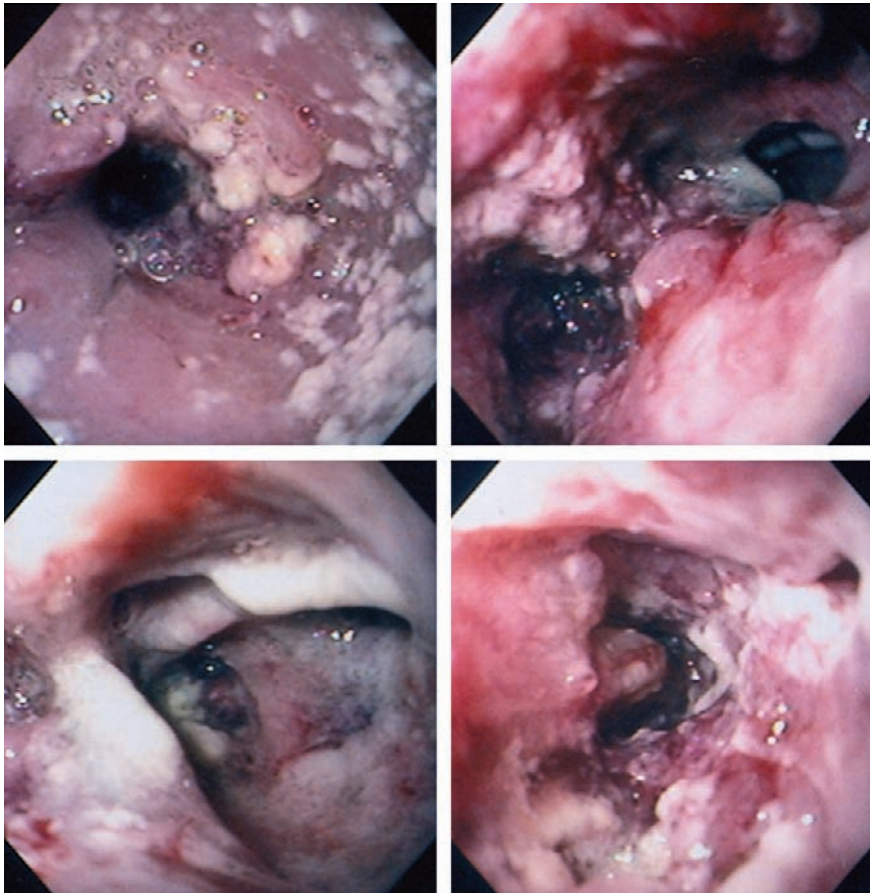


FIGURE 2.60 SQUAMOUS CELL CARCINOMA WITH TRACHEAL–ESOPHAGEAL FISTULA

Dilated esophagus with multiple white plaques, characteristic of *Candida* esophagitis. *Candida* esophagitis commonly occurs in areas of stasis resulting from obstruction. The proximal portion of the tumor is evident by the hemicircumferential rim of nodularity. The distal lumen is narrowed (*top left*). Two lumina are seen distal to the proximal portion of the tumor (*top right*). On the left, the esophageal lumen with circumferential carcinoma is shown; the lumen on the right is the large fistula. The fistula has an ulcerated appearance (*bottom left*). The circumferential ulcerated tumor is present distally in the esophagus (*bottom right*).

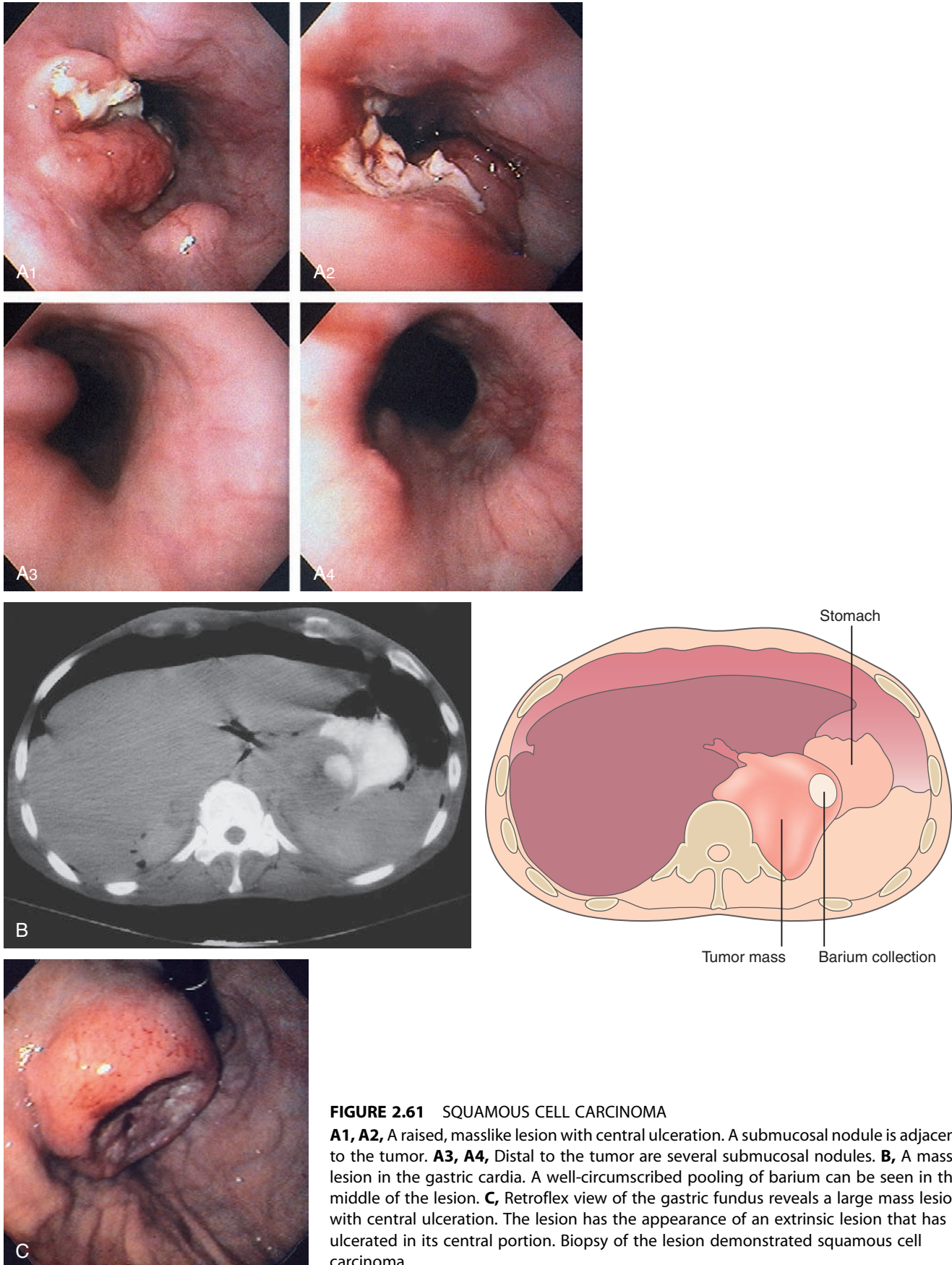


FIGURE 2.61 SQUAMOUS CELL CARCINOMA

A1, A2, A raised, masslike lesion with central ulceration. A submucosal nodule is adjacent to the tumor. **A3, A4,** Distal to the tumor are several submucosal nodules. **B,** A mass lesion in the gastric cardia. A well-circumscribed pooling of barium can be seen in the middle of the lesion. **C,** Retroflex view of the gastric fundus reveals a large mass lesion with central ulceration. The lesion has the appearance of an extrinsic lesion that has ulcerated in its central portion. Biopsy of the lesion demonstrated squamous cell carcinoma.

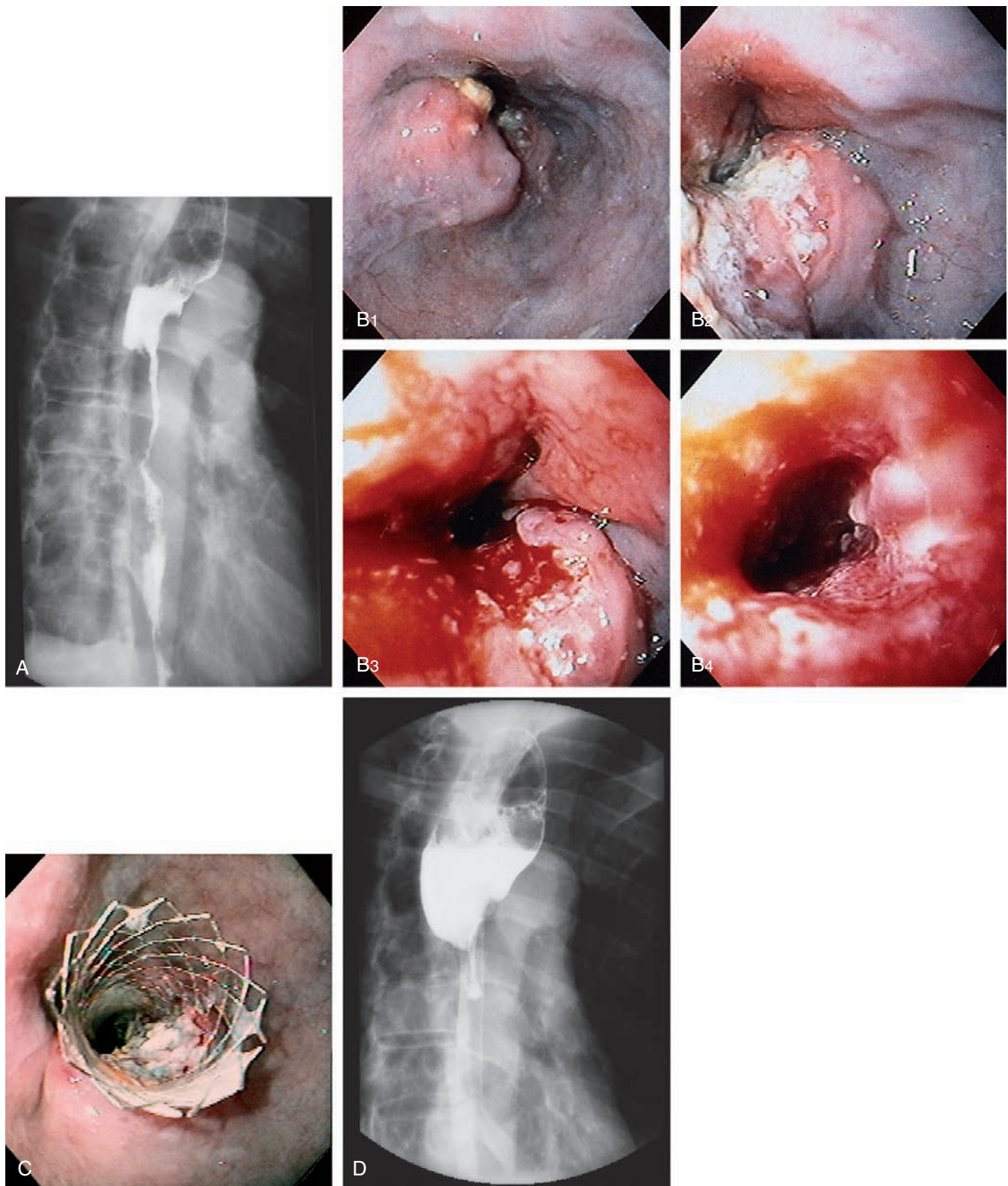


FIGURE 2.62 SQUAMOUS CELL CARCINOMA

A, Long, irregular stricture characteristic of a neoplasm. The proximal portion of the tumor has shelving and is dilated. **B1**, The shelflike lesion is evident. **B2**, The center of the tumor has a necrotic appearance. **B3, B4**, The midportion of the tumor becomes circumferential and friable, with significant luminal narrowing. **C**, Gianturco metal stent placed into the esophageal cancer, resulting in luminal patency. Tumor is growing into the mesh stent. **D**, The stent is in a good position through the tumor mass. Barium is outlining the wire mesh of the stent.

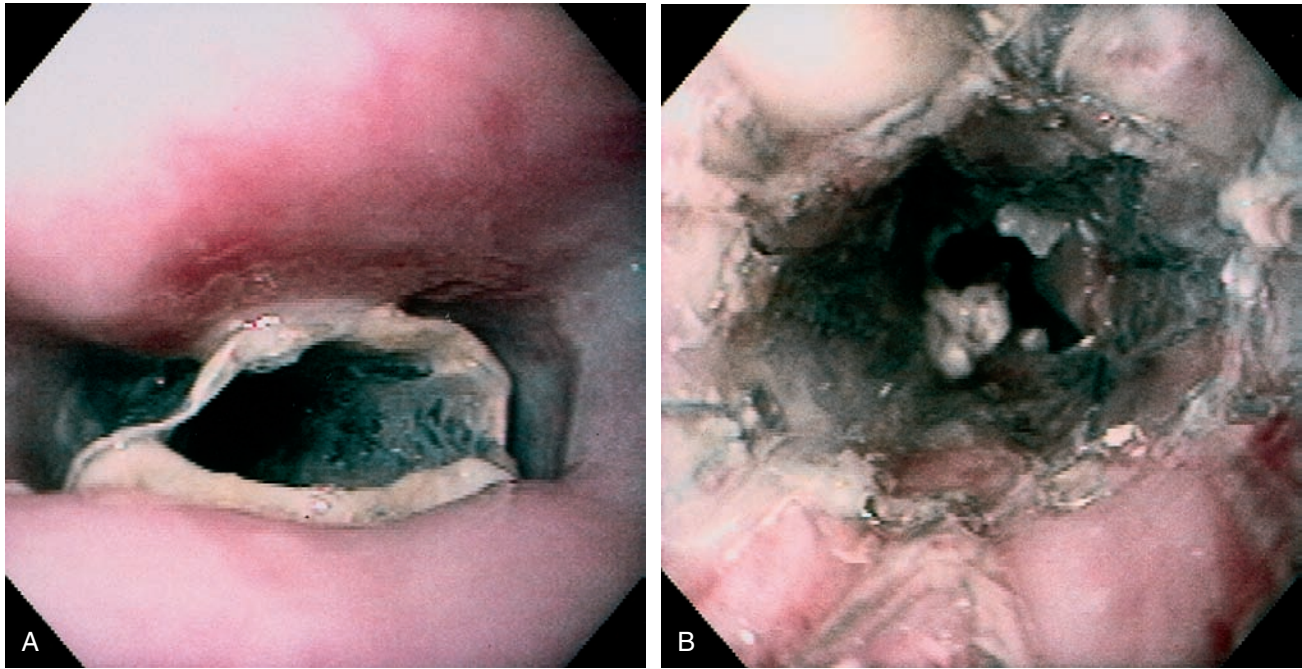


FIGURE 2.63 POLYURETHANE-COATED ESOPHAGEAL STENT

A, Proximal portion of the stent. **B**, The polyurethane coating of the metal stent avoids ingrowth of tumor. The metal flanges are beneath the polyurethane.

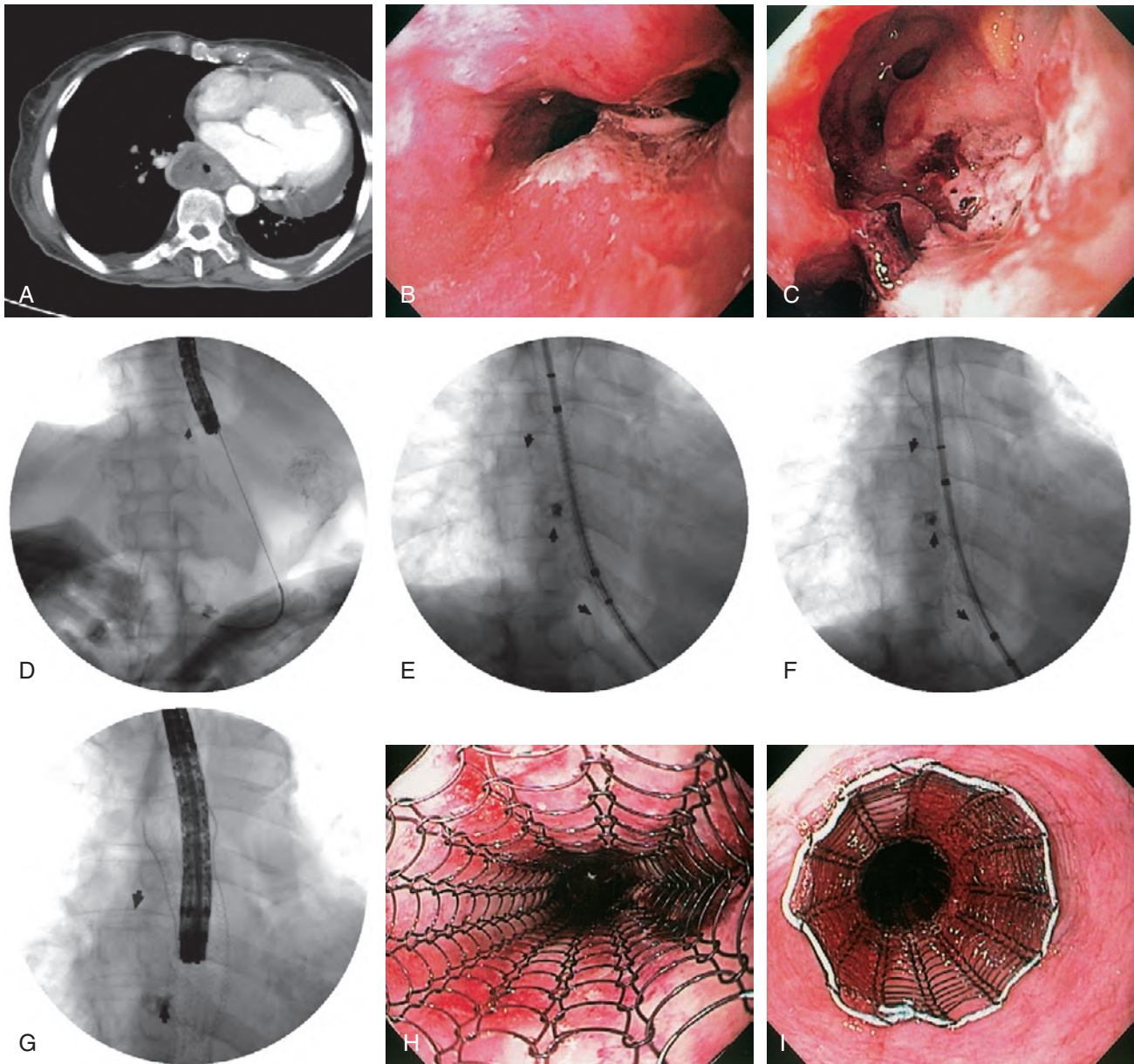


FIGURE 2.64 STENTING OF SQUAMOUS CELL CANCER

A, Large mediastinal lesion with luminal compromise. **B**, Luminal compromise of the midesophagus with mediastinal extension of the tumor. **C**, Ulceration extending to the mediastinum. **D**, A wire has been placed through the tumor into the stomach and the most proximal margin of the tumor is marked with an arrow. **E**, The stent is passed fluoroscopically to the GE junction and deployed. Note the proximal opening of the stent and the distal markings with the arrow. **F**, Stent has been fully deployed. **G**, The endoscope is passed through the stent to the level of the fistula noting adequate deployment. **H**, Appearance of the stent after deployment. **I**, Proximal extent of the prosthesis.

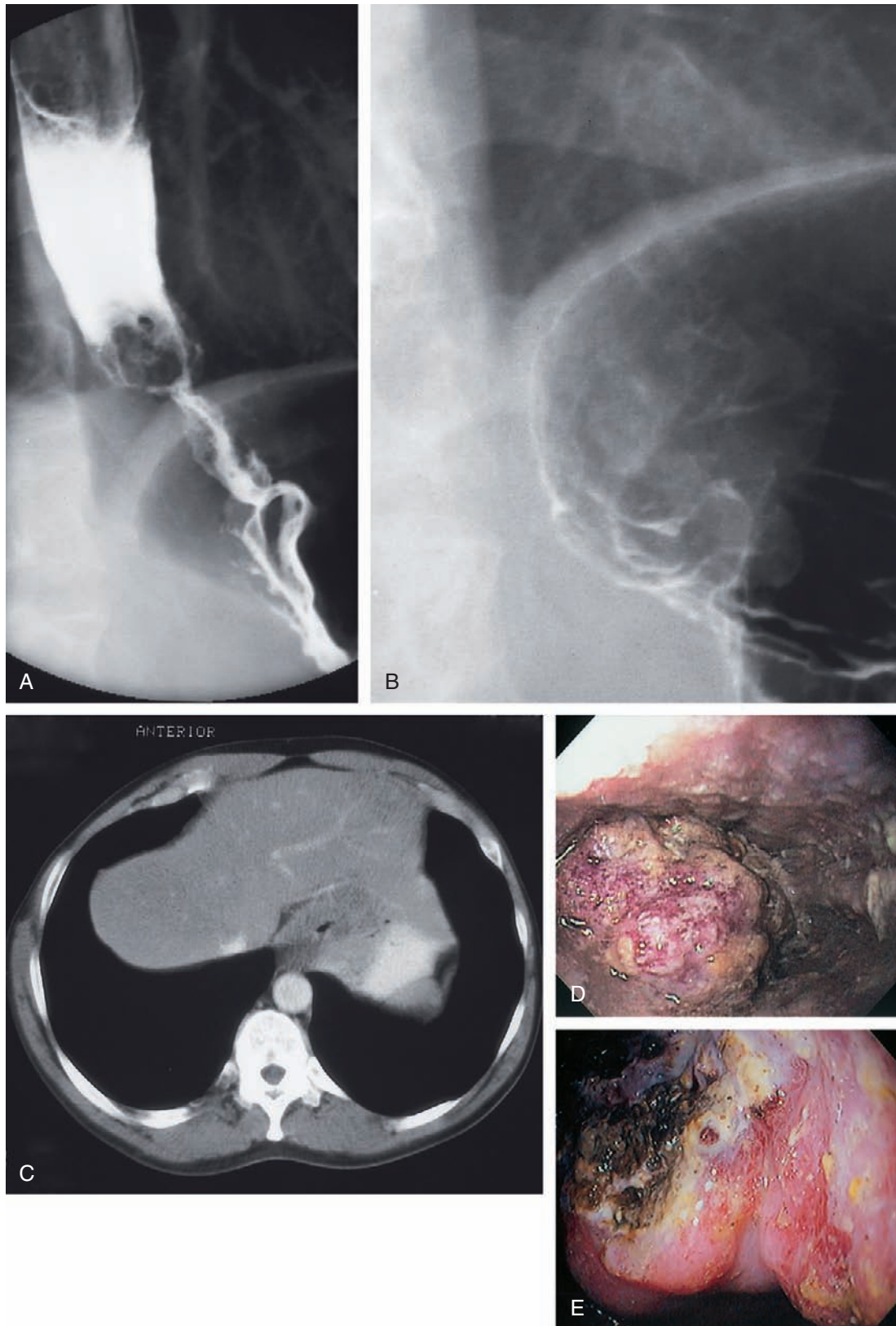


FIGURE 2.65 ADENOCARCINOMA

A, Irregular stricture at the gastroesophageal junction. In the proximal portion of the stricture, a mass lesion is present in the barium column. The proximal esophagus is dilated. The lesion can be seen extending into the gastric fundus. **B**, An irregular, masslike lesion is outlined by the residual barium. **C**, The circumferential masslike lesion is adjacent to the liver and impinging on the gastric fundus. The lumen is significantly narrowed. **D**, The proximal tumor appears as a round, nodular, masslike lesion. Part of the tumor appears to have normal overlying squamous mucosa. **E**, Retroflex view of the proximal stomach demonstrates hemicircumferential ulceration with a mass lesion, typical of adenocarcinoma of the gastroesophageal junction.

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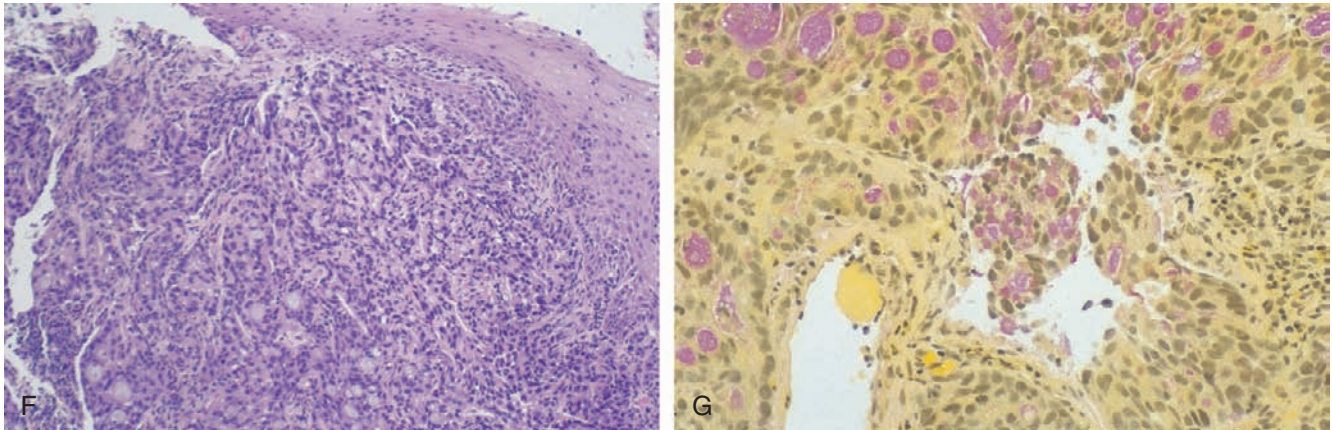


FIGURE 2.65 ADENOCARCINOMA

F, The overlying squamous epithelium is compressed by poorly differentiated tumor occupying the submucosa. **G**, The mucicarmine stain is useful in identifying mucin-producing adenocarcinoma.

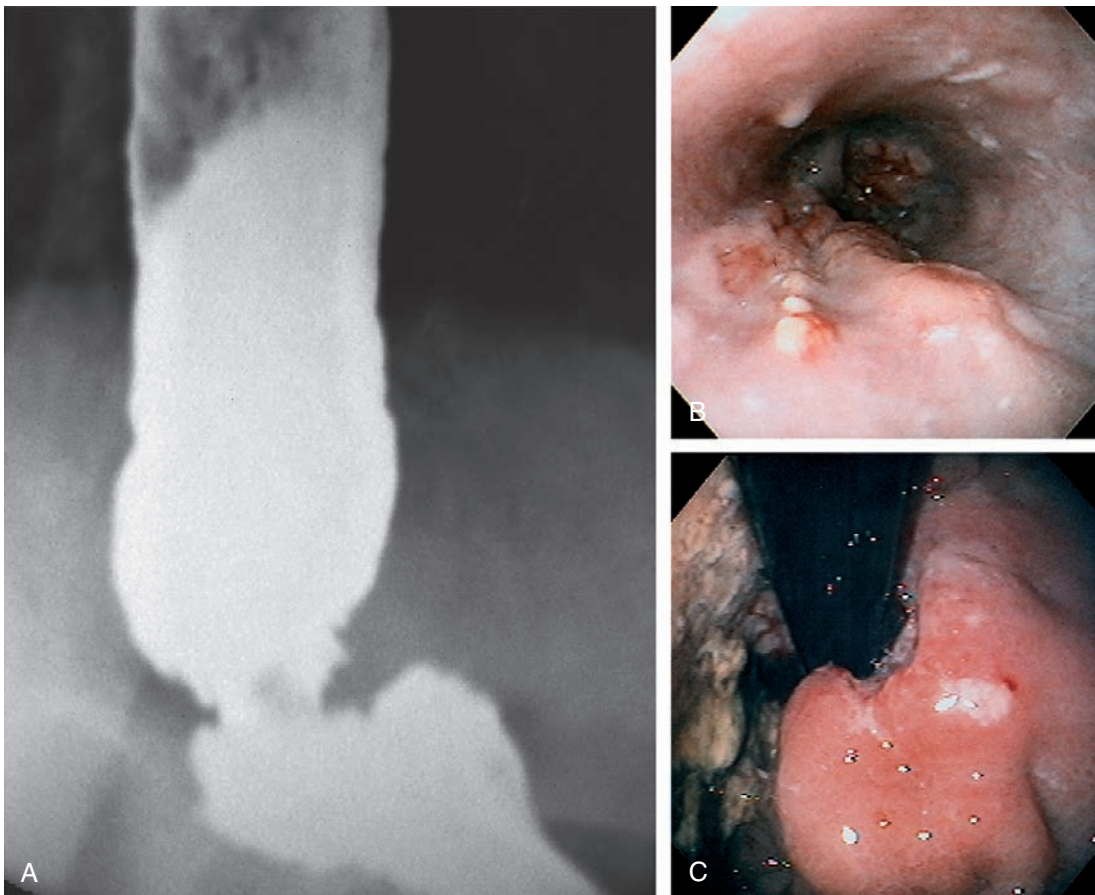


FIGURE 2.66 ADENOCARCINOMA WITH PROXIMAL SUBMUCOSAL EXTENSION

A, Dilated esophagus with a short, ulcerated stricture at the gastroesophageal junction. The distal esophageal mucosa is irregular. The proximal stomach appears to be involved, with an ulcerated masslike lesion. **B**, Nodularity of the distal esophagus with overlying areas of necrosis, resulting from proximal submucosal extension of adenocarcinoma at the gastroesophageal junction. Candidal plaques are also present as a result of the distal obstruction, with secondary stasis. **C**, Retroflex view of the cardia shows a hemicircumferential ulcerated mass.

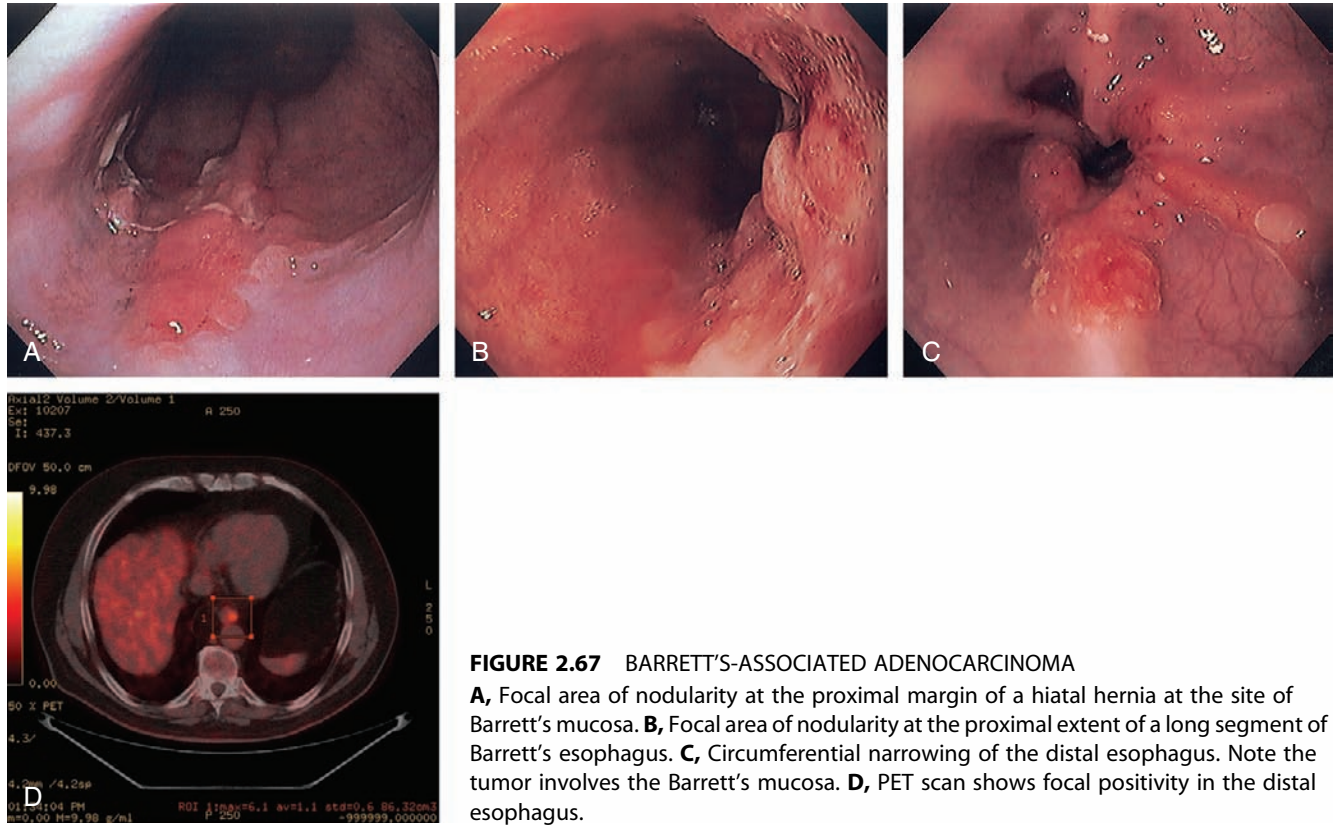


FIGURE 2.67 BARRETT'S-ASSOCIATED ADENOCARCINOMA

A, Focal area of nodularity at the proximal margin of a hiatal hernia at the site of Barrett's mucosa. **B**, Focal area of nodularity at the proximal extent of a long segment of Barrett's esophagus. **C**, Circumferential narrowing of the distal esophagus. Note the tumor involves the Barrett's mucosa. **D**, PET scan shows focal positivity in the distal esophagus.

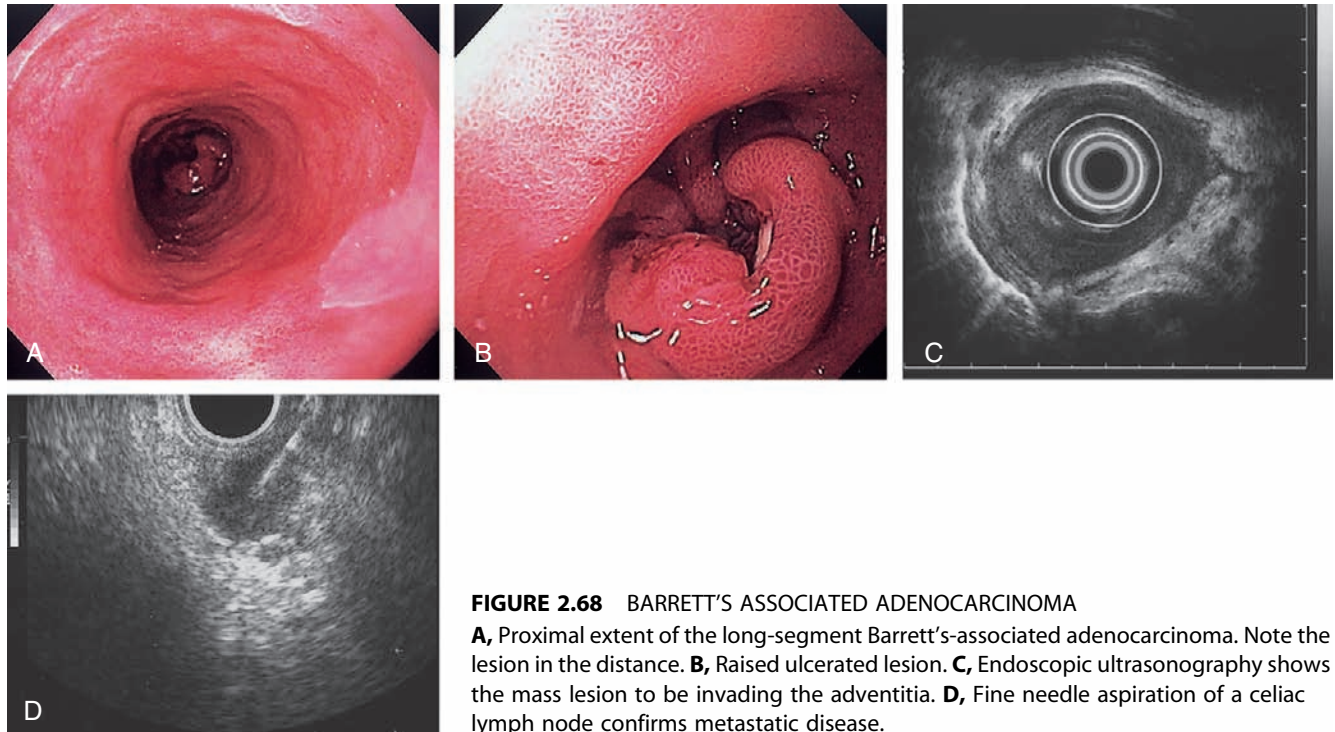


FIGURE 2.68 BARRETT'S ASSOCIATED ADENOCARCINOMA

A, Proximal extent of the long-segment Barrett's-associated adenocarcinoma. Note the lesion in the distance. **B**, Raised ulcerated lesion. **C**, Endoscopic ultrasonography shows the mass lesion to be invading the adventitia. **D**, Fine needle aspiration of a celiac lymph node confirms metastatic disease.

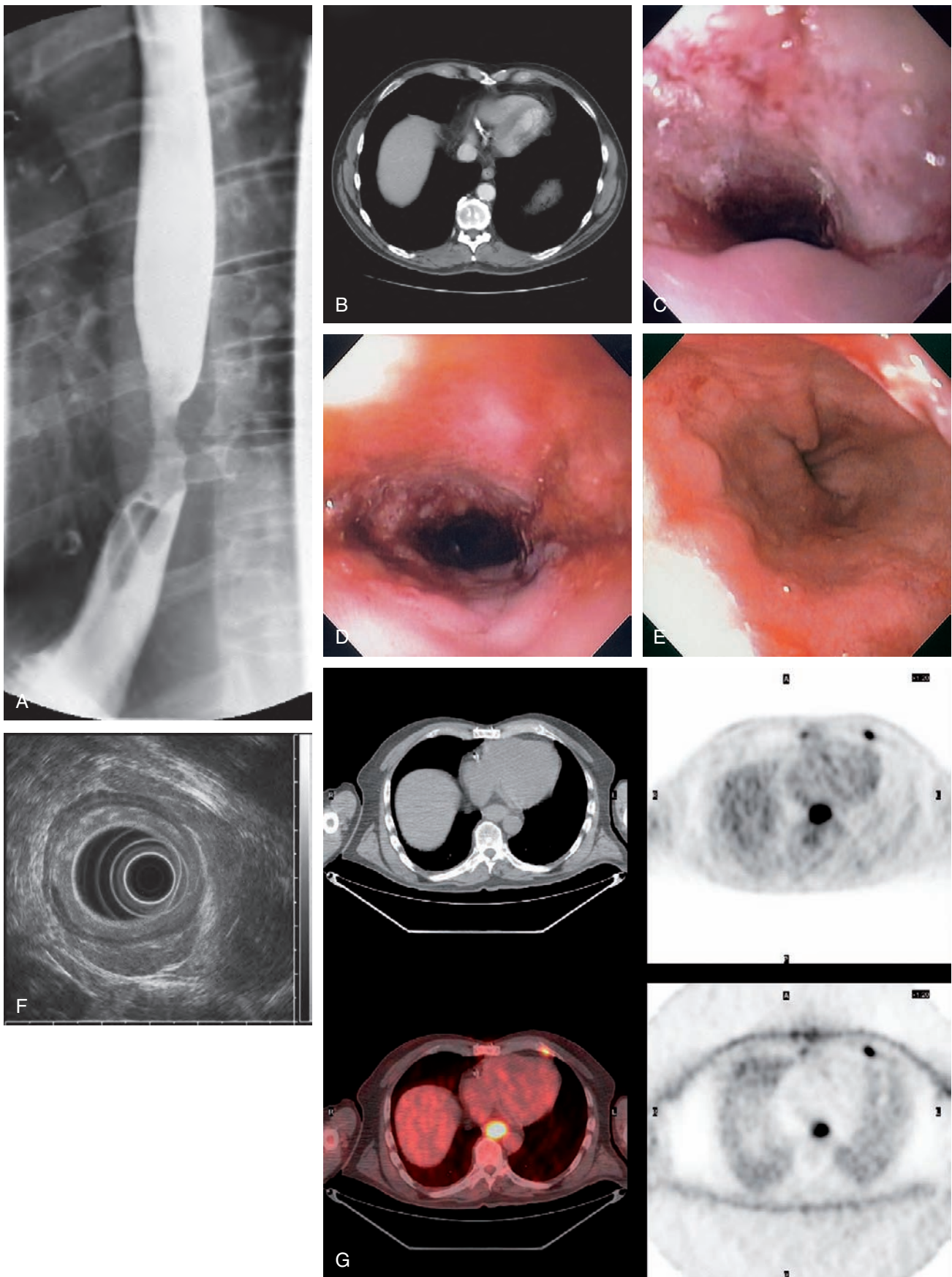


FIGURE 2.69 BARRETT'S-ASSOCIATED ADENOCARCINOMA

A, Stricture of the distal esophagus. **B**, Circumferential thickening of the distal esophagus. **C**, Hemicircumferential ulceration at the point of luminal narrowing in the distal esophagus. **D**, The area of neoplastic obstruction is now open after dilation. **E**, Note the distal extent of the tumor and the Barrett's mucosa in the distance. **F**, Endoscopic ultrasonography (EUS) shows invasion of muscularis and adventitia (T3 stage). **G**, PET scan demonstrates the tumor.

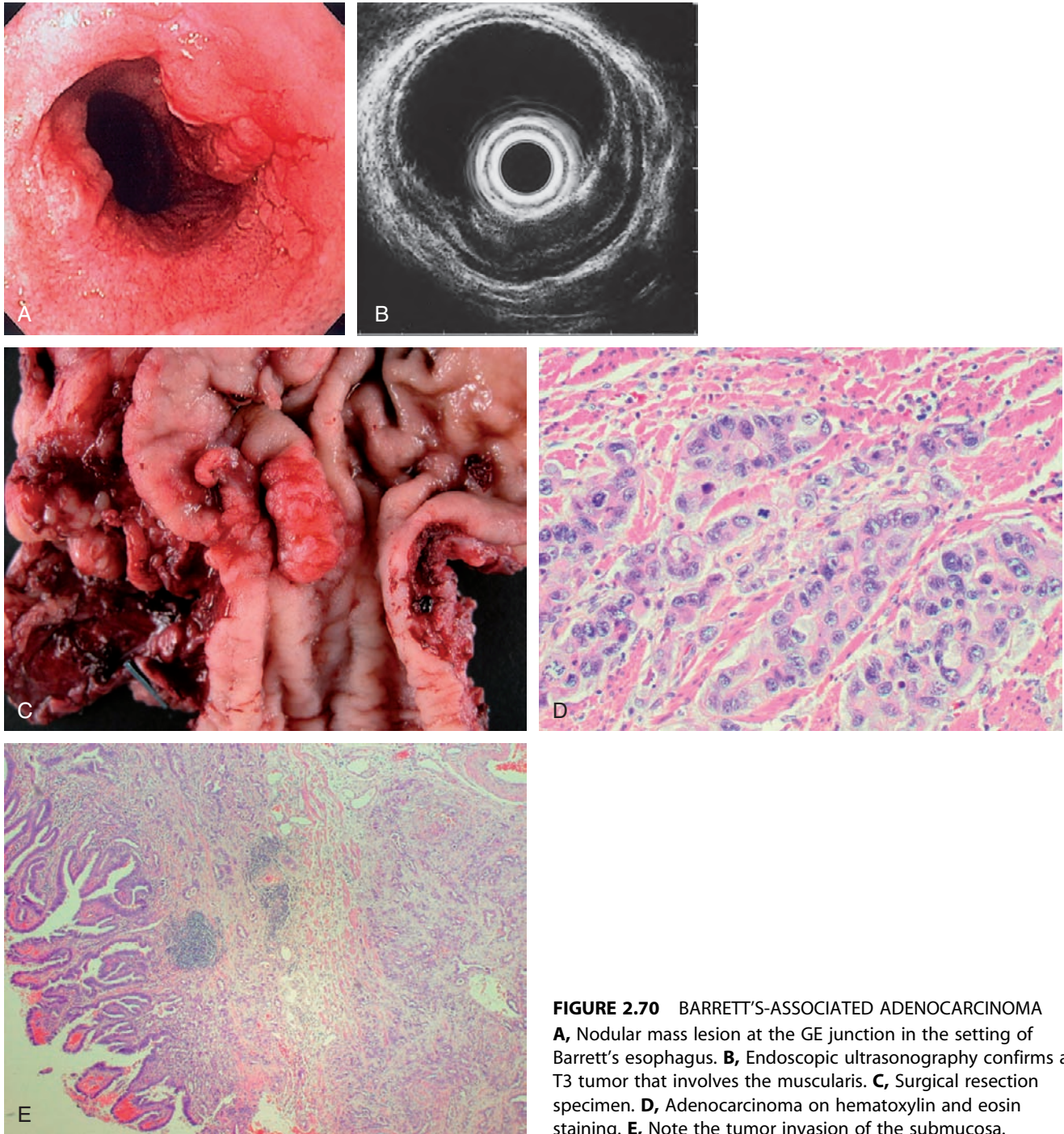


FIGURE 2.70 BARRETT'S-ASSOCIATED ADENOCARCINOMA
A, Nodular mass lesion at the GE junction in the setting of Barrett's esophagus. **B**, Endoscopic ultrasonography confirms a T3 tumor that involves the muscularis. **C**, Surgical resection specimen. **D**, Adenocarcinoma on hematoxylin and eosin staining. **E**, Note the tumor invasion of the submucosa.

**FIGURE 2.71** NON-HODGKIN'S LYMPHOMA

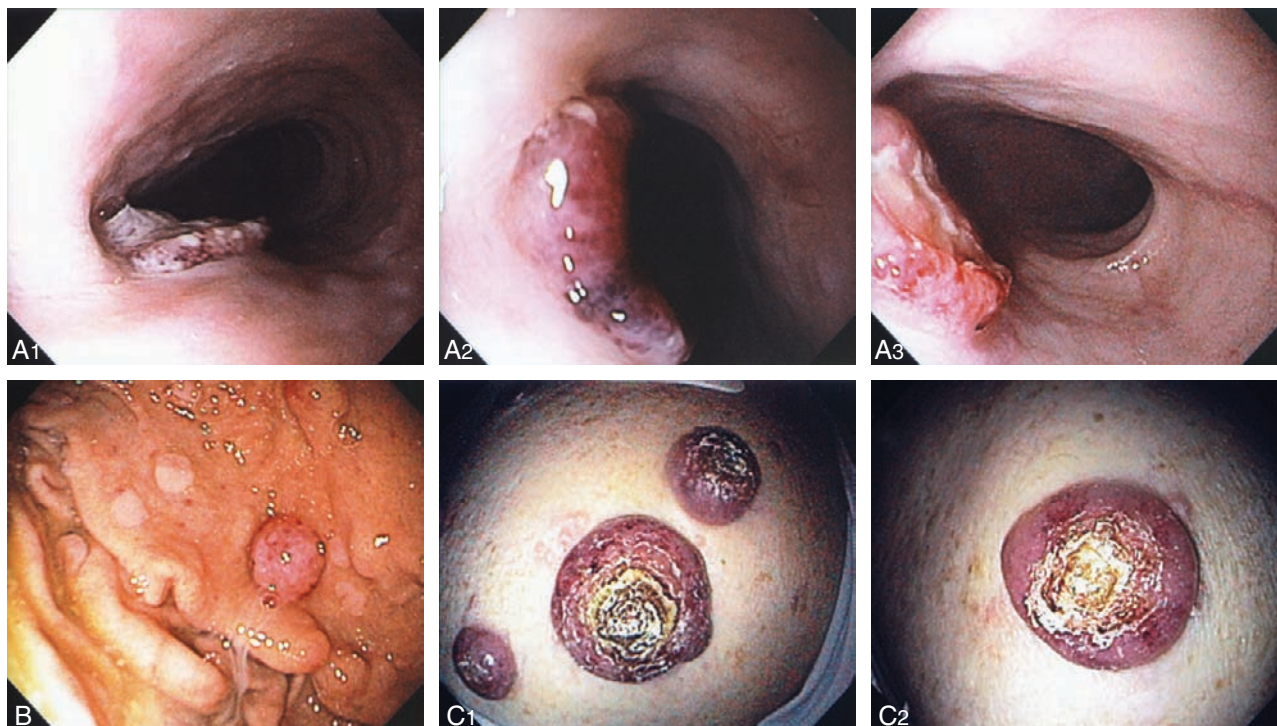
Well-circumscribed ulcerated "donut" lesion in the proximal esophagus.



Differential Diagnosis

Non-Hodgkin's Lymphoma (Figure 2.71)

Squamous cell carcinoma
 Metastatic tumors
 Melanoma
 Lung carcinoma
 Breast carcinoma
 Lymphoma

**FIGURE 2.72** BURKITT'S LYMPHOMA

A1, A2, Multiple well-circumscribed, raised, ulcerated dark lesions of the esophagus. There is central ulceration (**A3**). Note the resemblance to the gastric lesion (**B**) and to the nodular skin lesions (**C1, C2**).

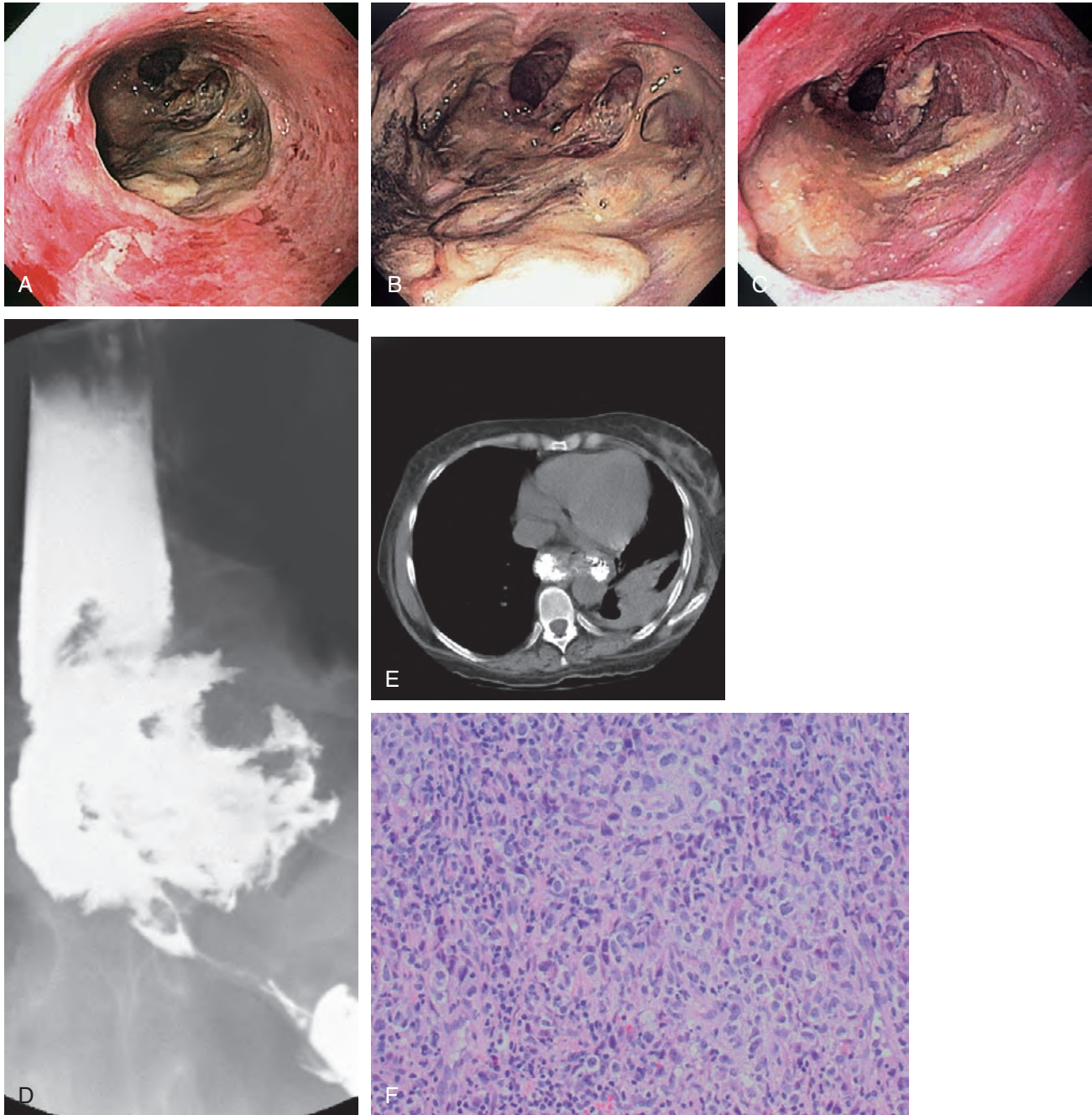


FIGURE 2.73 POST-TRANSPLANT LYMPHOPROLIFERATIVE DISORDER

A, Distal esophagitis with a large necrotic ulcerative lesion. **B**, Close-up shows the diffuse exudate. **C**, With washing, a large ulcerative lesion is identified. Note the luminal narrowing distally. **D**, Upper GI shows the large ulcer proximal to the GE junction with distal narrowing. **E**, CT shows the extent of the GE junction lesion. **F**, Hematoxylin and eosin stain shows infiltration with lymphocytes.

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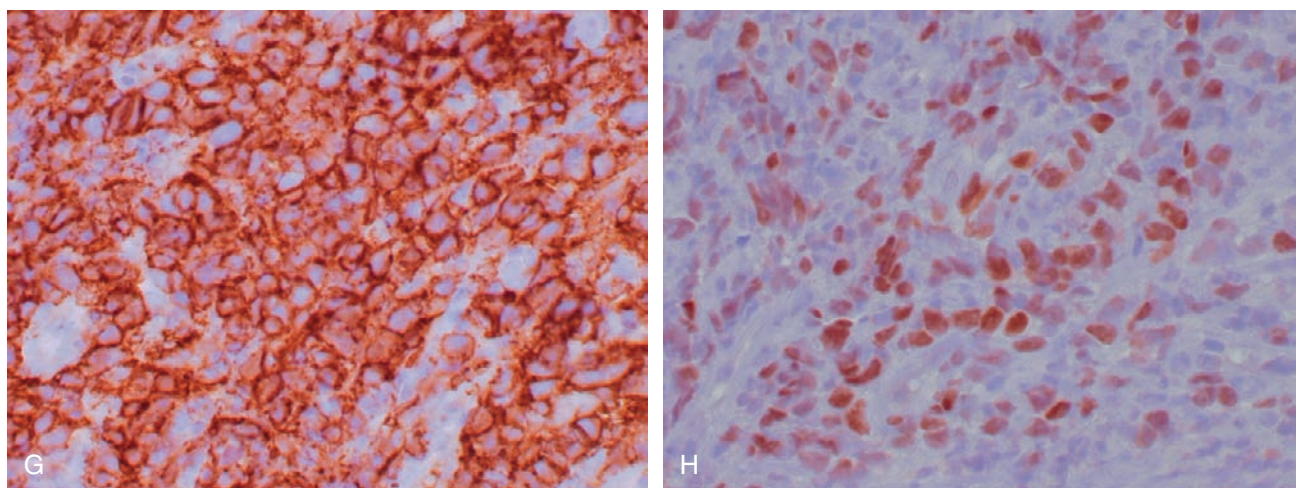


FIGURE 2.73 POST-TRANSPLANT LYMPHOPROLIFERATIVE DISORDER

G, CD20 immunostain is positive, indicating a population of B cells. **H**, Staining for Epstein-Barr virus is positive, typical for a lymphoproliferative disorder after transplant.

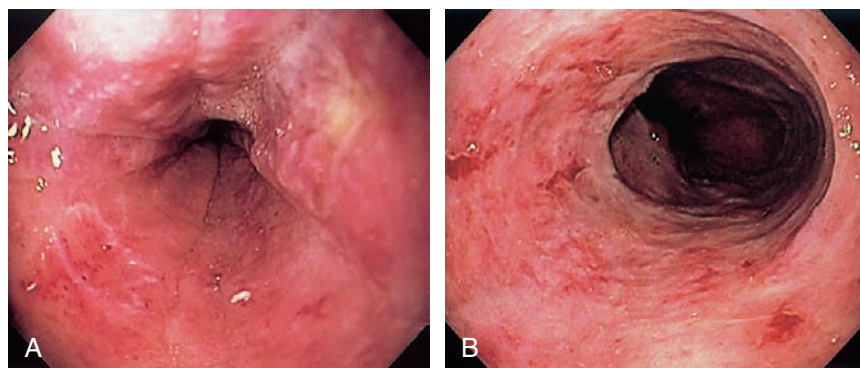
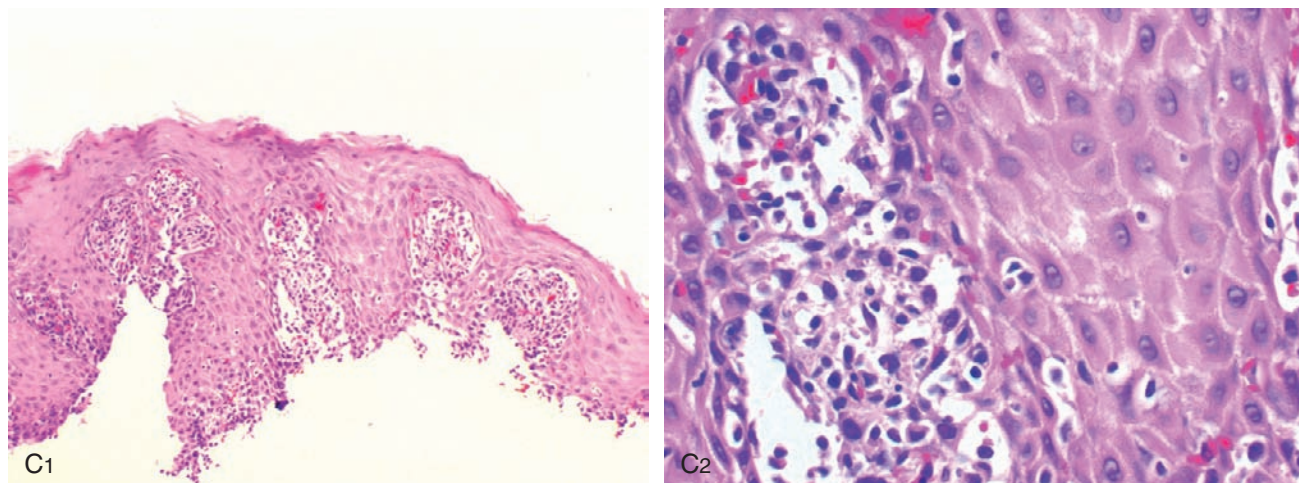


FIGURE 2.74 LEUKEMIA

A, B, Diffuse esophagitis with focal ulceration. **C1, C2**, The submucosa is infiltrated by lymphocytes. (See also Figures 1.37, 5.145, and 5.207.)



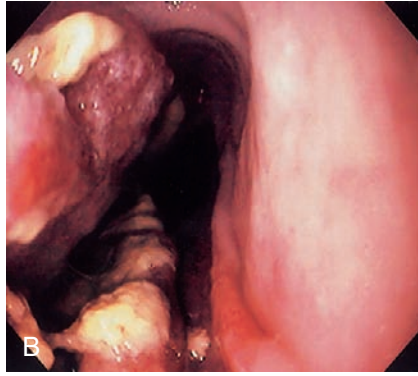
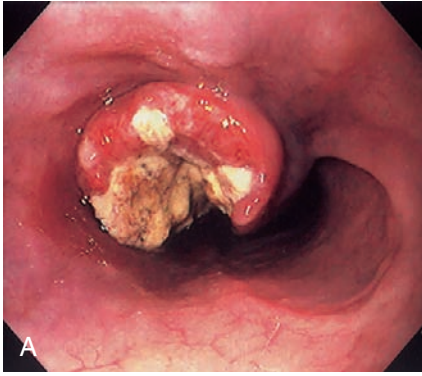


FIGURE 2.75 SMALL CELL CARCINOMA
A, Ulcerated heaped-up lesion in the distal esophagus. **B**, Close-up shows the hemircumferential excavated lesion.

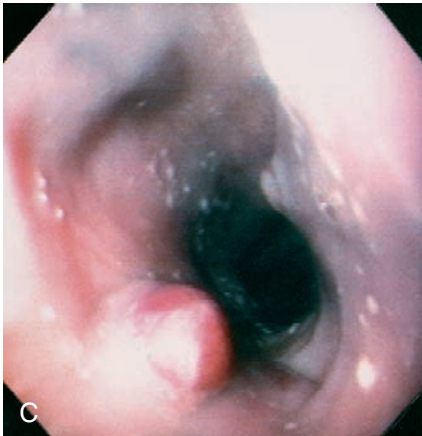
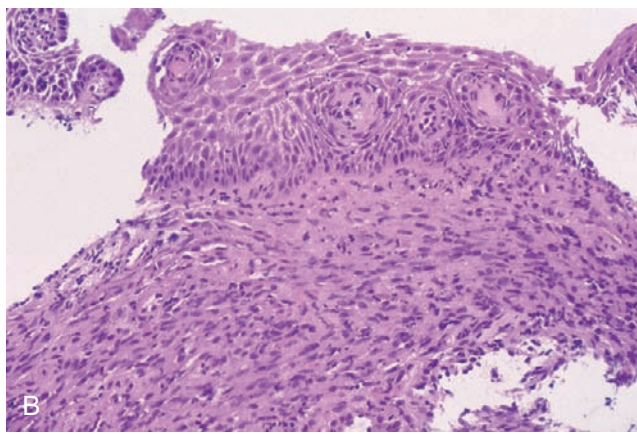
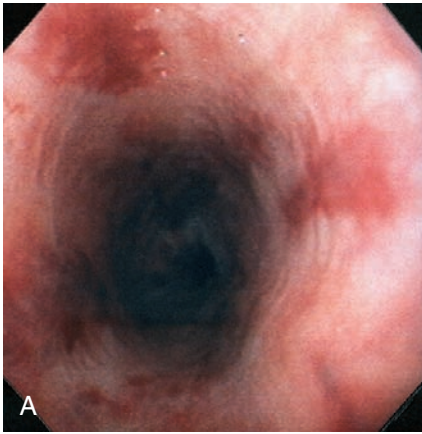


FIGURE 2.76 KAPOSI'S SARCOMA

A, Multiple flat, red plaques throughout the esophagus. **B**, Characteristic spindle cell stroma and slitlike vascular channels occupying the submucosa form a plaque-like lesion. **C**, Smooth nodular lesion bulging into the esophageal lumen.



FIGURE 2.77 GASTROINTESTINAL STROMAL TUMOR (GIST)

A, Large, masslike lesion, with obliteration of the esophageal lumen. **B**, Large mass lesion in the midesophagus with hypodense areas, suggesting tumor necrosis or debris in the esophagus. The esophageal lumen is narrowed. **C1**, Polypoid mass in the distal esophagus. Ulcer is present on the mass. **C2**, The distal esophageal lumen is obliterated by extrinsic compression. **C3**, The extrinsic compression is ulcerated. **C4**, Retroflex view of the proximal stomach confirms the mass lesion. **D**, The resection specimen shows a bulky, necrotic polypoid lesion.

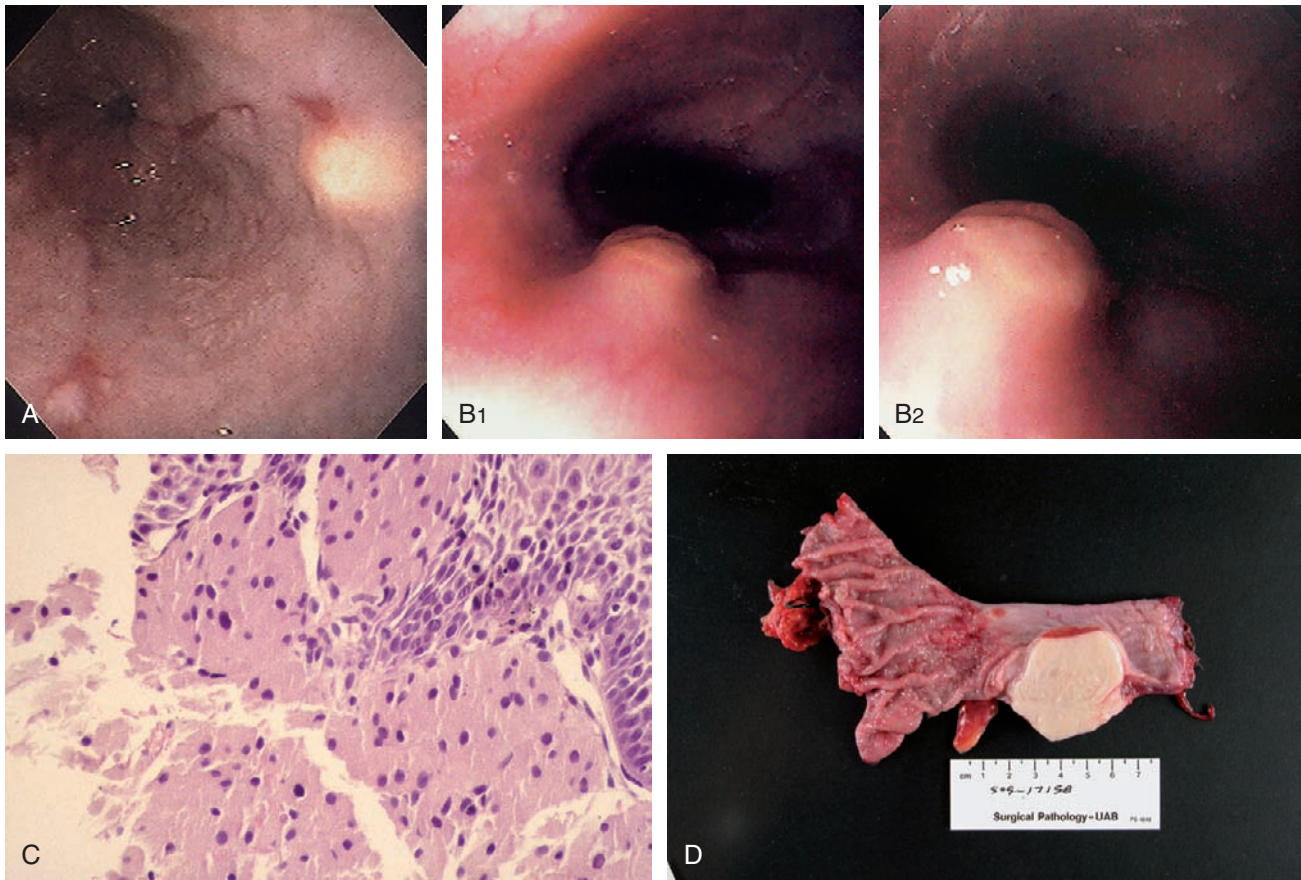


FIGURE 2.78 GRANULAR CELL TUMOR

A, Small, submucosal, yellowish nodule. Patient has associated reflux esophagitis. **B1**, **B2**, Raised submucosal lesion with yellowish discoloration at the mucosal surface. **C**, Amorphous pink material fills these large cells typical for granular cell tumors. **D**, Postoperative specimen shows a giant granular cell lesion. Note the yellow appearance of the tumor.

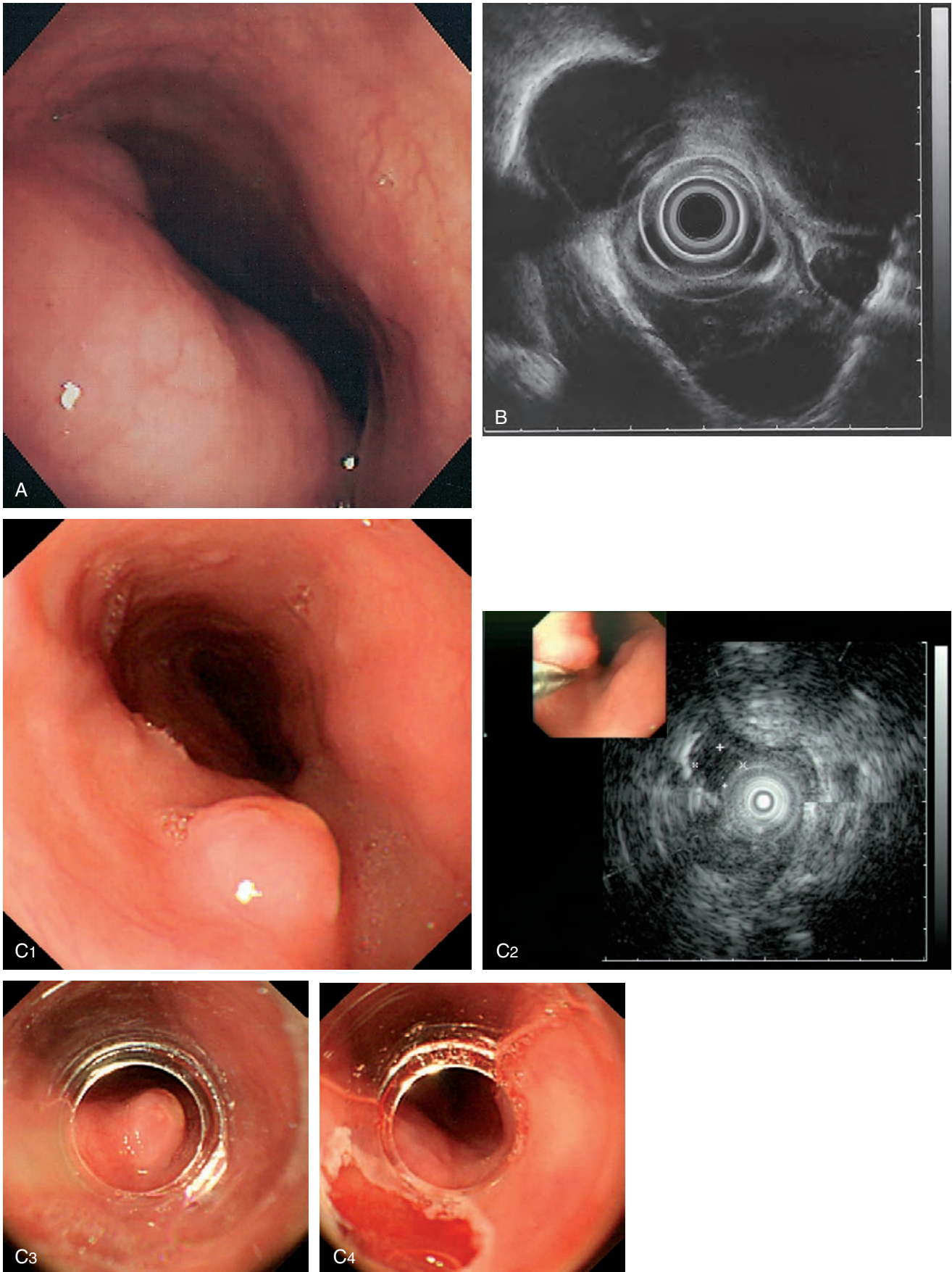


FIGURE 2.79 LEIOMYOMA

A, Large, submucosal, masslike lesion of the midesophagus. **B**, Endoscopic ultrasonography shows the lesion arises from the muscularis propria. **C1**, Submucosal lesion in the proximal esophagus. **C2**, Endoscopic ultrasonography with a probe demonstrates the lesion arises from the muscle layer diagnostic of leiomyoma. **C3**, A cap device is used for endoscopic mucosal resection. **C4**, Appearance of the mucosal defect after endoscopic mucosal resection.

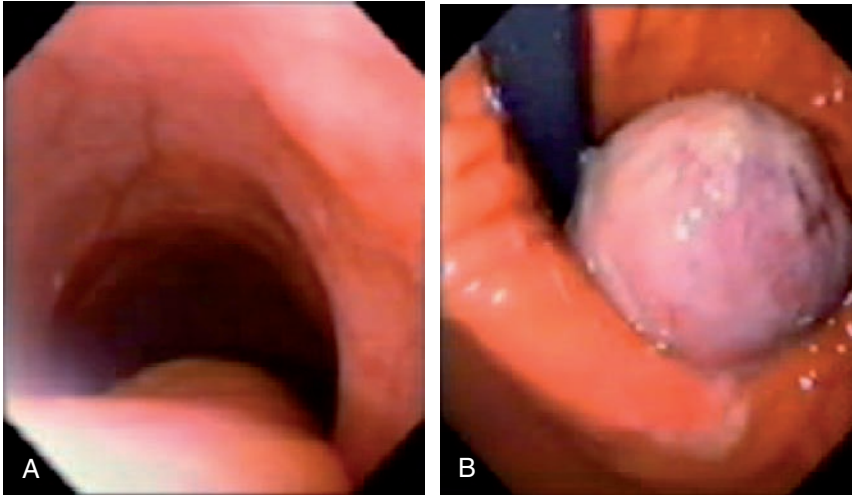


FIGURE 2.80 FIBROVASCULAR POLYP
A, Submucosal lesion in the midesophagus. The lesion extended to the GE junction where the polypoid nature of the lesions is appreciated on retroflexion
(B). (Courtesy B. Garcia-Perez, MD, Cartagena, Spain.)

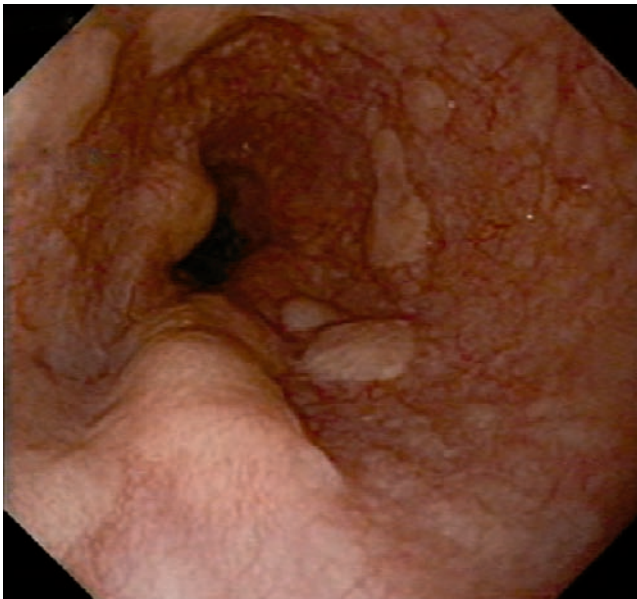


FIGURE 2.81 METASTATIC GASTRIC CANCER
 Multiple submucosal nodules in the distal esophagus in a patient with signet ring carcinoma of the stomach.

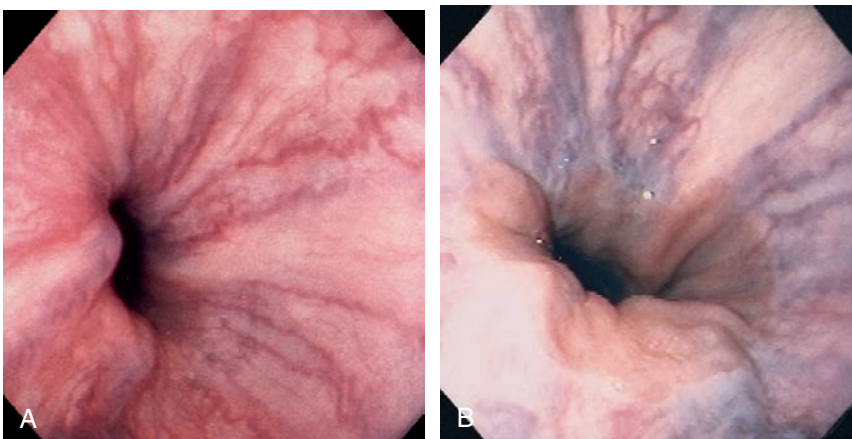


FIGURE 2.82 EARLY PORTAL HYPERTENSION
A, The vessels at the gastroesophageal junction are dilated and tortuous. **B**, With progression of portal hypertension, the varices become more apparent. The gastroesophageal junction is well demarcated, and the veins appear to originate from the gastroesophageal junction. Veins are not present in the gastric mucosa.



FIGURE 2.83 ESOPHAGEAL VARICES ON BARIUM ESOPHAGRAM
Tubular filling defects in the distal esophagus.

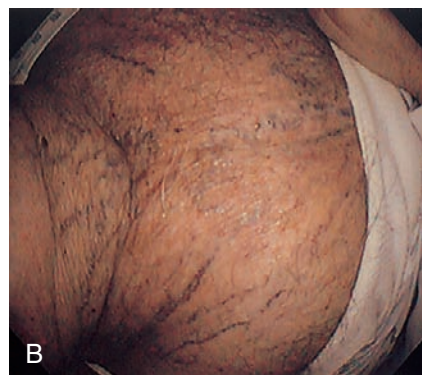


FIGURE 2.84 PROXIMAL VARICES

A, Small serpiginous veins in the proximal esophagus. Note the normal distal esophagus (**A2**). This patient had superior venacaval syndrome with marked varices on the neck and upper chest (**B**).

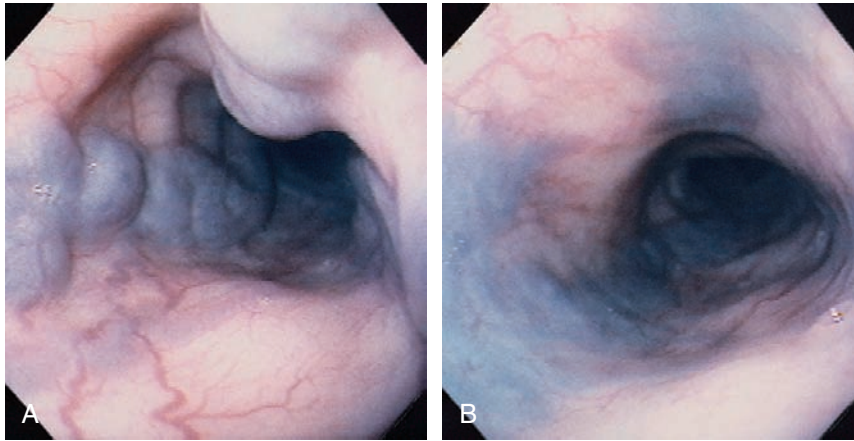


FIGURE 2.85 PROXIMAL ESOPHAGEAL VARICES

A, Dilated veins in the proximal esophagus. Small subepithelial vessels are also dilated and ectatic. **B**, With further insufflation, the esophageal veins flatten, but not completely.



FIGURE 2.86 RED COLOR SIGNS

High-risk bleeding stigmata on varices include red whale signs (**A**, **B**) and hematocystic spots (**C**).

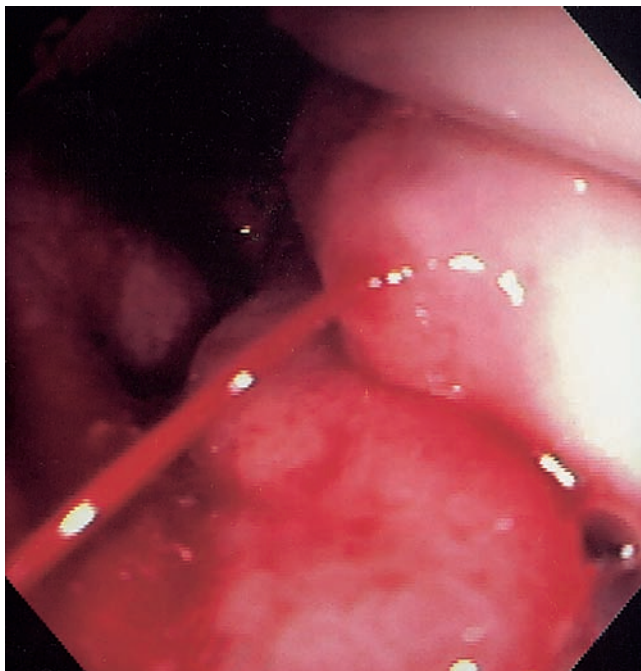


FIGURE 2.87 BLEEDING VARIX AT THE GASTROESOPHAGEAL JUNCTION

Active bleeding from this varix at the GE junction.

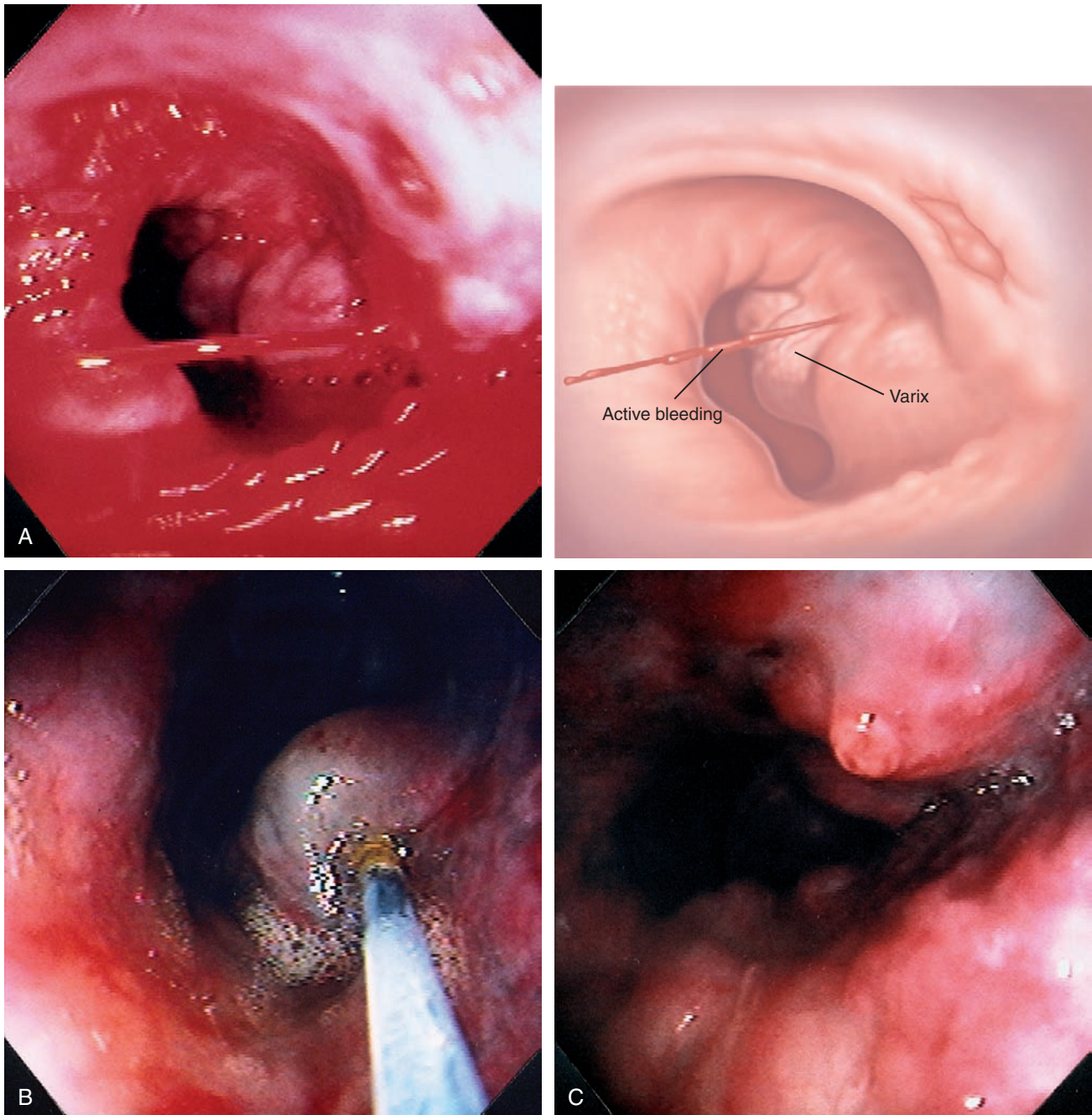


FIGURE 2.88 BLEEDING ESOPHAGEAL VARIX

A, Actively bleeding esophageal varix. **B**, Injection of sclerosant causes bleb formation, suggesting a submucosal rather than intravariceal injection. **C**, With further sclerotherapy, the bleeding stops; a white nipple appears at the bleeding point.

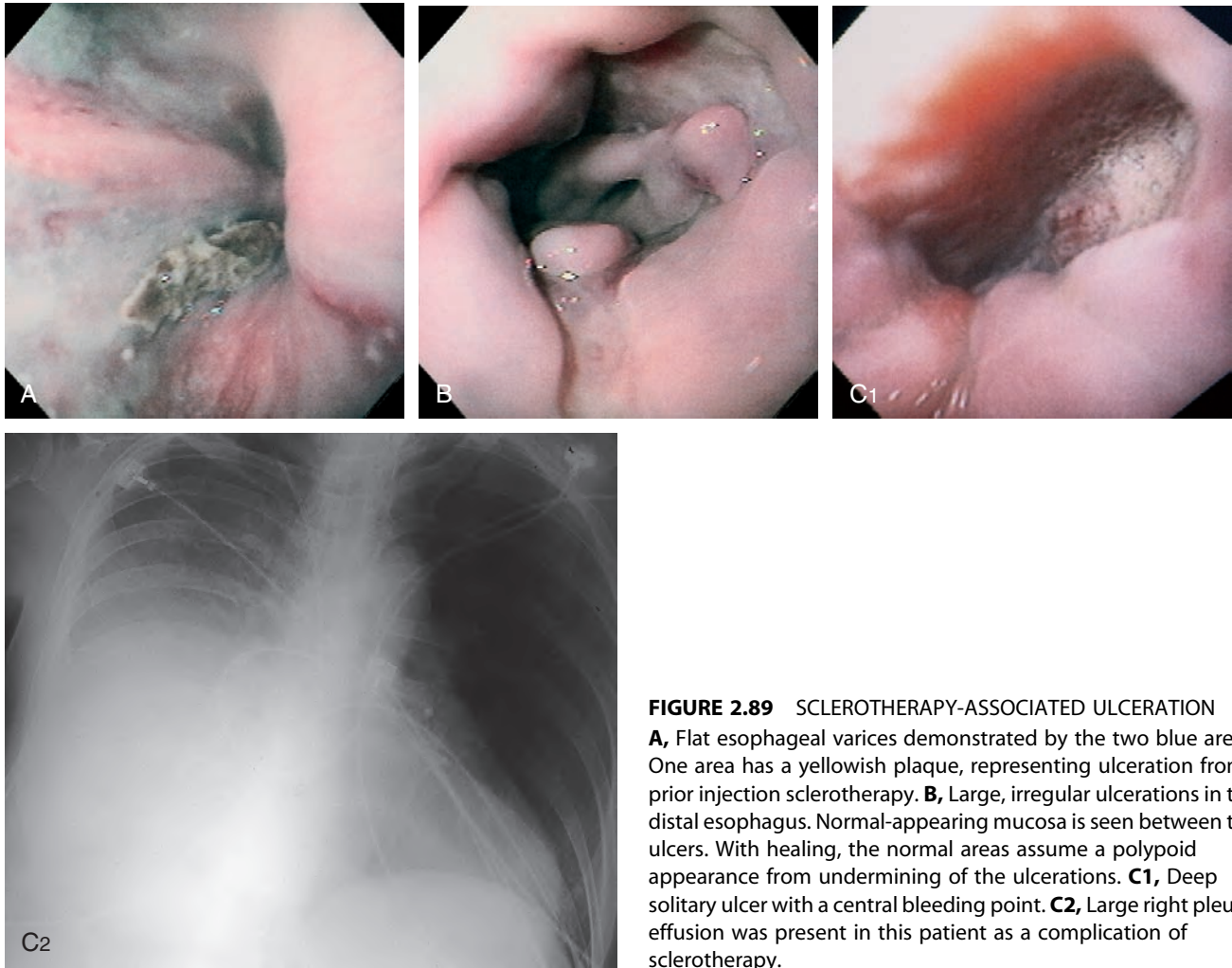


FIGURE 2.89 SCLEROTHERAPY-ASSOCIATED ULCERATION

A, Flat esophageal varices demonstrated by the two blue areas. One area has a yellowish plaque, representing ulceration from prior injection sclerotherapy. **B**, Large, irregular ulcerations in the distal esophagus. Normal-appearing mucosa is seen between the ulcers. With healing, the normal areas assume a polypoid appearance from undermining of the ulcerations. **C1**, Deep solitary ulcer with a central bleeding point. **C2**, Large right pleural effusion was present in this patient as a complication of sclerotherapy.

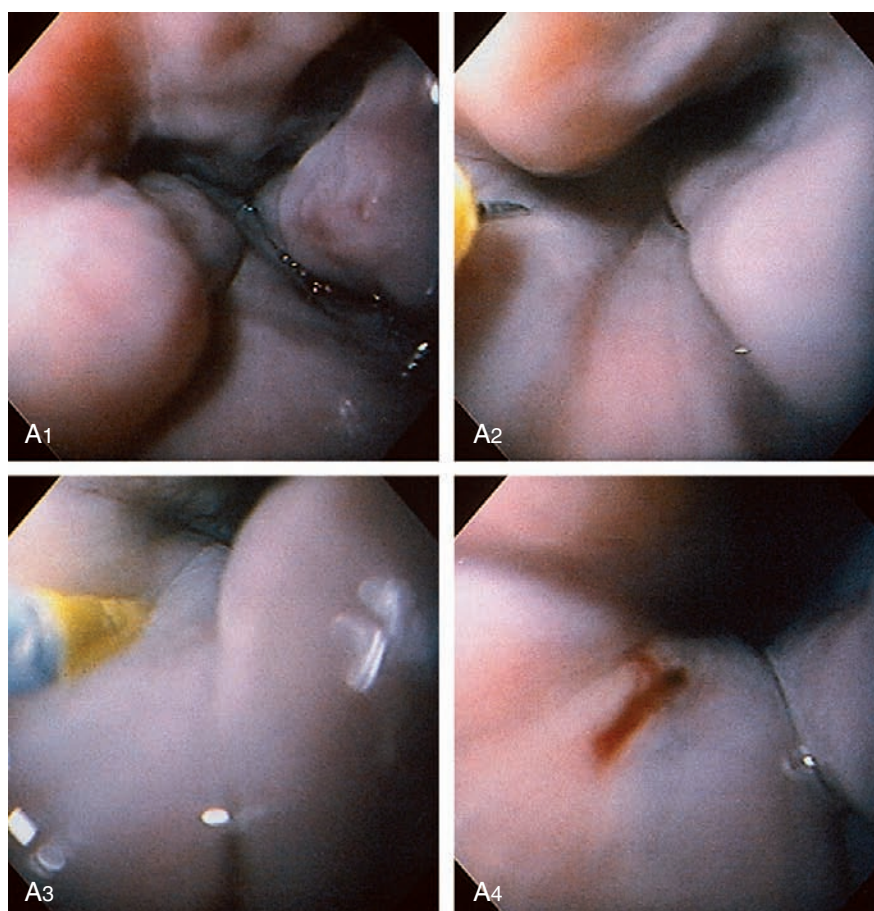


FIGURE 2.90 VARICEAL SCLEROTHERAPY

Varices with red color signs in the distal esophagus (**A1**). The sclerotherapy needle is placed into the lumen (**A2**) and directed toward a varix. The needle is then advanced into the varix and sclerosant is injected (**A3**). A small amount of oozing occurs after injection, marking the injection site (**A4**). **B**, After sclerotherapy, the varix appears to have a dark blue color.



FIGURE 2.91 VARICEAL SCLEROTHERAPY

After sclerotherapy, a deep bluish discoloration outlines the sclerosed varix. This color change probably represents either variceal thrombosis or stasis of blood. A small amount of blood is oozing from the injection site.

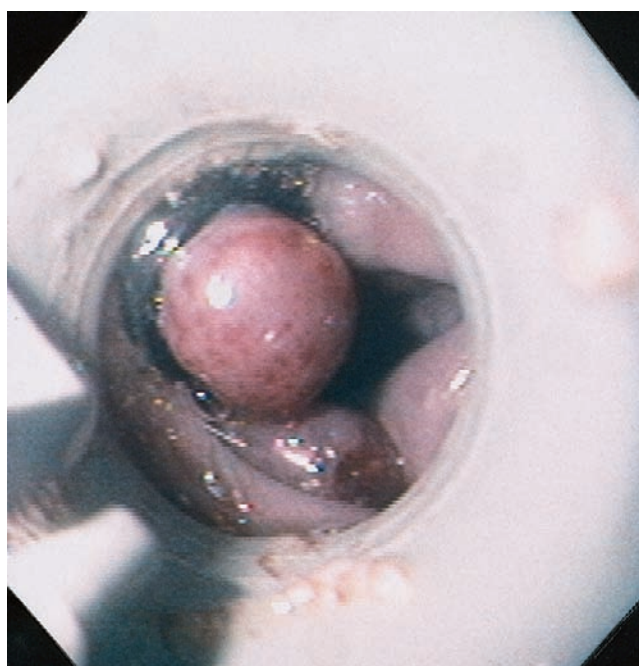


FIGURE 2.92 ESOPHAGEAL VARICEAL BANDING

View of an esophageal varix through an early banding device. The varix appears round, with the band encircling it. Two varices that have not been banded are on the contralateral wall.

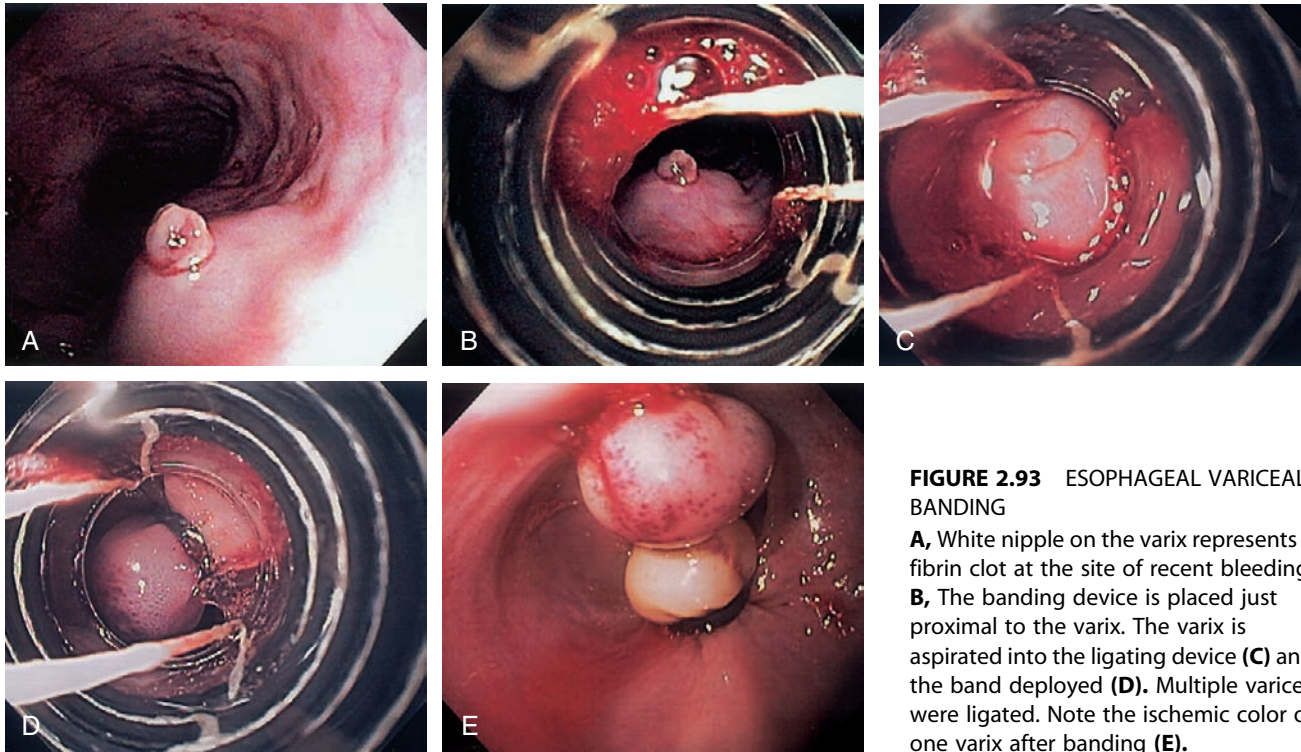


FIGURE 2.93 ESOPHAGEAL VARICEAL BANDING

A, White nipple on the varix represents a fibrin clot at the site of recent bleeding. **B**, The banding device is placed just proximal to the varix. The varix is aspirated into the ligating device (**C**) and the band deployed (**D**). Multiple varices were ligated. Note the ischemic color of one varix after banding (**E**).

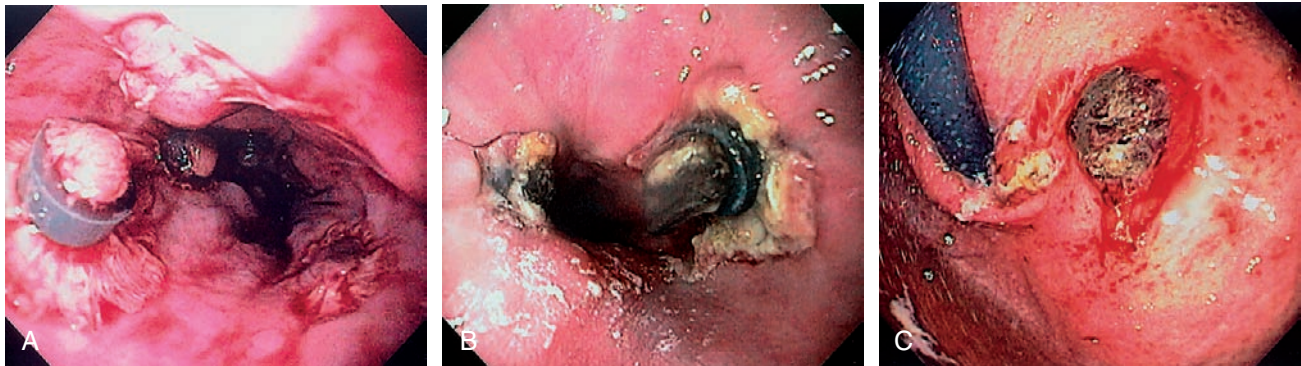


FIGURE 2.94 RECENT BANDING

A, Areas with the bands have spontaneously fallen off, leaving ulceration alongside persistent bands. **B**, More extensive ulceration at the GE junction at the site of band placement. **C**, Ulceration just distal to the GE junction at the site of band placement.

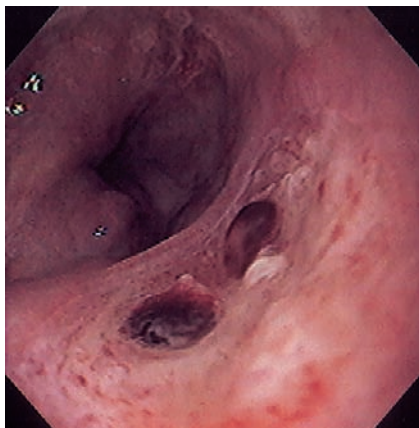
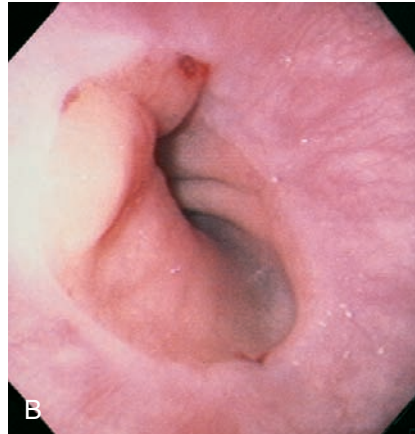
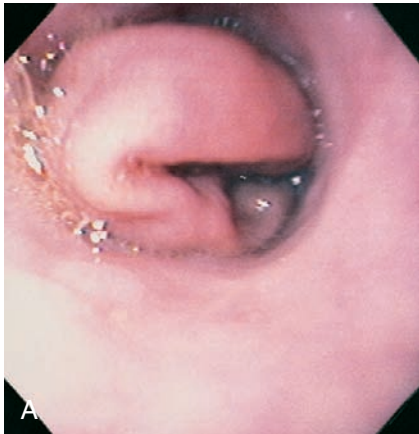


FIGURE 2.95 POST-BANDING ULCER WITH RECENT BLEEDING

Large ulceration in the distal esophagus with two flat clots at the site of bleeding from a banding-associated ulcer.

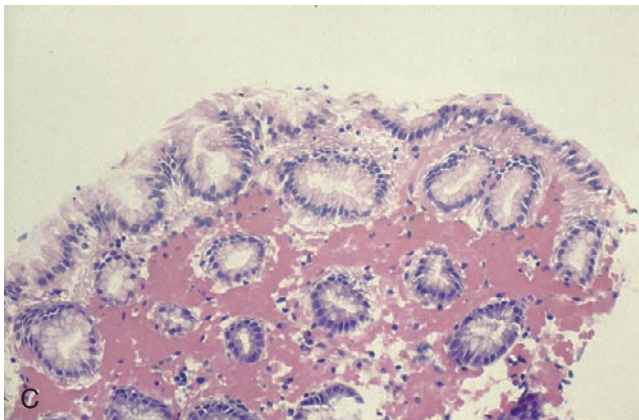
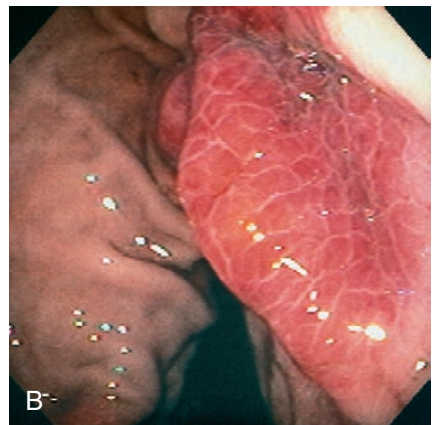
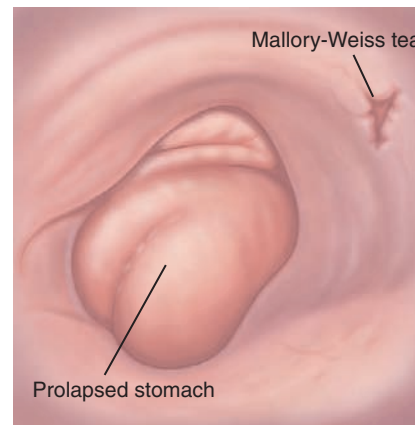
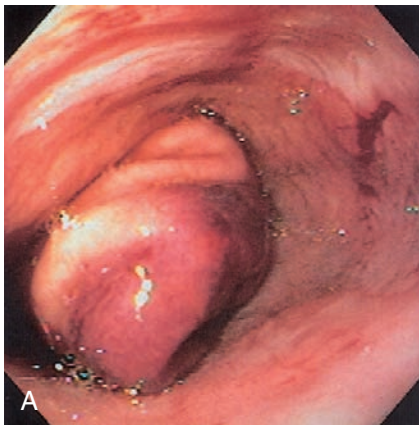
**FIGURE 2.96** POST-BANDING SCAR

White stellate area in the distal esophagus representing a site of prior banding.

**FIGURE 2.97** GASTRIC PROLAPSE INDUCING A MALLORY-WEISS TEAR

A, With retching, prolapse of gastric mucosa comes from the gastroesophageal junction.

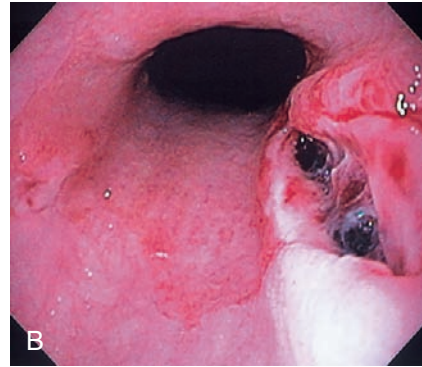
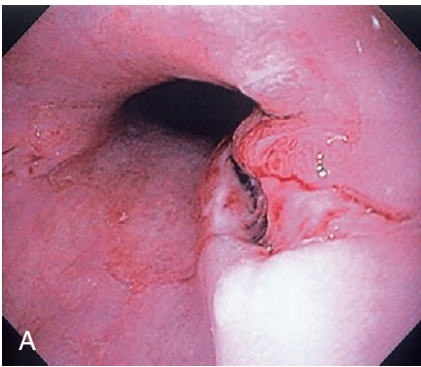
B, After retraction of the stomach, two areas of subepithelial hemorrhage with one small tear are seen at the gastroesophageal junction.

**FIGURE 2.98** GASTRIC LESION ASSOCIATED WITH RETCHING

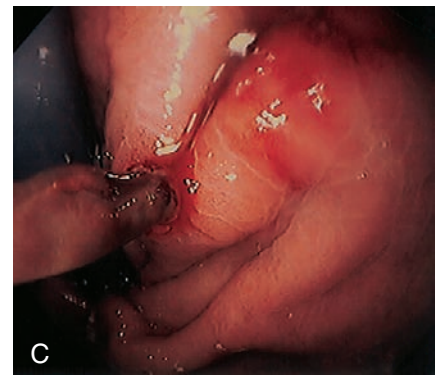
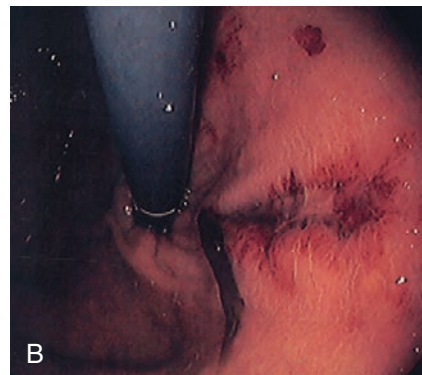
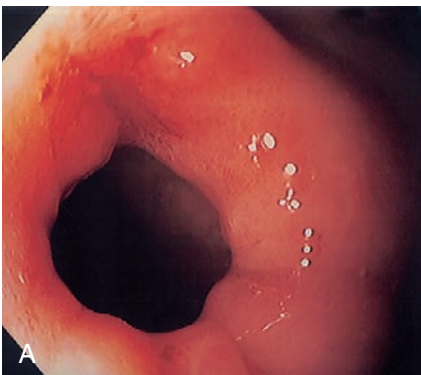
A, With repetitive emesis, gastric subepithelial hemorrhage occurs. This hemorrhagic prolapsed mucosa mimics some unusual mass lesions. A small Mallory-Weiss tear is also present on the lesser curve portion of the distal esophagus. **B**, With retraction of the stomach, the hemorrhagic area is well circumscribed, with accentuation of the areae gastricae. **C**, Diffuse subepithelial hemorrhage of otherwise normal gastric mucosa.

**FIGURE 2.99** ESOPHAGEAL MALLORY-WEISS TEAR

Tear at the gastroesophageal junction extending proximally, without involvement of the gastric mucosa. The base of the lesion is hemorrhagic from recent bleeding. The most common location for a Mallory-Weiss tear is on the lesser curvature side of the gastroesophageal junction.

**FIGURE 2.100** ESOPHAGOGASTRIC MALLORY-WEISS TEAR

Long, linear tear involving both the esophageal and gastric mucosae. The surrounding area is nodular, and the base of the tear is hemorrhagic. **A**, Linear tear along the lesser curve in the distal esophagus with heaped-up margins. **B**, The tear extends into a small hiatal hernia.

**FIGURE 2.101** MALLORY-WEISS TEAR WITH FIBRIN CLOT

A, Small tear at the GE junction. **B**, The tear extends along the lesser curve into the cardia. Note the adherent clot. **C**, On close-up, a fibrin clot with active oozing is apparent.

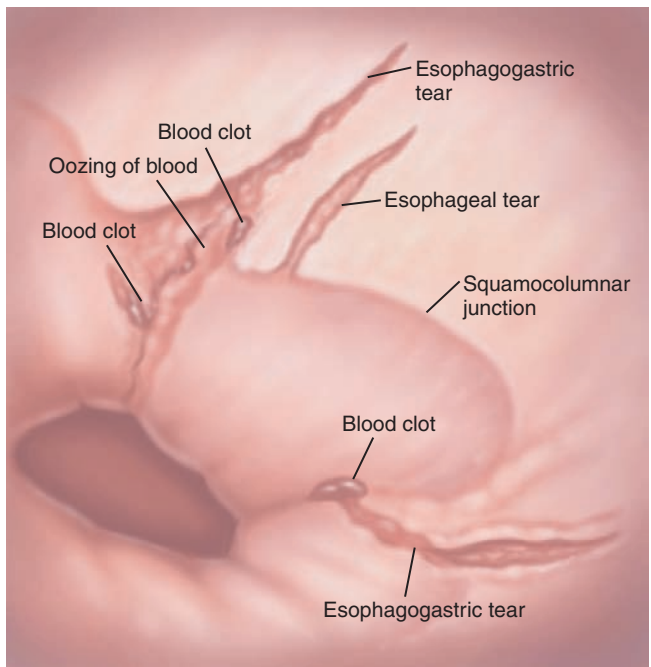
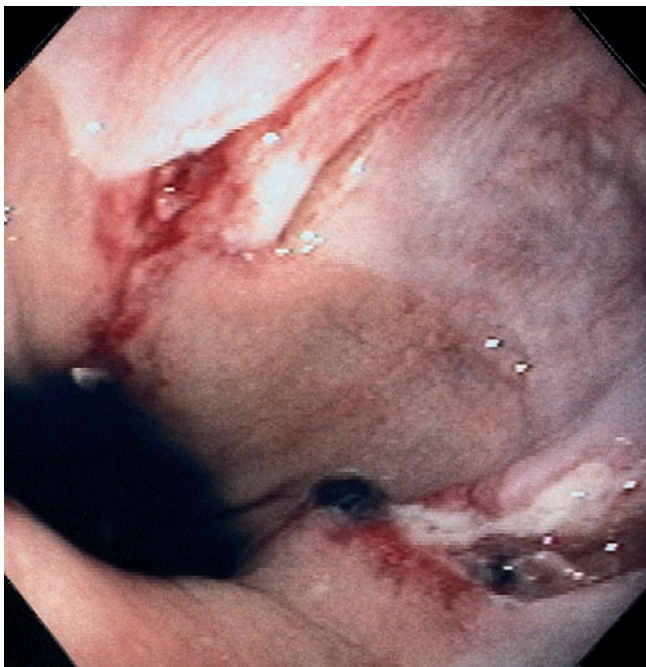


FIGURE 2.102 MULTIPLE MALLORY-WEISS TEARS

Two large, deep tears involve the esophagus and stomach, with overlying blood clots. One area of active oozing is present. One smaller tear involves only the squamous mucosa.

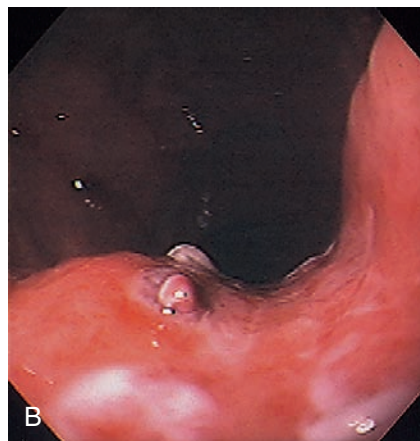
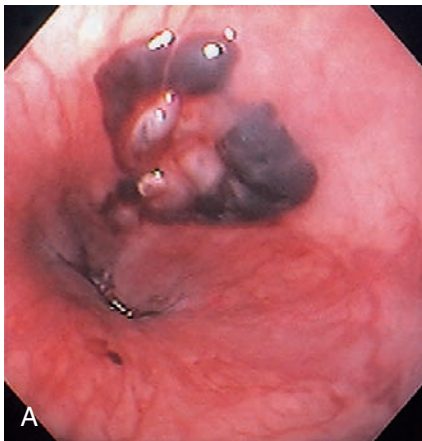


FIGURE 2.103 MALLORY-WEISS TEAR AND ESOPHAGEAL HEMATOMA

A, Multiple hematomas just proximal to the GE junction on the lesser curve. **B**, The tear extends into the cardia along the lesser curvature. A visible vessel is present.

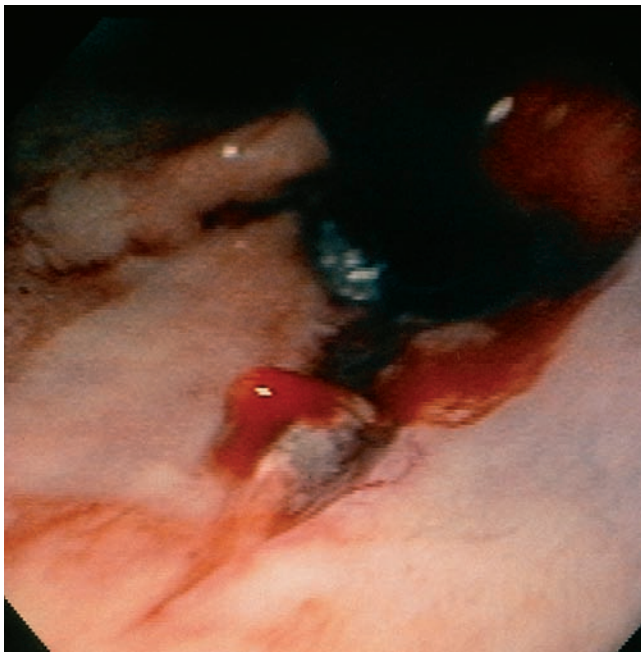


FIGURE 2.104 BLEEDING MALLORY-WEISS TEAR

Retroflex view demonstrates an irregular tear, with blood oozing from one of the margins.

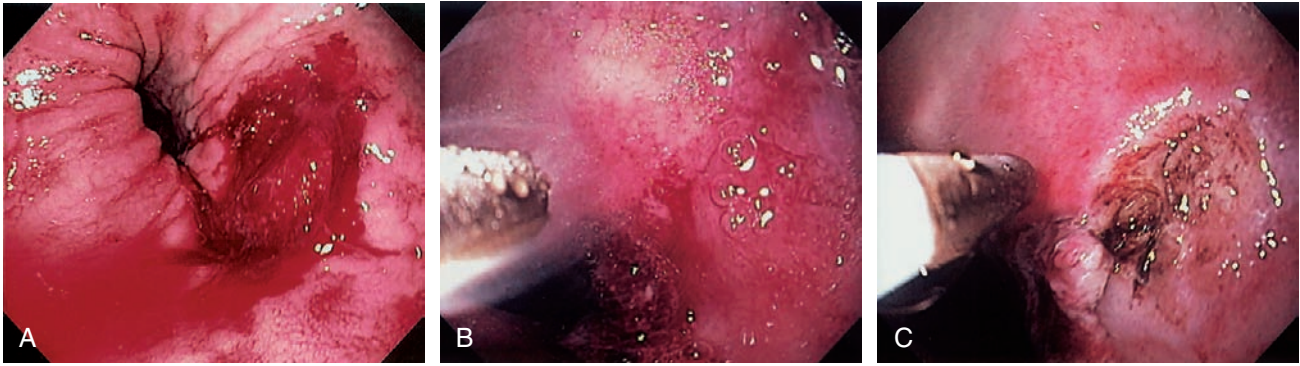


FIGURE 2.105 MALLORY-WEISS TEAR: THERMAL PROBE THERAPY

A, Fresh blood clot and active oozing at the GE junction. **B**, The heater probe is used to wash the clot demonstrating active bleeding. **C**, The thermal probe is applied to the area, resulting in eschar and hemostasis.

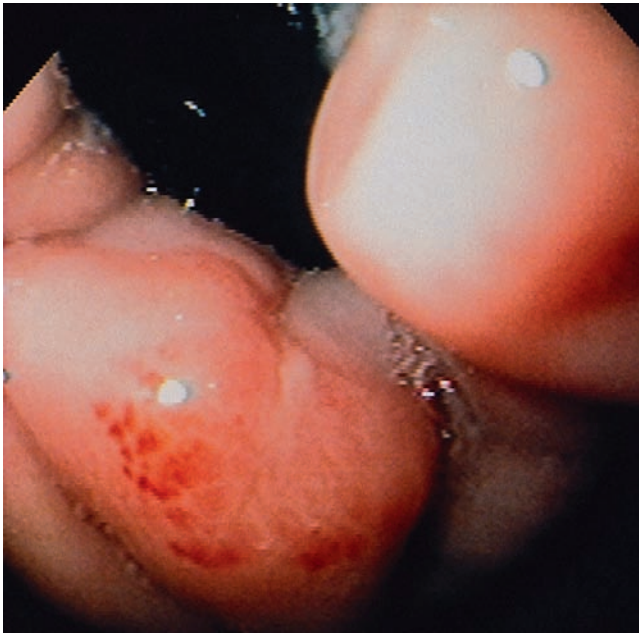
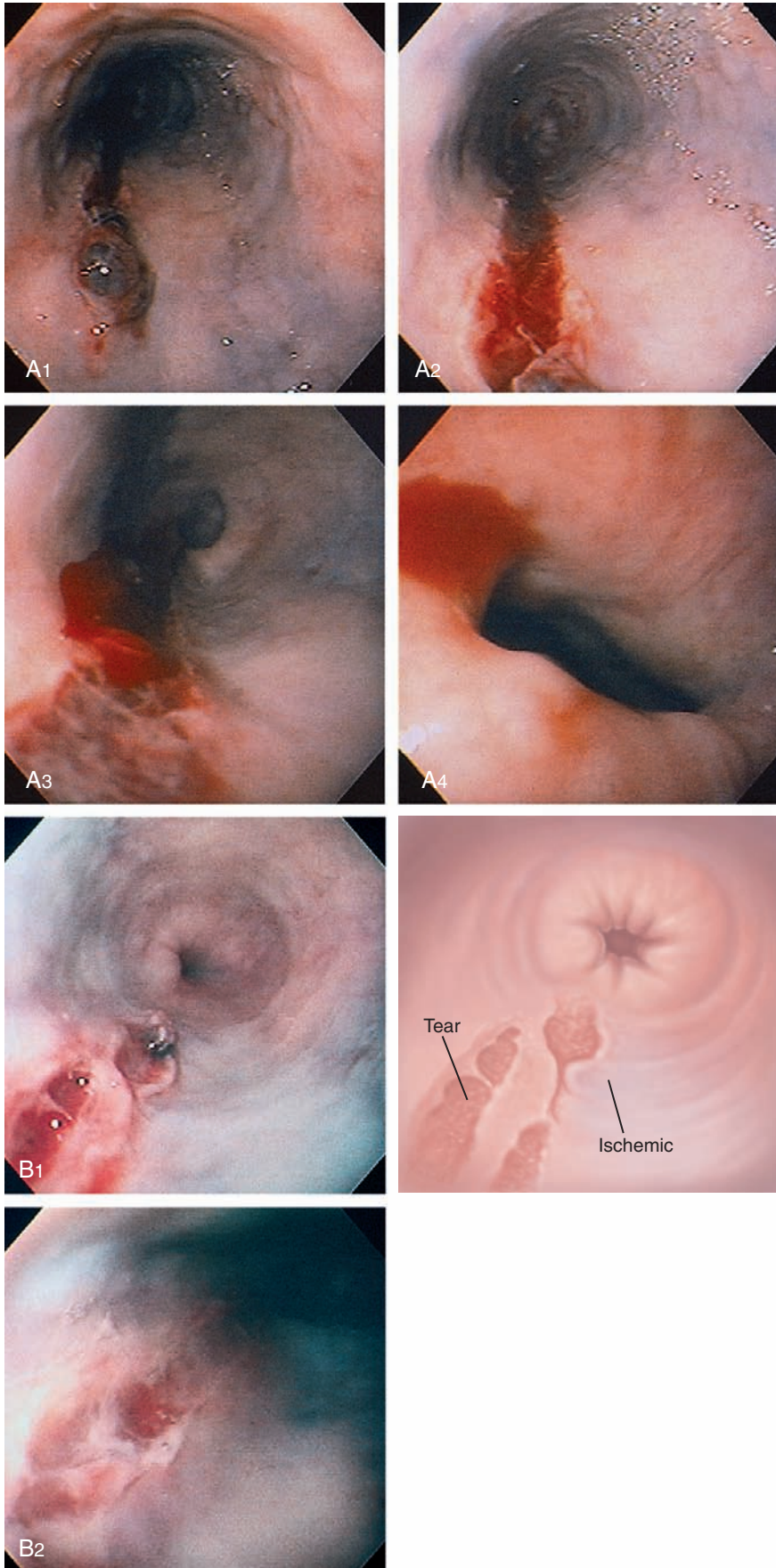


FIGURE 2.106 HEALING MALLORY-WEISS TEAR

Retroflex view shows shallow exudate with surrounding subepithelial hemorrhage, characteristic of a healing Mallory-Weiss tear. The endoscopic photograph was taken 6 days after the clinical event.

**FIGURE 2.107** ESOPHAGEAL TEAR

The proximal margin of the lesion has an overlying blood clot (**A1**). The lesion is linear with a hemorrhagic base (**A2**) and an active bleeding point (**A3**). The lesion does not extend to the gastroesophageal junction (**A4**). Epinephrine and sodium morrhuate were injected into the lesion for hemostasis. After injection, a well-demarcated area with a bluish hue appeared (**B1**), resulting from ischemia. Note that the base of the tear is now bland (**B2**).

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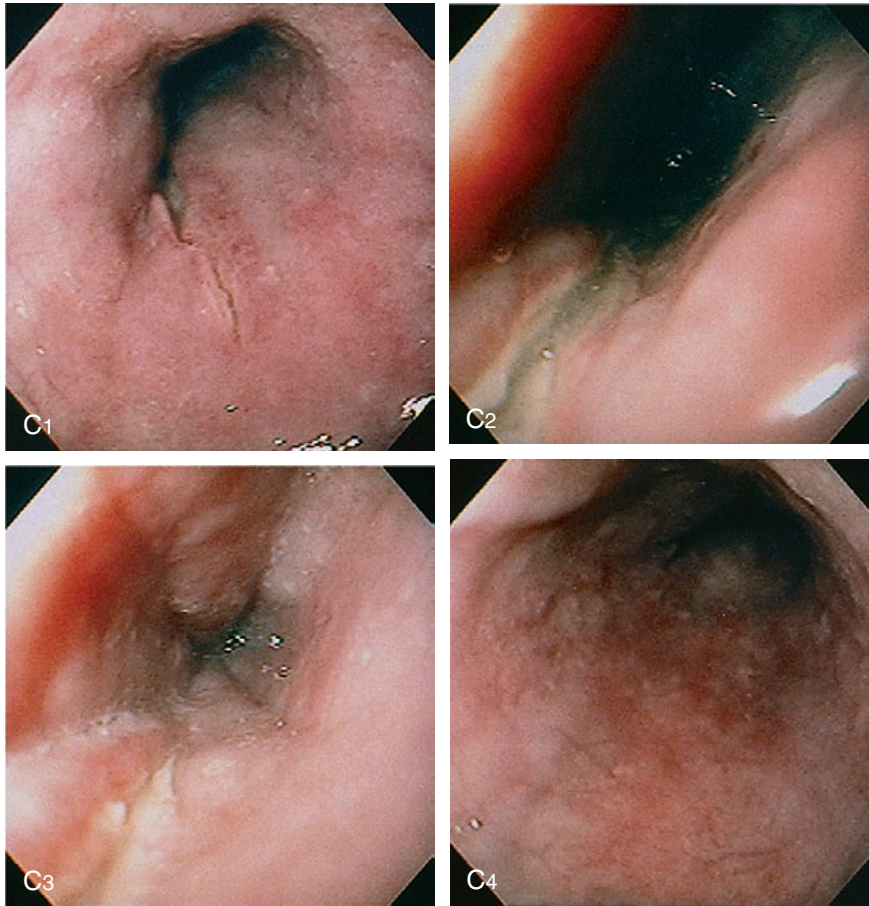


FIGURE 2.107 ESOPHAGEAL TEAR
C, Four days later, the esophageal mucosa appears abnormal. The tear is well shown (**C1-C3**). Biopsy of the mucosa demonstrated severe acute inflammation, probably resulting from ischemia secondary to the injection therapy (**C4**).

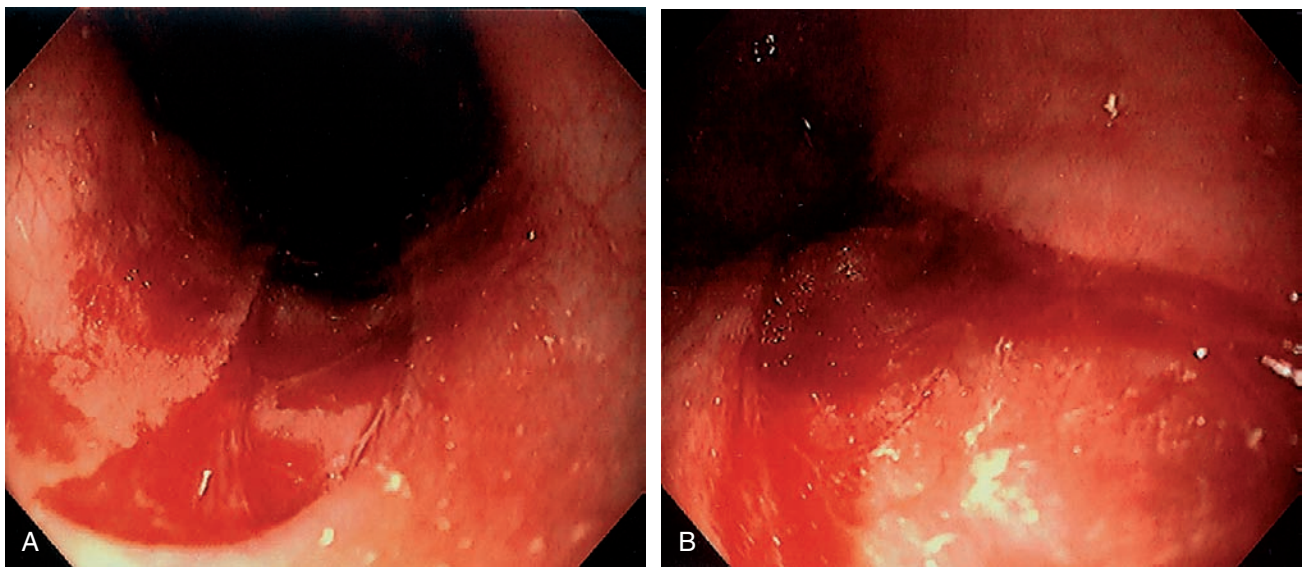


FIGURE 2.108 ESOPHAGEAL TEAR

A, Large tear extending proximally from the GE junction. **B**, The lesion is shallow with well-circumscribed margins.

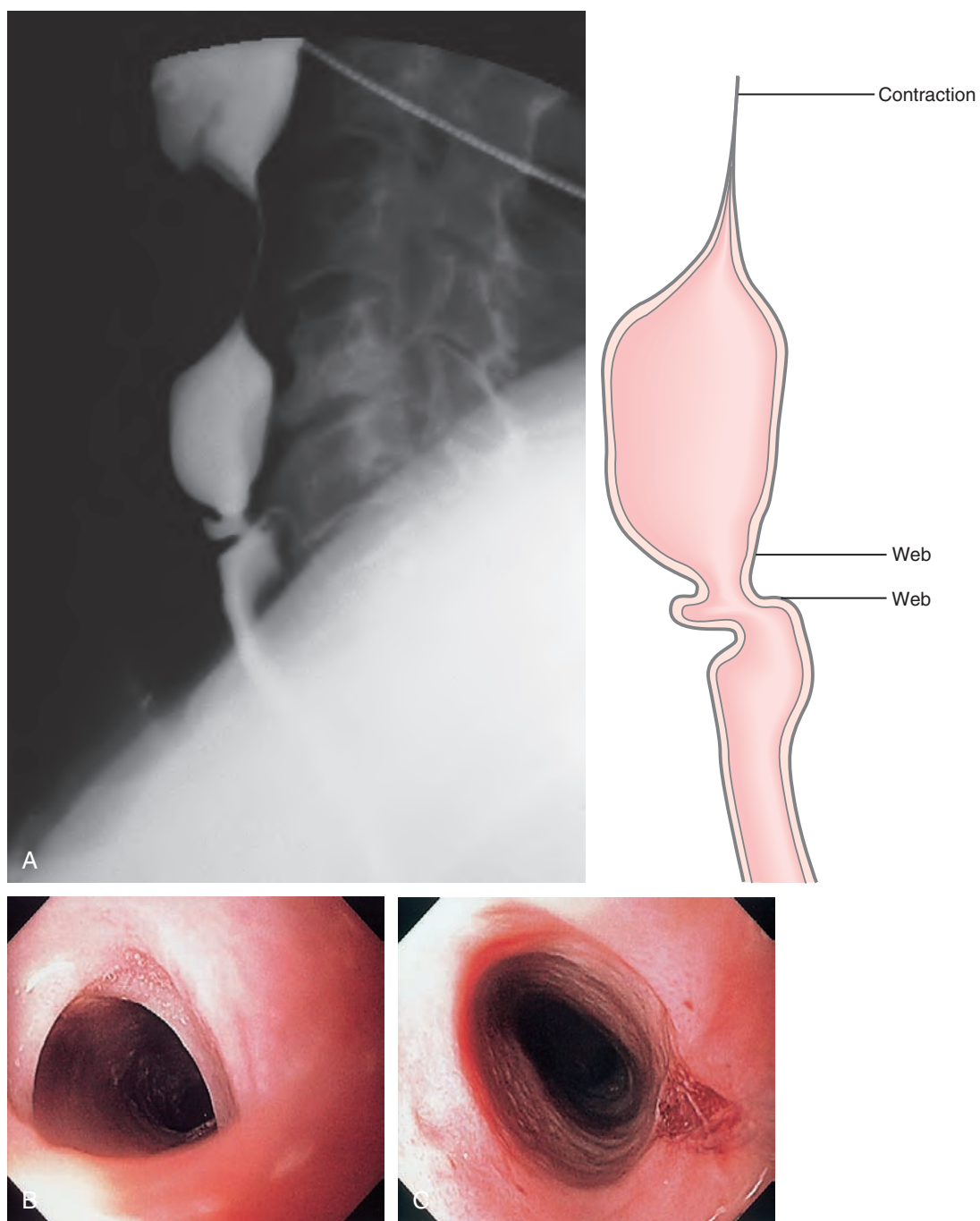


FIGURE 2.109 ESOPHAGEAL WEB

A, Lateral view demonstrates a short stricture with outpouching of mucosa in the middle of the stricture. An esophageal contraction is shown proximally. Two webs are present, with the distal web well visualized. Between the two webs is normal esophagus. The distal web is characterized by symmetric, circumferential narrowing of normal-appearing mucosa. **B**, Web just distal to the upper esophageal sphincter. **C**, After dilatation, a tear is evident.

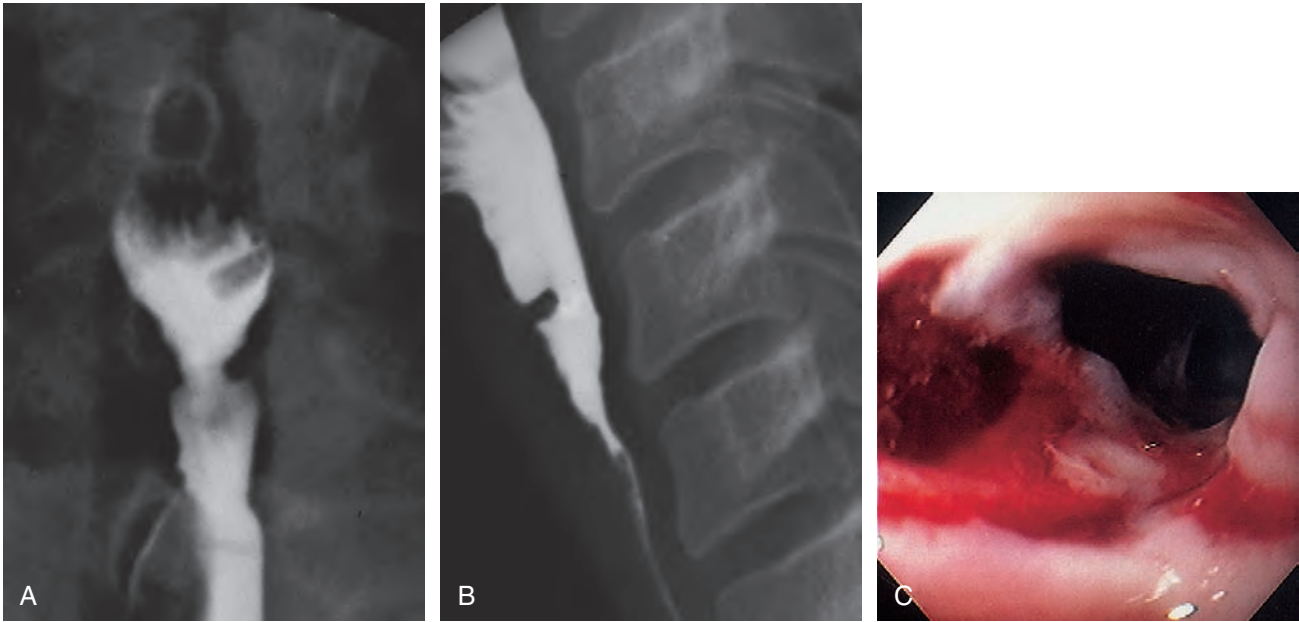


FIGURE 2.110 ESOPHAGEAL WEB IN PLUMMER-VINSON SYNDROME

A, Anteroposterior view shows the compromised luminal diameter. **B**, Lateral projection demonstrates a thick web just distal to the cricopharynx. **C**, Tight stricture with *Candida* esophagitis resulting from stasis.

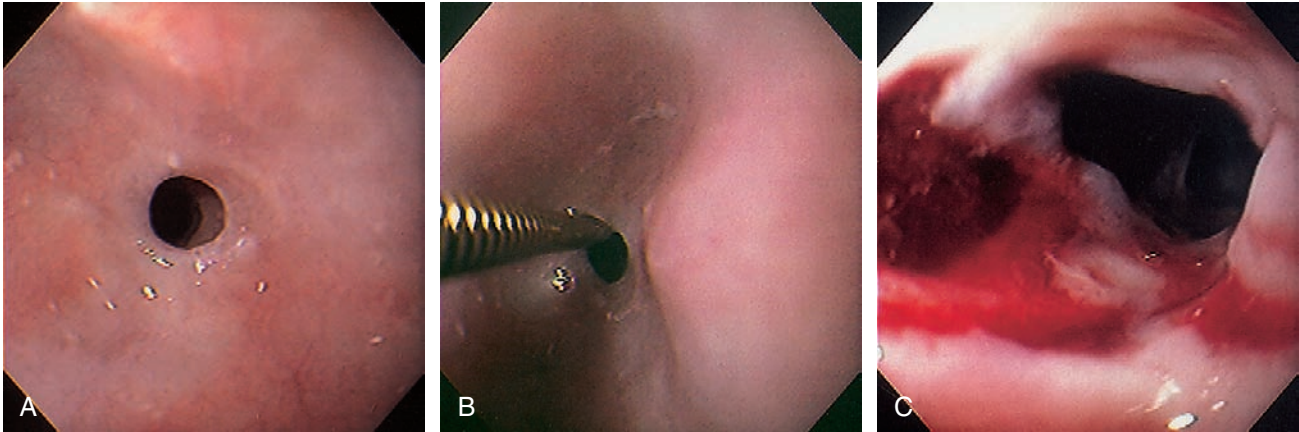


FIGURE 2.111 PROXIMAL ESOPHAGEAL STRICTURE

A, Tight ringlike stricture in the proximal esophagus. **B**, A Savary guidewire is passed through the stricture. **C**, Tearing of the stricture after dilatation.

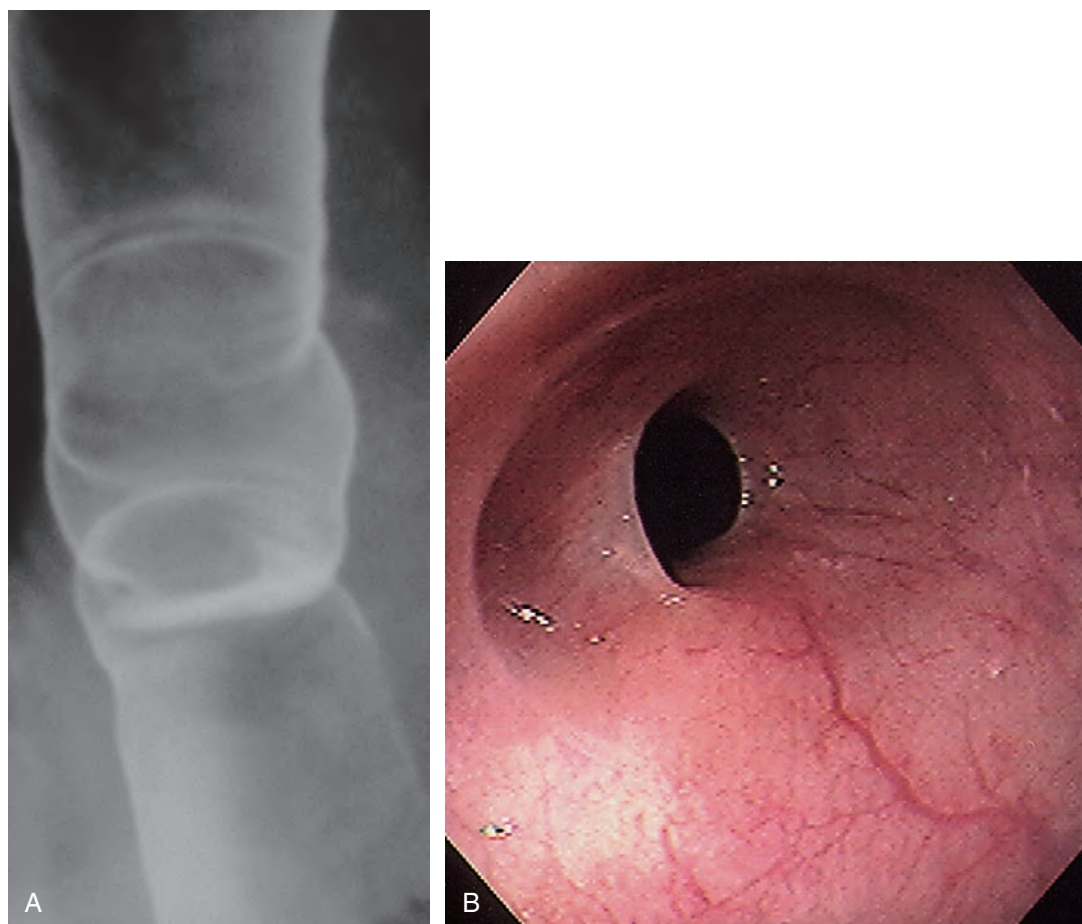


FIGURE 2.112 ESOPHAGEAL RINGS

A, Multiple rings in the midesophagus. **B**, Endoscopically, the rings have a semilunar appearance.

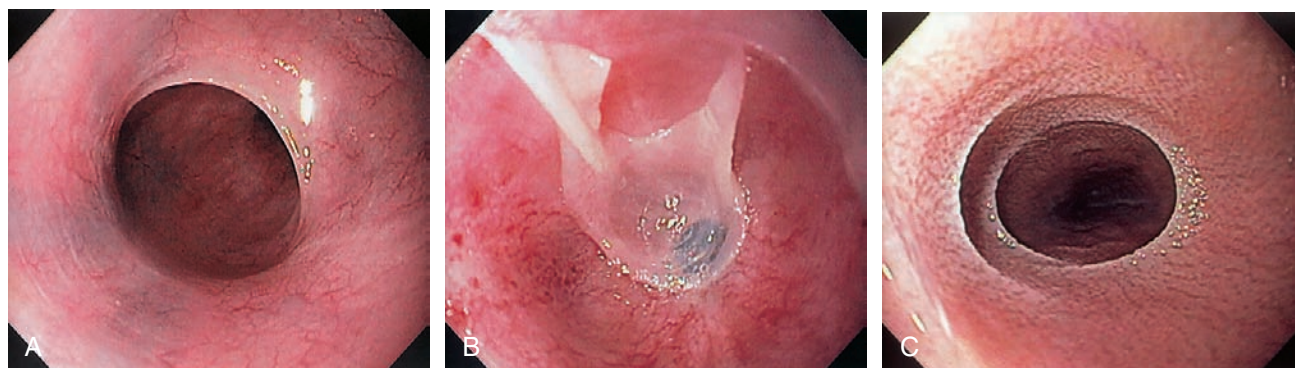


FIGURE 2.113 CHRONIC GRAFT-VERSUS-HOST DISEASE

A, Ring in the midesophagus. **B**, When passing the endoscope through the area, the mucosa peels away. **C**, Multiple rings with a thickened textured appearance.

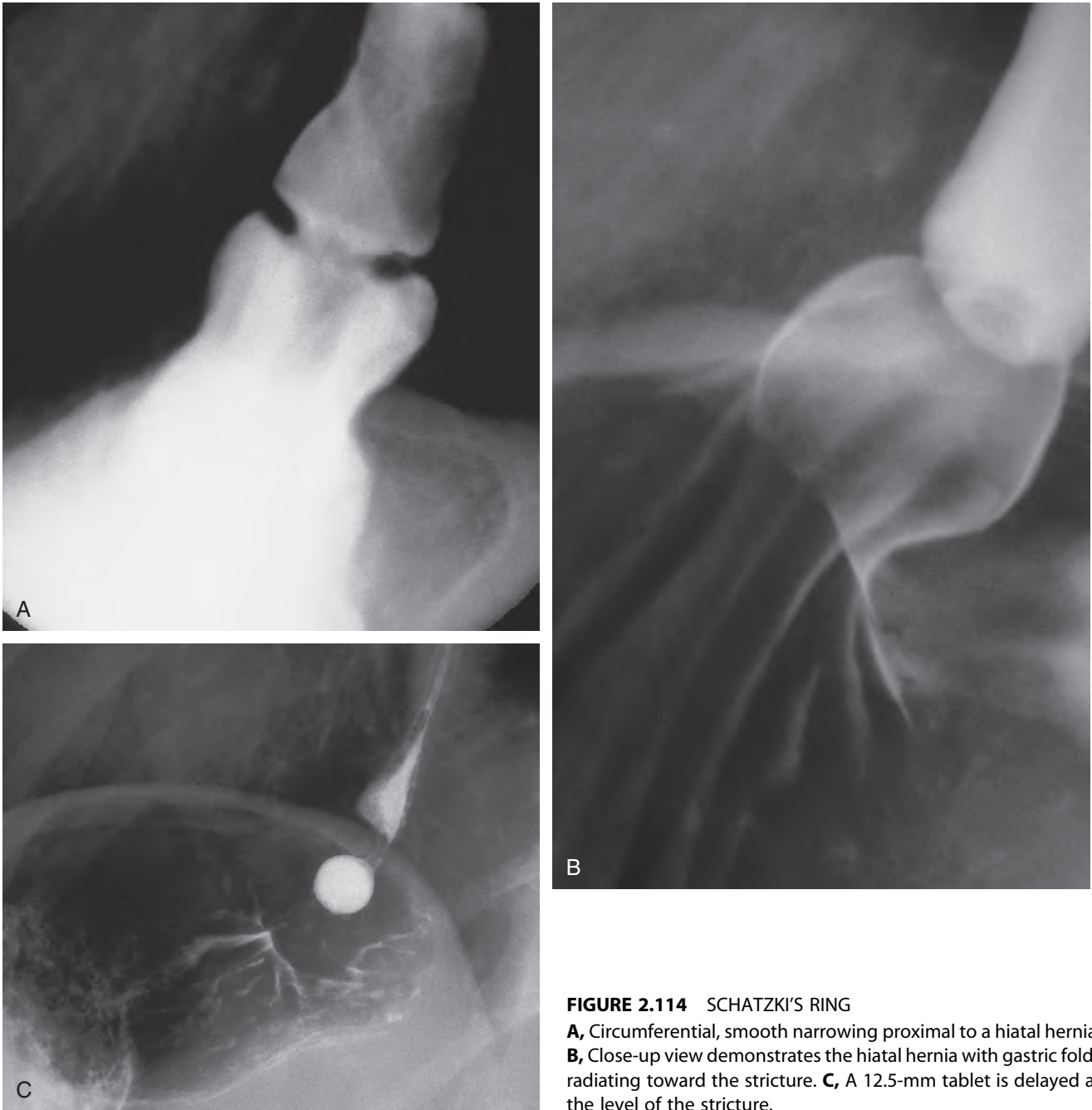


FIGURE 2.114 SCHATZKI'S RING

A, Circumferential, smooth narrowing proximal to a hiatal hernia. **B**, Close-up view demonstrates the hiatal hernia with gastric folds radiating toward the stricture. **C**, A 12.5-mm tablet is delayed at the level of the stricture.

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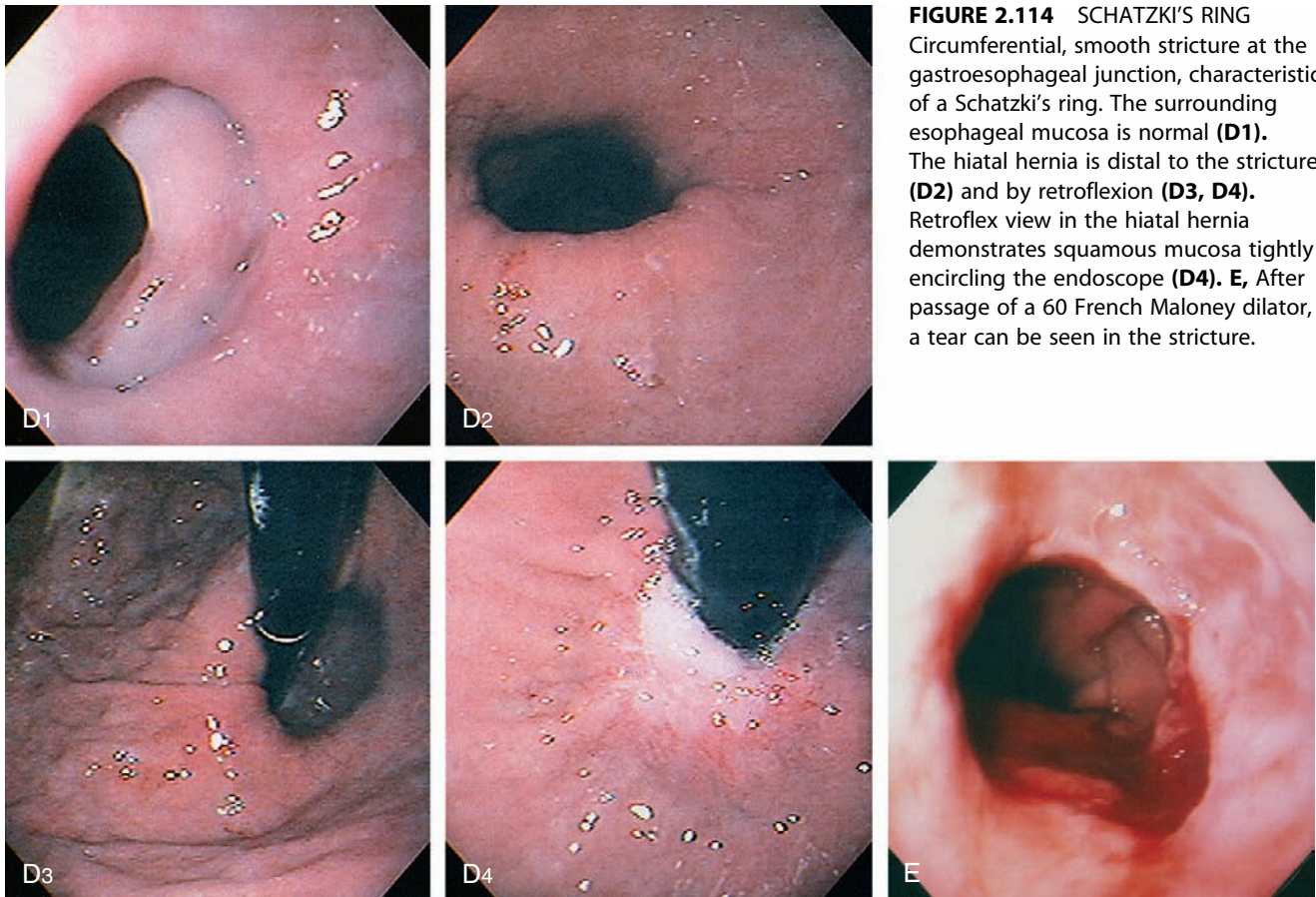


FIGURE 2.115 SCHATZKI'S RING

A, Typical-appearing ring as shown on standard endoscopy. **B**, High-definition and **(C)** narrow band imaging.

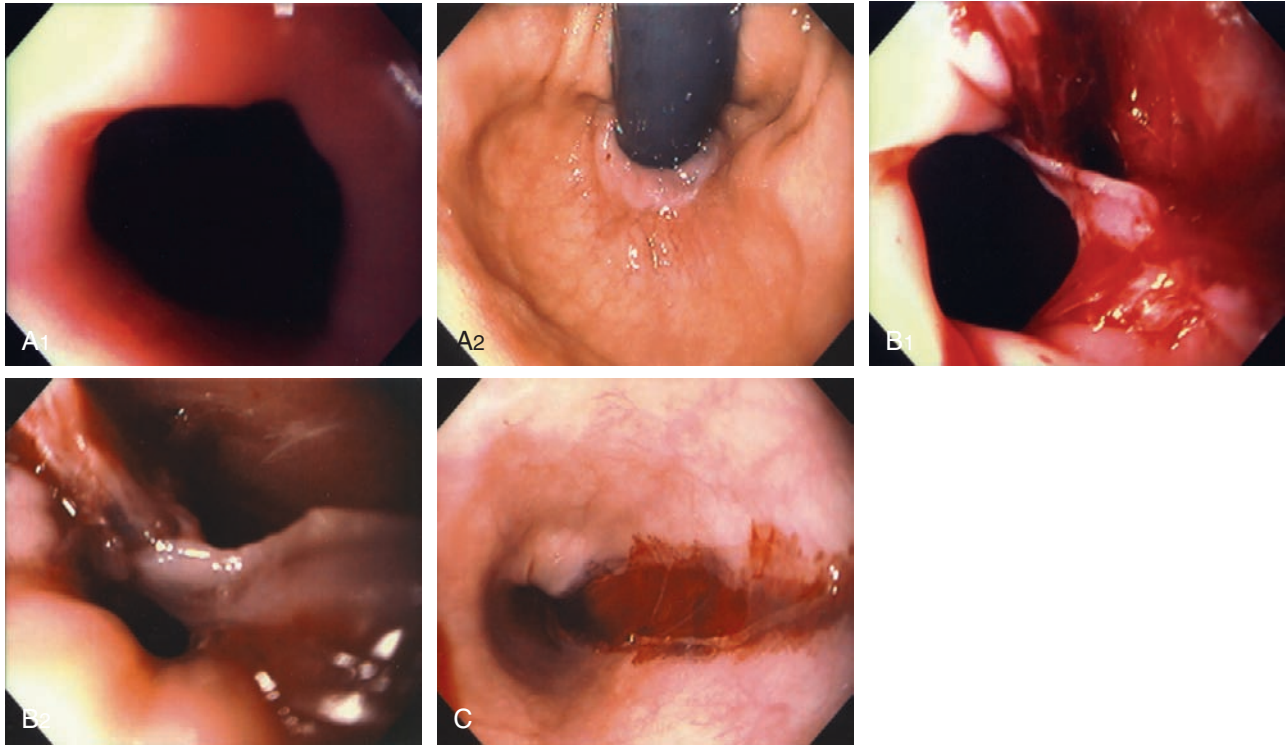


FIGURE 2.116 TEARING OF A SCHATZKI'S RING

A1, A2, Tight ring at the gastroesophageal junction on antegrade and retrograde views. **B1, B2,** After Maloney dilation, a large tear with a flap of squamous tissue is shown. **C,** Linear ulceration and hematoma are shown more proximally.

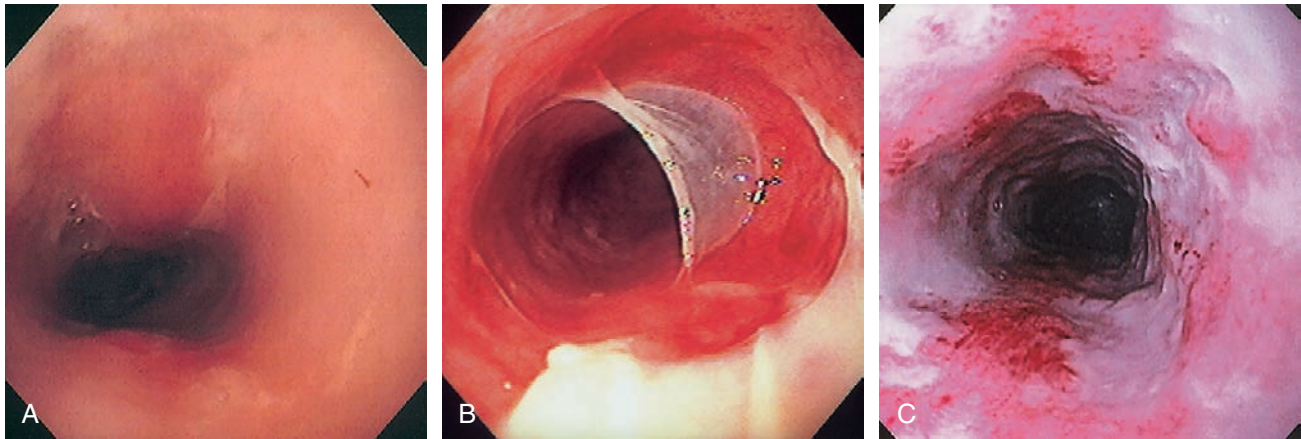
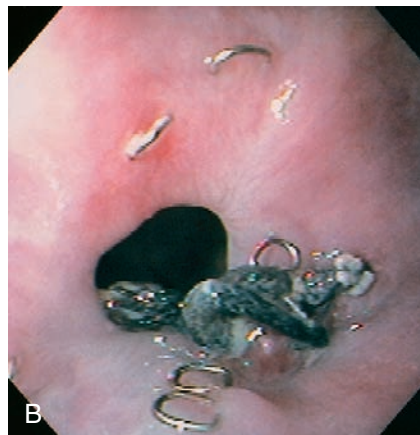
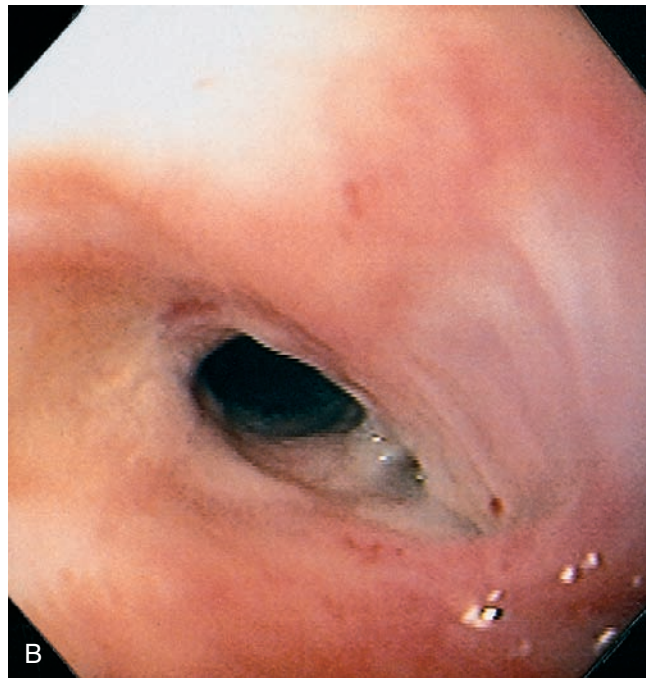


FIGURE 2.117 RADIATION ESOPHAGITIS

A, Diffuse exudate of the midesophagus. **B,** With passage of the endoscope, the mucosa peels away. **C,** Diffuse exudate with ulceration representing the site of prior tumor.

**FIGURE 2.118** RADIATION STRICTURE

A, A short, smooth narrowing in the proximal esophagus. The esophagus is dilated proximal to the stricture. **B**, The short, smooth stricture is shown. The surrounding mucosa has a tan appearance, suggestive of fibrosis.

**FIGURE 2.119** ANASTOMOTIC STRICTURE

A, A short, smooth stricture proximal to the gastric pull-up, after resection for carcinoma. Multiple surgical clips are present. **B**, The stricture is smooth, without ulceration or tumor. Surgical clips and sutures are shown.

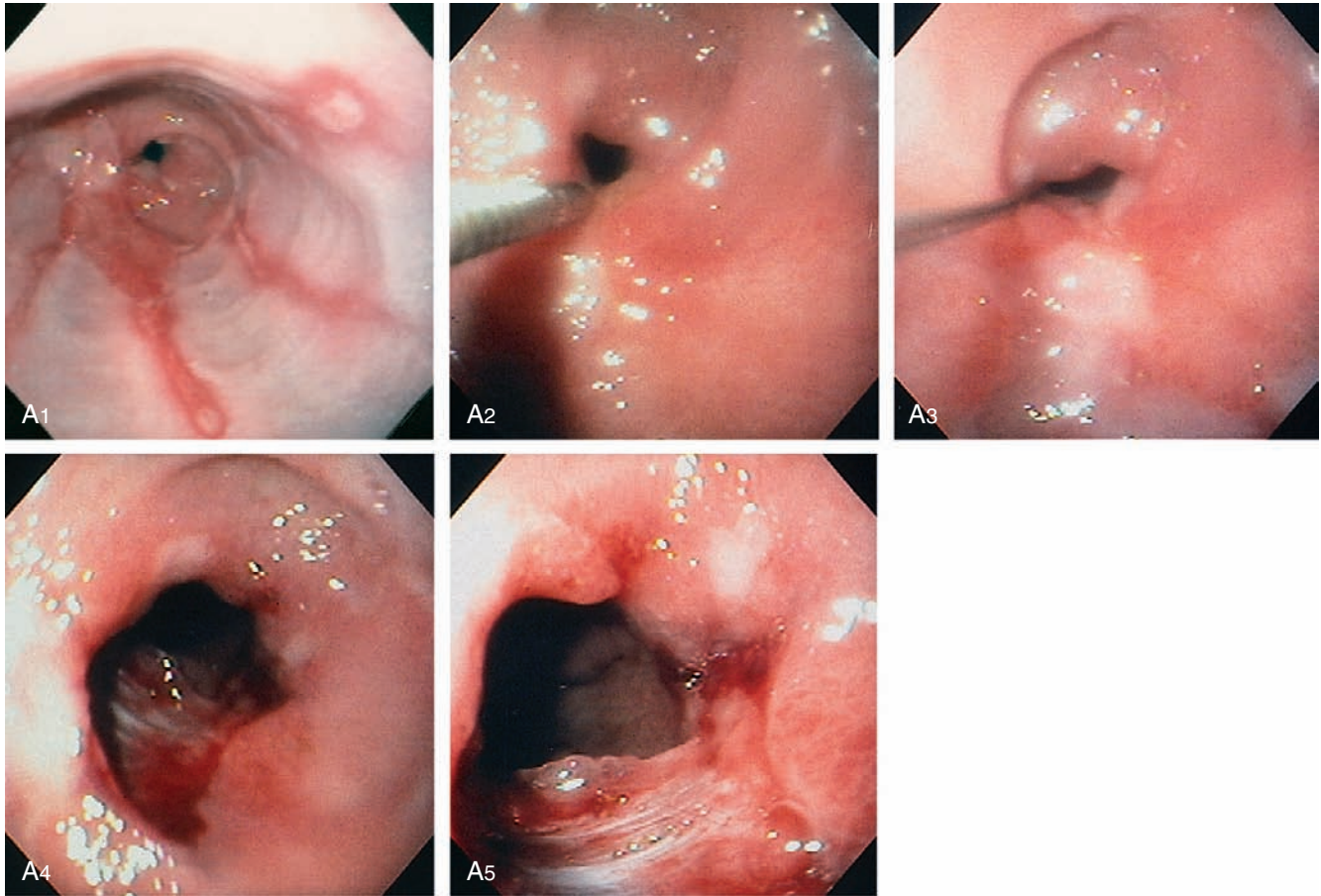


FIGURE 2.120 BARRETT'S STRICTURE

A1, Linear erosions are emanating from the stricture. The mucosa at the stricture has a textured orange color. These findings suggest reflux-associated Barrett's esophagus. **A2**, The tip of the guidewire is just proximal to the stricture. **A3**, The guidewire is then passed blindly through the stricture. **A4**, After passage of Savary dilators, a tear is seen in the stricture. **A5**, The base of the stricture has a fibrotic appearance.

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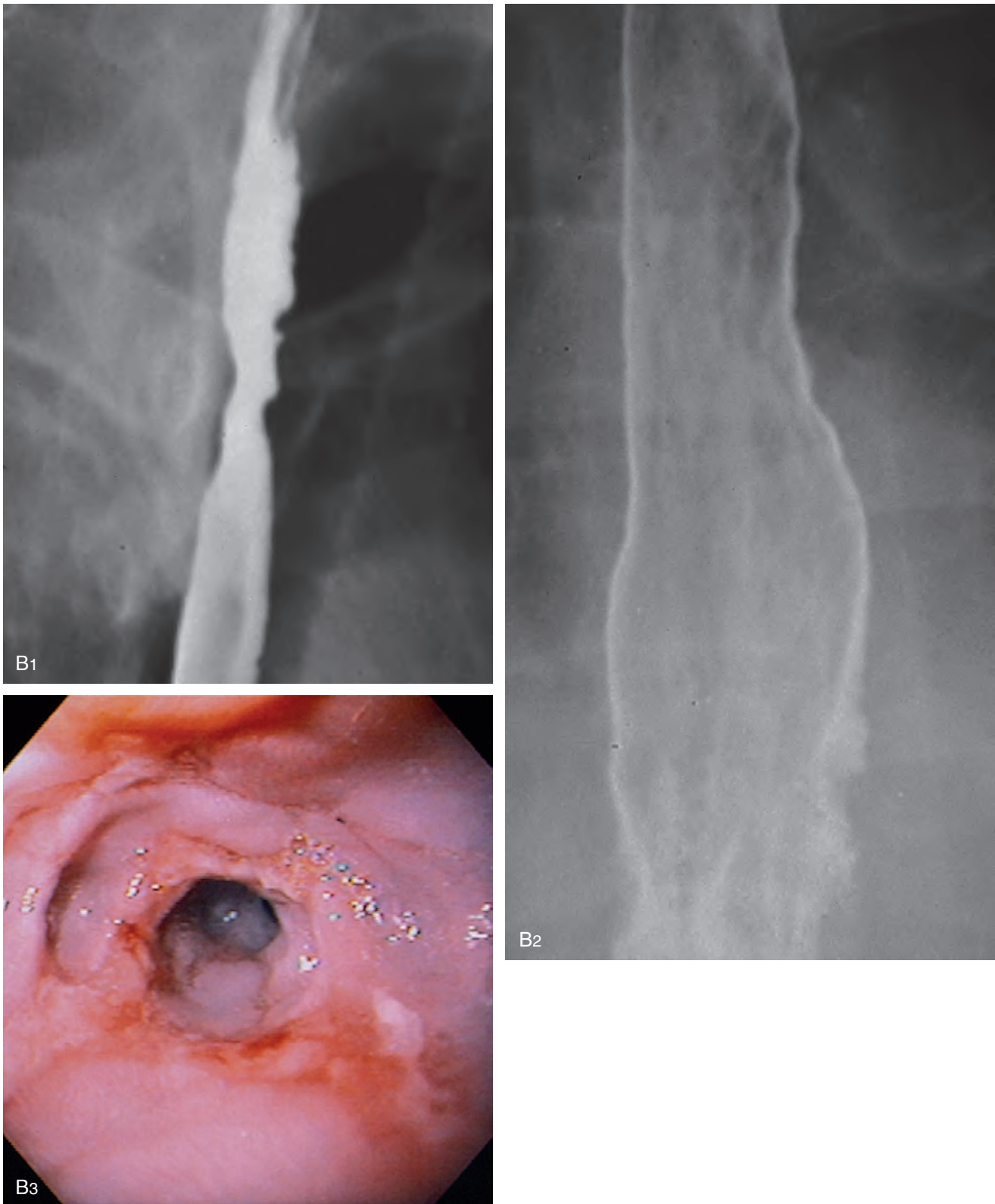


FIGURE 2.120 BARRETT'S STRICTURE

B1, Irregular stricture in the proximal esophagus. **B2**, The distal esophageal mucosa has a fine granular appearance. Free reflux is seen to the level of the stricture. A hiatal hernia is also present. These radiographic findings are compatible with a Barrett's stricture. The mucosa of the distal esophagus is granular as the squamous mucosa is replaced by gastric mucosa. **B3**, There is nodularity at the level of the stricture and active ulceration. The orange ulcerated mucosa extending proximally from the stricture contained gastric mucosa on biopsy.

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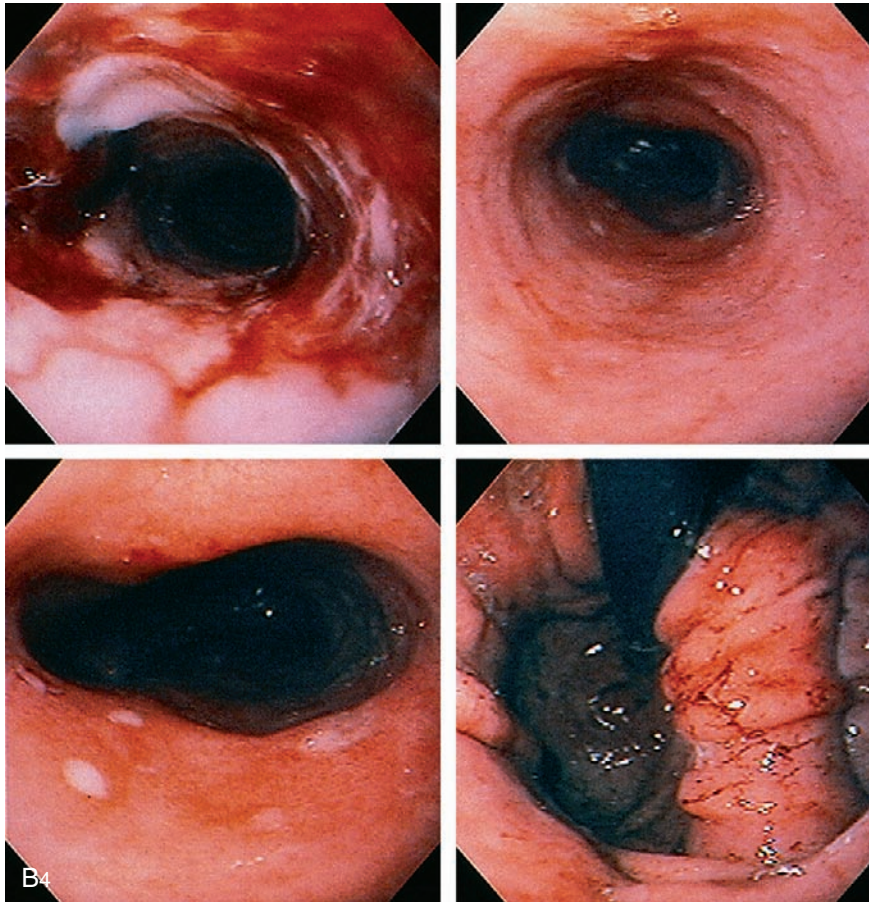


FIGURE 2.120 BARRETT'S STRICTURE

B4, The stricture has been dilated (*top left*). The mucosa distal to the stricture has an orange color with a few erosions (*top right, bottom left*), and a large hiatal hernia is present (*bottom right*). Biopsy of the mucosa distal to the esophageal stricture consisted of normal gastric (body-type) tissue.

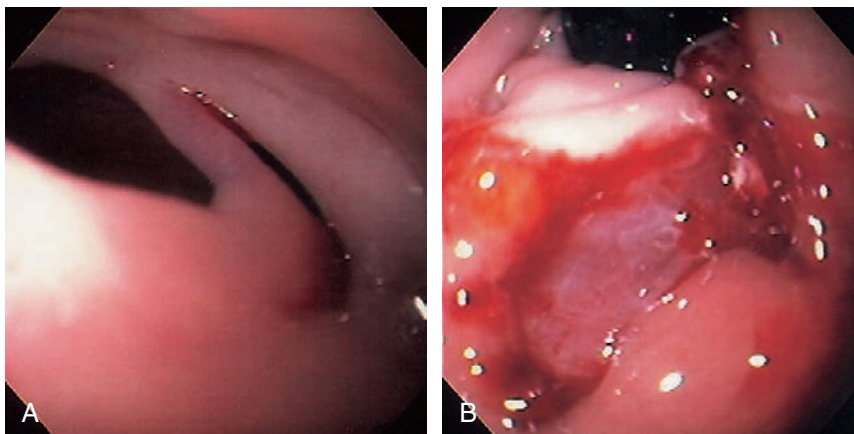


FIGURE 2.121 STRICTURE DILATATION WITH CREATION OF FISTULA

A, Slitlike area alongside a Schatzki's ring. **B**, Retroflex view shows tearing representing creation of a fistula alongside the ring. Dilatation was performed with a Maloney bougie.

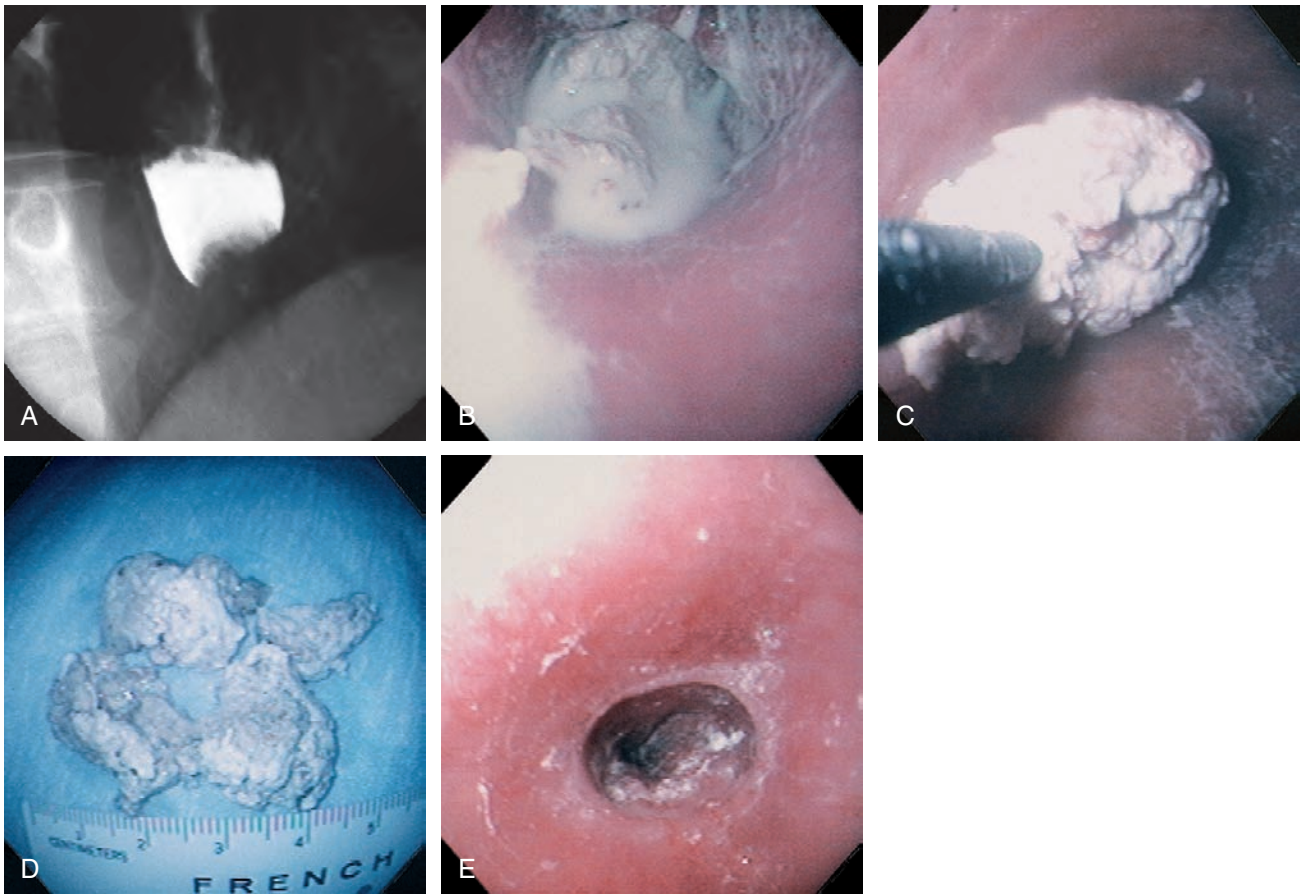


FIGURE 2.122 FOOD BOLUS IMPACTION

A, Acute dysphagia resulted after the patient swallowed a large piece of meat at a steakhouse. Barium can be seen overlying a filling defect at the gastroesophageal junction, with mild dilation proximally. **B**, Barium coats the food bolus. **C**, The large meat bolus is being extracted with the forceps grabber up to an overtube. **D**, After extraction, multiple large pieces of meat are identified. **E**, A slight area of narrowing is seen at the gastroesophageal junction, which, although nonobstructing, caused the impaction. Many patients with food bolus esophageal impaction have an underlying esophageal stricture, although, as shown in this case, it can be very mild. A 60 French Maloney dilator was then passed to treat the stricture.

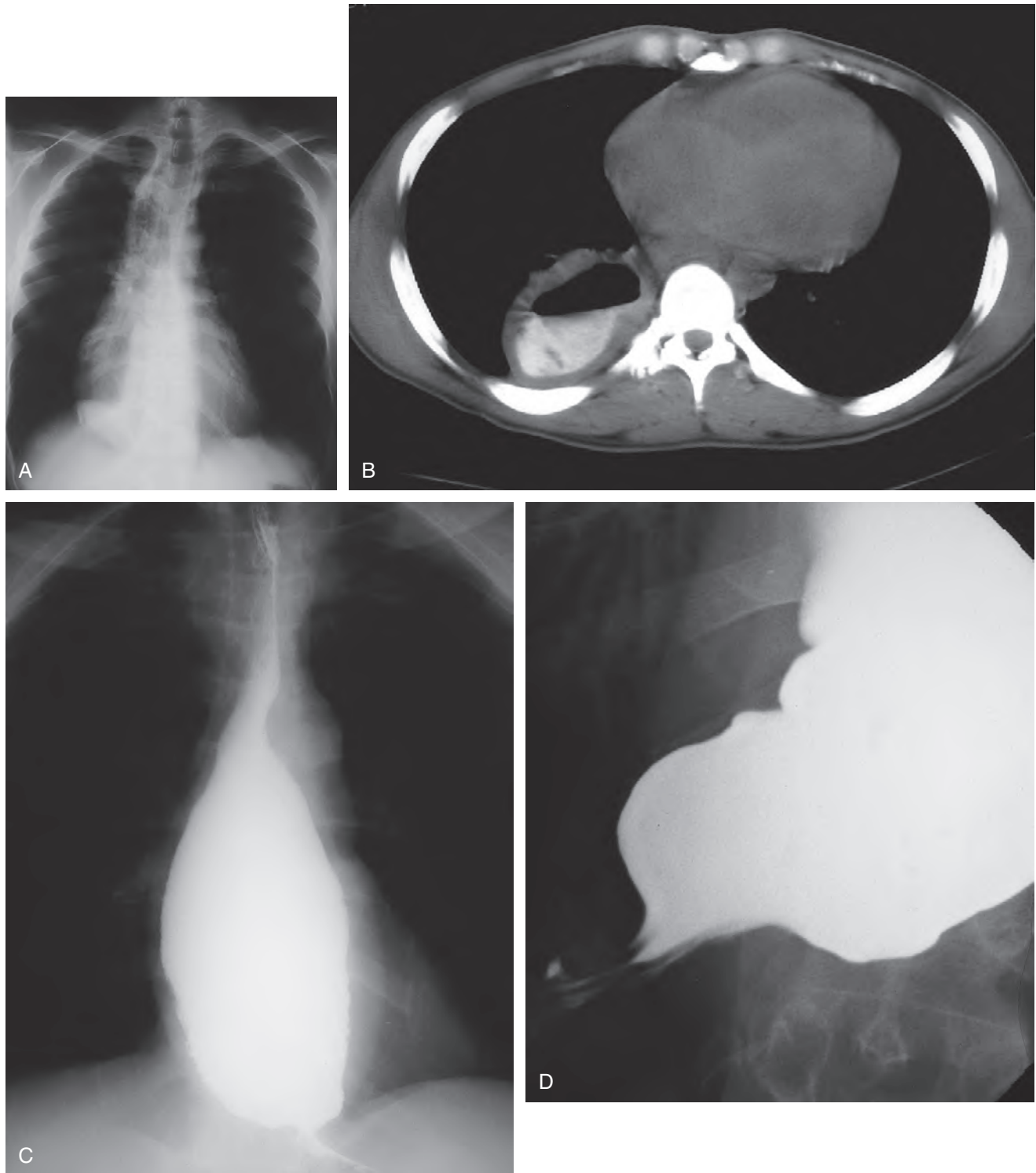


FIGURE 2.123 ACHALASIA

A, The mediastinum is widened, with a large air-fluid level. **B**, The massively dilated esophagus is filled with barium. Note the thickening of the esophageal wall. **C**, The dilated esophagus is well visualized on the anteroposterior view of the chest. **D**, The massively dilated esophagus tapers to a "bird's beak," suggestive of achalasia. During observation of the esophagus under fluoroscopy, there were noted to be tertiary contractions but poor peristalsis.

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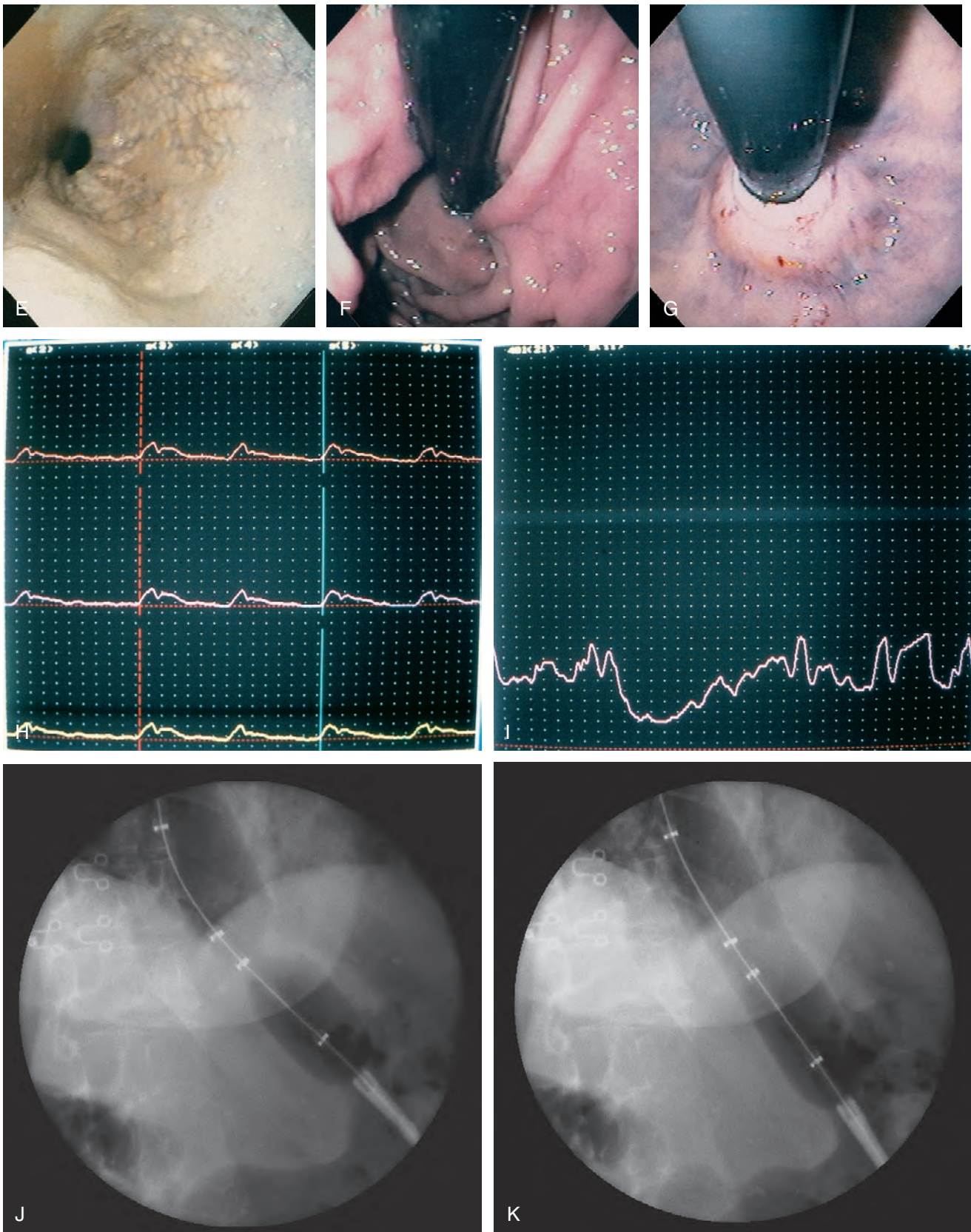


FIGURE 2.123 ACHALASIA

E, On endoscopic examination, the esophagus is found to be dilated, with puddling of fluid. The thick white mucosa and yellow plaques represent *Candida* esophagitis, resulting secondarily from stasis of esophageal contents. **F**, Retroflex view of the gastric cardia demonstrates no mass lesion. **G**, Close-up view of the gastroesophageal junction shows mucosa tightly encircling the endoscope. The mucosa appeared to bulge when the endoscope was advanced. **H**, Esophageal motility is poor, with reduced amplitude and absence of peristaltic waves. **I**, The lower esophageal sphincter does not totally relax. **J**, The Microvasive 35-mm balloon is passed across the stricture and inflated. A “waist” is shown, representing the gastroesophageal junction. **K**, With full insufflation of the balloon, the “waist” is obliterated, indicating successful dilation.

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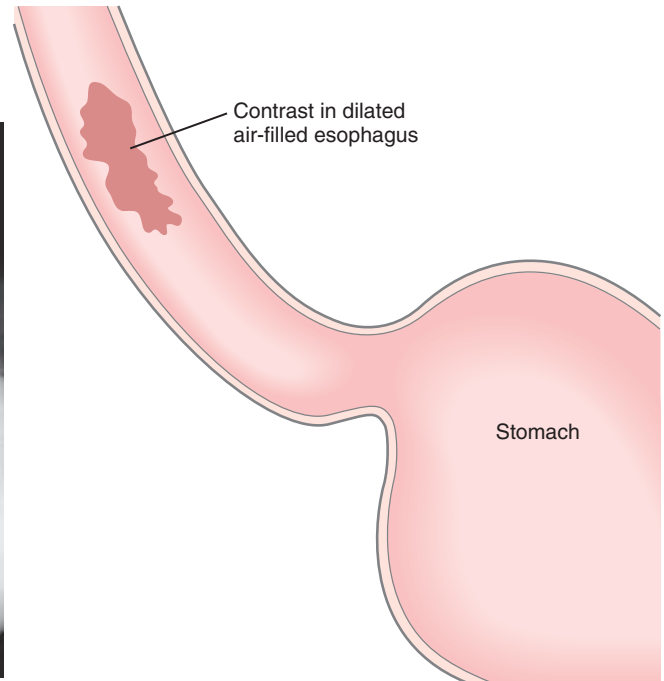


FIGURE 2.123 ACHALASIA

L, After dilation, oral contrast material is swallowed, filling the dilated distal esophagus; however, contrast now enters the stomach. No evidence of extravasation is present.

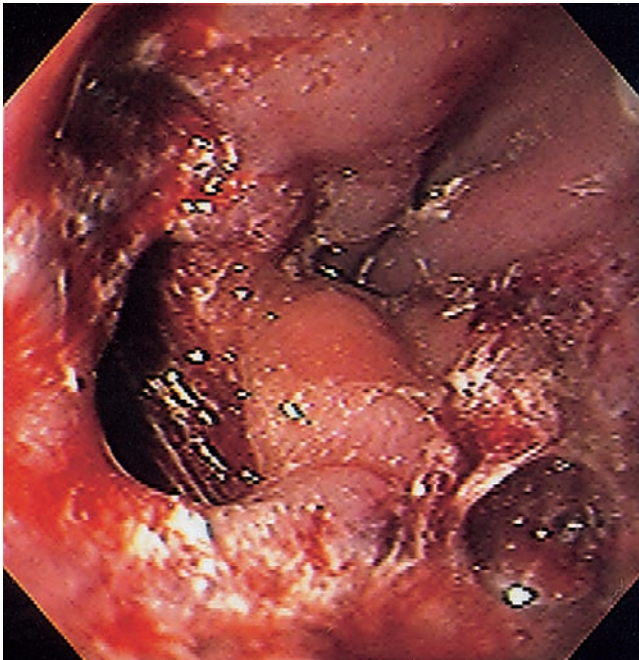


FIGURE 2.124 ACHALASIA TEAR POSTDILATATION
Deep mucosal defect just proximal to the GE junction.

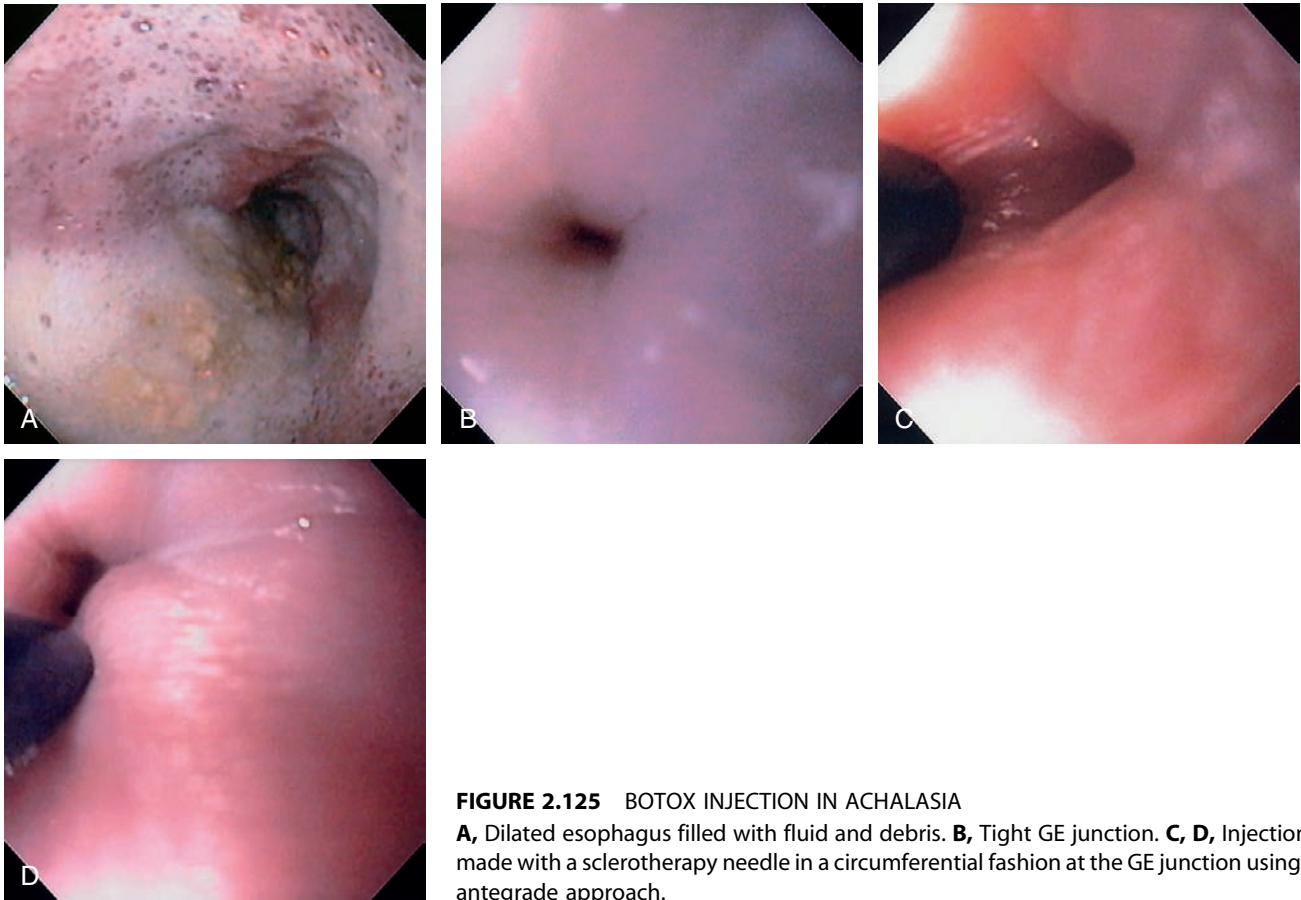


FIGURE 2.125 BOTOX INJECTION IN ACHALASIA

A, Dilated esophagus filled with fluid and debris. **B,** Tight GE junction. **C, D,** Injection is made with a sclerotherapy needle in a circumferential fashion at the GE junction using an antegrade approach.



FIGURE 2.126 ACHALASIA COMPLICATED BY SQUAMOUS CELL CARCINOMA

Hemicircumferential raised ulcerative lesion in the distal esophagus. Note the esophagus is dilated.

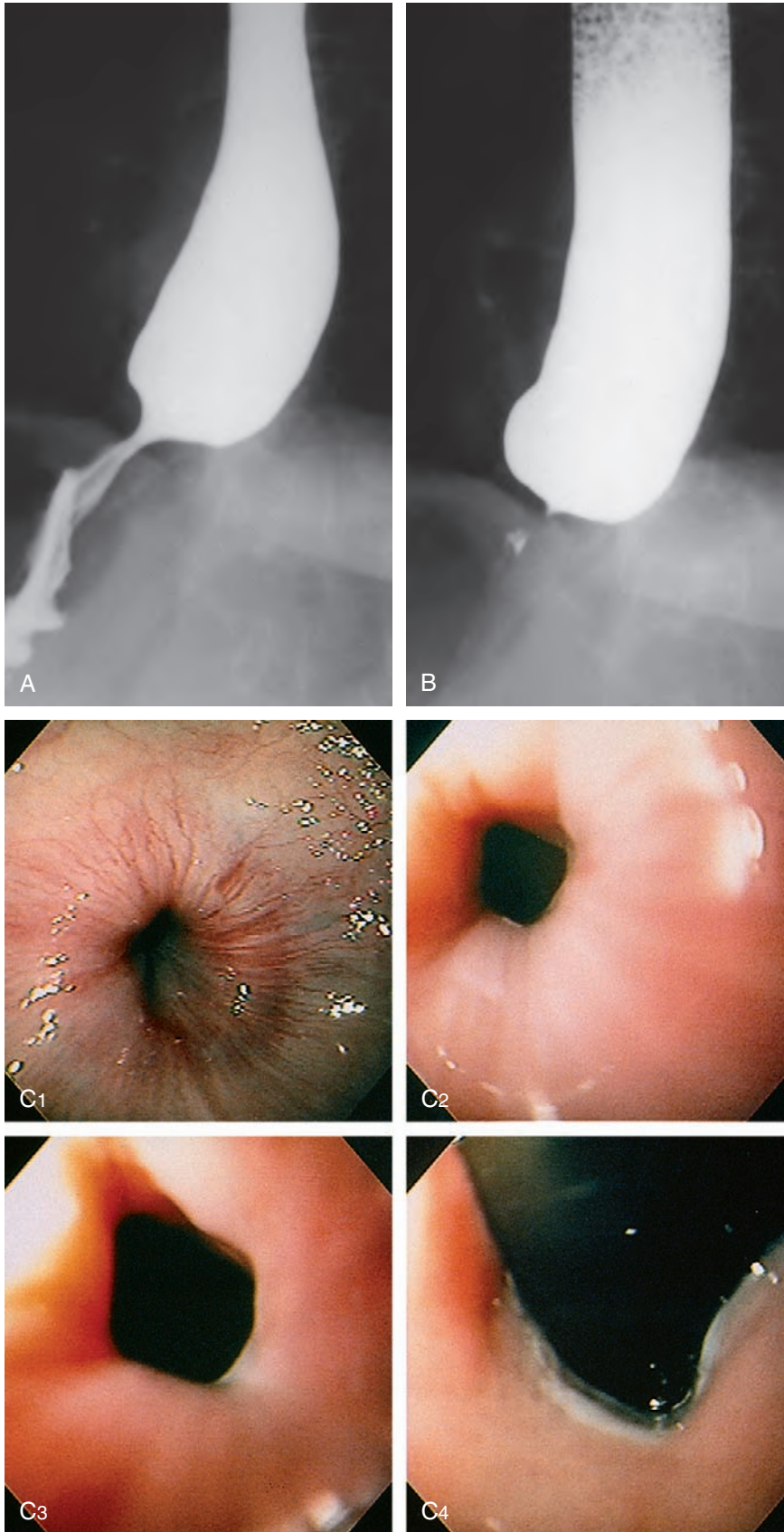


FIGURE 2.127 HYPERTENSIVE LOWER ESOPHAGEAL SPHINCTER

A, Smooth narrowing at the gastroesophageal junction, suggesting achalasia. The esophagus is dilated.

B, Only a small amount of barium passes into the stomach. **C1**, The lower esophagus appears to be wrapped tightly around a doughnut; the gastroesophageal junction appears to have a smooth narrowing, although the endoscope passed with slight pressure (**C2**, **C3**). Retroflex view of the gastroesophageal junction is normal (**C4**). A motility study demonstrated an increased lower esophageal sphincter pressure, with normal relaxation and esophageal peristalsis.

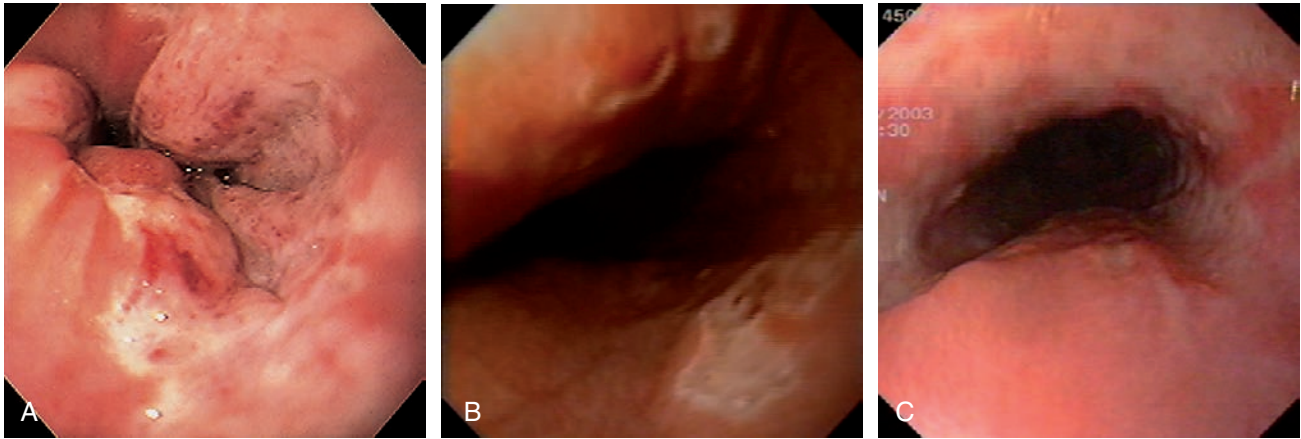


FIGURE 2.128 DRUG-INDUCED ESOPHAGITIS

A, Hemicircumferential exudate at the GE junction caused by alendronate. **B**, Several shallow ulcers in the midesophagus caused by aspirin. **C**, Multiple lesions in the midesophagus caused by doxycycline.

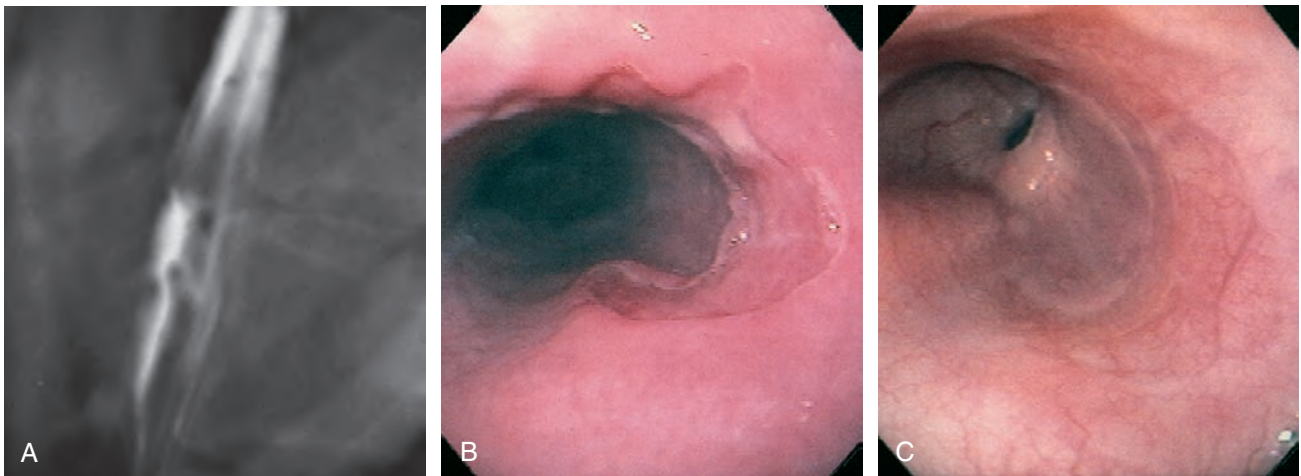


FIGURE 2.129 DRUG-INDUCED ESOPHAGEAL ULCER

A, Well-circumscribed ulcer, with a distal fold radiating to the lesion. The surrounding mucosa appears normal. **B**, Large hemicircumferential esophageal ulceration. The surrounding esophageal mucosa and distal esophagus appear normal. Odynophagia resulted several weeks after beginning doxycycline therapy. **C**, Healing of the ulceration shows the demarcated area now reepithelialized, with a normal vascular pattern.



Differential Diagnosis

Drug-Induced Esophageal Ulcer (Figure 2.129)

- Cytomegalovirus esophagitis
- Herpes simplex virus esophagitis
- Human immunodeficiency virus-associated idiopathic esophageal ulcer
- Other infections

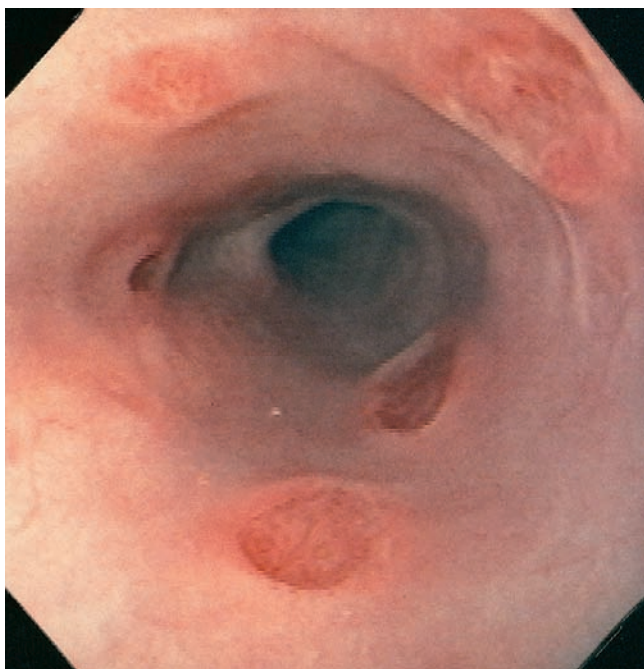


FIGURE 2.130 HUMAN IMMUNODEFICIENCY VIRUS-ASSOCIATED IDIOPATHIC ULCER

Multiple well-circumscribed ulcerations throughout the esophagus. The ulcers have a punched-out appearance, with normal-appearing intervening mucosa. The ulcers seem to be raised above the normal level of the esophageal wall, resulting in this heaped-up appearance.



Differential Diagnosis

Human Immunodeficiency Virus-Associated Idiopathic Ulcer (Figure 2.130)

- Cytomegalovirus esophagitis
- Herpes simplex virus esophagitis
- Histoplasmosis
- Drug-induced esophagitis
- Other infections

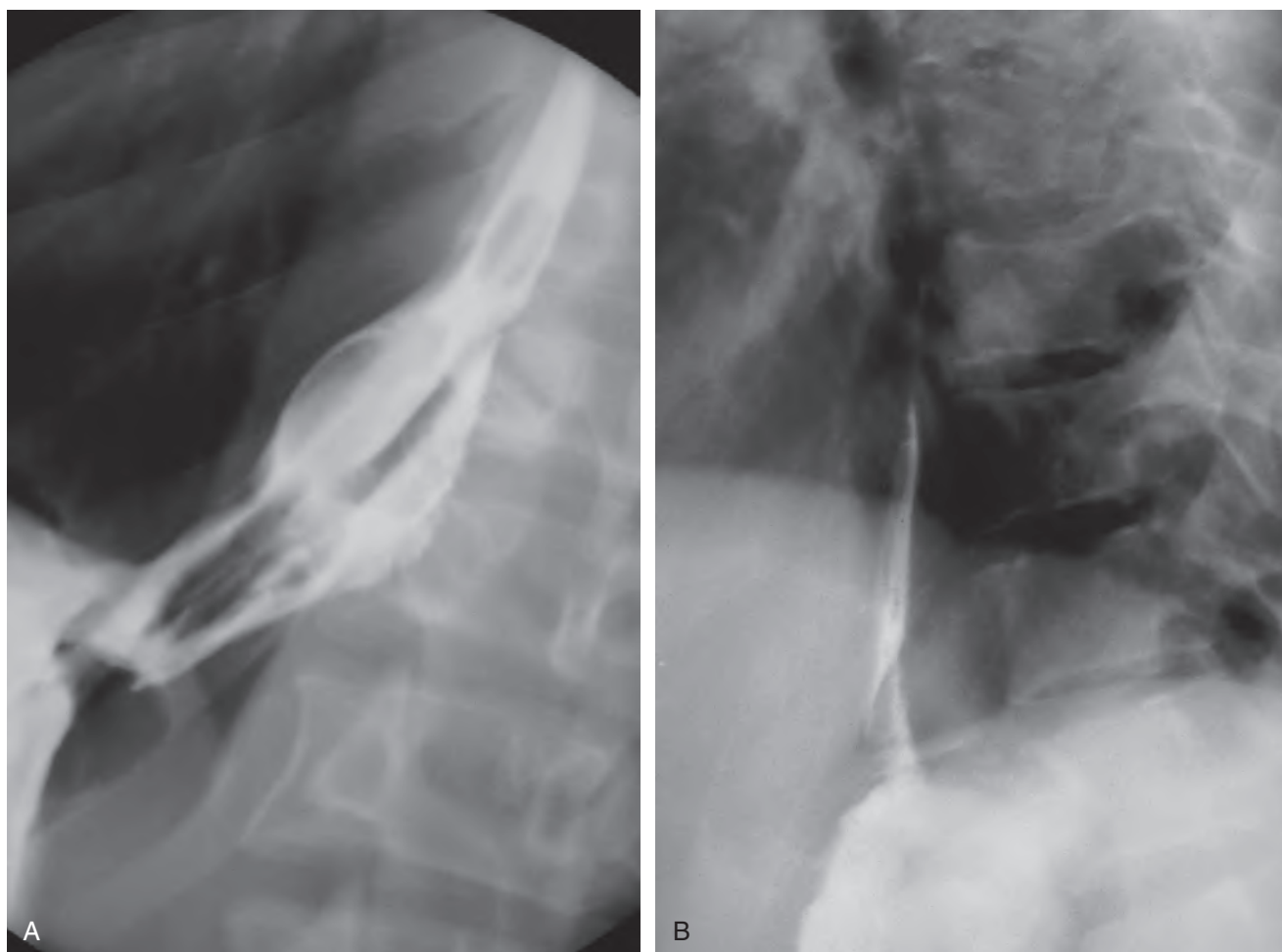


FIGURE 2.131 HUMAN IMMUNODEFICIENCY VIRUS-ASSOCIATED IDIOPATHIC ULCER

A, Marked abnormality of the gastroesophageal junction, suggestive of ulceration. **B**, Barium is refluxing into the more proximal esophagus. The combination of these two radiographic findings suggests reflux disease.

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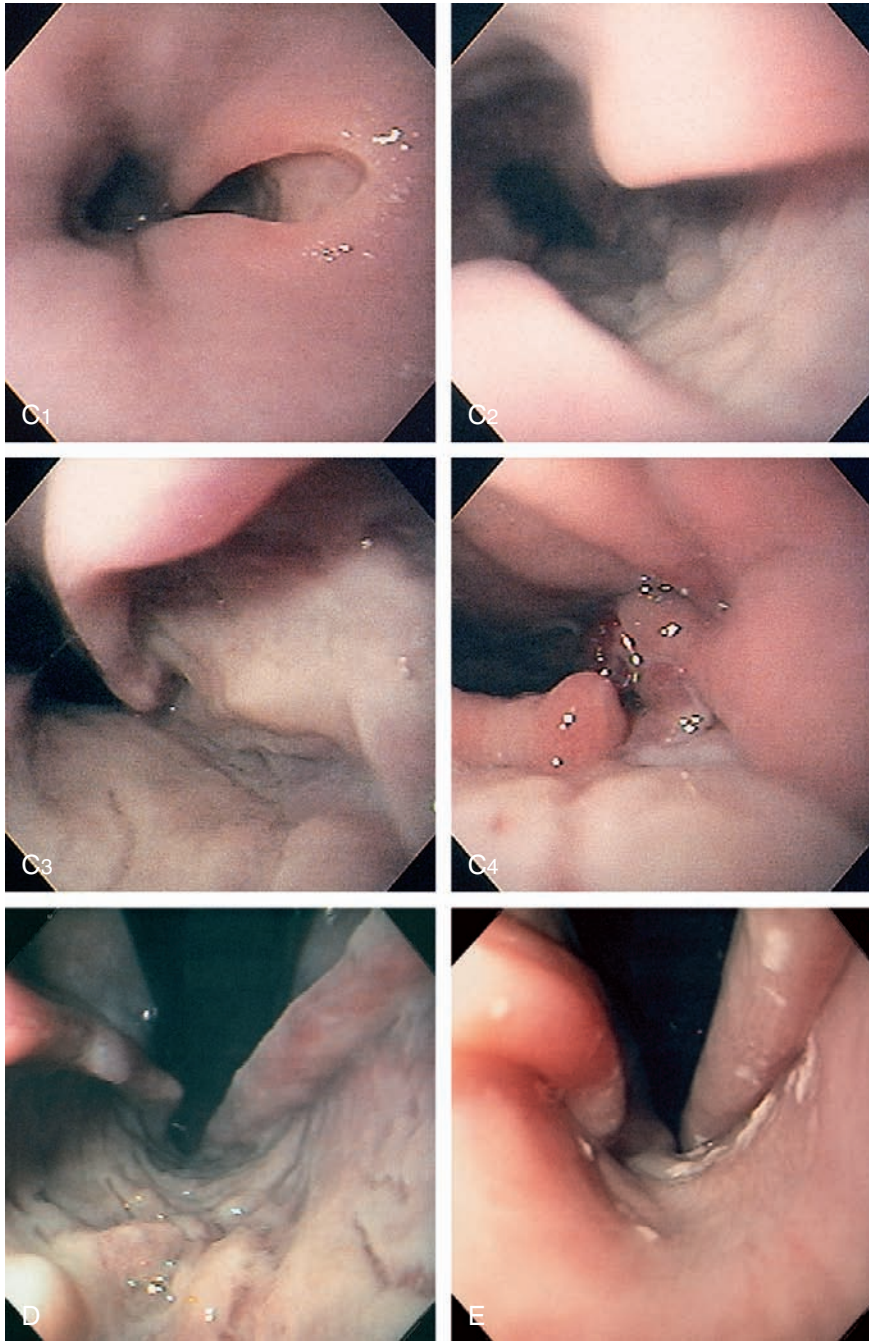


FIGURE 2.131 HUMAN IMMUNODEFICIENCY VIRUS-ASSOCIATED IDIOPATHIC ULCER

C, Large, deep ulceration extending from the distal esophagus to the gastroesophageal junction (**C1-C3**), where the ulcer becomes hemicircumferential (**C3-C4**). The ulcer base has an irregular appearance. **D**, Retroflex view into the ulcer demonstrates the depth of the lesion. **E**, After oral steroid therapy, the ulceration has completely reepithelialized.

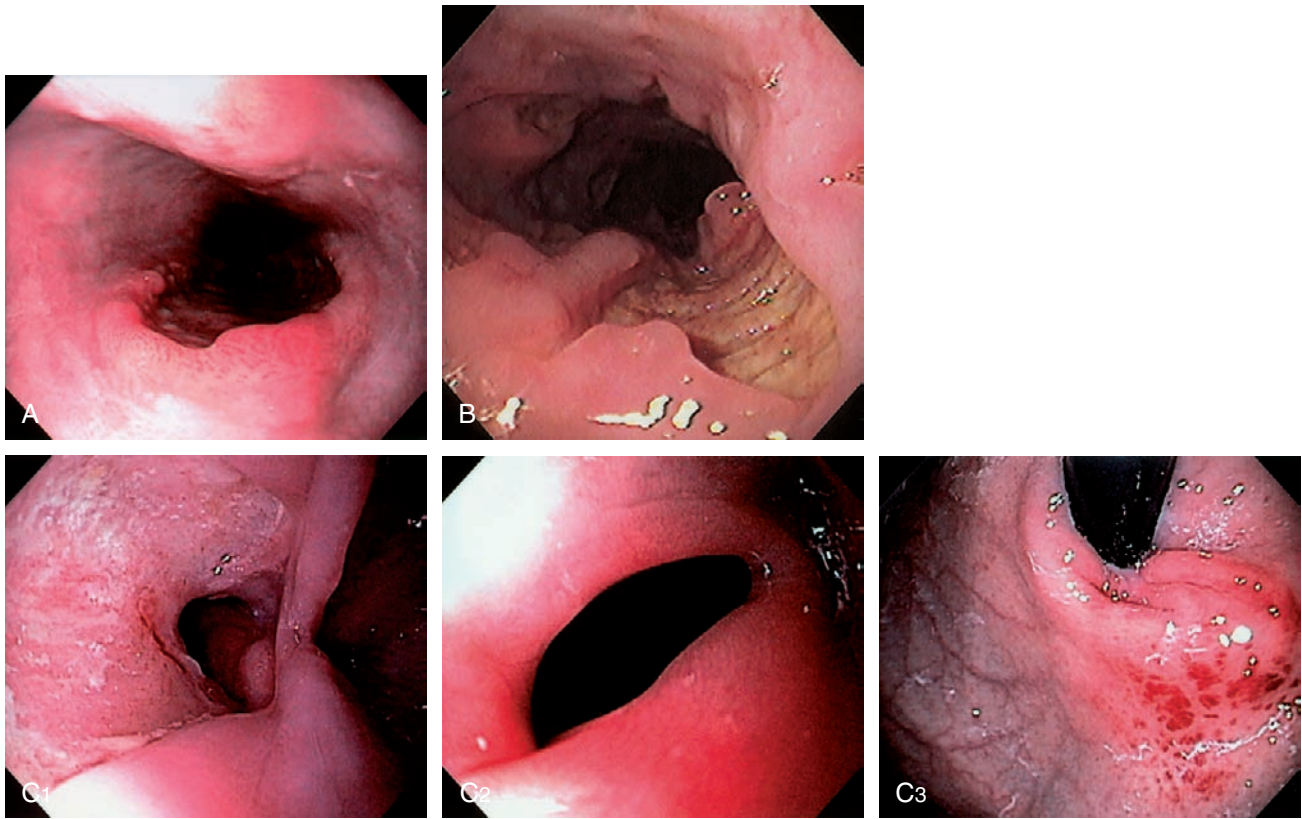


FIGURE 2.132 HUMAN IMMUNODEFICIENCY VIRUS-ASSOCIATED IDIOPATHIC ULCER

A, Large, well-circumscribed, heaped-up ulcer in the midesophagus. **B**, Multiple deep ulcers in the esophagus. **C1**, **C2**, Deep ulcer at the GE junction with creation of a fistula to the stomach. Note the slit in the cardia representing the fistula into the stomach (**C3**).

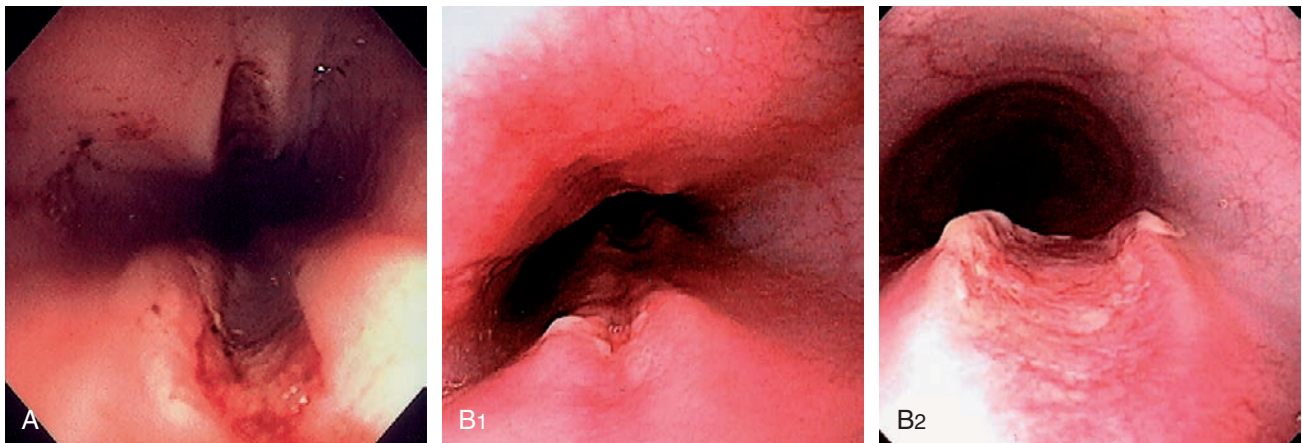


FIGURE 2.133 NASOGASTRIC TUBE ULCER

A, Linear "kissing" ulcers in the midesophagus associated with long-standing nasogastric tube placement. **B1**, **B2**, Linear ulcer with raised appearance of the midesophagus. The most distal portion has a raised appearance to the edges.

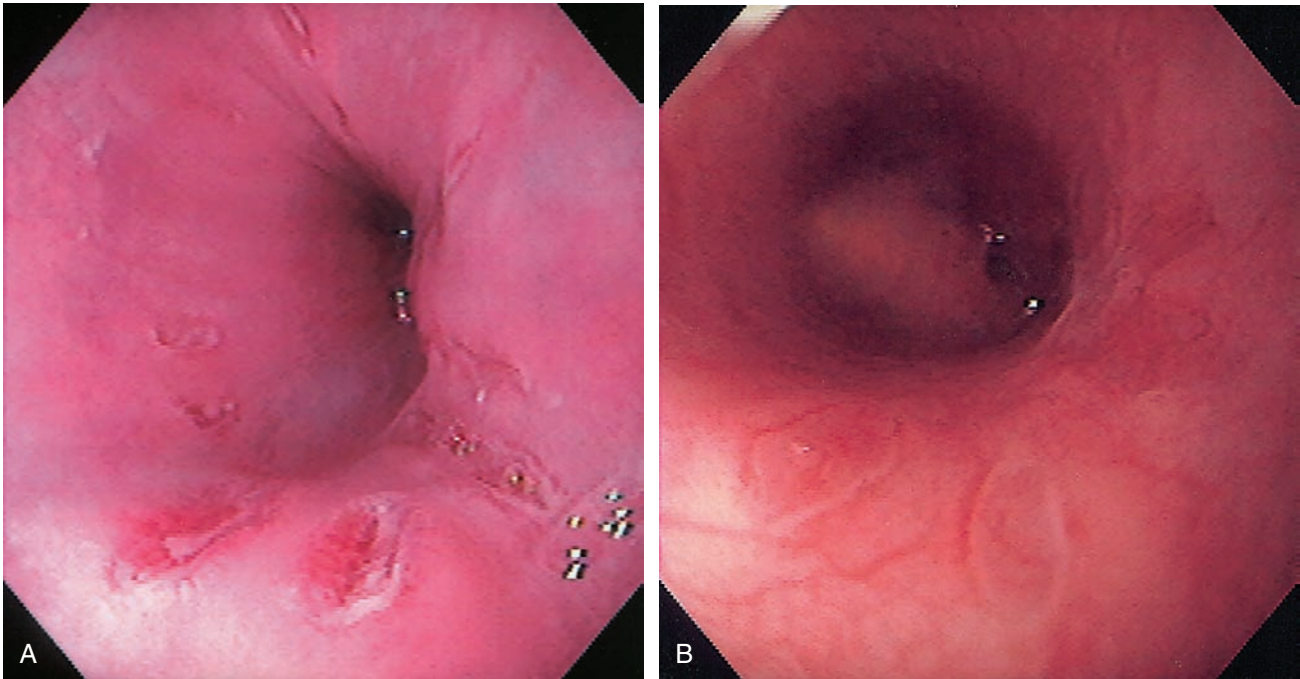


FIGURE 2.134 CROHN'S DISEASE

A, Multiple shallow, well-circumscribed ulcers in the midesophagus. **B**, Healing of the ulcers after corticosteroid therapy.



Differential Diagnosis

Crohn's Disease (Figure 2.134)

Cytomegalovirus esophagitis
 Herpes simplex virus esophagitis
 Pill-induced esophagitis

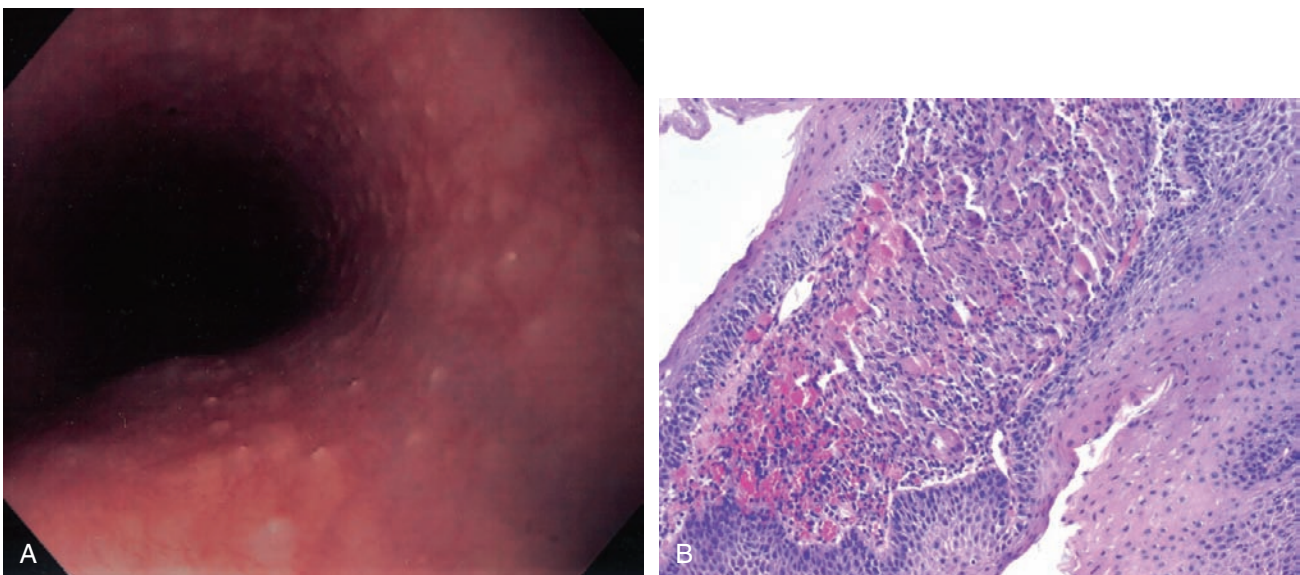


FIGURE 2.135 ESOPHAGEAL SARCOIDOSIS

A, Multiple pinpoint raised whitish areas. **B**, Biopsy confirmed granulomatous esophagitis.

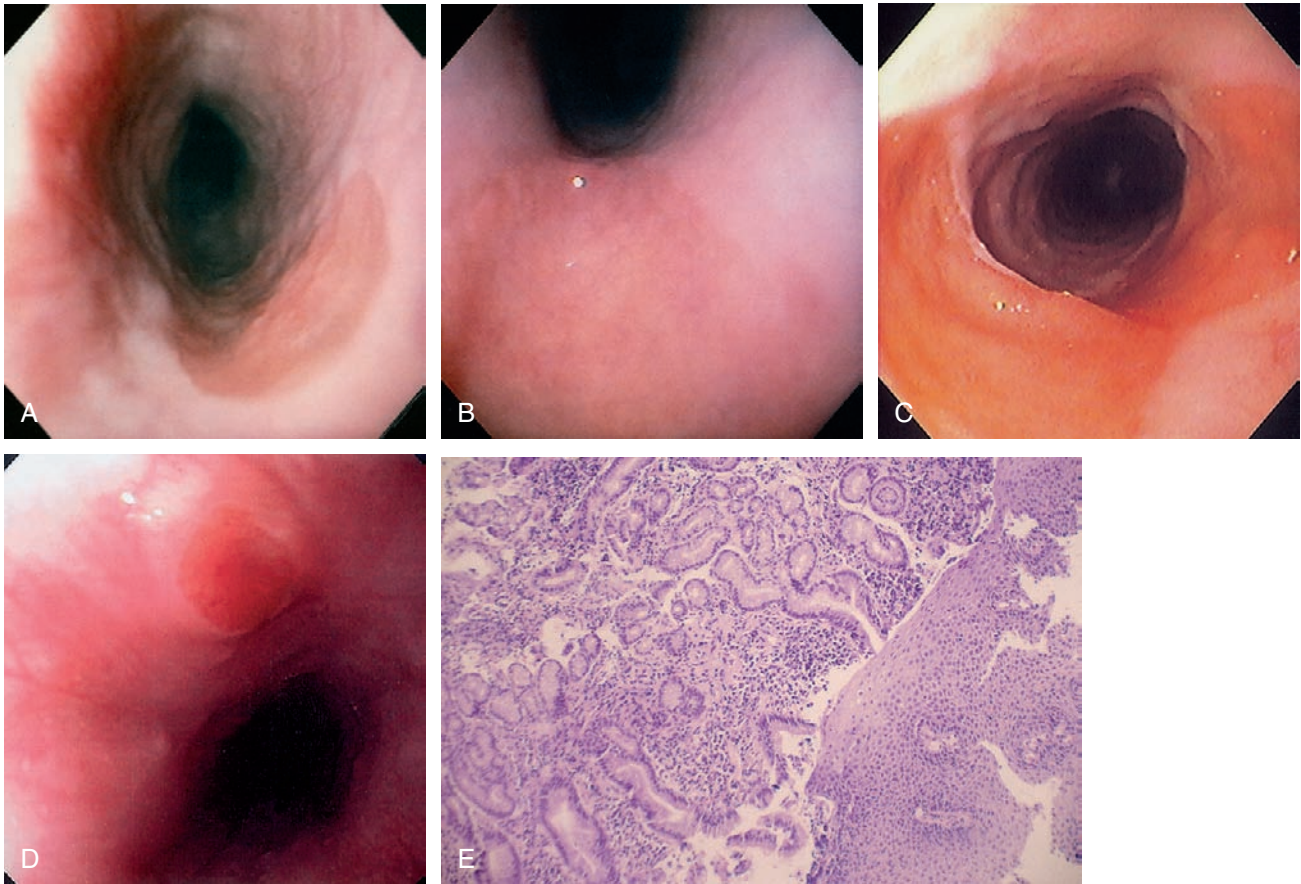


FIGURE 2.136 INLET PATCH

A, Distal to the cricopharyngeus, a well-circumscribed area with an orange color is shown. The surrounding esophageal mucosa has the typical pearly white appearance of squamous mucosa. **B**, Close-up view of the patch. **C**, Large area of involvement. **D**, The inlet patch has a raised appearance. **E**, This area represents heterotopic gastric mucosa. Normal squamous epithelium is on the right, with gastric mucosa and typical-appearing fundic glands on the left.

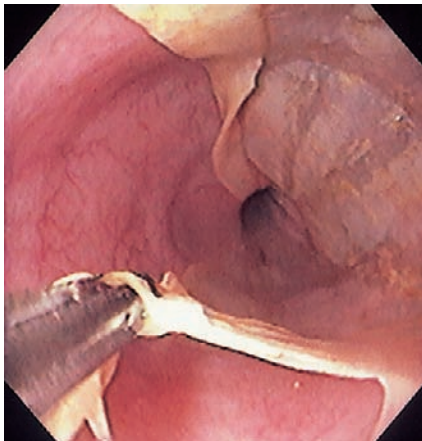


FIGURE 2.137 SLOUGHING ESOPHAGITIS

Normal-appearing squamous mucosa appears to be peeling away from the mucosal surface. Note the underlying mucosa is normal.

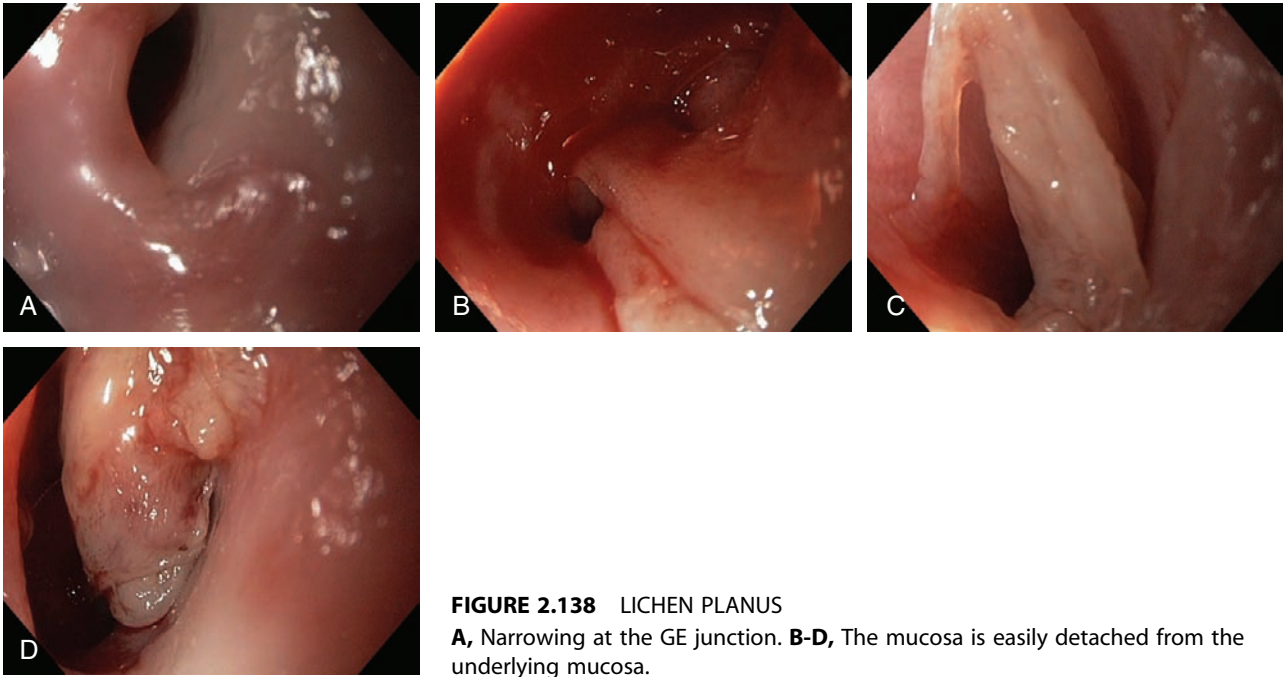


FIGURE 2.138 LICHEN PLANUS

A, Narrowing at the GE junction. **B-D**, The mucosa is easily detached from the underlying mucosa.



FIGURE 2.139

SQUAMOUS PAPILLOMA

Verrucous-appearing lesion in the midesophagus.

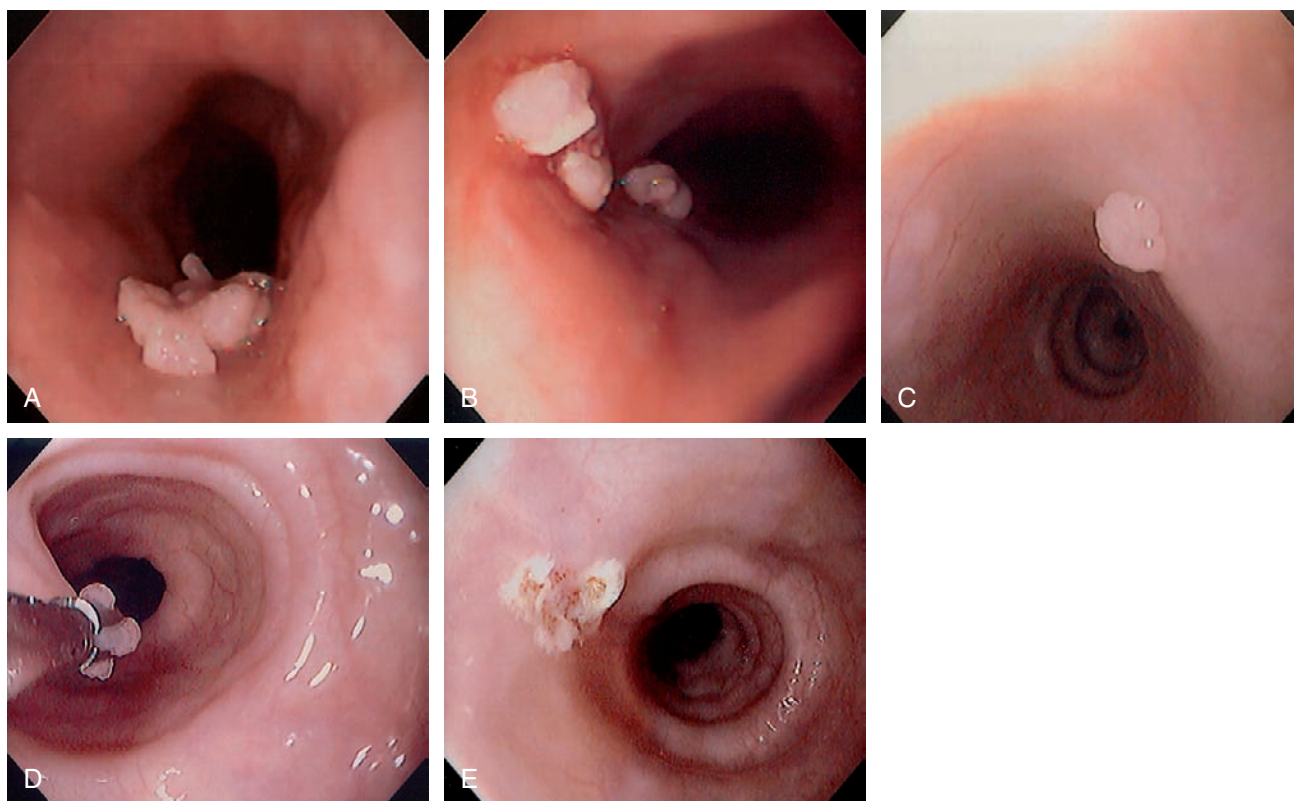


FIGURE 2.140 SQUAMOUS PAPILOMA

A, Large verrucous plaque-like lesion. **B**, Multiple smaller lesions were more distal. **C**, Solitary verrucous lesion in the midesophagus. The lesion is grasped with a hot biopsy forcep and ablated (**D**), and the area coagulated (**E**).

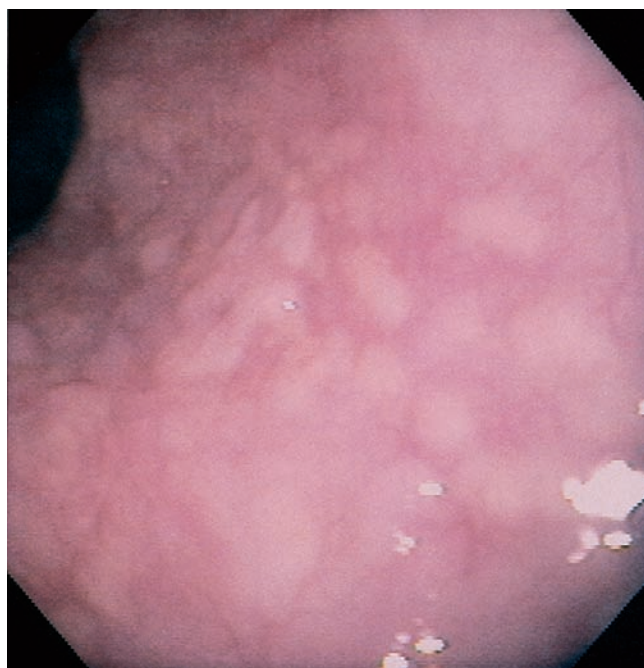


FIGURE 2.141 GLYCOGENIC ACANTHOSIS

Multiple slightly raised, yellowish lesions are seen throughout the esophagus.

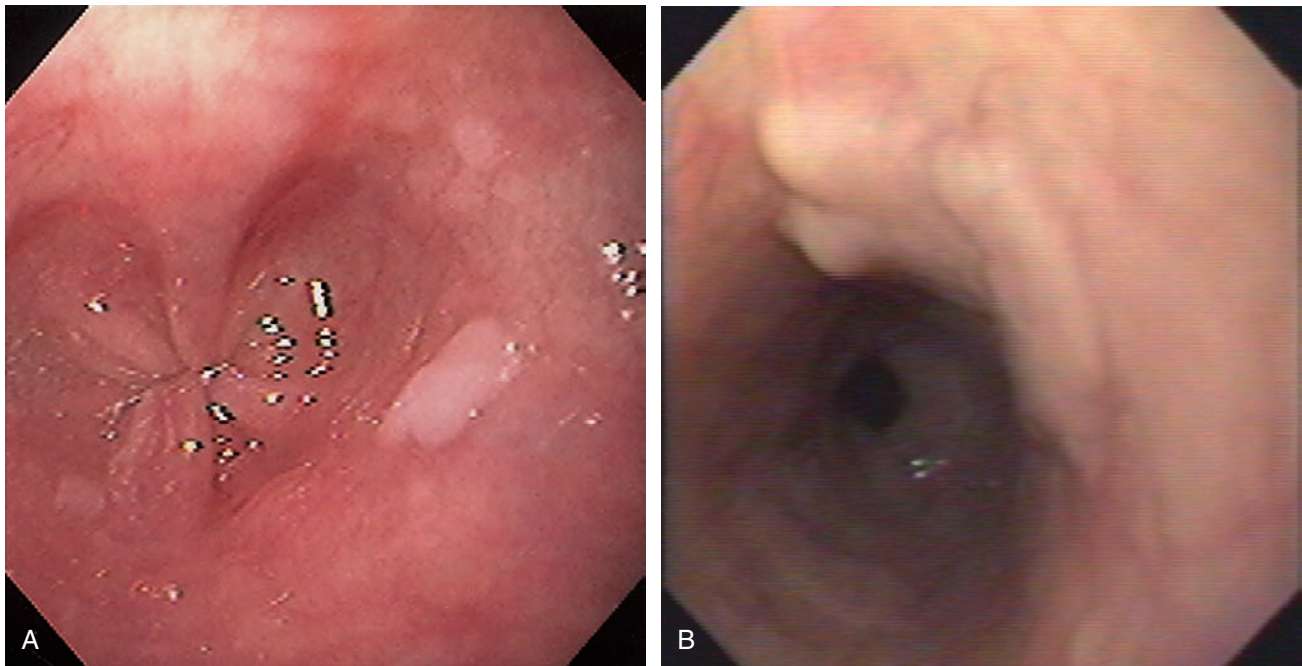


FIGURE 2.142 GLYCOGENIC ACANTHOSIS

A, Solitary white lesion in the distal esophagus. **B**, Large, flat, white lesion in the midesophagus. This patient had multiple lesions.

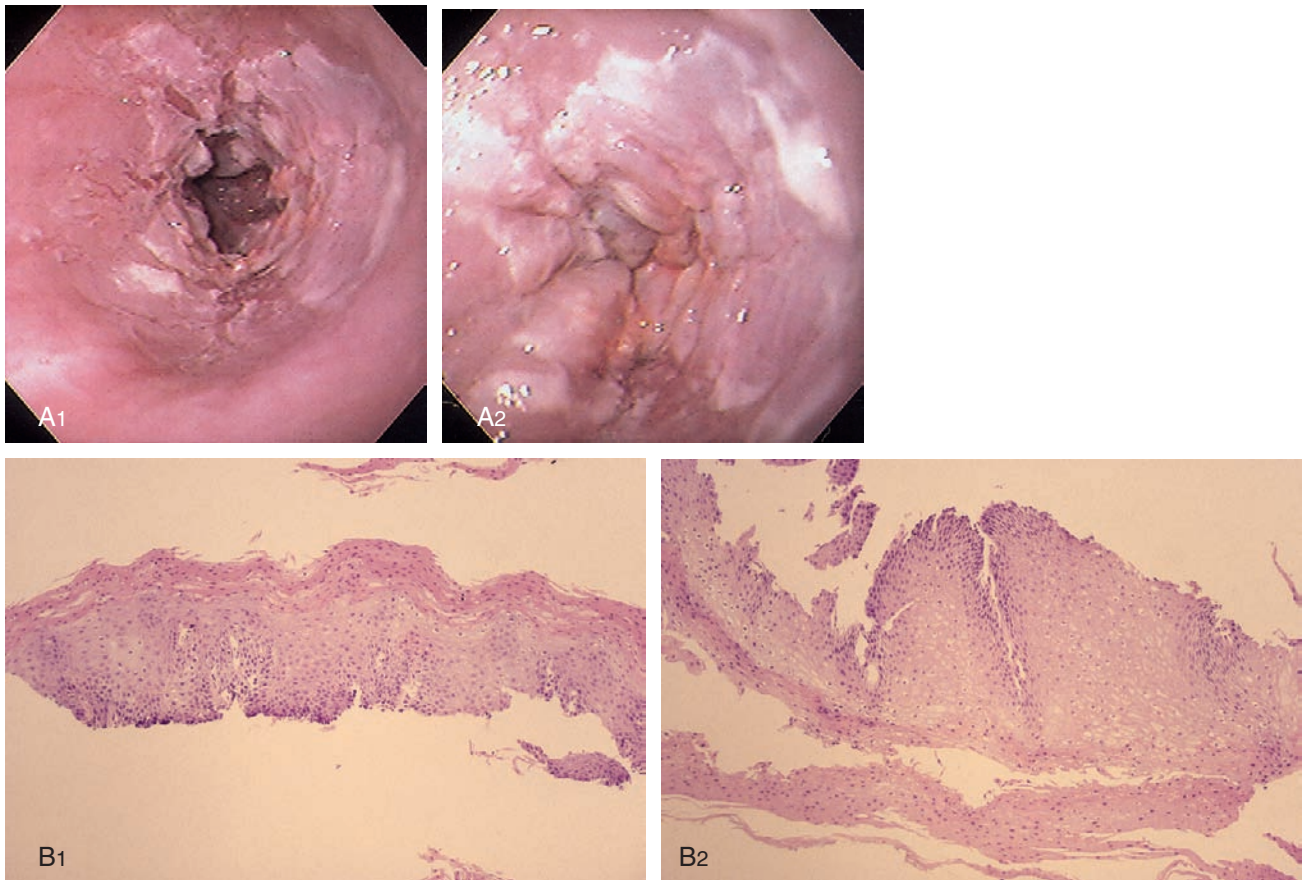


FIGURE 2.143 PARAKERATOSIS

A1, A2, Marked thickening and plaque-like appearance of the squamous mucosa in the distal esophagus. These lesions can result from stasis such as in achalasia or obstruction from other causes. **B1, B2**, Increased thickness of the stratum corneum with spindle-shaped cells and condensed nuclei.

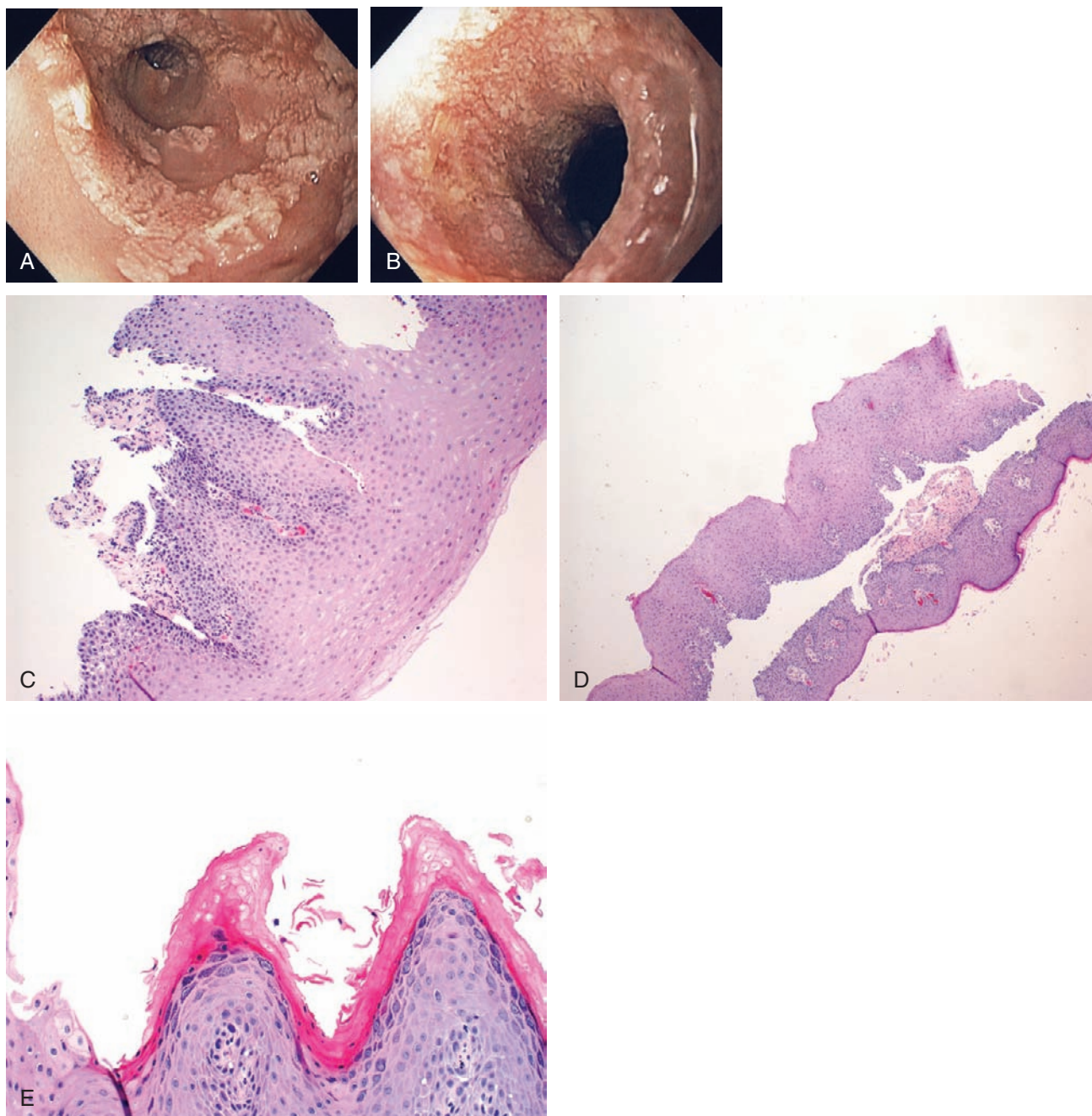
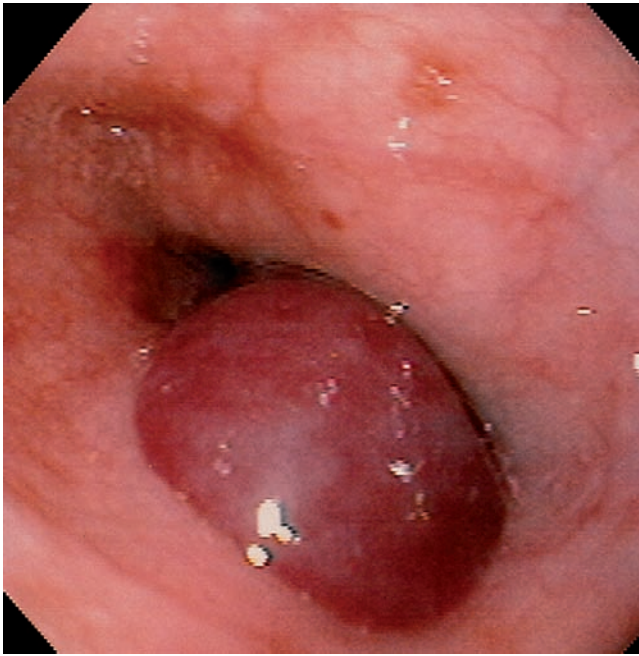
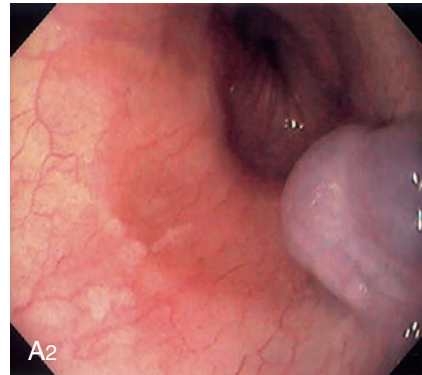


FIGURE 2.144 HYPERKERATOSIS OF THE ESOPHAGUS

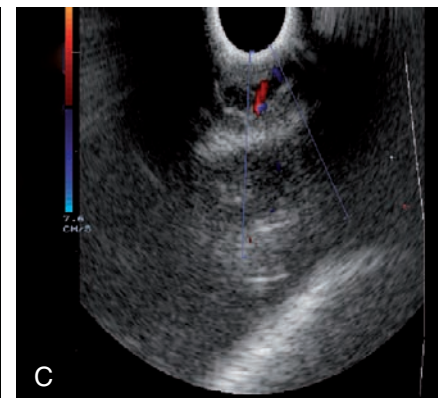
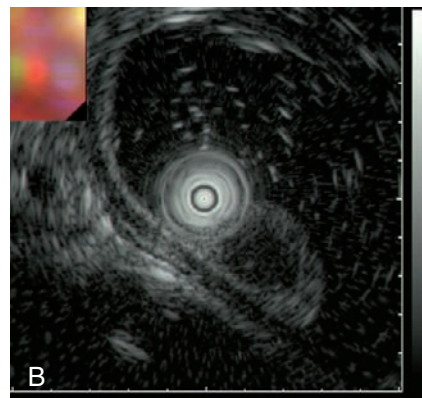
A, B, Multiple whitish plaques throughout the distal esophagus, some of which are confluent. **C, D,** Biopsy of the lesion shows squamous mucosa with thickening of the superficial squamous mucosa, granular cell formation, parakeratosis, and focal papillomatosis. **E,** Close-up shows the marked thickening of the superficial mucosa.

**FIGURE 2.145** VASCULAR LESION

This well-circumscribed lesion bulges into the esophageal lumen. The overlying mucosa is normal and has a red discoloration, typical of a vascular anomaly.

**FIGURE 2.146** VASCULAR LESION

A1, A2, Venous bleb in the midesophagus.

**FIGURE 2.147** HEMANGIOMA

A, Submucosal vascular lesion. **B,** Endoscopic ultrasonography characterizes the lesion. **C,** Doppler probe of the lesion confirms arterial flow.



FIGURE 2.148
BLUE RUBBER BLEB
NEVOUS SYNDROME
Focal venous bleb in
the distal esophagus.

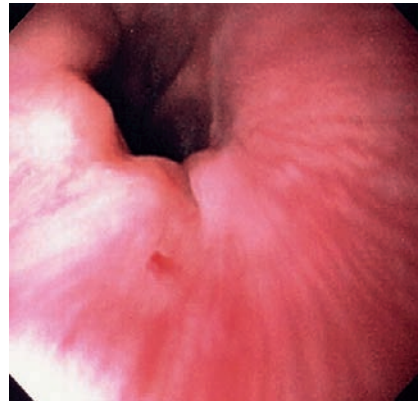
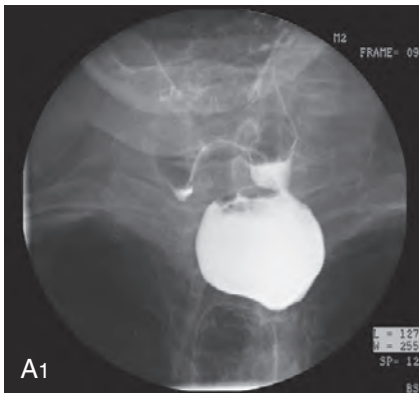
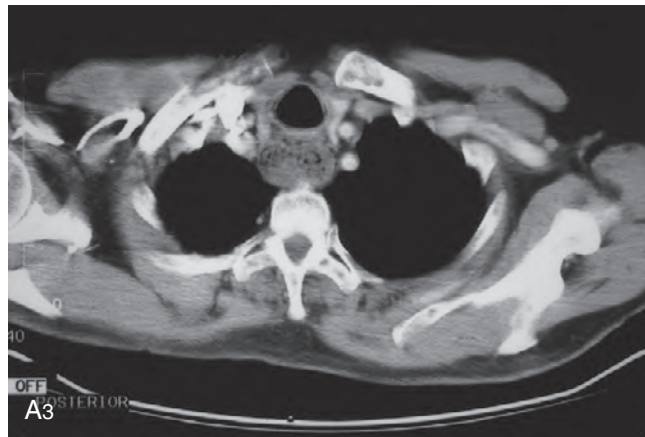


FIGURE 2.149
VASCULAR
ECTASIA
Pinpoint ectasia at
the GE junction in
a patient with
Osler-
Weber-Rendu
syndrome.



A1



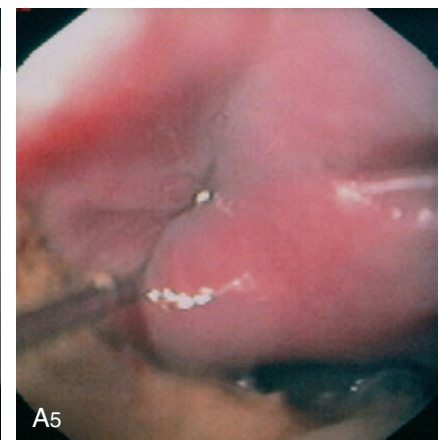
A3



A2



A4



A5

FIGURE 2.150 ESOPHAGEAL DIVERTICULA

A, Zenker's diverticulum. **A1**, **A2**, Barium swallow both on anteroposterior and lateral view shows typical location of the diverticulum, which is filled with barium. **A3**, Debris-filled cavity posterior to the trachea. **A4**, Debris-filled cavity. **A5**, A guidewire is in the esophagus at the level of the cricopharynx, with the arytenoids visible. This lesion results from outpouching of hypopharyngeal mucosa between the oblique fibers of the inferior pharyngeal constrictor muscle and the transverse fibers of the cricopharynx. This area of thin muscular wall is termed *Killian's triangle*.

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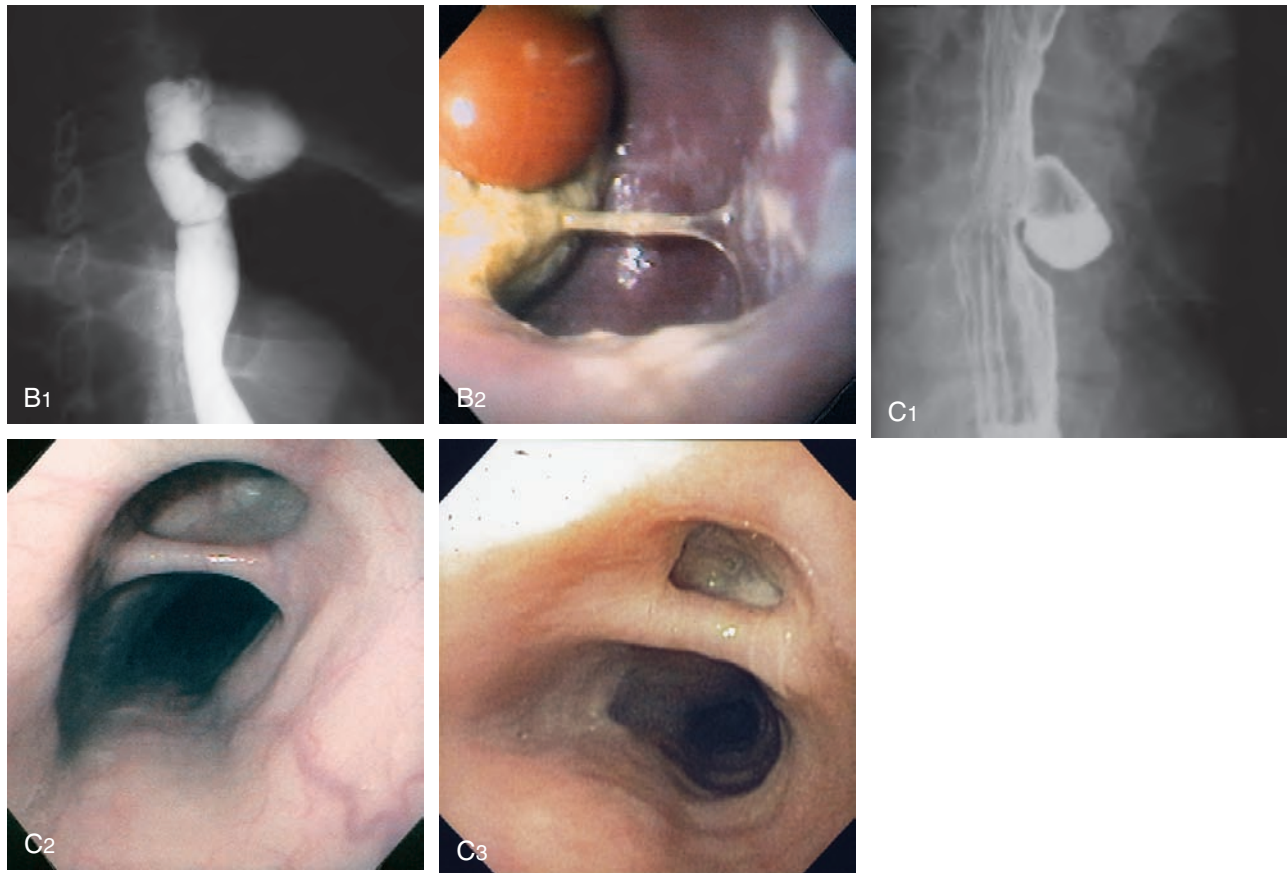


FIGURE 2.150 ESOPHAGEAL DIVERTICULA

B, Cervical esophageal. **B1**, A large diverticulum is present, distal to the cricopharyngeus. **B2**, The diverticulum is filled with *Candida*, food debris, and a pill. **C**, Midesophageal. **C1**, Diverticulum in the midesophagus, usually termed a *traction diverticulum*. **C2**, The diverticulum projects laterally. **C3**, Midesophageal diverticulum with exudate at the base.

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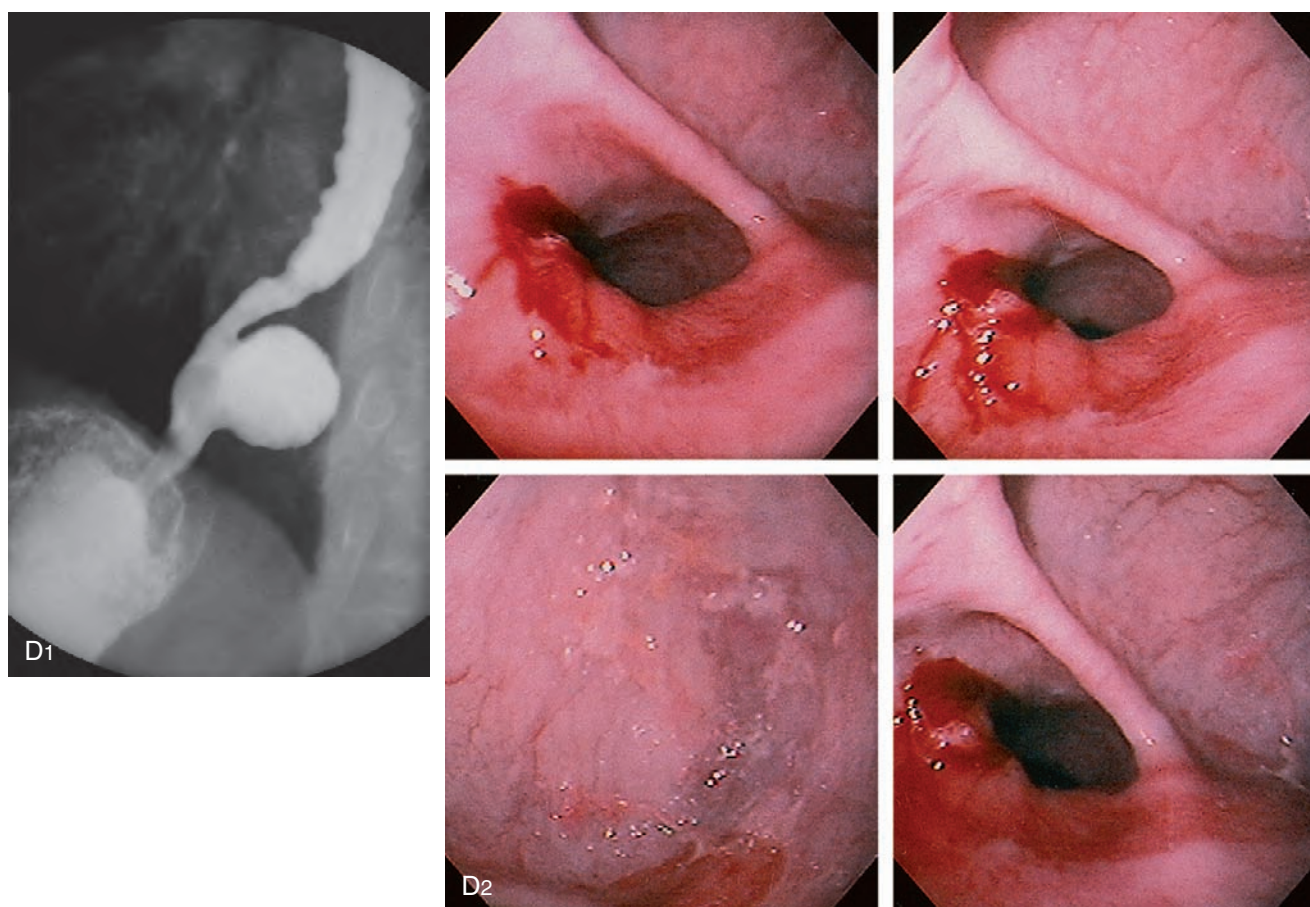


FIGURE 2.150 ESOPHAGEAL DIVERTICULA

D, Epiphrenic. **D1**, Epiphrenic diverticulum and tertiary esophageal contractions. **D2**, A large diverticulum proximal to the gastroesophageal junction is present on the right, with the normal esophageal lumen on the left. The size of the diverticulum is appreciated (*bottom left*). Gastric tissue appears to enter the diverticulum (*right*). Fresh blood is seen across the gastroesophageal junction resulting from a Mallory-Weiss tear (*bottom right*).

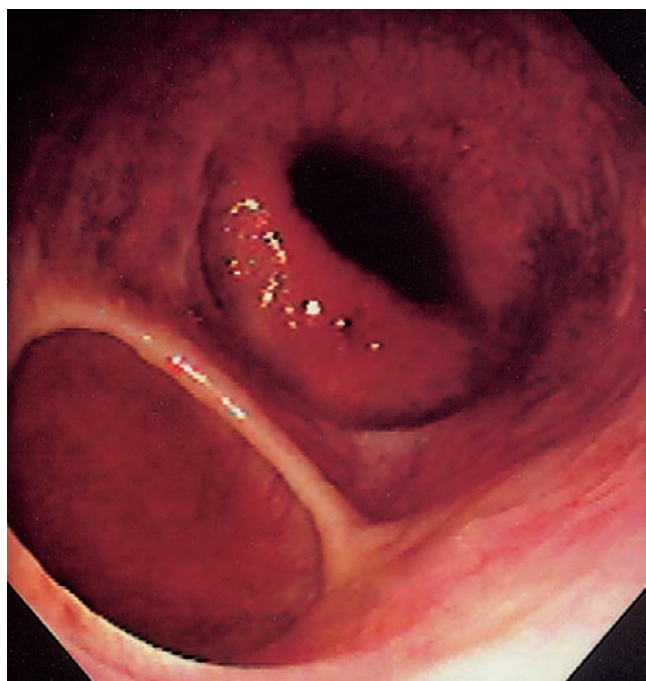


FIGURE 2.151 ESOPHAGEAL DIVERTICULUM
Outpouching in the distal esophagus.

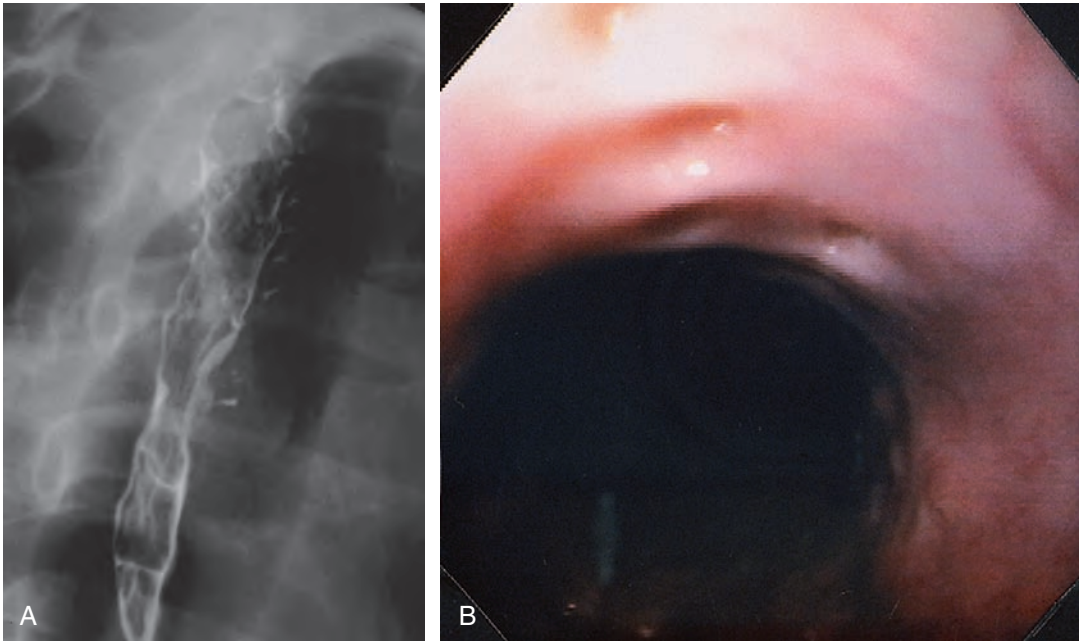


FIGURE 2.152 INTRAMURAL PSEUDODIVERTICULOSIS

A, Multiple small collections of barium immediately lateral to the esophageal wall. **B**, The barium collections represent these round defects in the esophageal wall. The base of the lesions does not have a granular appearance suggestive of ulceration.

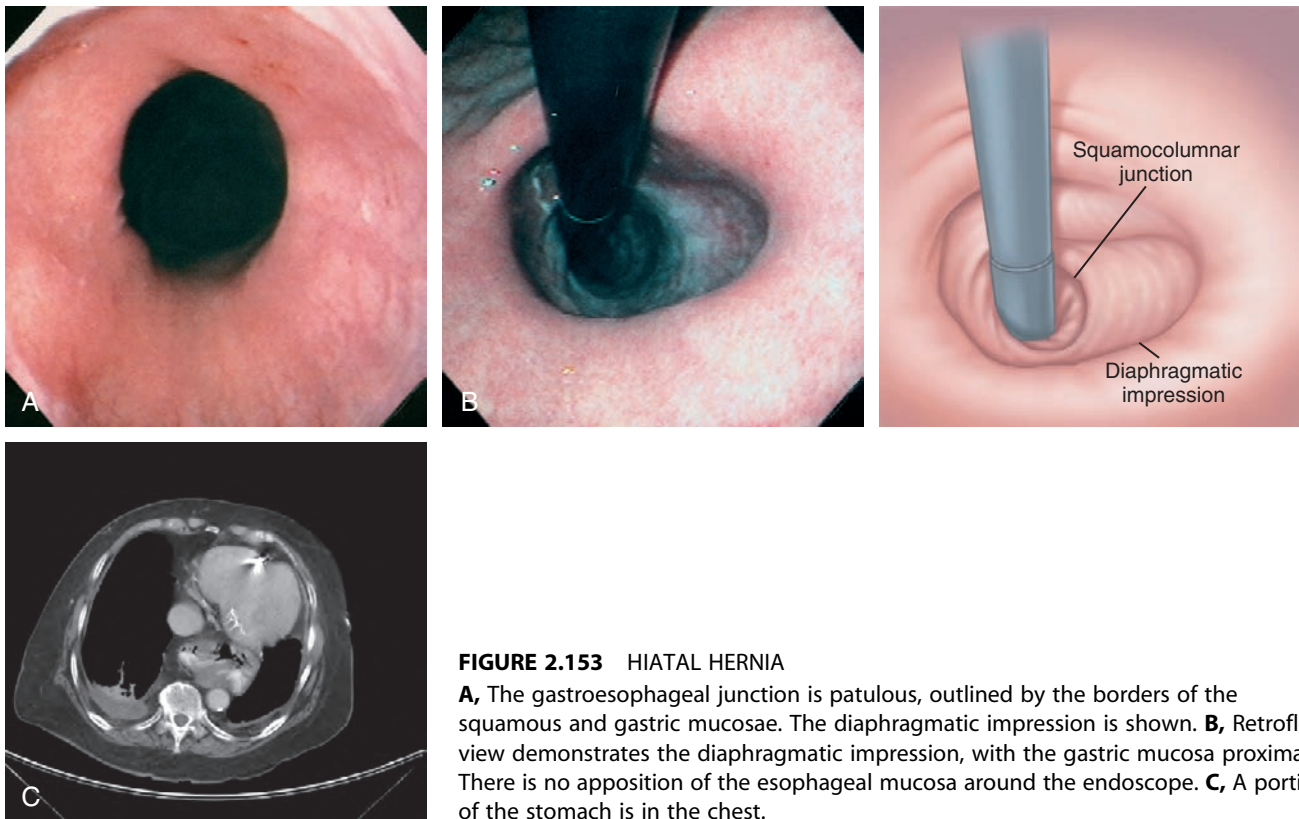


FIGURE 2.153 HIATAL HERNIA

A, The gastroesophageal junction is patulous, outlined by the borders of the squamous and gastric mucosae. The diaphragmatic impression is shown. **B**, Retroflex view demonstrates the diaphragmatic impression, with the gastric mucosa proximal. There is no apposition of the esophageal mucosa around the endoscope. **C**, A portion of the stomach is in the chest.

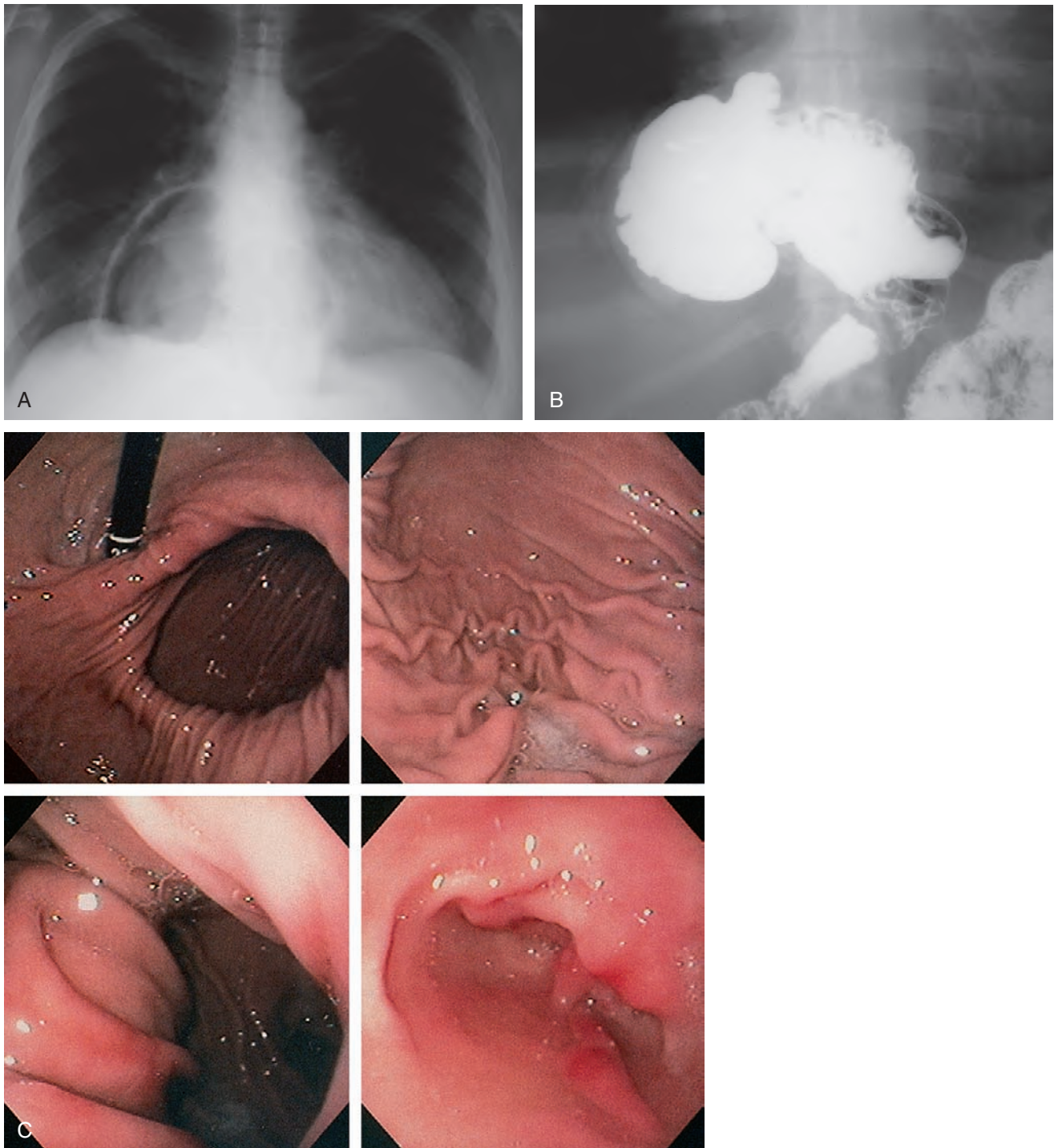


FIGURE 2.154 PARAESOPHAGEAL HERNIA

A, The mediastinum is widened by a large gastric air bubble. **B**, Upper gastrointestinal barium study demonstrates that the air bubble represents a significant portion of the stomach in the chest cavity. **C**, On retroflex view, a large defect is next to the endoscope extending proximally (*top left*). The defect is entered, and typical gastric mucosa is shown (*top right*). With further advancement of the endoscope, an area of impingement is seen encircling the stomach. More gastric mucosa is in the distance (*bottom left*). With further advancement, the antrum is shown, as evidenced by the loss of gastric rugae (*bottom right*).

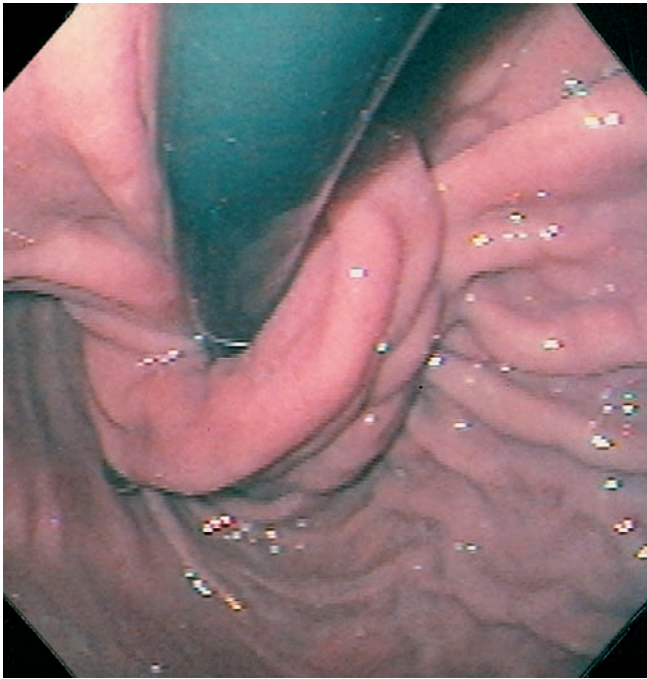


FIGURE 2.155 NISSEN FUNDOPLICATION

The gastric mucosa tightly encircles the endoscope as if it were twisted.



FIGURE 2.156 FAILED NISSEN FUNDOPLICATION

Although the gastric mucosa has a twisted appearance, the endoscope is now free, with loss of competence.

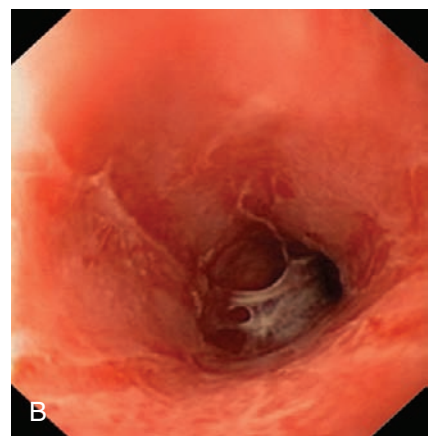
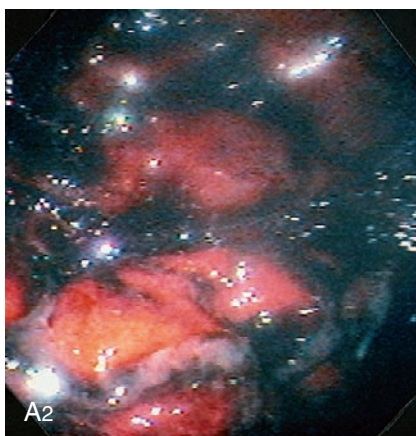
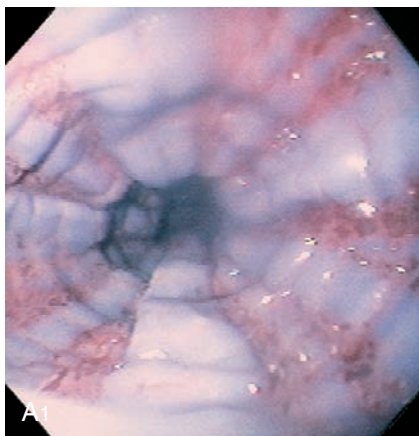


FIGURE 2.157 CAUSTIC INGESTION

A1, After the ingestion of acid, the squamous mucosa sloughs in a linear pattern. The mucosa is edematous and has a bluish discoloration. **A2**, The gastric mucosa is hemorrhagic and edematous. **B**, Diffuse shallow ulceration with exudate coating the esophagus.



FIGURE 2.158 CAUSTIC INGESTION

A, Diffuse ulceration of the hypopharynx. Note the presence of an endotracheal tube. **B**, Just distal to the upper esophageal sphincter the mucosa is denuded and there is a peculiar vascular pattern. **C**, More distally, the vascular pattern apparently represents the submucosa as there is a deep ulcer with sparing of the contralateral wall. **D**, Exudative esophagitis is present in the distal esophagus but without deep ulceration. **E**, The stomach is spared. **F**, At 4 days, the hypopharynx is much improved with erosion, and edema is seen at the arytenoids. Ulceration is more extensive at the upper esophageal sphincter (**G**). **H**, The area of hemicircumferential ulceration (**C**) is now more clearly demarcated. **I**, At 7 days, ulceration and edema are still present in the hypopharynx. Note the presence of a feeding tube. **J**, Severe ulceration is still present in the proximal esophagus.

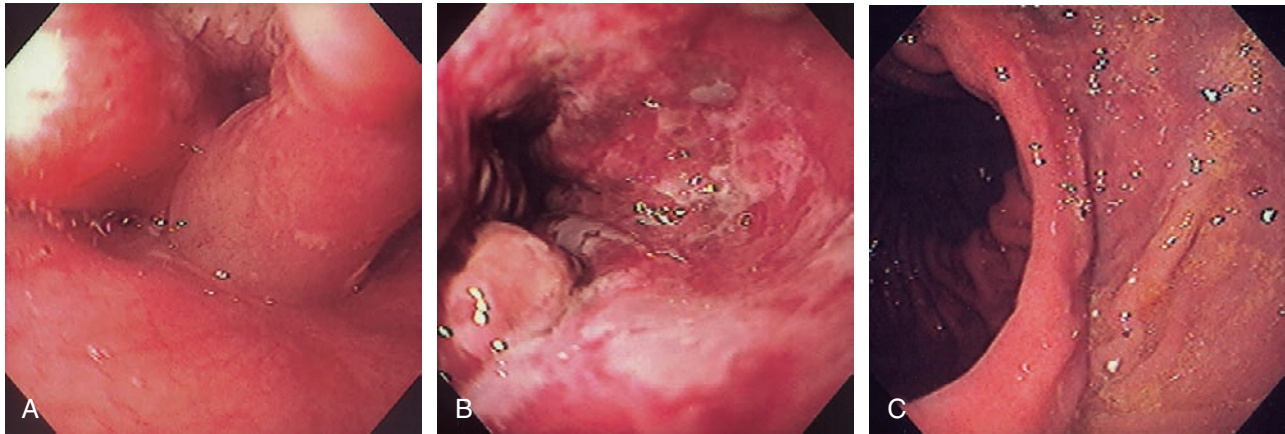


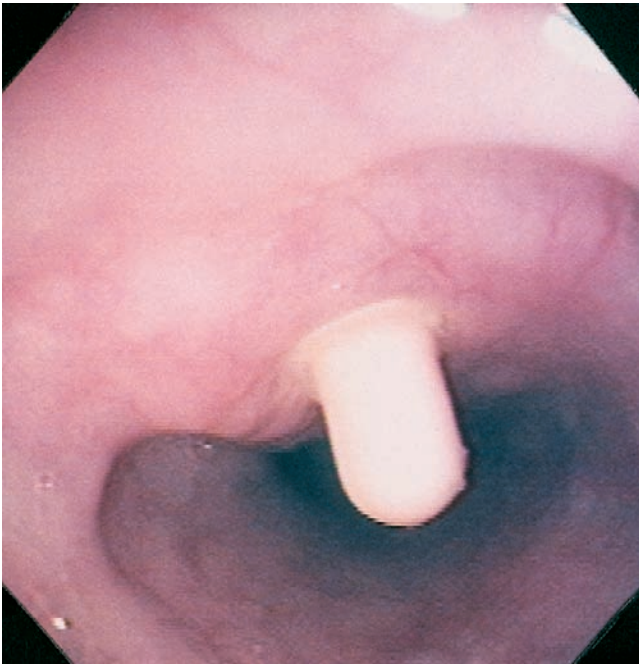
FIGURE 2.159 CAUSTIC INGESTION IN COLONIC INTERPOSITION

A, Diffuse edema of the hypopharynx and arytenoids. **B**, Diffuse ulceration is present in the colon. **C**, There is sparing of the colonic–gastric anastomosis.



FIGURE 2.160 FOREIGN BODIES

A variety of foreign bodies are present in the esophagus, including a watch (**A**), quarters (**B**), PEG tube bumper (**C**), and shrimp (**D**). **E1**, Bottle cap. **E2**, After removal, extensive ulceration is evident.

**FIGURE 2.161** BLOM-SINGER PROSTHESIS

The plastic prosthesis enters anteriorly and fits tightly into the esophagus. This prosthesis enters the esophagus through the trachea and is used for speech after tracheostomy.

**FIGURE 2.162** CYSTIC ESOPHAGEAL LESION

A, Well-circumscribed, smooth filling defect in the distal esophagus.

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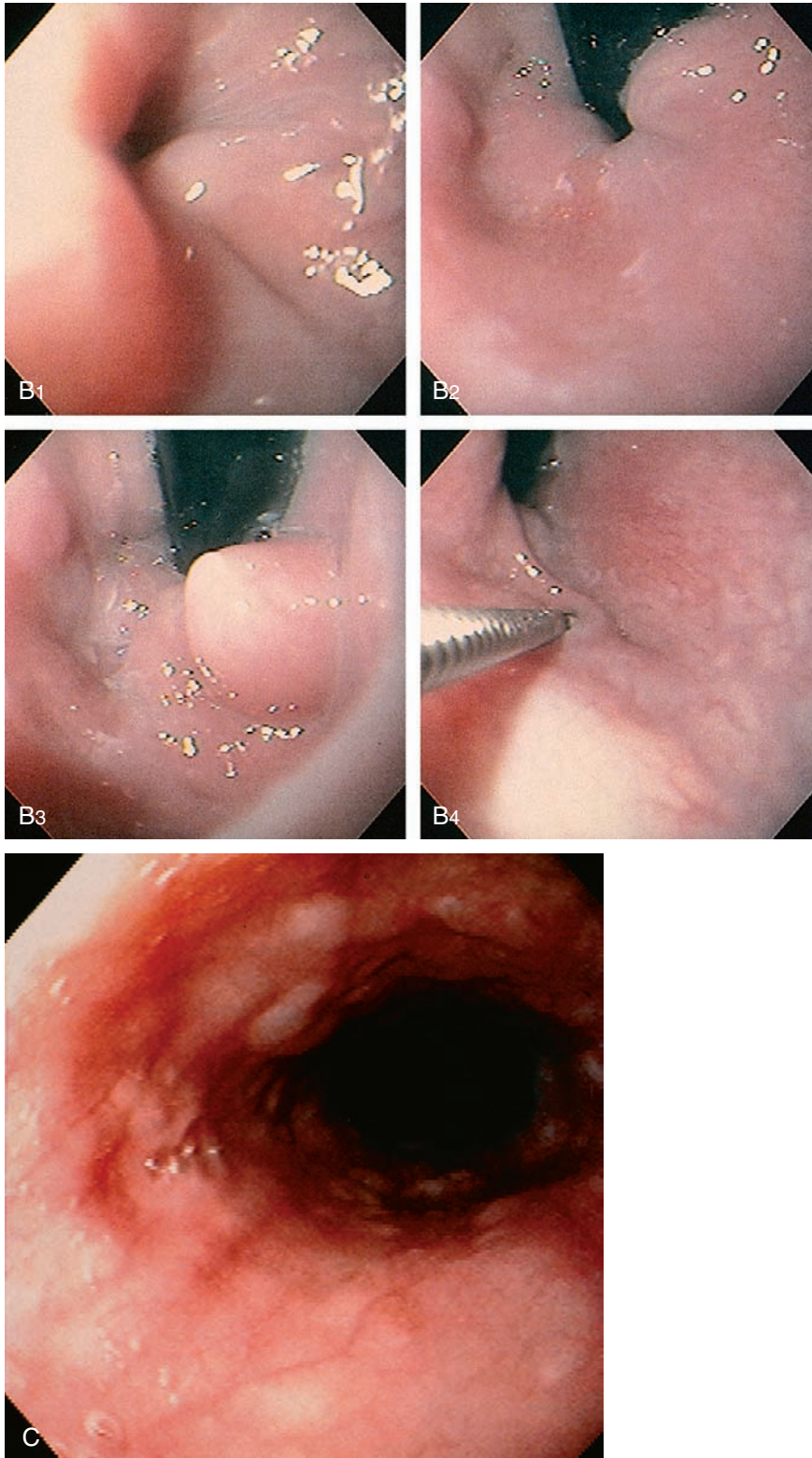


FIGURE 2.162 CYSTIC ESOPHAGEAL LESION

B, The filling defect appears round and smooth, with overlying normal-appearing mucosa. This can be seen both antegrade (**B1**) and retrograde (**B2**, **B3**). The lesion is soft and collapses when probed with the biopsy forceps (**B4**). **C**, Multiple cystic-appearing lesions in the midesophagus.

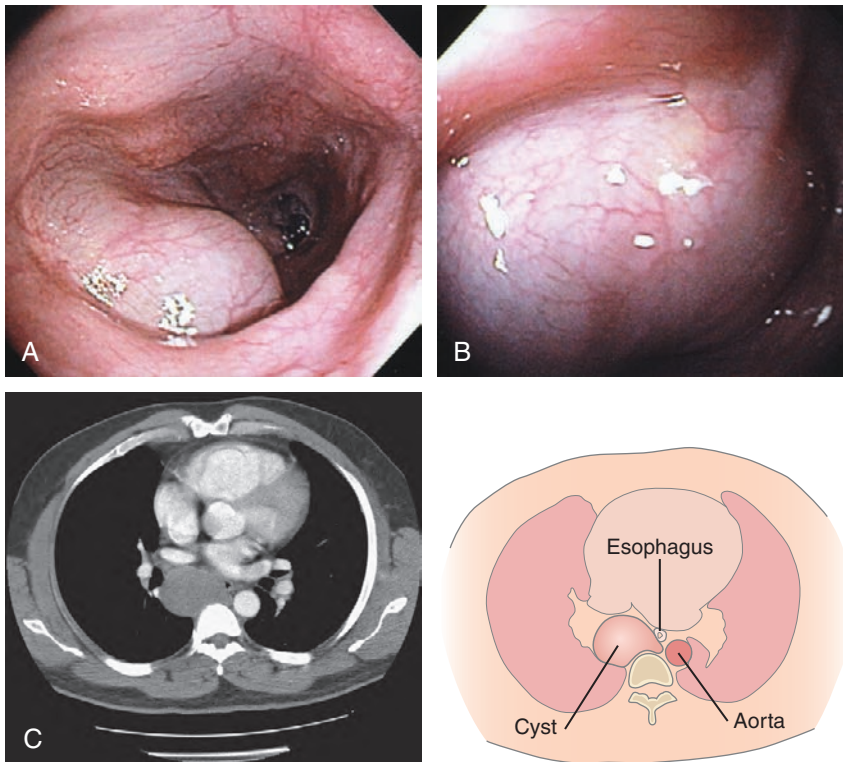


FIGURE 2.163 PARAESOPHAGEAL CYST
A, B, Cystic impression in the midesophagus.
C, Large cystic lesion in the mediastinum impinging on the esophagus.

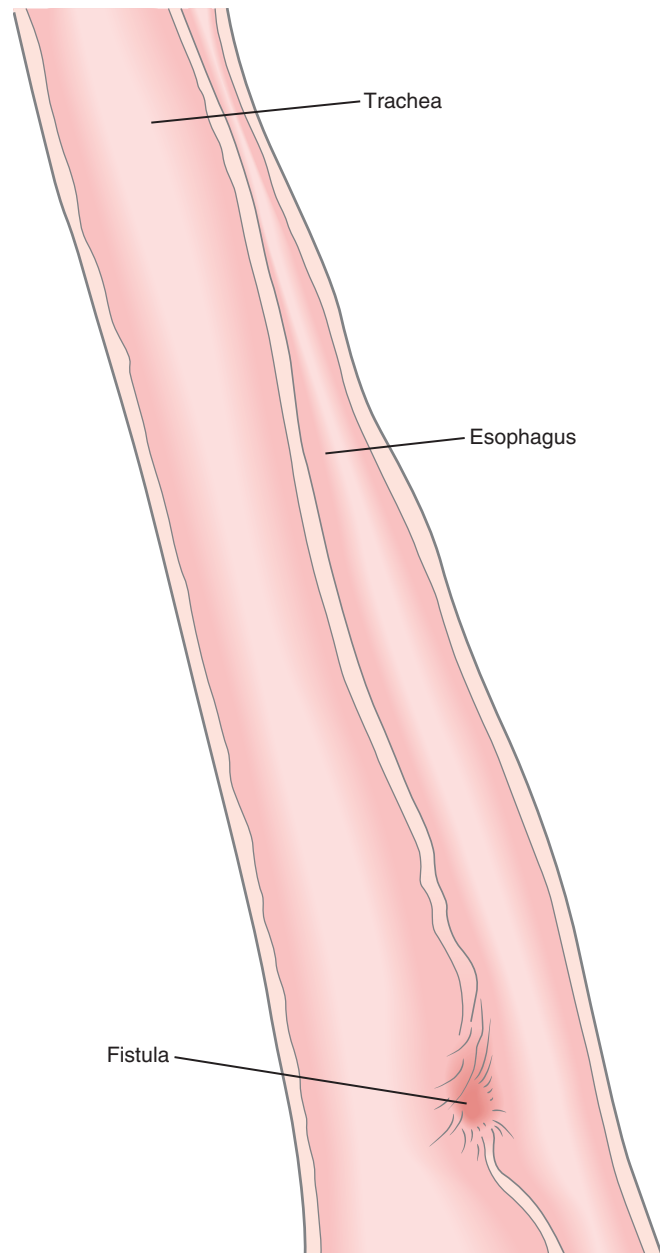


FIGURE 2.164 TRACHEAL–ESOPHAGEAL FISTULA

A, A communication is present in the midesophagus, with outline of the trachea.

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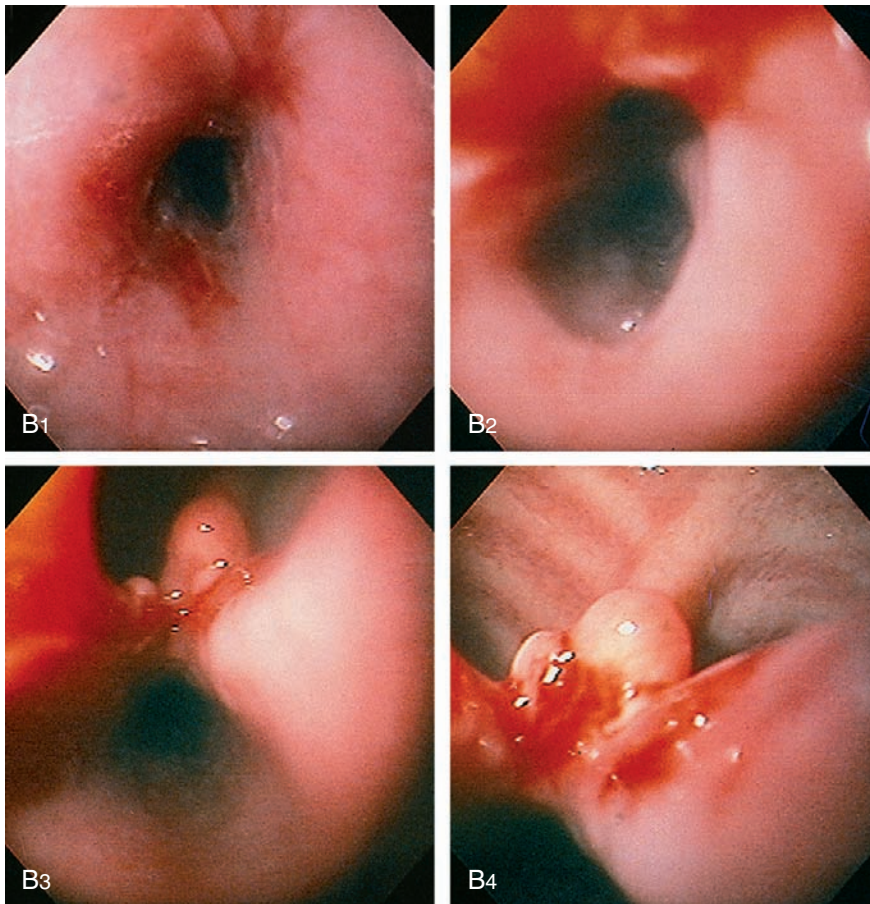


FIGURE 2.164 TRACHEAL–ESOPHAGEAL FISTULA

B1, B2, A stricture is present proximal to the fistula. Beyond the stricture, the large fistula is apparent (**B3, B4**), with tracheal rings at the level of the carina (**B4**).

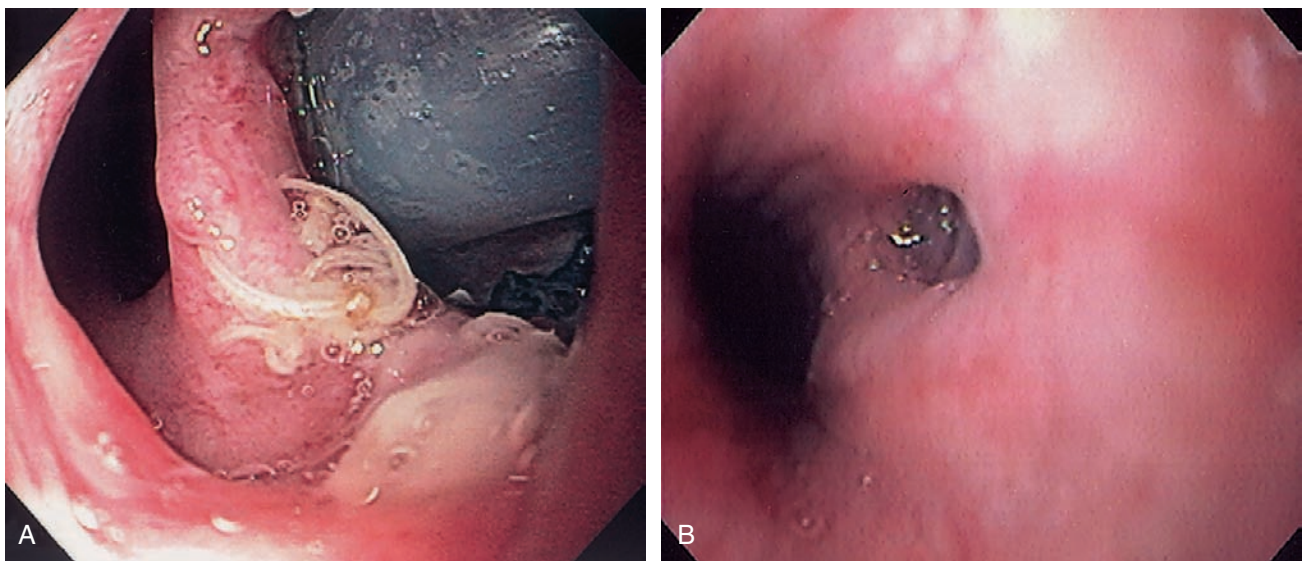


FIGURE 2.165 TRACHEAL–ESOPHAGEAL FISTULA

A, Erosion of endotracheal tube into the esophagus. **B**, A tracheoesophageal fistula resulted from radiation therapy for lung cancer.

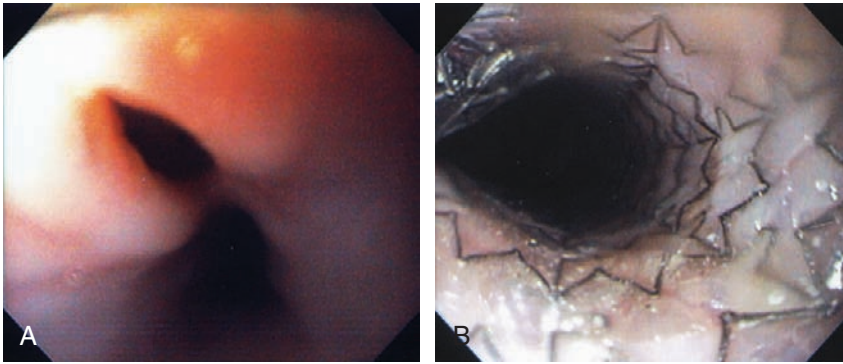


FIGURE 2.166 TRACHEAL-ESOPHAGEAL FISTULA CAUSED BY LUNG CANCER
A, Small fistulous opening identified.
B, A fully covered esophageal stent has been placed.

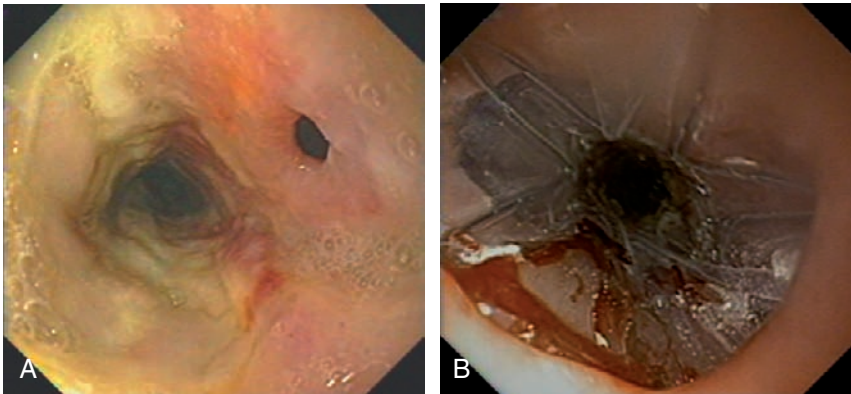


FIGURE 2.167 FISTULA AFTER RADIATION THERAPY
A, Fistula easily seen. **B**, A covered stent has been deployed across the opening.

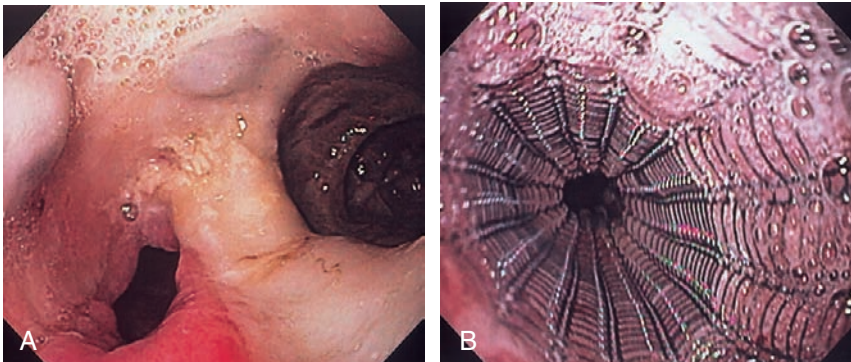


FIGURE 2.168 STENTING OF TRACHEOESOPHAGEAL FISTULA FROM LUNG CANCER
A, Large fistula in the midesophagus from lung cancer. **B**, Placement of coated metallic stent.

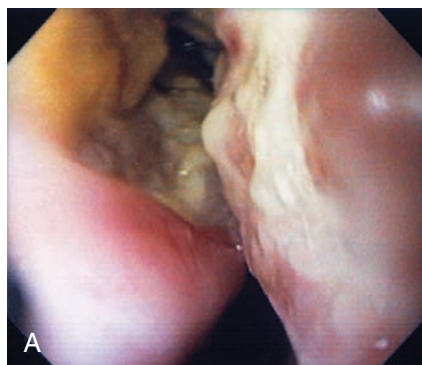


FIGURE 2.169 TRACHEOESOPHAGEAL FISTULA CAUSED BY LUNG CANCER

A, Large, deep ulceration of the midesophagus. **B**, **C**, CT scans shows the large mass lesion that involves the esophagus.

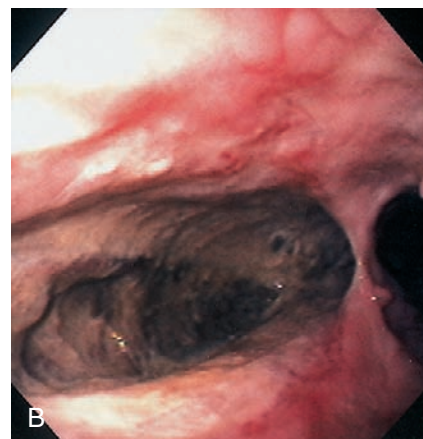
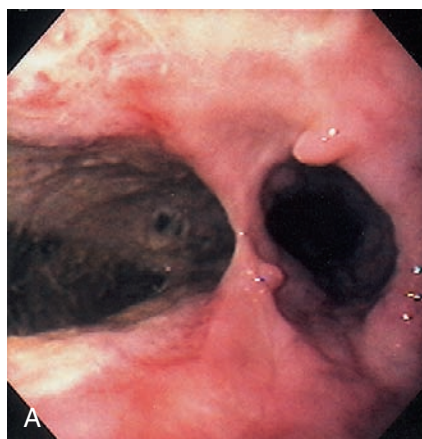
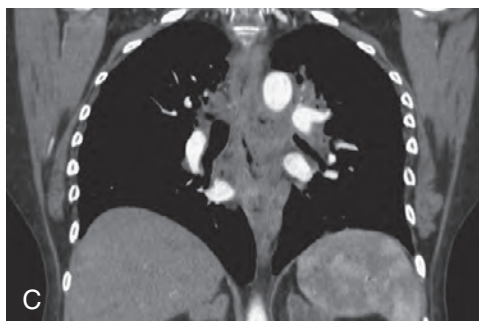


FIGURE 2.170 ULCER INVOLVING MEDIASTINUM

A, Large idiopathic esophageal ulcer of AIDS in the distal esophagus. **B**, Close-up shows the depth of the lesion. Biopsy showed lung tissue.

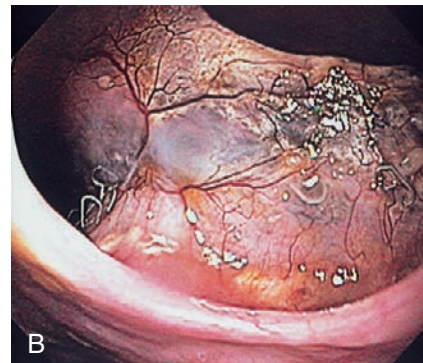


FIGURE 2.171 POSTSURGICAL FISTULA

A, Large opening in the midesophagus connecting to the mediastinum. **B**, Metallic suture is present with neovascularization.

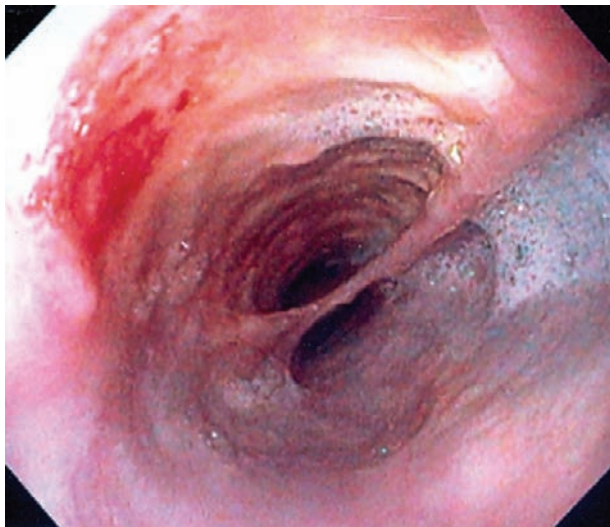


FIGURE 2.172 DOUBLE-BARREL ESOPHAGUS

Two distinct esophageal lumens are visible. Such a lesion is typically caused by some type of trauma creating a false lumen. In this case, the false lumen is in the superior location.

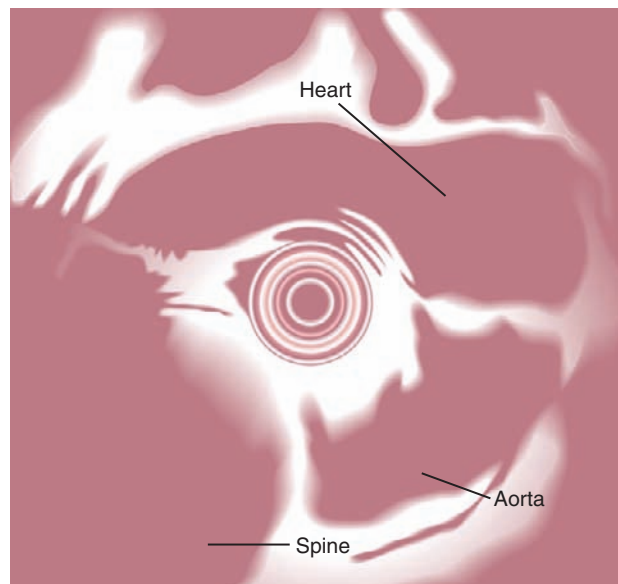
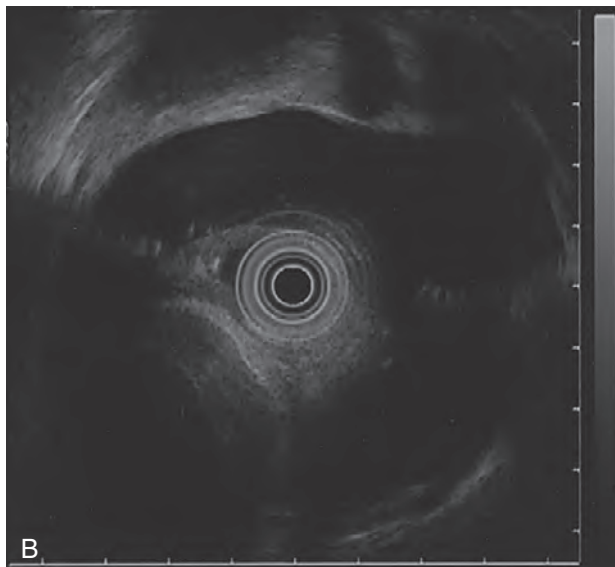
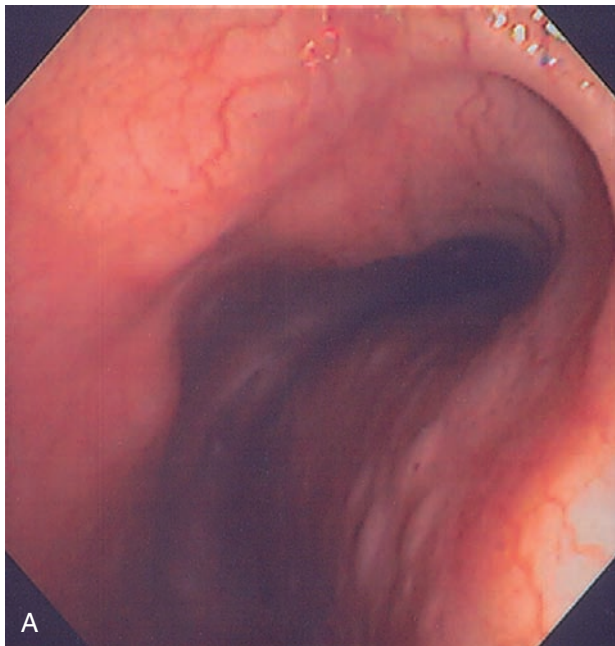
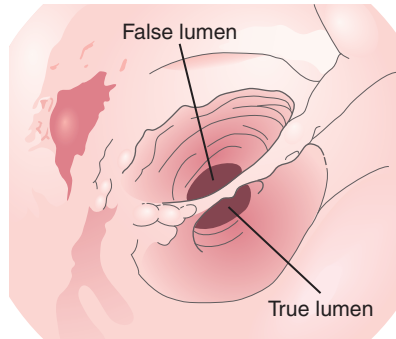


FIGURE 2.173 EXTRINSIC LESION

A, Tubular extrinsic compression in the midesophagus in a patient after pneumonectomy. **B**, Endoscopic ultrasonography confirms the extrinsic compression to be the aorta.

Stomach

INTRODUCTION

The stomach functions to store food and begin the process of digestion. It can be divided physiologically, anatomically, and endoscopically. Upon entering the stomach, one looks directly toward the greater curvature and encounters the gastric rugae. On close inspection, the mucosa has a subtle mosaic pattern, representing the areae gastricae. Any process causing mucosal edema will accentuate this pattern. Gastric folds should flatten with full insufflation. The incisura angularis (gastric notch), located on the distal lesser curvature, is an important landmark that helps to differentiate the gastric body from the antrum and is a common location for benign gastric ulceration. Not unexpectedly, given the histologic differences, the antral mucosa appears endoscopically different from the gastric body.

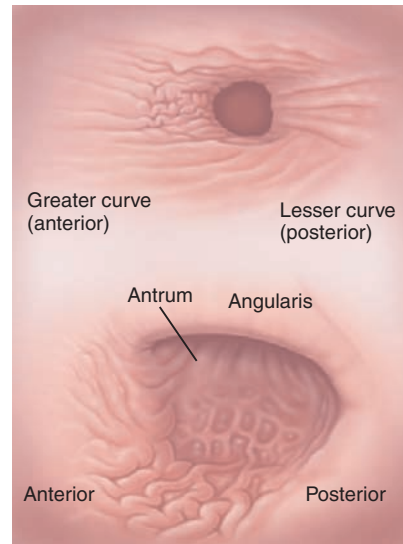
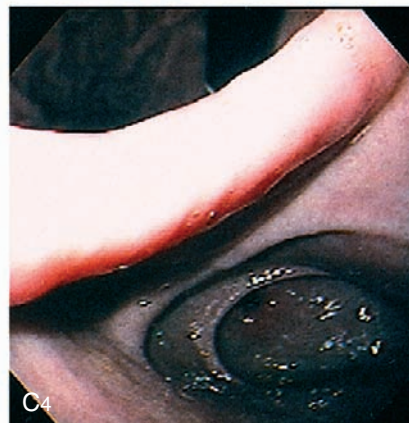
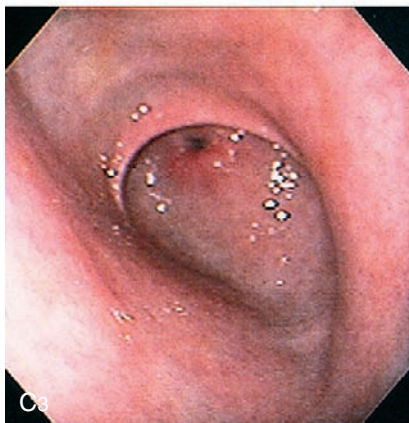
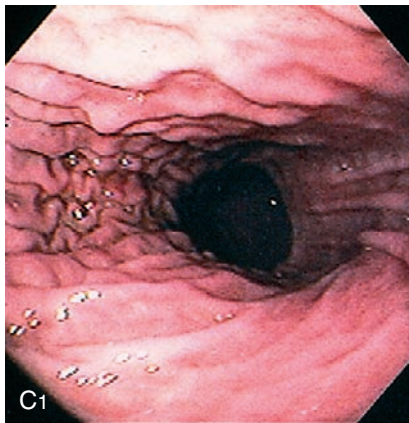
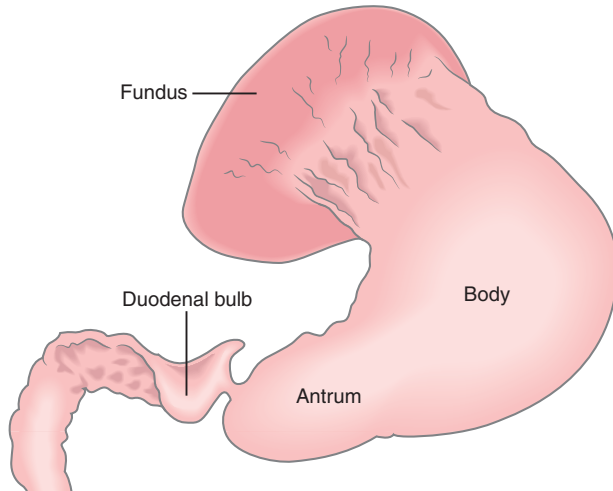
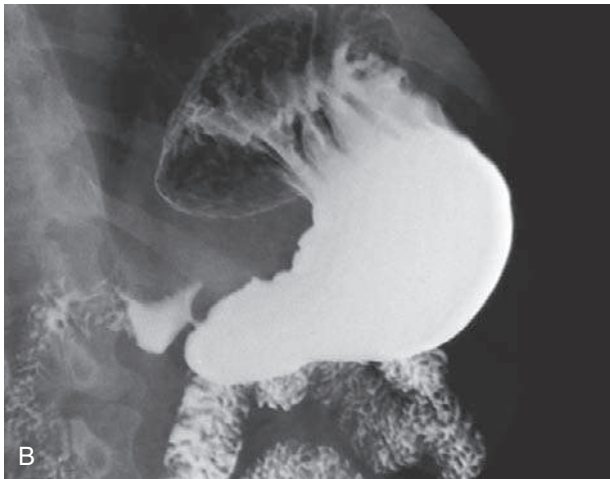
Inflammatory disorders are the most common gastric disorders encountered by endoscopists. As with any endoscopic abnormality, gastric ulcers should be thoroughly characterized, noting location, size, and appearance, because these characteristics yield important information about the likelihood of neoplasm. Similarly, improved resolution with newer endoscope systems has increased the sensitivity for the endoscopic detection of histologic gastritis. *Helicobacter pylori* gastritis may be suspected at the time of endoscopy, although definitive diagnosis requires confirmation, given that “endoscopic abnormalities” may represent normal findings, and conversely, a normal endoscopic appearance may not represent normal histology.



FIGURE 3.1 NORMAL ANATOMY

A, The gastric fundus is well filled with barium, providing an air contrast view of the body, antrum, and duodenal bulb. Normal-appearing gastric rugae are seen in the proximal body. The antral and duodenal mucosae are smooth. Barium is entering the second portion of the duodenum. **B**, Barium is filling the gastric body and antrum, showing normal contour. An air contrast view of the gastric fundus is shown. The distal duodenum and proximal jejunum are inferior to the gastric body. **C**, As the endoscopic tube enters the stomach, the greater curvature is on the left and the lesser curvature on the right, with the angularis (i.e., incisura angularis) in the distance. Gastric rugae are more prominent on the greater than the lesser curvature (**C1**). Normal-appearing rugae are seen in the distal body, extending to the level of the angularis (**C2**). The antral mucosa is smooth, and the pylorus is in the distance (**C3**). The endoscope tip is elevated, and the scope is rotated slightly to the left, identifying the pylorus and angularis, with the endoscope seen above (**C4**).

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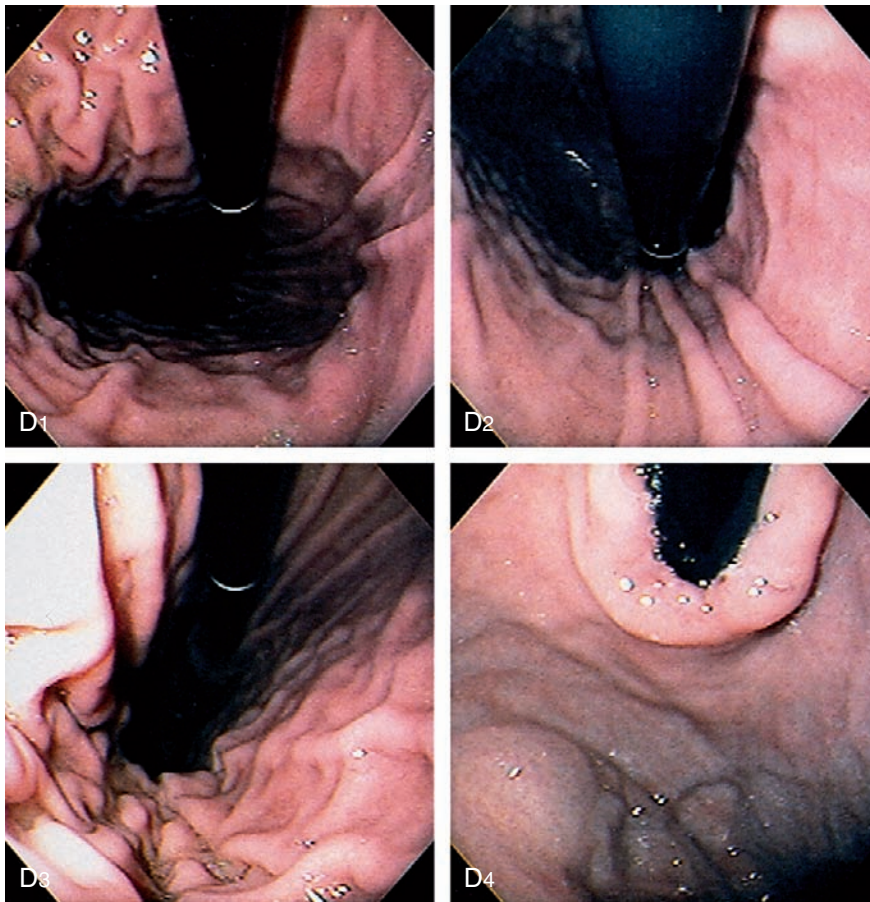
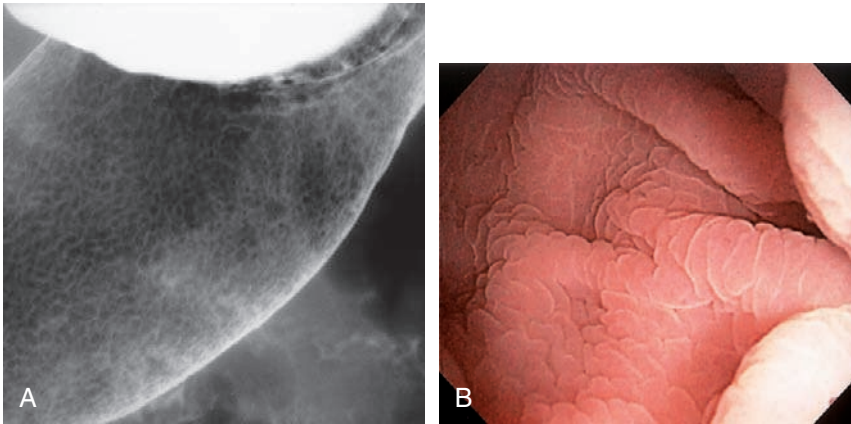


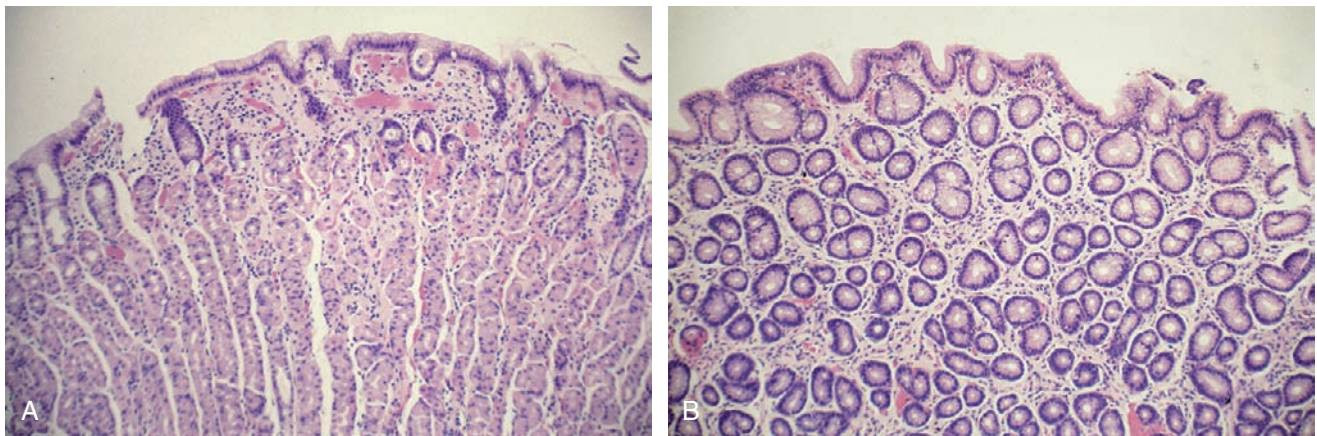
FIGURE 3.1 NORMAL ANATOMY
D, The endoscope is withdrawn to the level of the angularis. The lesser curvature forms the right wall and the greater curvature the left wall. The gastric rugae are more prominent on the left wall (**D1**). With further withdrawal of the endoscope, small rugae are seen on the lesser curvature (**D2**). More prominent rugae are on the opposite wall (greater curvature) with the endoscope rotated to the left (**D3**). With still further withdrawal of the endoscope, the gastric fundus and cardia are shown. The fundus has no rugae, and blood vessels are present. A small rim of gastric mucosa (gastric cardia) can be seen encircling the endoscope (**D4**).



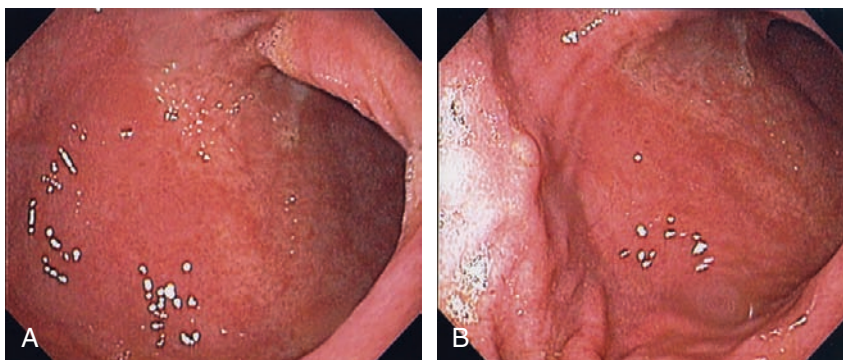
FIGURE 3.2 ANTERIOR–POSTERIOR RELATIONSHIP
 With the patient supine, indentation of the anterior wall documents the anterior–posterior relationship of the angularis.

**FIGURE 3.3** AREAЕ GASTRICAE

A, This pattern may be seen in healthy individuals or can be associated with gastritis. Endoscopically, the pattern may not be as well appreciated as with a barium study. **B**, The normal areae gastricae as seen underwater. Clarity is enhanced when structures are viewed underwater.

**FIGURE 3.4** GASTRIC HISTOLOGY

A, The normal histology of the gastric body is demonstrated. The foveolar surface epithelium is shown. The deeper structures represent the fundic glands. The vertical orientation of the glands is evident. **B**, The normal antral mucosa is composed of deep pits lined by foveolar epithelium. Mucin-producing glands are present.

**FIGURE 3.5** GASTRIC BODY–ANTRUM DEMARCATION

A, B, The gastric mucosa often changes in appearance near the angularis, in association with the histopathologic change. This change may be more striking in patients with associated gastritis.



FIGURE 3.6 *HELICOBACTER PYLORI* GASTRITIS
Mild superficial gastritis results in erythema and prominence of the areae gastricae (as seen underwater).

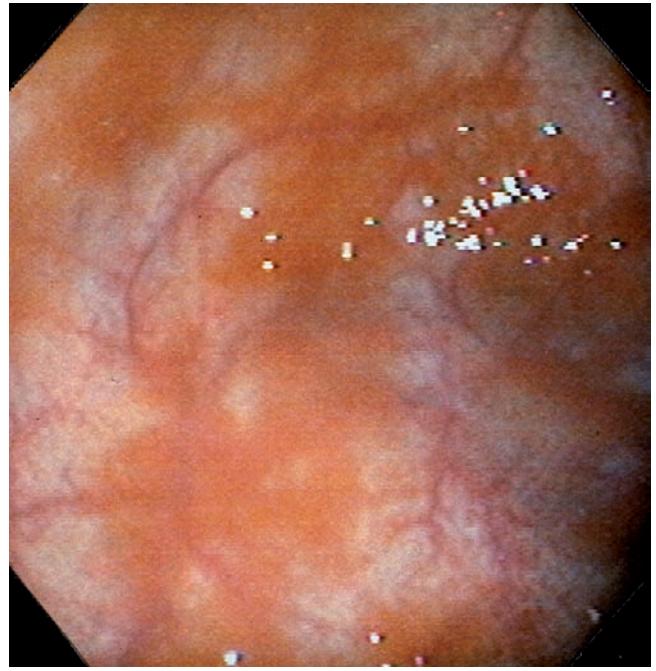


FIGURE 3.7 FOCAL *HELICOBACTER PYLORI* GASTRITIS
Patchy areas of inflammation in the proximal gastric body are well demarcated by the surrounding atrophic mucosa.

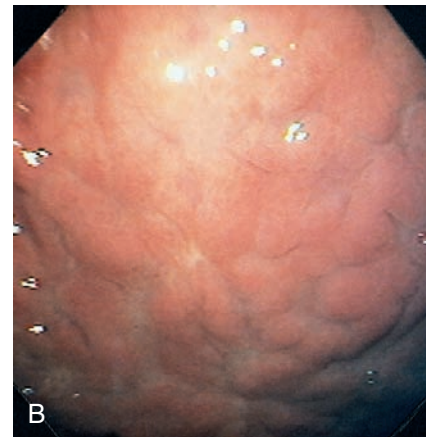
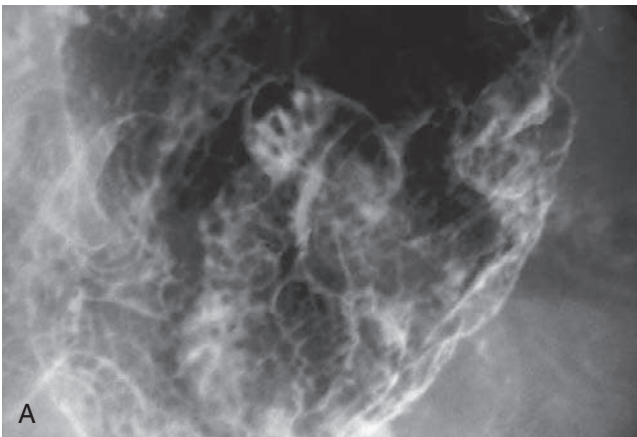


FIGURE 3.8 *HELICOBACTER PYLORI* GASTRITIS
A, Multiple nodular filling defects and prominence of the areae gastricae in the gastric body. This pattern may represent inflammation or an infiltrating neoplasm. **B**, Diffuse nodularity, with overlying normal mucosa.



Differential Diagnosis

Lymphocytic gastritis
Sarcoidosis
Lymphoma

Helicobacter pylori Gastritis (Figure 3.8)

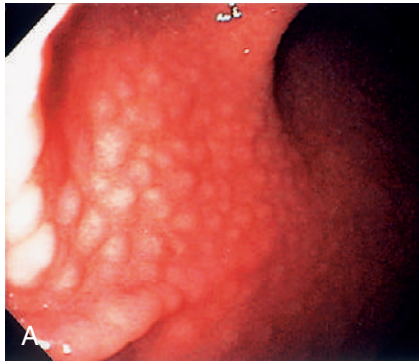


FIGURE 3.9 *HELICOBACTER PYLORI* GASTRITIS

A, There is marked nodularity of the anterior wall of the gastric body when viewed from this angle. This has been termed a "chicken skin" appearance. **B**, Follicular lymphoid hyperplasia associated with prominent chronic gastritis. An enlarged lymphoid follicle with germinal center is present.

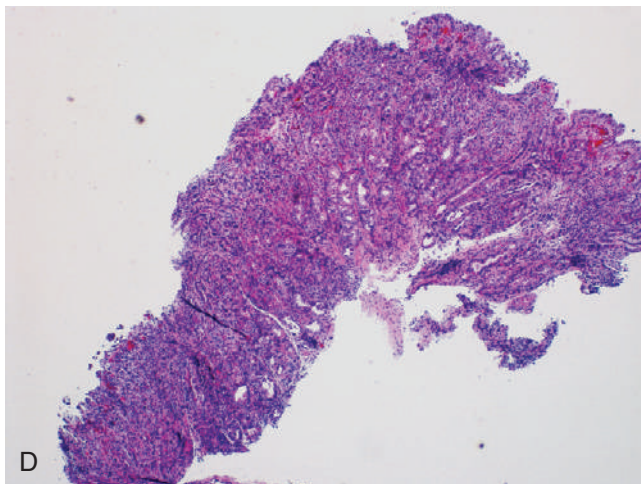
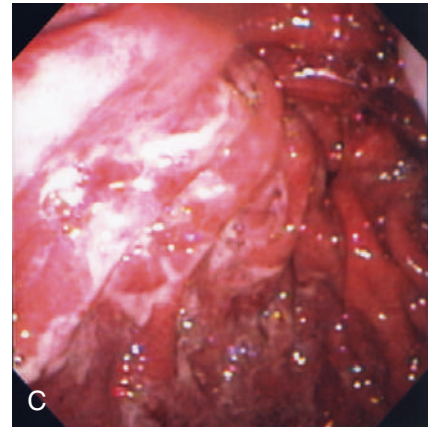
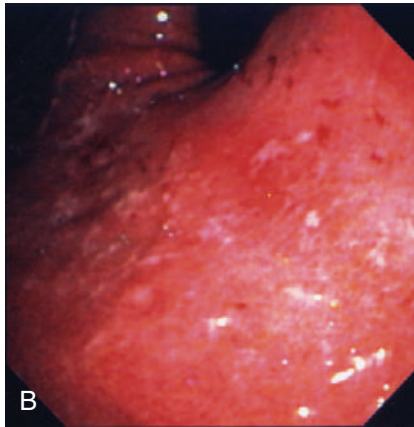
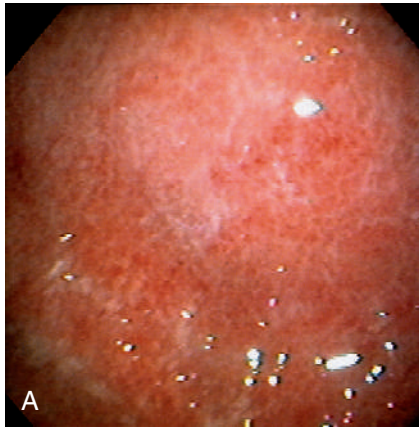
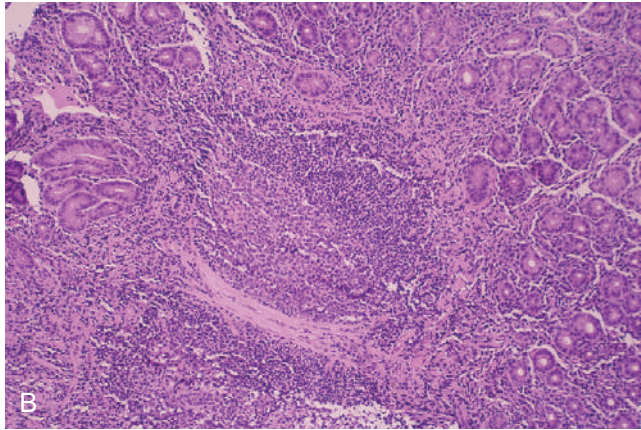


FIGURE 3.10 *HELICOBACTER PYLORI* GASTRITIS

A, Severe gastritis in the gastric body, with edema, erythema, scattered subepithelial hemorrhage, and overlying exudate.

B, C, Severe gastritis manifested by erythema and exudate.

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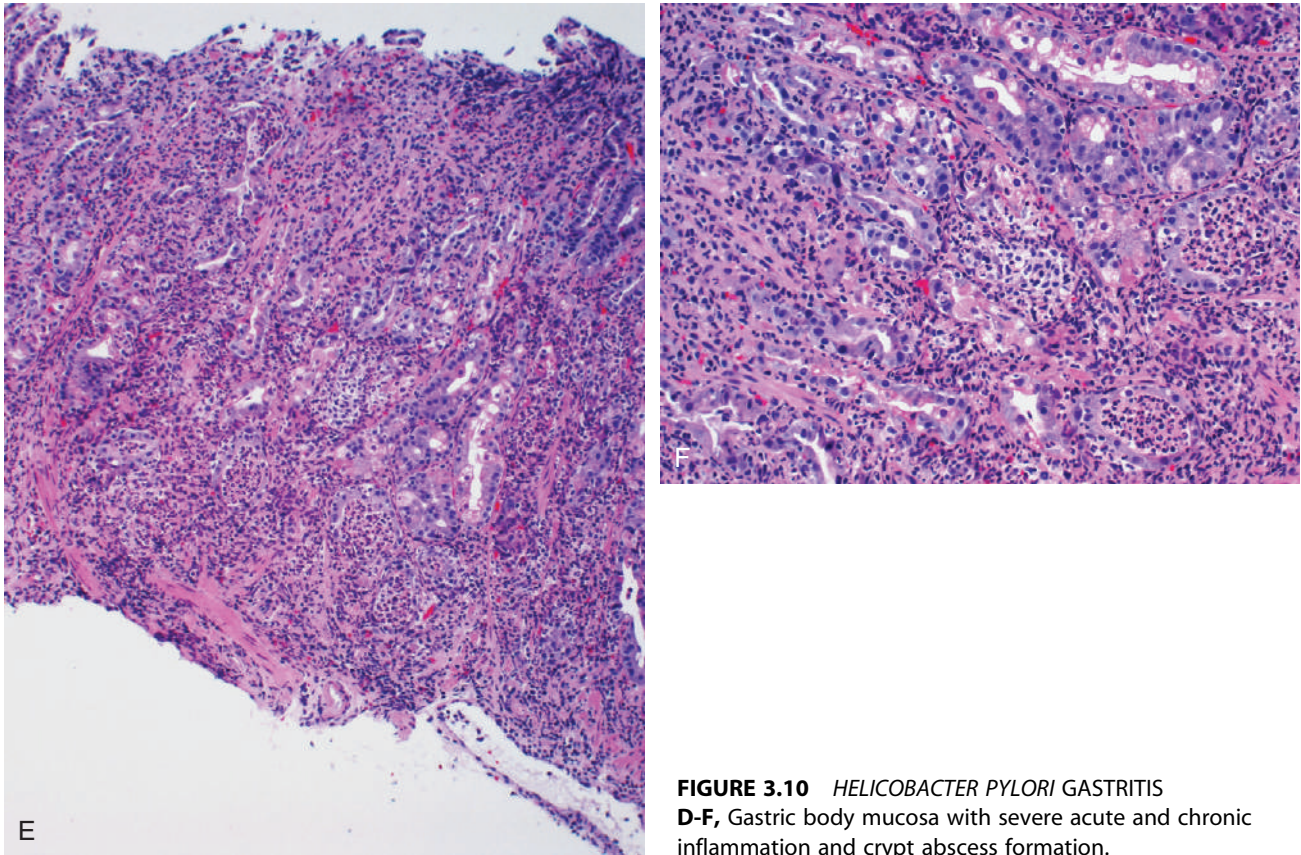


FIGURE 3.10 *HELICOBACTER PYLORI* GASTRITIS
D-F, Gastric body mucosa with severe acute and chronic inflammation and crypt abscess formation.

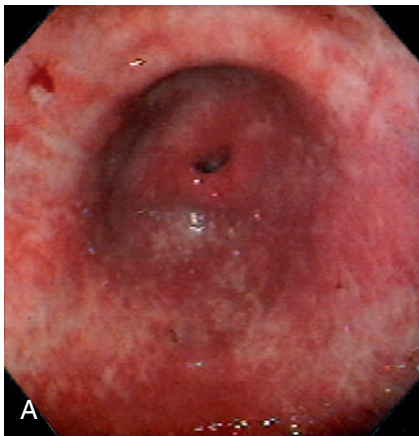
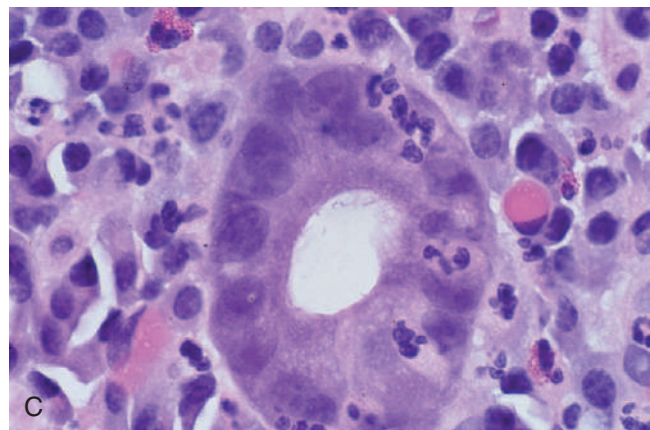
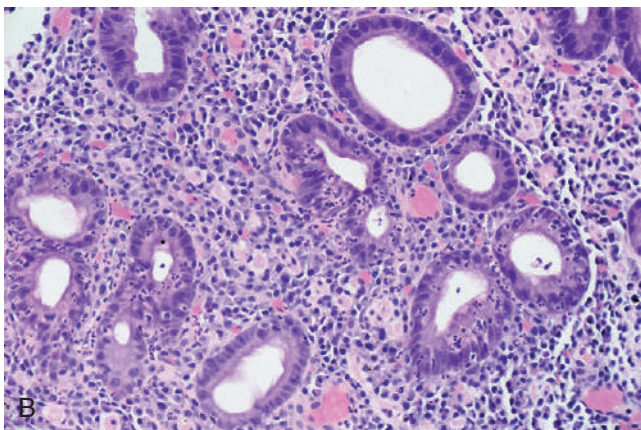


FIGURE 3.11 *HELICOBACTER PYLORI* ANTRAL GASTRITIS

A, A mottled appearance of the gastric antrum. The area of bleeding represents extreme friability. **B**, Prominent chronic active gastritis. The pyloric glands are infiltrated by neutrophils, and increased numbers of chronic inflammatory cells are in the lamina propria. **C**, Close-up view of a gastric gland reveals infiltration with neutrophils. Organisms compatible with *Helicobacter pylori* are seen on the luminal surface of the epithelial cells.

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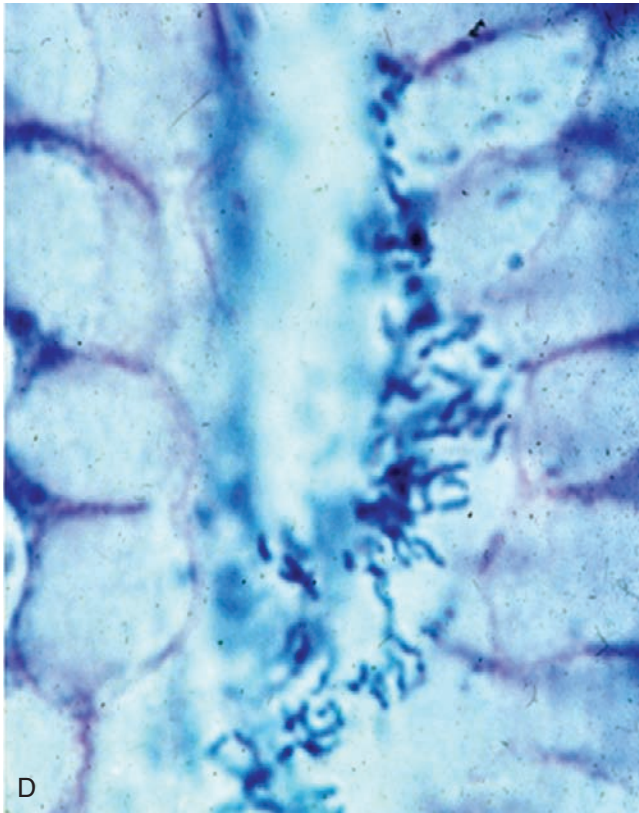


FIGURE 3.11 *HELICOBACTER PYLORI* ANTRAL GASTRITIS
Special stains with Giemsa (D) and silver stain (E) better highlight the organism.

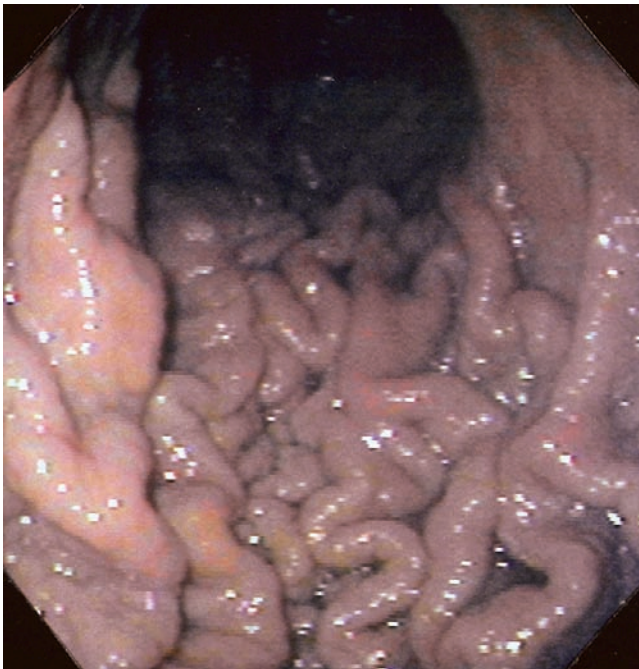
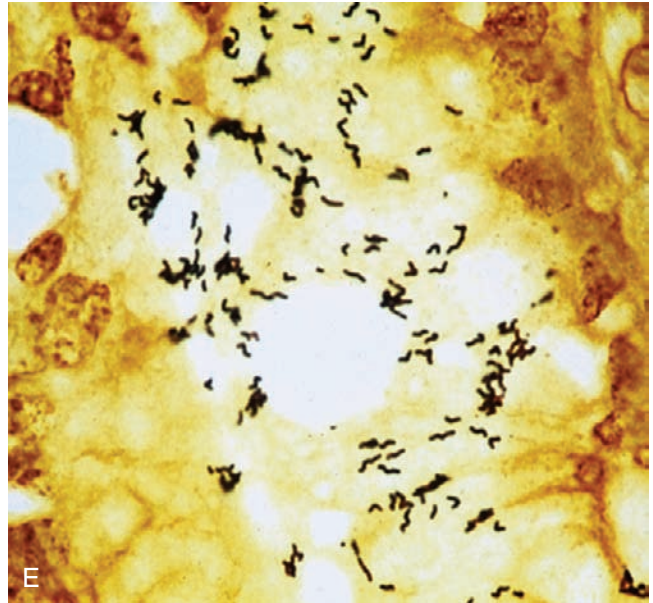


FIGURE 3.12 *HELICOBACTER PYLORI* GASTRITIS
Marked prominence of the gastric rugae.



Differential Diagnosis

Helicobacter pylori Gastritis (Figure 3.12)

- Ménétrier's disease
- Infiltrating neoplasms
- Lymphoma
- Zollinger-Ellison syndrome
- Mastocytosis

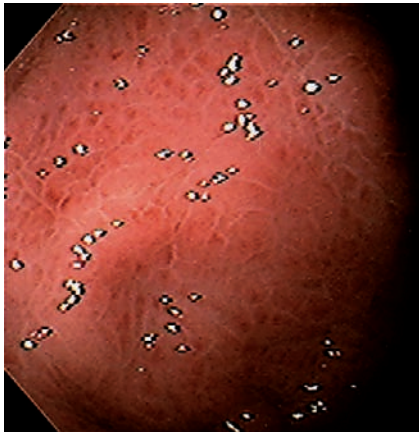


FIGURE 3.13
HELICOBACTER
PYLORI GASTRITIS
The areae gastricae are prominent and there is associated subepithelial hemorrhage.

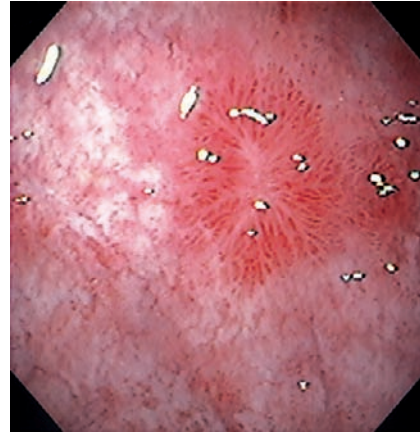


FIGURE 3.14
HELICOBACTER
PYLORI GASTRITIS
WITH SCARRING
End-stage *H. pylori* gastritis with atrophy and evidence of prior scarring, with "ghosts" of prior mucosal injury seen as linear areas of scarring with surrounding subepithelial hemorrhage and edema.

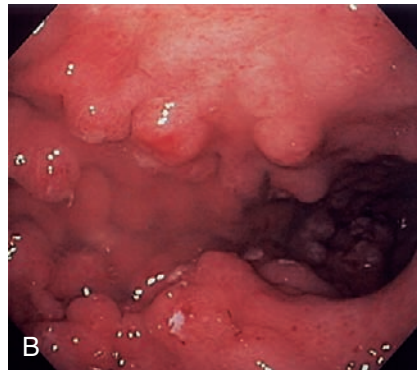
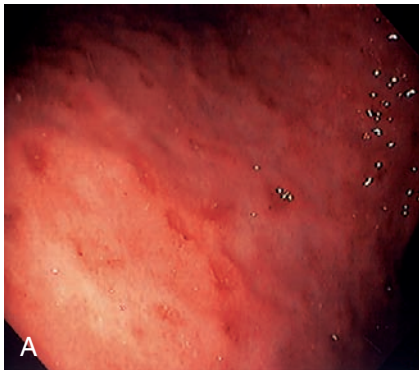


FIGURE 3.15 LYMPHOCYTIC GASTRITIS
A, Multiple erosions of the gastric body.
B, Multiple small polypoid lesions principally involving the gastric body. **C**, Diffuse nodularity of the distal (**C1**) and proximal (**C2**) stomach. **D1**, Preserved architecture with an appearance of chronic gastritis. **D2**, Close-up shows a diffuse infiltration of lymphocytes in the mucosa.

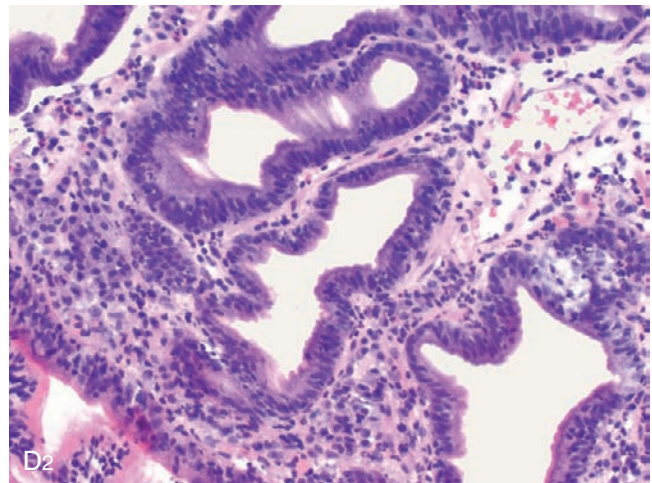
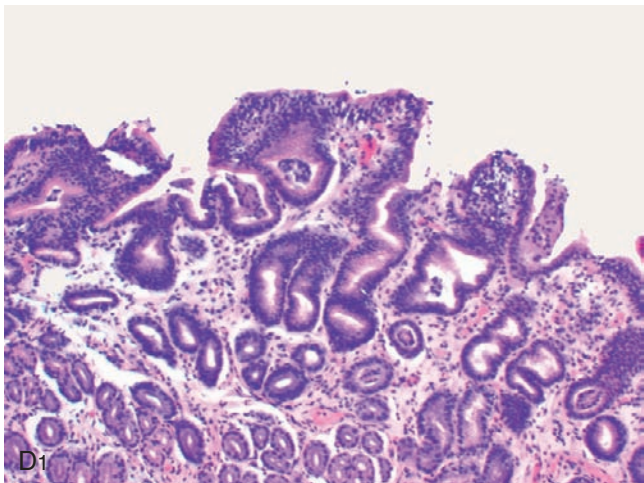
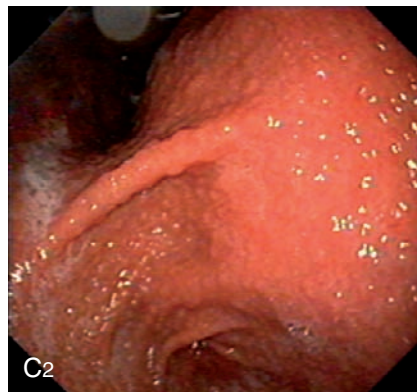




FIGURE 3.16 CHEMICAL GASTRITIS

Focal area of edema with exudate in the gastric body. Biopsies showed mild inflammation with foveolar hyperplasia. Iron was also present in the specimen. These findings suggest gastropathy induced by pills, in this case, iron.

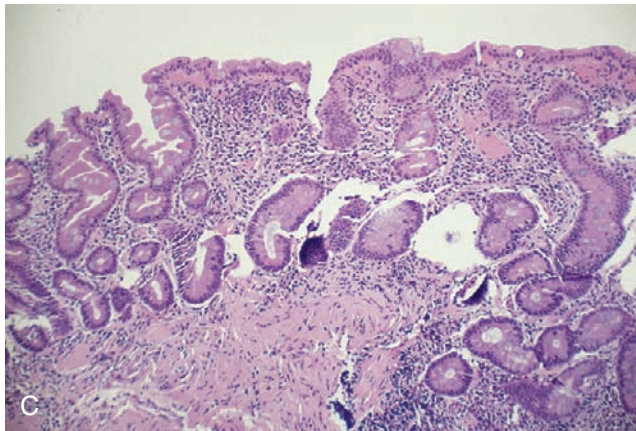
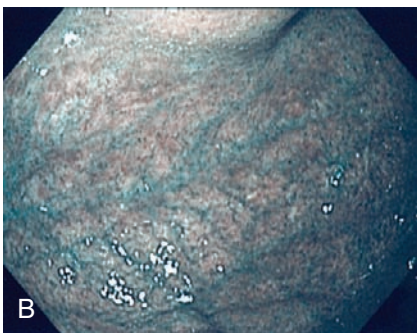
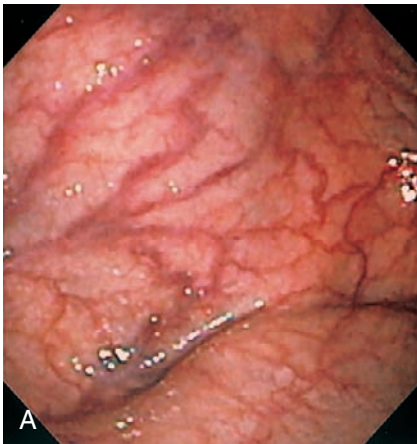


FIGURE 3.17 GASTRIC ATROPHY

A, The end result of long-standing *Helicobacter pylori* gastritis is atrophy. The gastric rugae are completely absent, with blood vessels easily seen throughout the gastric body and antrum. **B**, Narrow band imaging highlights the underlying vasculature. **C**, Gastric atrophy and chronic gastritis.

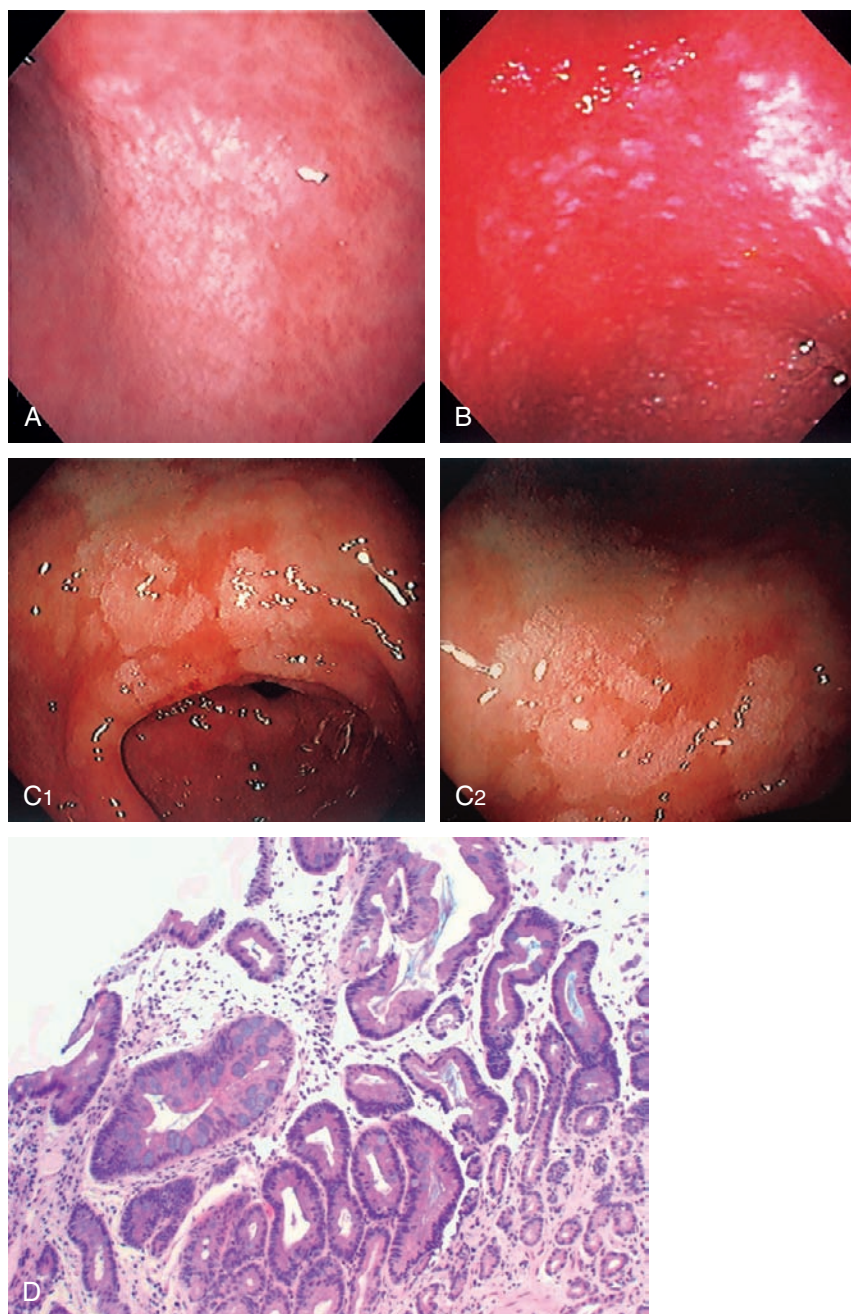


FIGURE 3.18 INTESTINAL METAPLASIA
A, Focal white plaquelike lesion of the antrum. **B**, Multiple white plaquelike lesions of the antrum. **C1, C2**, Multiple white plaquelike lesions with a verrucous appearance in the gastric antrum. Note that the surrounding gastric mucosa is relatively atrophic. **D**, Numerous goblet cells are present, confirming the diagnosis.

Continued

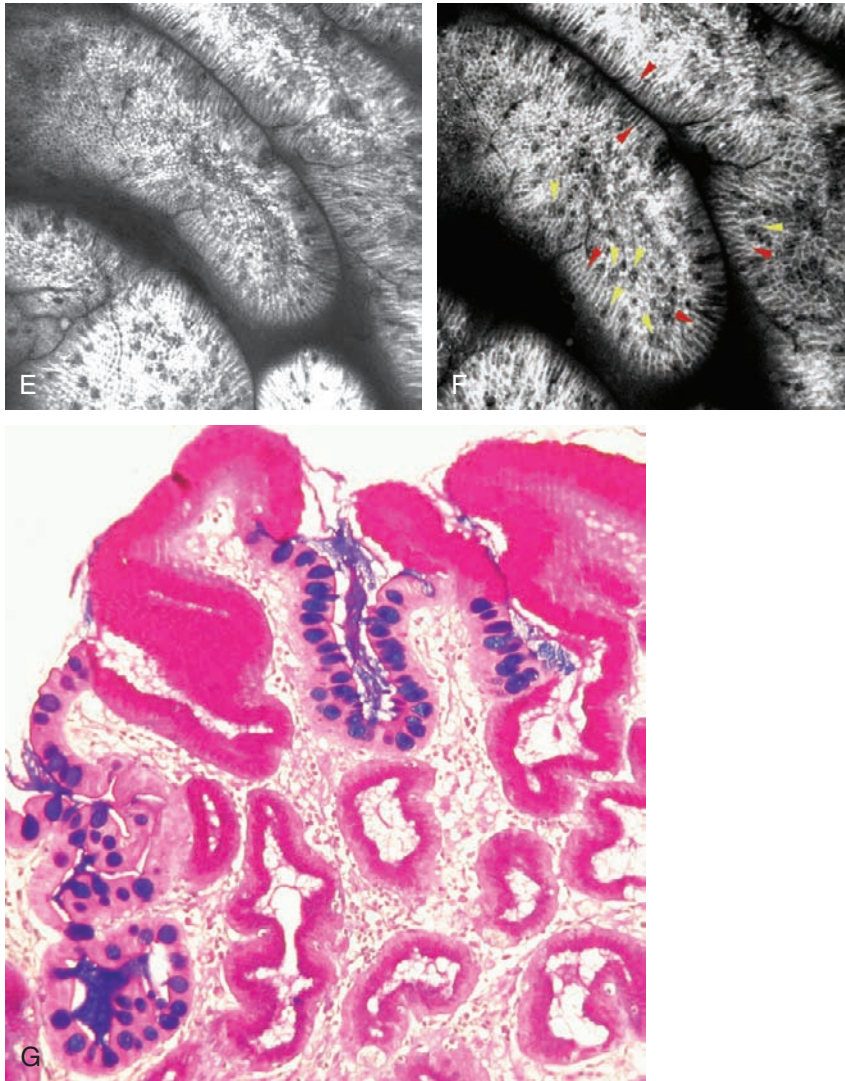


FIGURE 3.18 INTESTINAL METAPLASIA
INTESTINAL METAPLASIA PATHOLOGY

E, Intestinal metaplasia as seen by optical coherence tomography. **F**, The goblet cells stain and brush border are visible (*red arrows* indicate brush border; *yellow arrows* indicate goblet cells). **G**, Periodic acid-Schiff stain highlights the goblet cells. (**F** courtesy Cristian Gheorge, MD.)

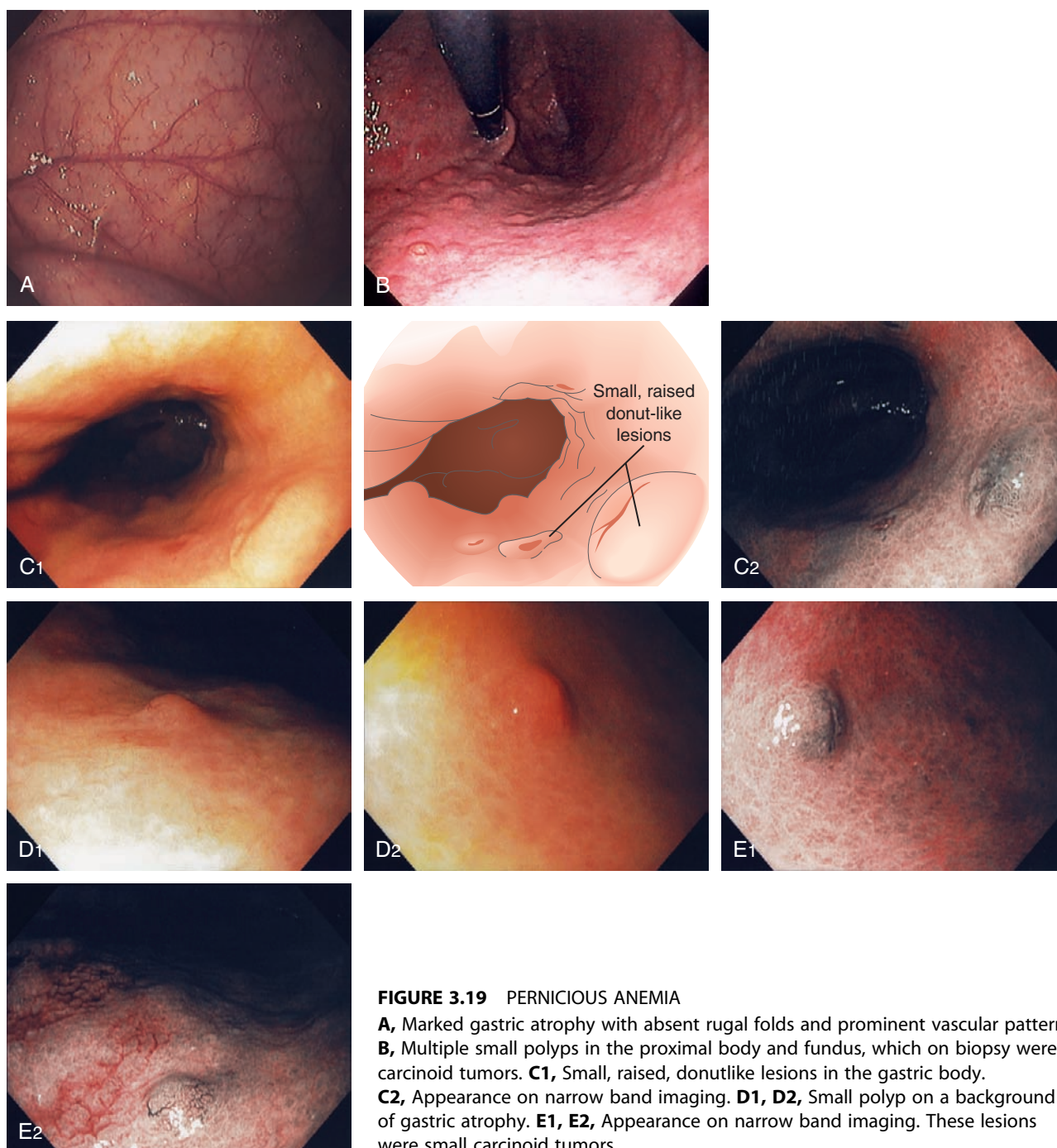


FIGURE 3.19 PERNICIOUS ANEMIA

A, Marked gastric atrophy with absent rugal folds and prominent vascular pattern. **B**, Multiple small polyps in the proximal body and fundus, which on biopsy were carcinoid tumors. **C1**, Small, raised, donutlike lesions in the gastric body. **C2**, Appearance on narrow band imaging. **D1**, **D2**, Small polyp on a background of gastric atrophy. **E1**, **E2**, Appearance on narrow band imaging. These lesions were small carcinoid tumors.

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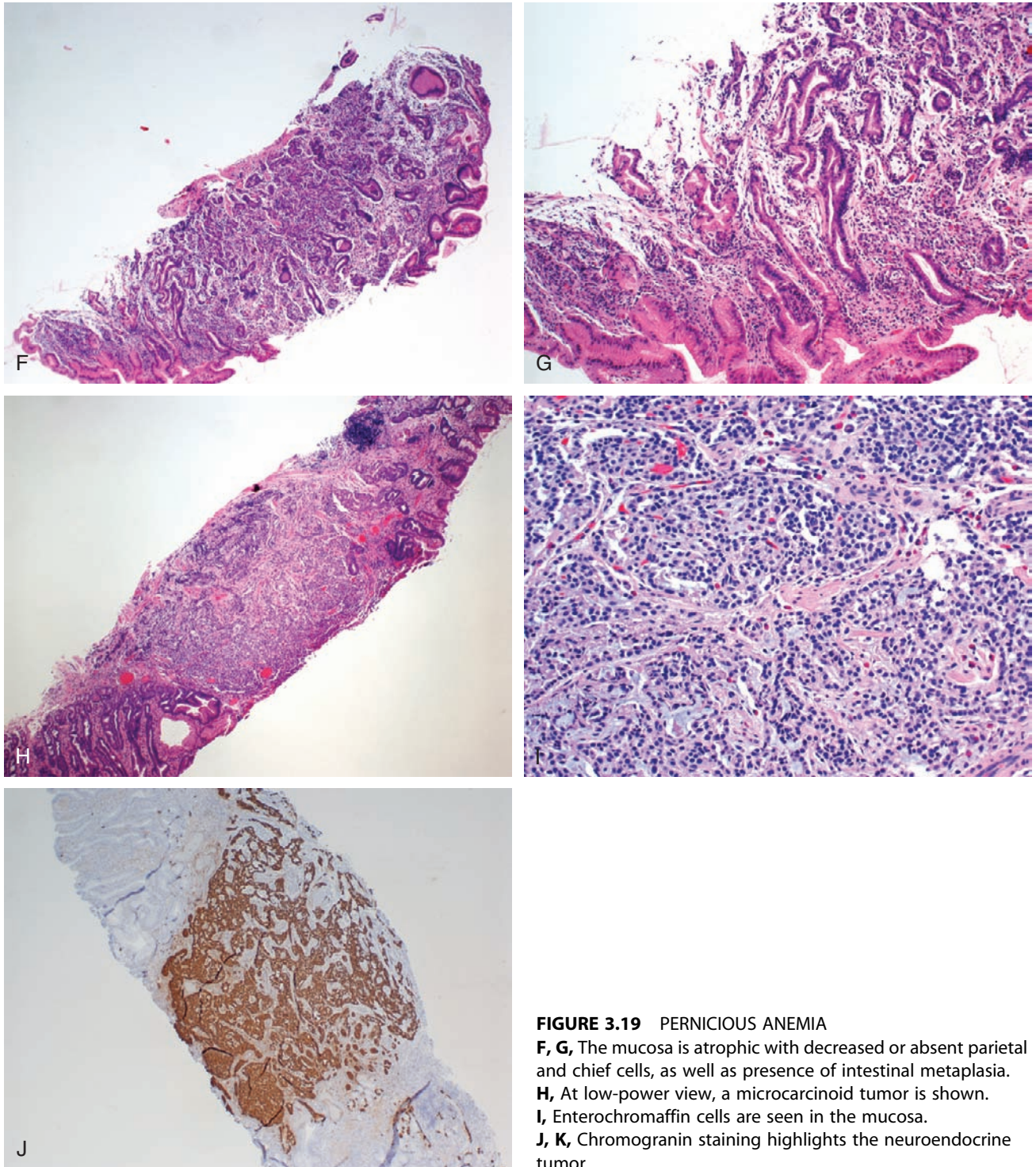


FIGURE 3.19 PERNICIOUS ANEMIA

F, G, The mucosa is atrophic with decreased or absent parietal and chief cells, as well as presence of intestinal metaplasia.

H, At low-power view, a microcarcinoid tumor is shown.

I, Enterochromaffin cells are seen in the mucosa.

J, K, Chromogranin staining highlights the neuroendocrine tumor.

Continued

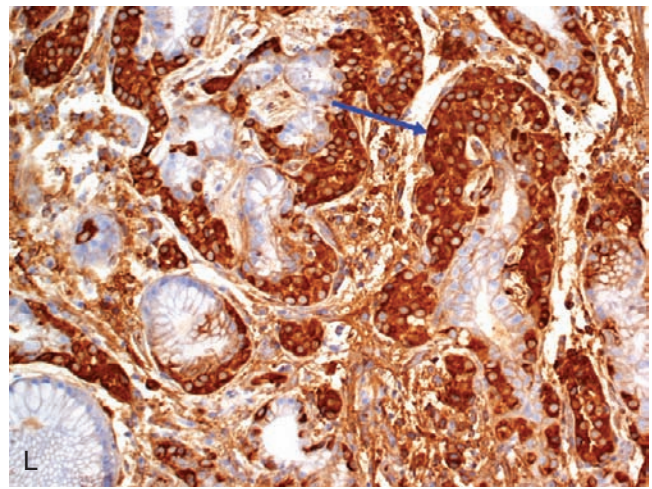
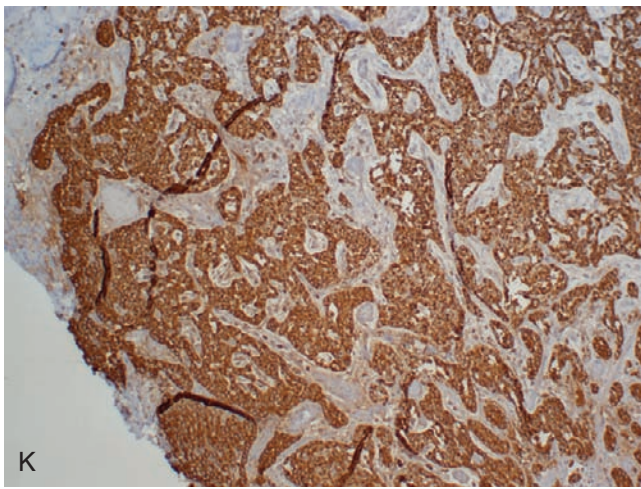


FIGURE 3.19 PERNICIOUS ANEMIA

L, Enterochromaffin cell hyperplasia/dysplasia at the base of the gland (*blue arrow*).

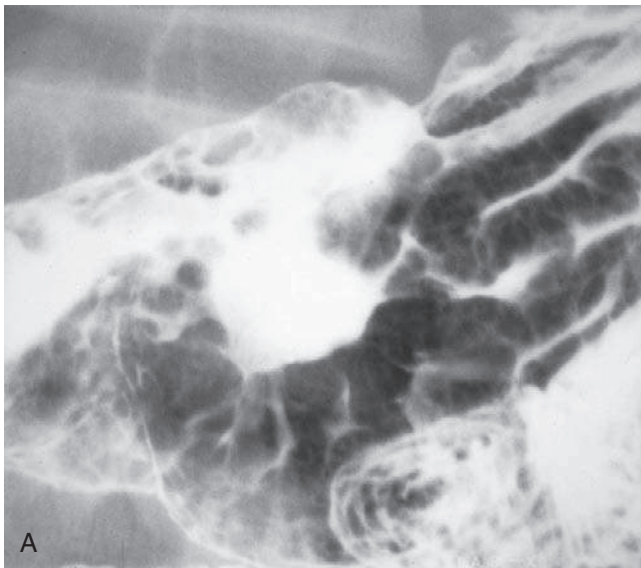
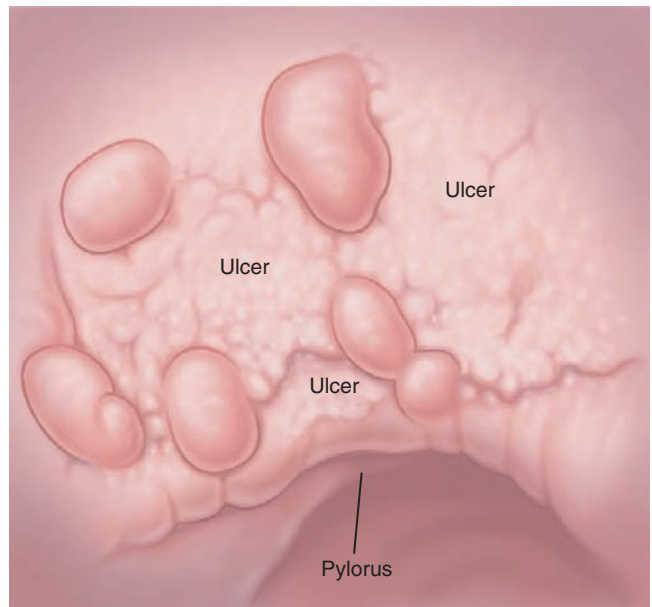
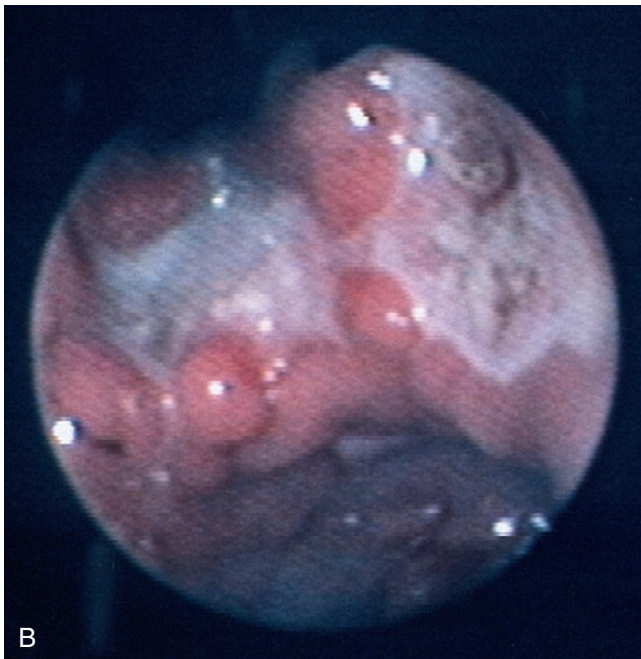
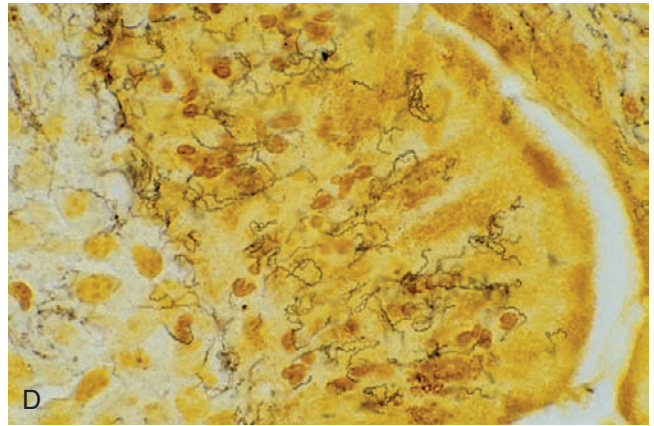
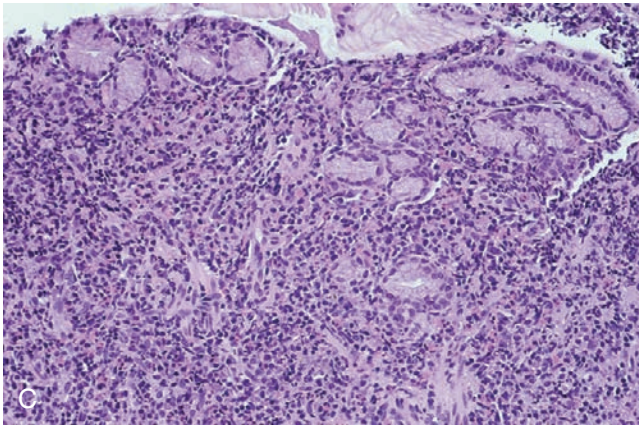


FIGURE 3.20 SYPHILIS

A, Large gastric ulceration, with prominent irregular rugae radiating to the lesion. **B,** Irregularly shaped ulceration on the angularis, with nodularity of the ulcer rim.



Continued

**FIGURE 3.20** SYPHILIS

C, Severe chronic inflammation composed primarily of plasma cells. A prominent plasmacytic infiltrate in a patient with positive syphilis serology is suggestive of gastric infection. **D**, Silver stain for spirochetes demonstrates multiple organisms.

E, Hyperpigmented lesions on the hands (**E1**) and feet (**E2**) are typical for secondary syphilis.

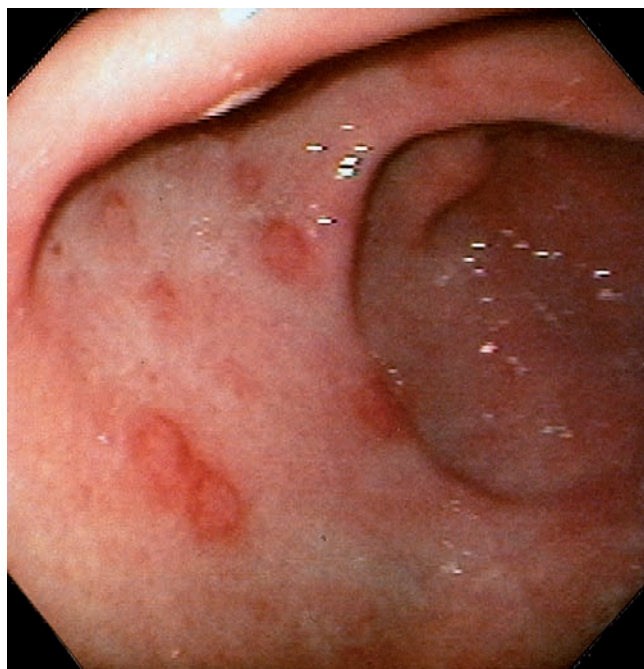


FIGURE 3.21 FOCAL CYTOMEGALOVIRUS GASTRITIS
Multiple round, erythematous, raised lesions in the gastric body and antrum. The remainder of the antrum and body is normal.

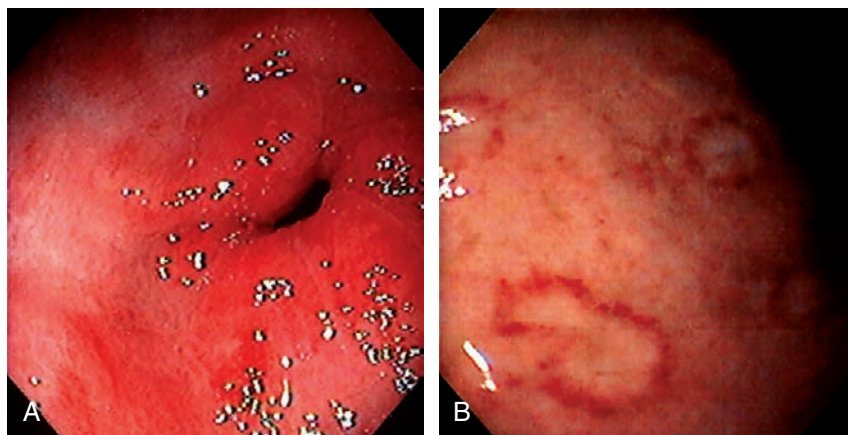
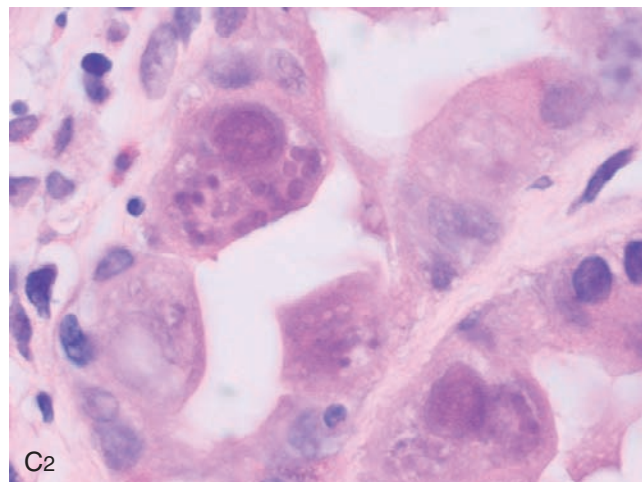
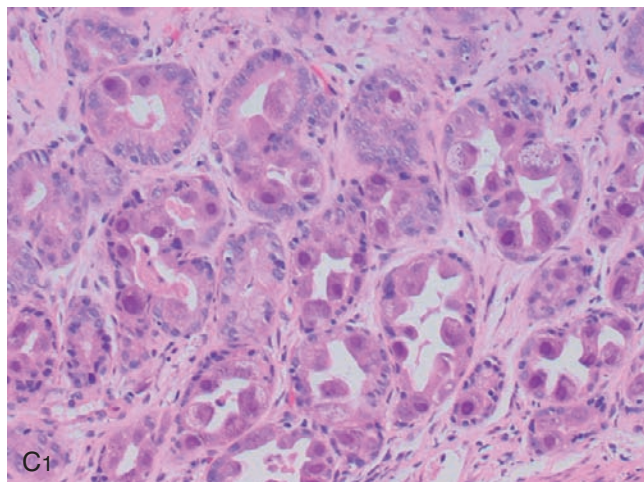


FIGURE 3.22 CYTOMEGALOVIRUS (CMV) GASTRITIS
A, Patchy subepithelial hemorrhage in the peripyloric area. **B**, Multiple focal areas of subepithelial hemorrhage in a "halo" pattern. **C1**, Numerous inclusions typical for CMV. **C2**, High-power view shows many intranuclear inclusions.



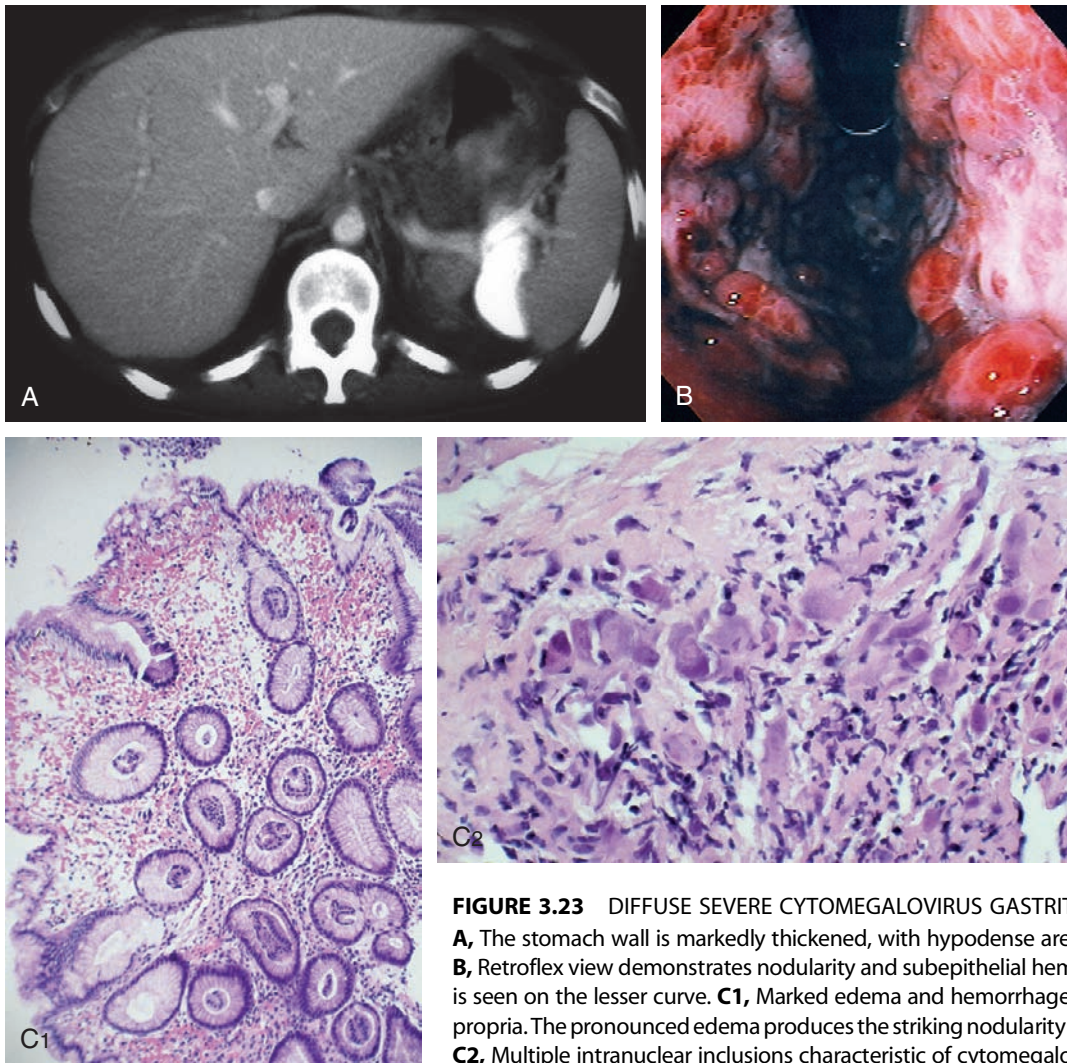


FIGURE 3.23 DIFFUSE SEVERE CYTOMEGALOVIRUS GASTRITIS

A, The stomach wall is markedly thickened, with hypodense areas suggesting necrosis.

B, Retroflex view demonstrates nodularity and subepithelial hemorrhage. Diffuse ulceration is seen on the lesser curve. **C1**, Marked edema and hemorrhage are present in the lamina propria. The pronounced edema produces the striking nodularity and areae gastricae pattern. **C2**, Multiple intranuclear inclusions characteristic of cytomegalovirus cytopathic effect.

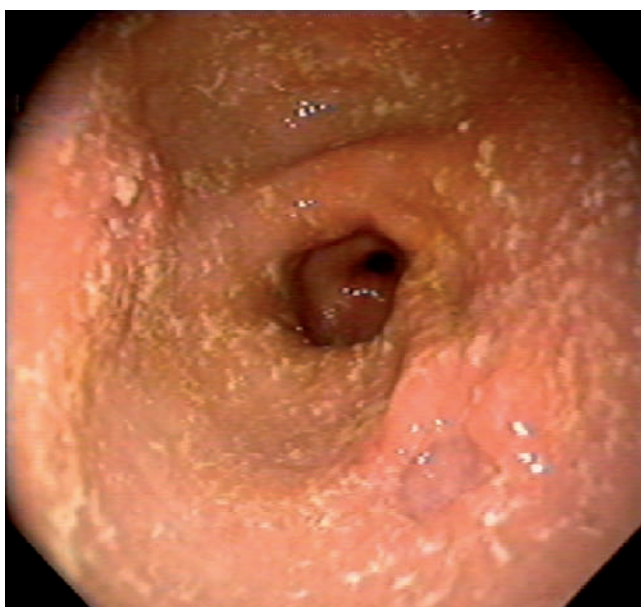


FIGURE 3.24 CYTOMEGALOVIRUS ULCER

Well-circumscribed, clean-based ulcer in the posterior antrum. The surrounding mucosa is normal.



Differential Diagnosis

Cytomegalovirus Ulcer (Figure 3.24)

- Peptic ulcer
- Nonsteroidal antiinflammatory drug (NSAID)-induced ulcer
- Ischemia caused by vasculitis
- Malignancy
- Other Infections



FIGURE 3.25 CYTOMEGALOVIRUS ANTRAL ULCER
Large, deep ulcer. The pylorus is seen at the top left, indicating the depth of the lesion.

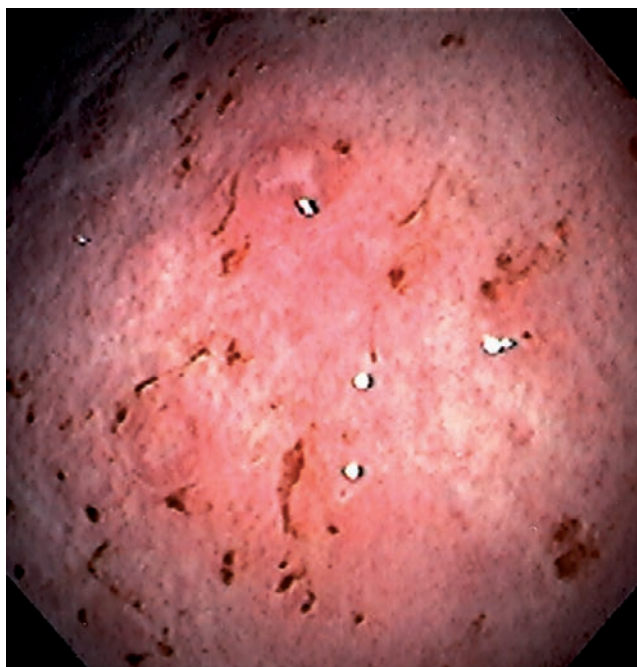


FIGURE 3.26 MYCOBACTERIUM AVIUM COMPLEX GASTRITIS
Diffuse gastritis with petechial hemorrhages and a well-circumscribed, small nodular lesion with central erosion.

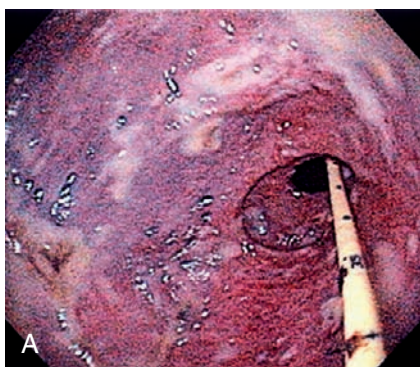
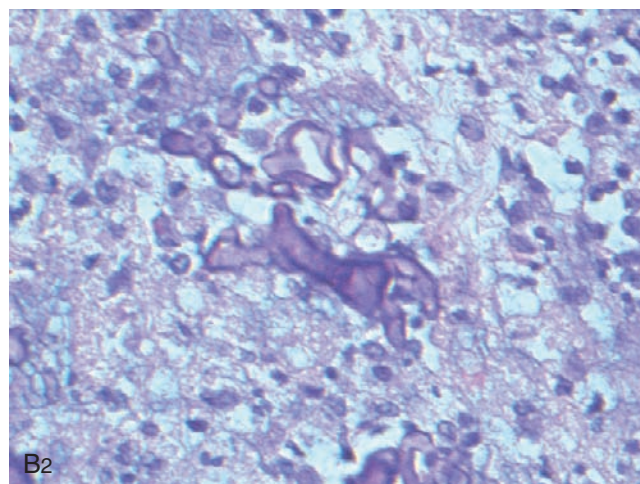
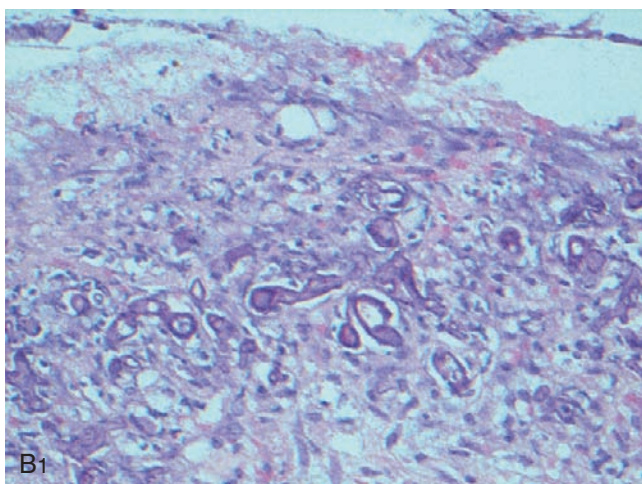
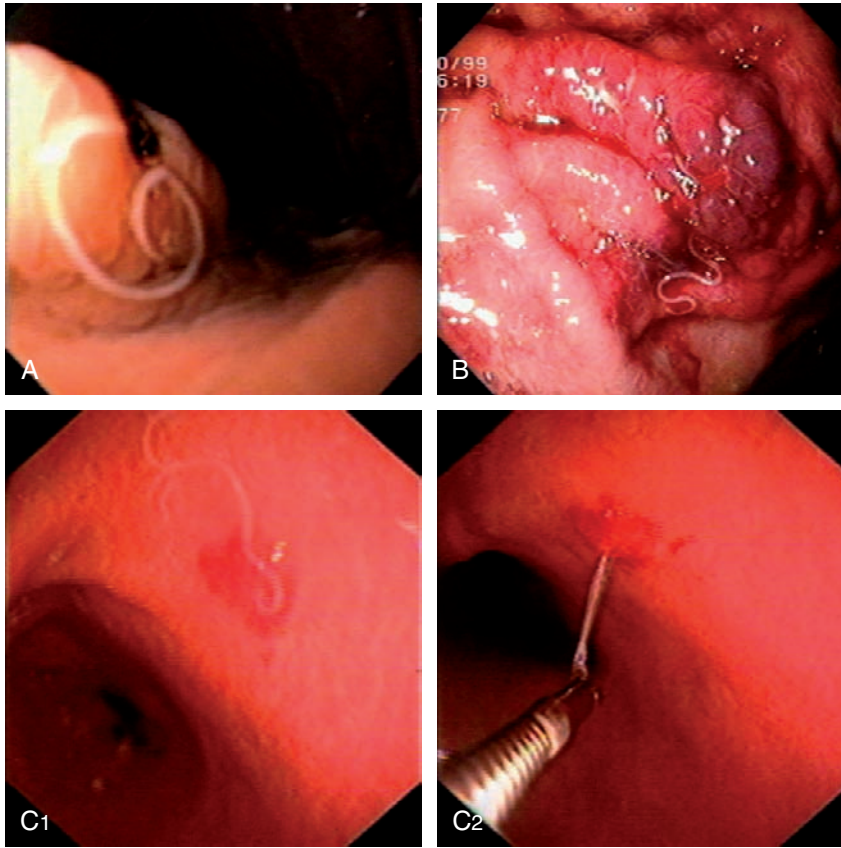
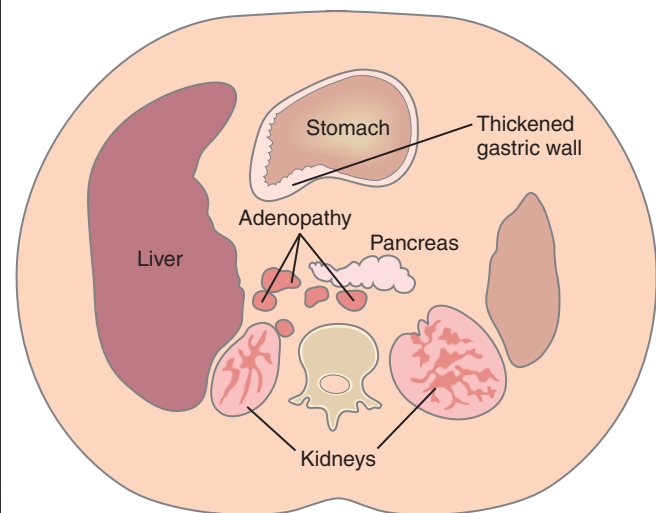
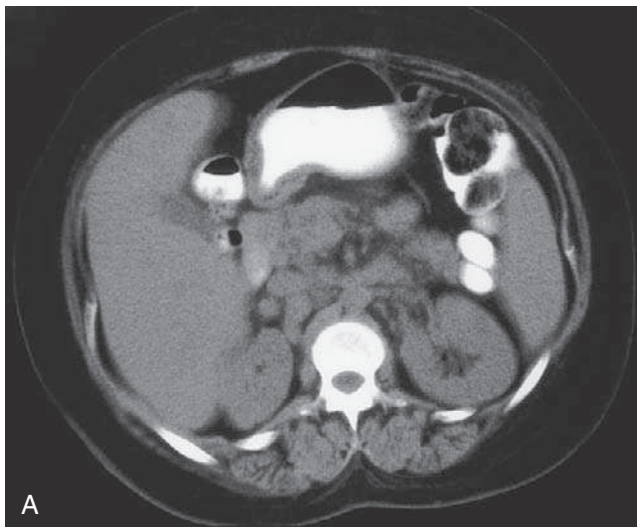


FIGURE 3.27 GASTRIC MUCORMYCOSIS
A, Erosion and exudate of the gastric antrum with a dark hue to the mucosa. A feeding tube is present. **B1, B2**, Multiple fungal forms in the submucosa.



**FIGURE 3.28 ANISAKIASIS**

Single larva entering the gastric mucosa with focal area of old bleeding (A) or subepithelial hemorrhage (B). C, The larva is being removed with biopsy forceps (C1, C2).

**FIGURE 3.29 SARCOID GASTRITIS**

A, Marked thickening of the gastric body and antrum. Multiple retroperitoneal nodes are present. Fullness along the lateral margin of the pancreatic head and retrocaval portion of the retroperitoneum suggests adenopathy.

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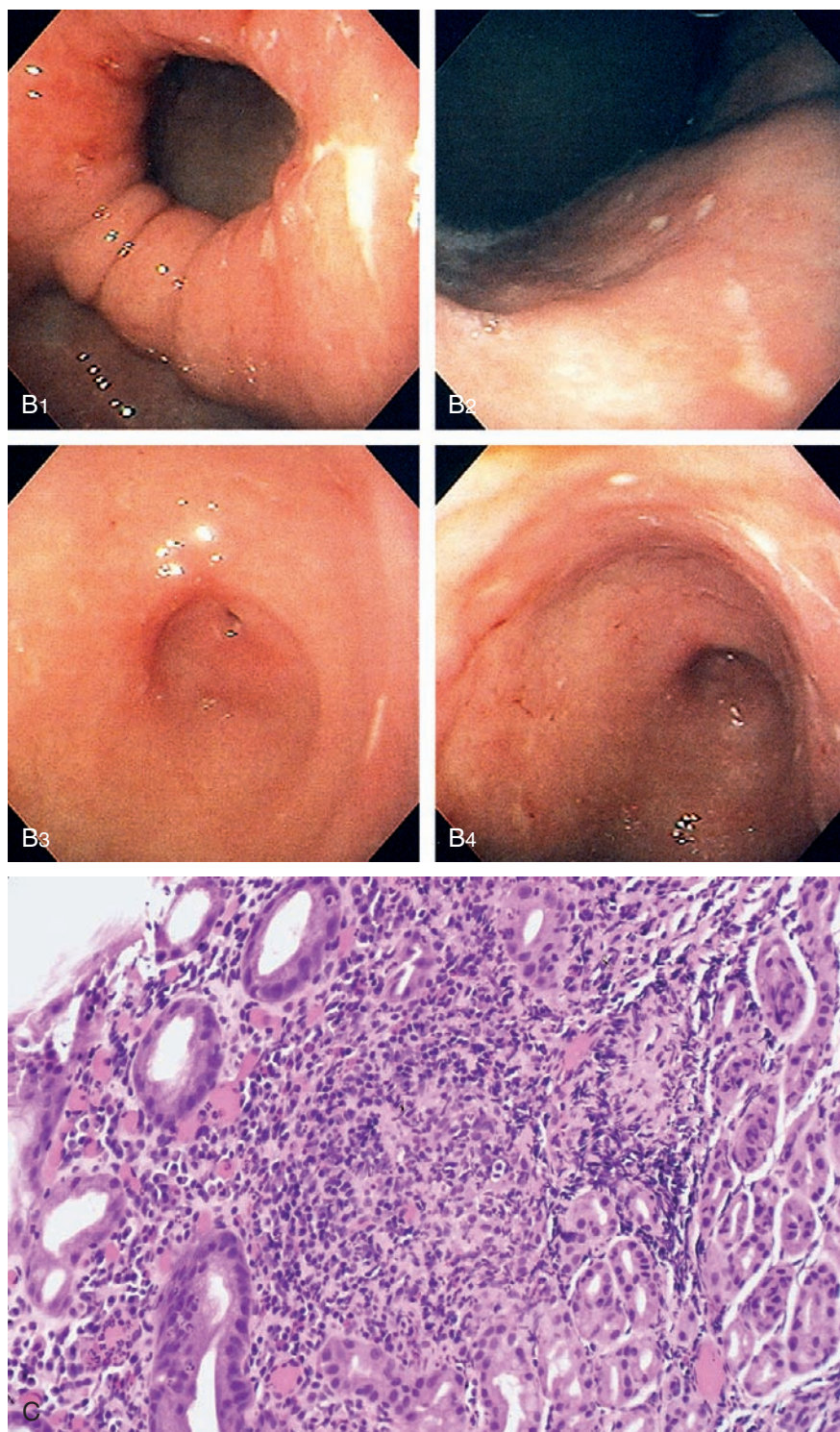


FIGURE 3.29 SARCOID GASTRITIS
B, Multiple erosions, some having an unusual stellate appearance, in the gastric body (**B1**), angularis and proximal lesser curve (**B2**), and antrum (**B3, B4**). The antrum has a yellow-orange discoloration and a mottled appearance; the mucosa is friable.
C, Noncaseating granuloma in the lamina propria. Special stains for other causes of granulomatous gastritis, including mycobacterial and fungal organisms, were negative.

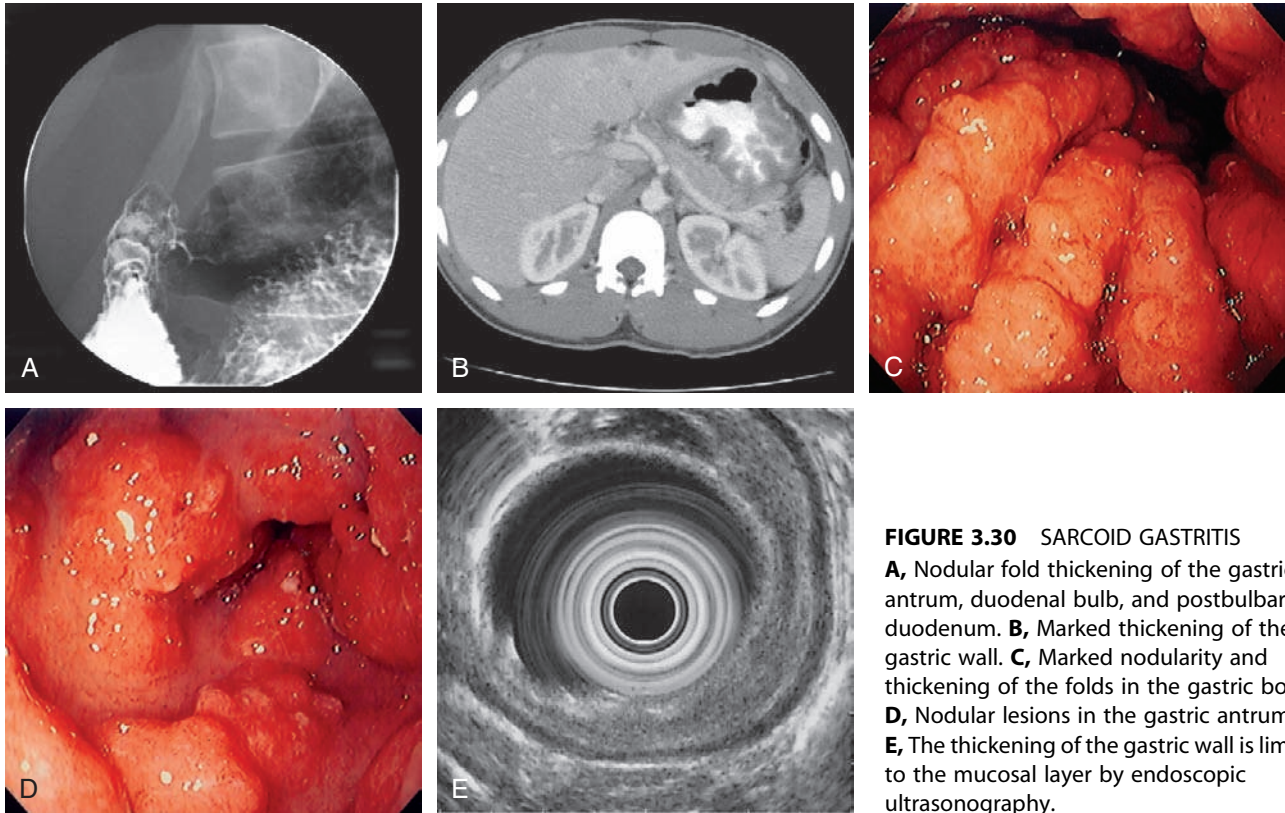


FIGURE 3.30 SARCOID GASTRITIS

A, Nodular fold thickening of the gastric antrum, duodenal bulb, and postbulbar duodenum. **B**, Marked thickening of the gastric wall. **C**, Marked nodularity and thickening of the folds in the gastric body. **D**, Nodular lesions in the gastric antrum. **E**, The thickening of the gastric wall is limited to the mucosal layer by endoscopic ultrasonography.



Differential Diagnosis

Sarcoid Gastritis (Figure 3.30)

Gastric adenocarcinoma
Lymphoma
Metastatic tumor resulting in linitis plastica

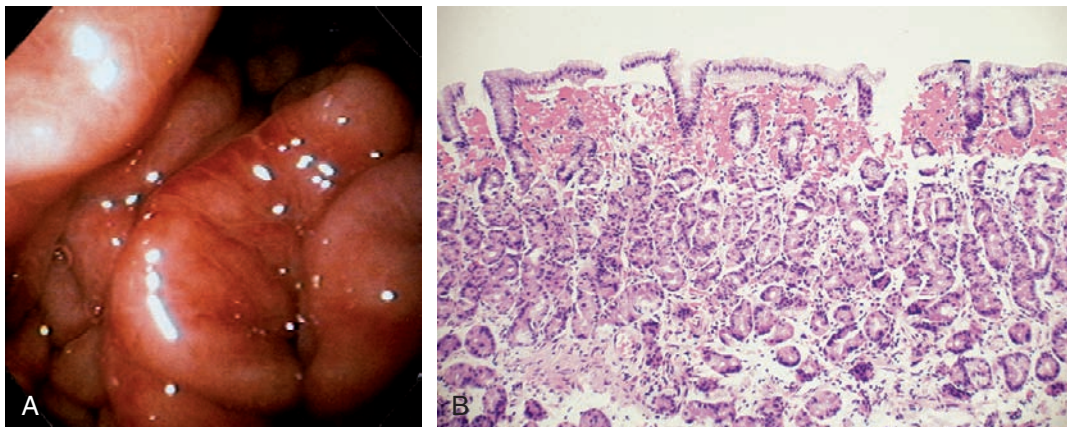


FIGURE 3.31 ALCOHOL-INDUCED GASTROPATHY

A, The gastric rugae are edematous, with fresh blood seen under the mucosal surface; the overlying mucosa is smooth. **B**, A prominent band of extravasated erythrocytes is present, associated with edema of the lamina propria. No histologic evidence of gastritis is present.

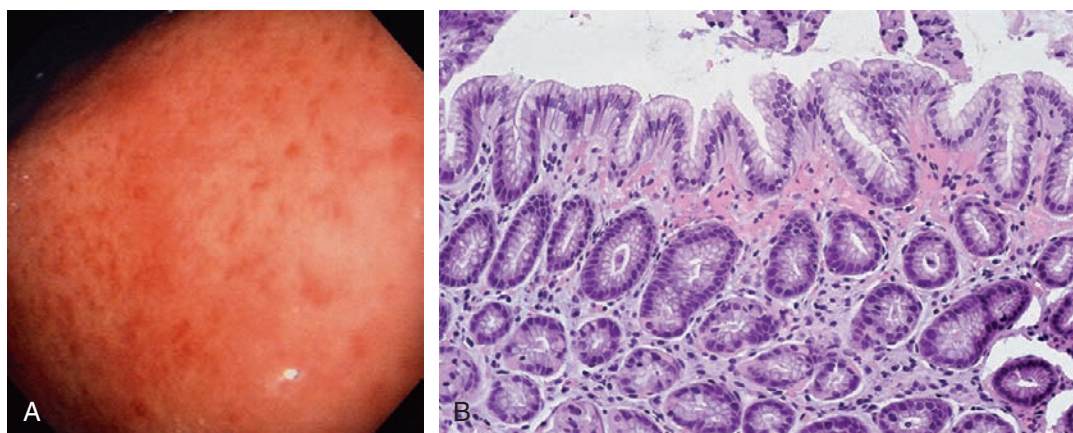


FIGURE 3.32 ASPIRIN-INDUCED GASTROPATHY

A, Multiple scattered petechial hemorrhages, with normal-appearing intervening mucosa. **B**, Subepithelial hemorrhage is present without an associated inflammatory process.

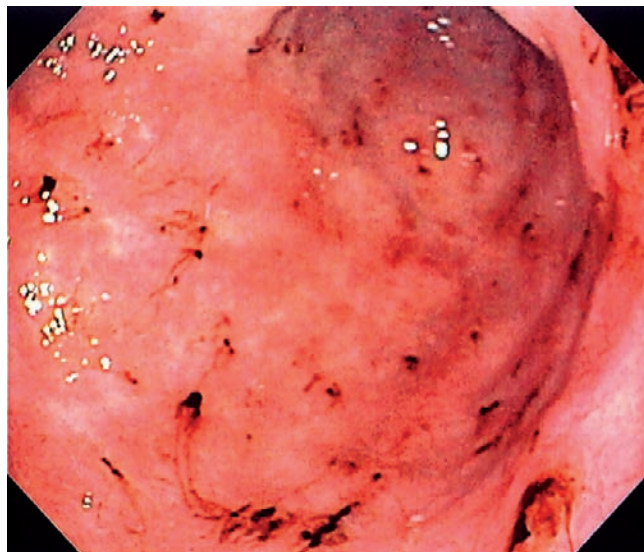


FIGURE 3.33 ASPIRIN-INDUCED GASTROPATHY

Multiple areas of fresh hemorrhage in the distal gastric body and antrum.

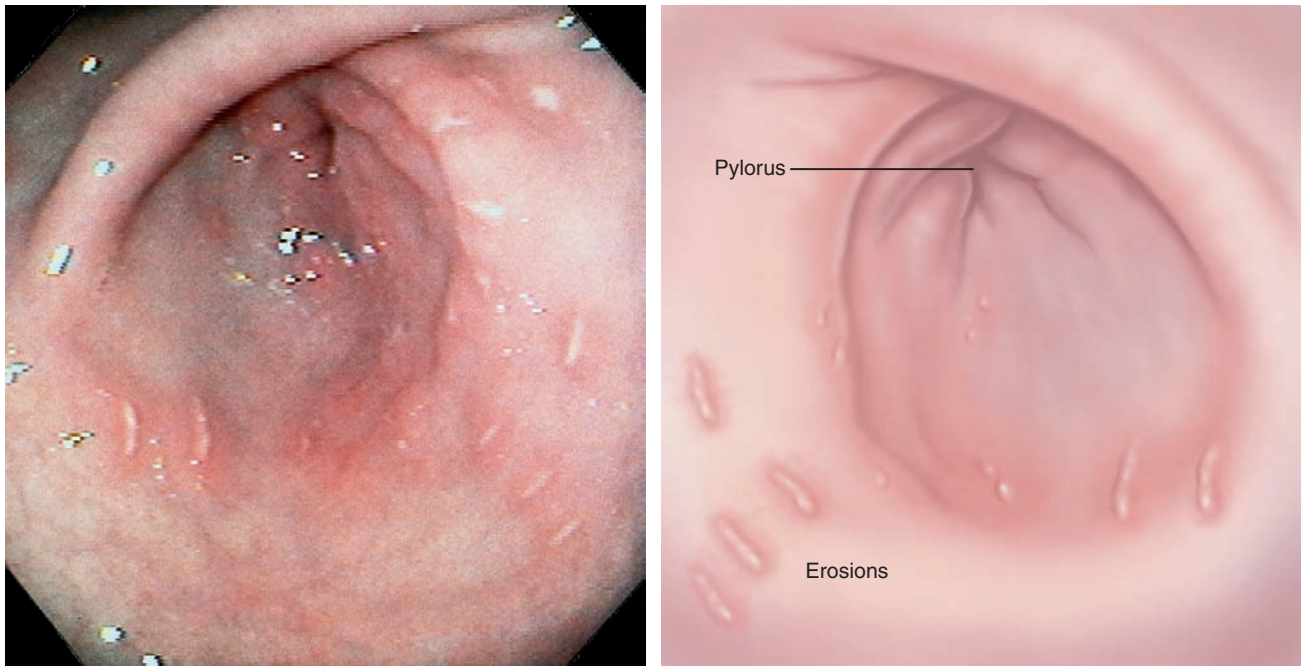


FIGURE 3.34 NONSTEROIDAL ANTIINFLAMMATORY DRUG (NSAID)-INDUCED EROSIVE GASTROPATHY

Multiple linear erosions surrounded by a halo of erythema in the antrum, with normal intervening mucosa. Antral disease is the typical location for NSAID-induced injury.

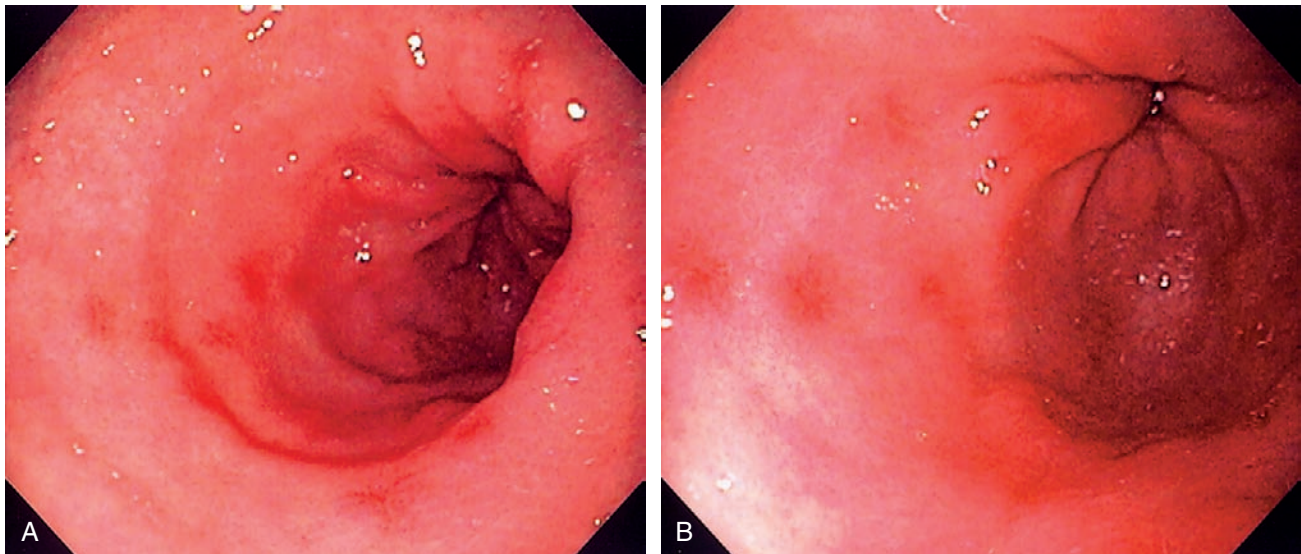


FIGURE 3.35 NONSTEROIDAL ANTIINFLAMMATORY DRUG (NSAID)-INDUCED GASTROPATHY

A, B, Multiple small antral erosions with erythematous halos.

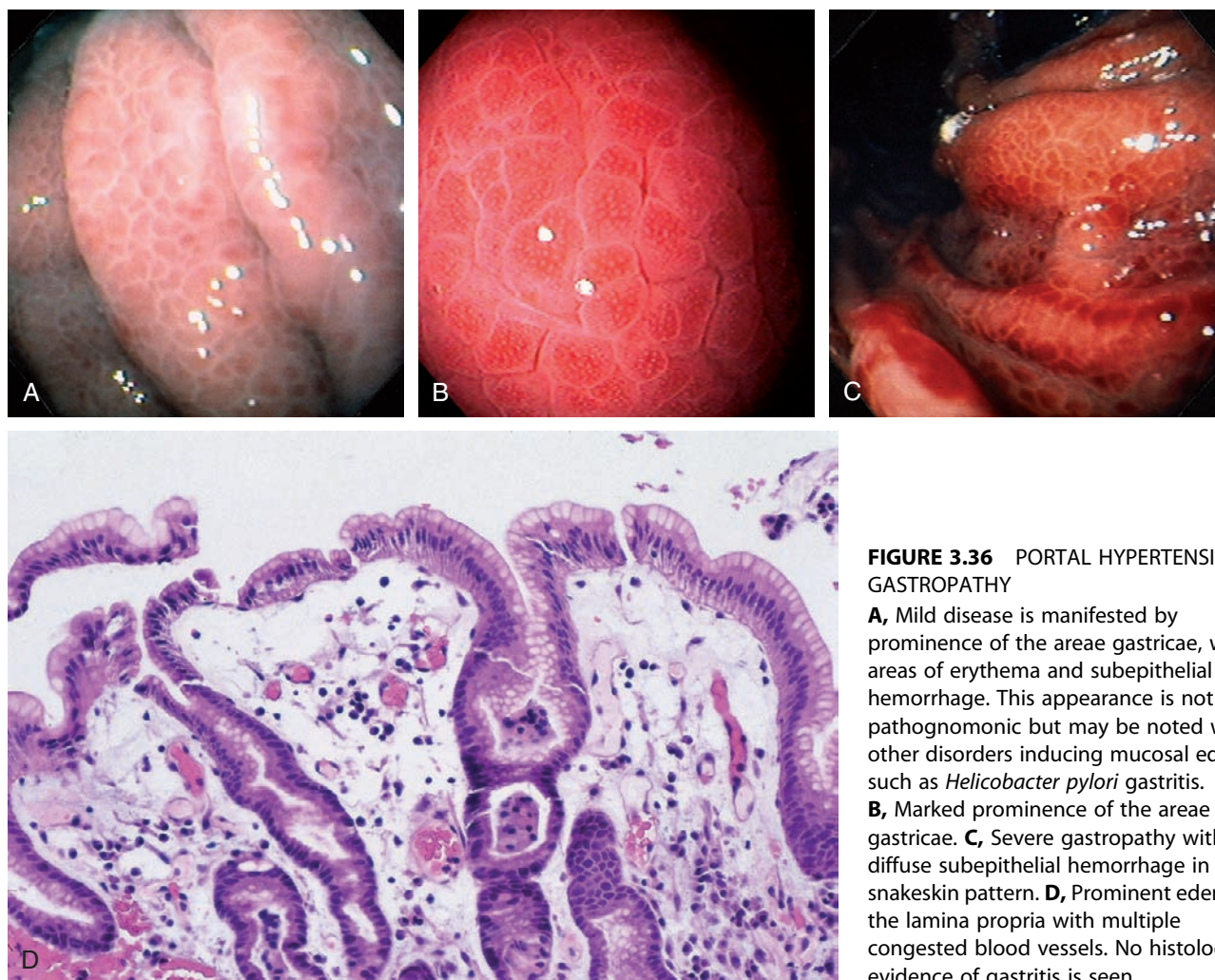


FIGURE 3.36 PORTAL HYPERTENSIVE GASTROPATHY

A, Mild disease is manifested by prominence of the areae gastricae, with areas of erythema and subepithelial hemorrhage. This appearance is not pathognomonic but may be noted with other disorders inducing mucosal edema, such as *Helicobacter pylori* gastritis.

B, Marked prominence of the areae gastricae. **C**, Severe gastropathy with diffuse subepithelial hemorrhage in a snakeskin pattern. **D**, Prominent edema of the lamina propria with multiple congested blood vessels. No histologic evidence of gastritis is seen.

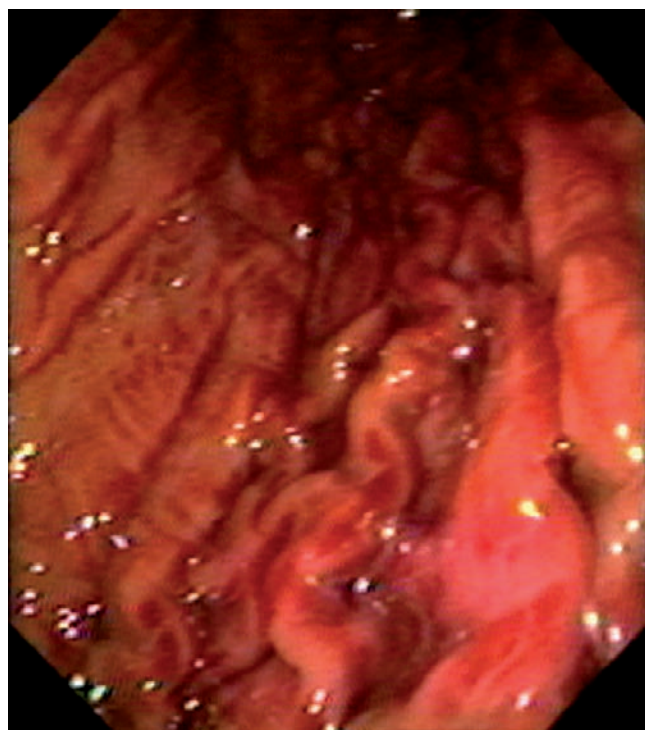


FIGURE 3.37 THROMBOTIC THROMBOCYTOPENIC PURPURA
Multiple areas of subepithelial hemorrhage throughout the gastric body.

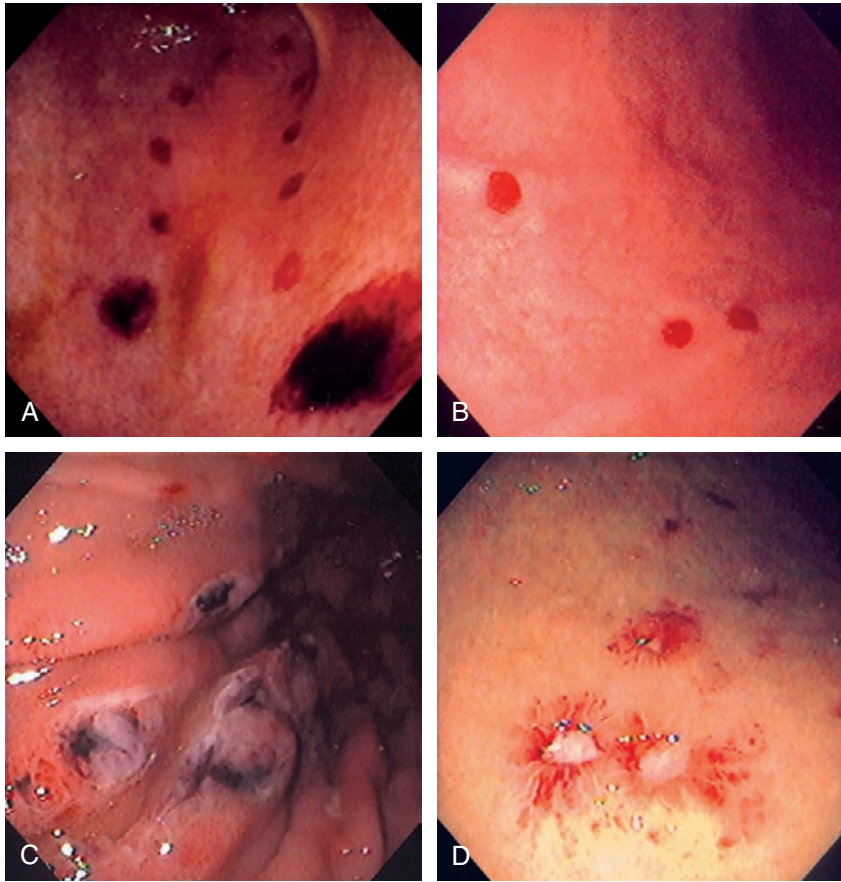


FIGURE 3.38 NASOGASTRIC TUBE TRAUMA

A, Multiple well-circumscribed, hemorrhagic lesions extending down the gastric body to the antrum. **B**, The reddish color resembles ectasias. **C**, With progression, erosions may result, and then ultimately ulcers (**D**).

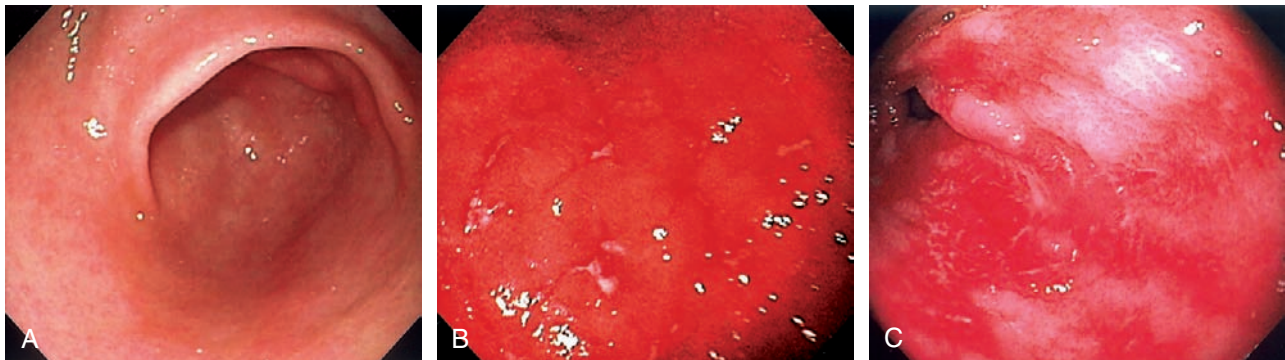
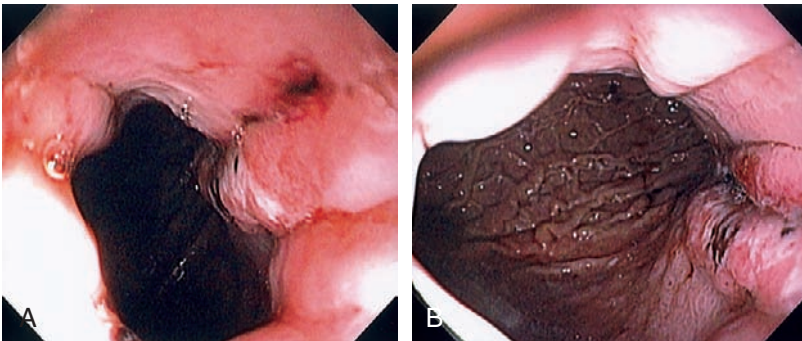


FIGURE 3.39 GRAFT-VERSUS-HOST DISEASE

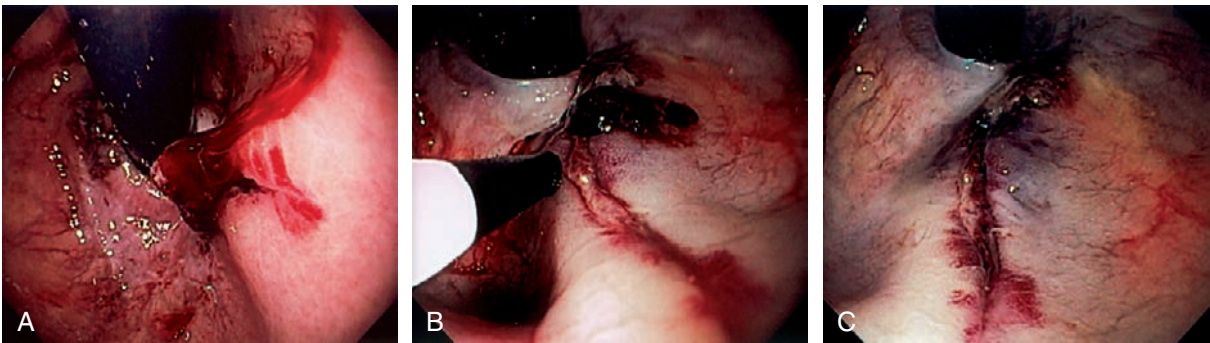
A, Normal-appearing gastric antrum. Biopsies confirmed mild graft-versus-host disease. The mucosa may appear normal in mild disease, emphasizing the importance of mucosal biopsies. **B**, Marked erythema of the gastric body with multiple erosions. **C**, Sloughing of the antral mucosa leaving a shiny erythematous appearance.

**FIGURE 3.40** GASTRIC TEAR

This fresh tear occurred during endoscopy in a patient with pronounced gastric atrophy. This could occur from the endoscope in addition to air insufflation and retching.

**FIGURE 3.41** GASTRIC MALLORY-WEISS TEAR

A, Tear begins distal to the gastroesophageal (GE) junction. **B**, Note the extent of the lesion down the lesser curvature.

**FIGURE 3.42** BLEEDING GASTRIC MALLORY-WEISS TEAR

A, Retroflex view shows active bleeding from a linear lesion just distal to the GE junction. **B**, Epinephrine injection results in blanching of the mucosa. **C**, Blanching is apparent around the tear with resultant hemostasis.

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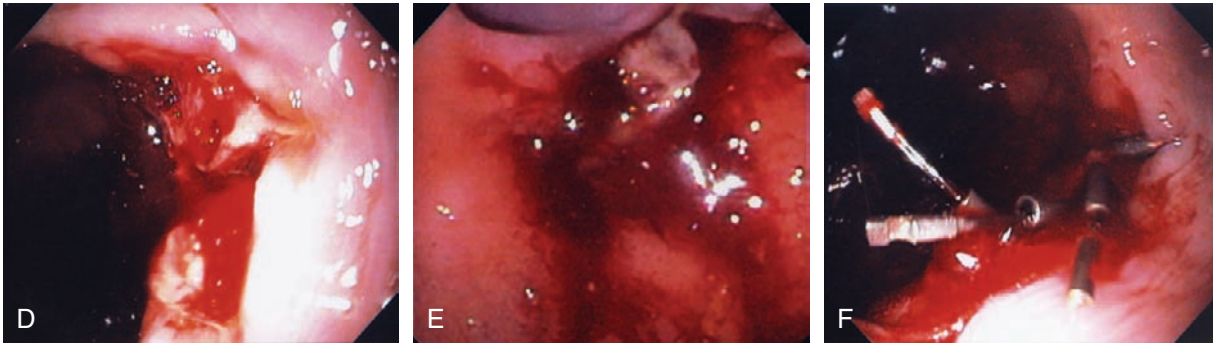


FIGURE 3.42 BLEEDING GASTRIC MALLORY-WEISS TEAR

CLIPPING OF A GASTRIC MALLORY-WEISS TEAR

D, E, Tear just below a ring at the gastroesophageal junction. **F,** Clips applied to the lesion resulting in hemostasis.

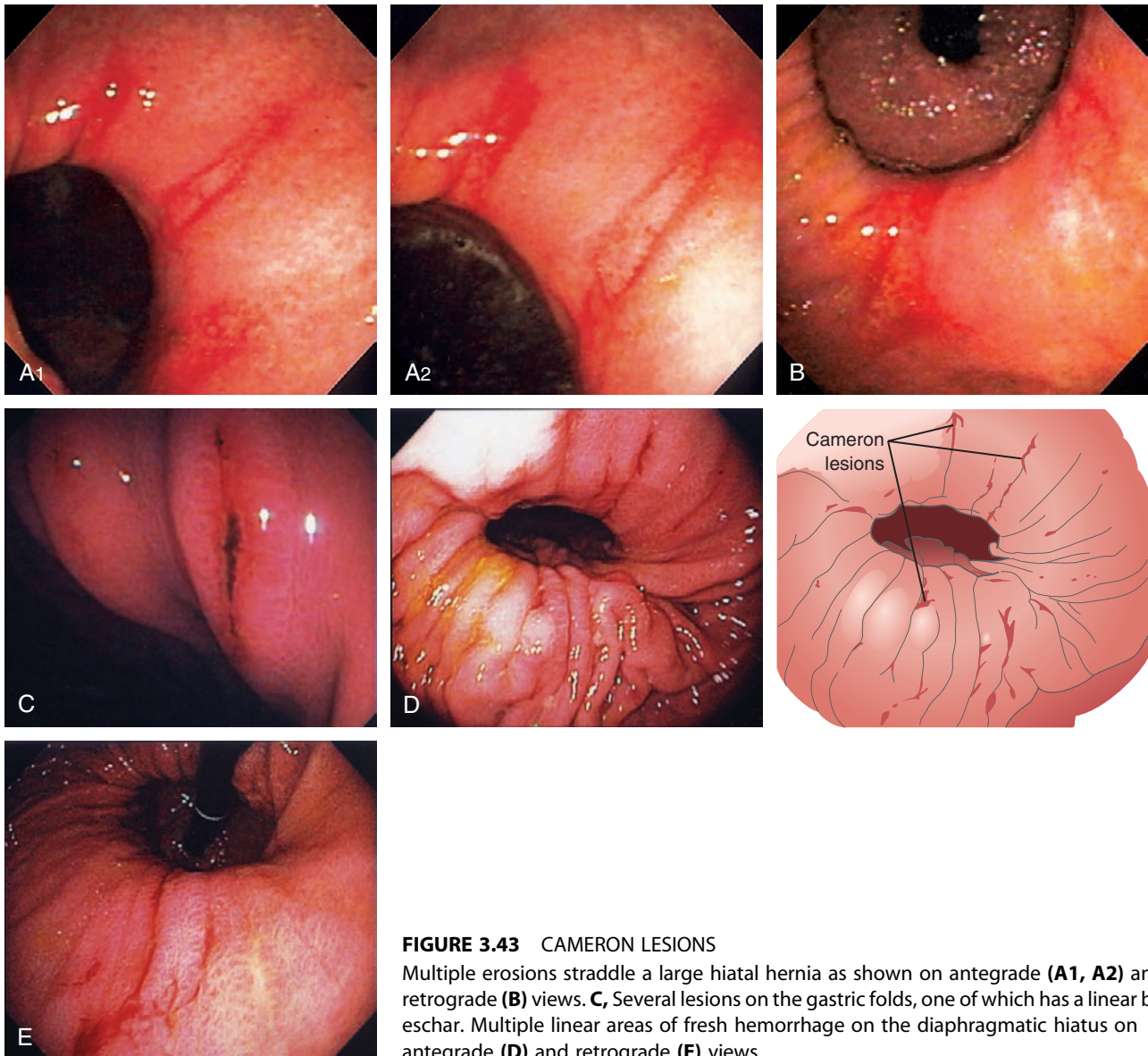


FIGURE 3.43 CAMERON LESIONS

Multiple erosions straddle a large hiatal hernia as shown on antegrade (**A1, A2**) and retrograde (**B**) views. **C,** Several lesions on the gastric folds, one of which has a linear black eschar. Multiple linear areas of fresh hemorrhage on the diaphragmatic hiatus on antegrade (**D**) and retrograde (**E**) views.



FIGURE 3.44 BENIGN GASTRIC ULCER

Linear ulceration of the gastric cardia. The surrounding mucosa is erythematous, with subepithelial hemorrhages.

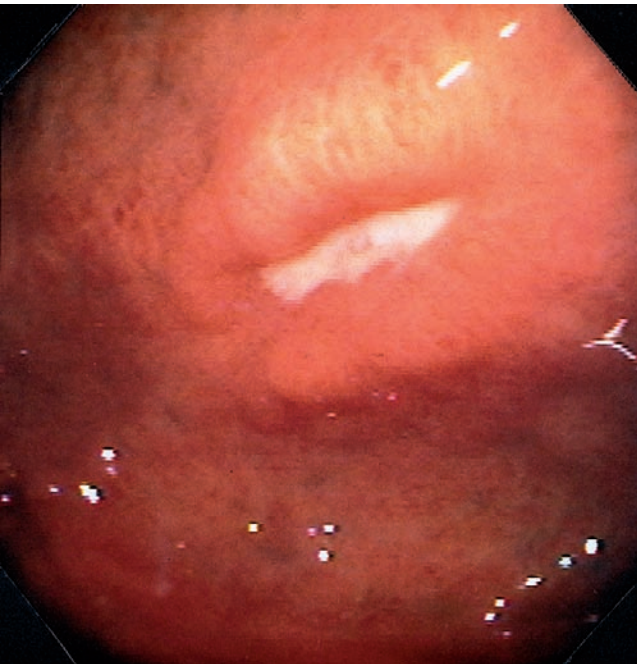


FIGURE 3.45 BENIGN GASTRIC ULCER

Ulcer in the fundus with an elevated appearance.

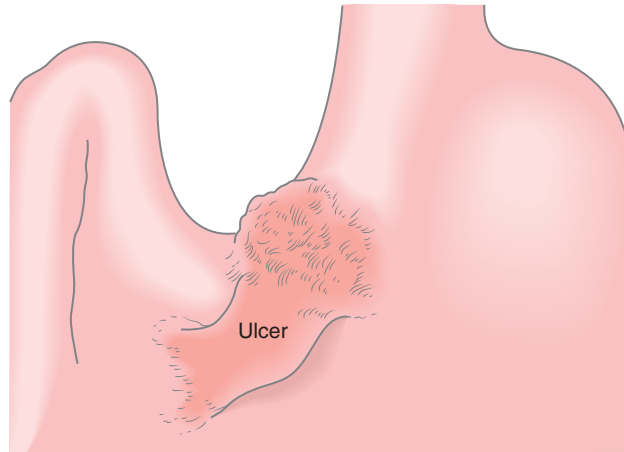
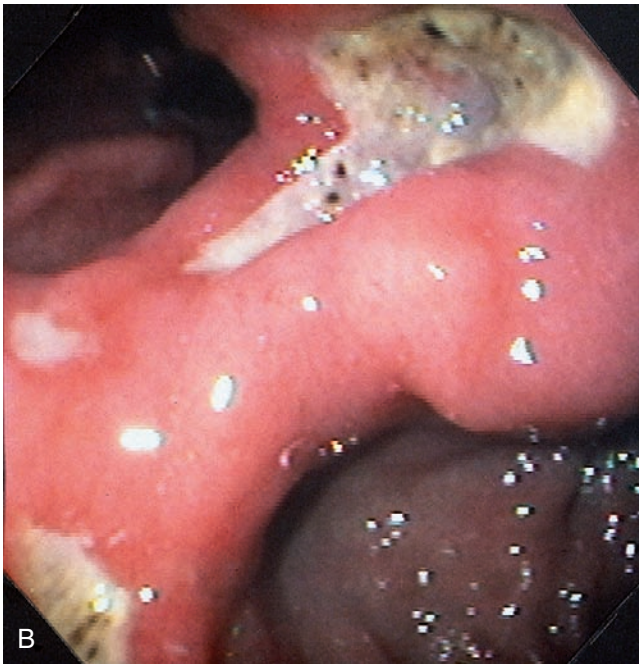
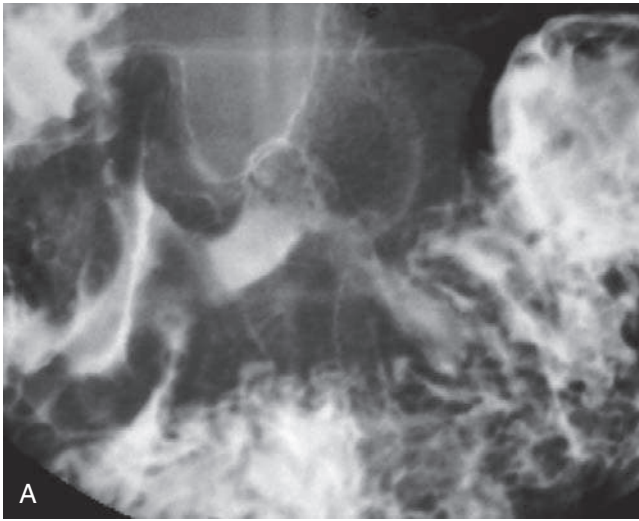


FIGURE 3.46 BENIGN GASTRIC ULCER

A, Elbow-shaped ulceration along the lesser curvature. The proximal portion of the ulcer has air contrast, whereas the distal portion has barium pooling. **B**, The shape of the large ulceration on the angularis corresponds to the radiograph. Additional ulcerations are present anteriorly. Multiple black spots (stigmata of hemorrhage) are present in the ulcer base, despite the absence of clinical bleeding.

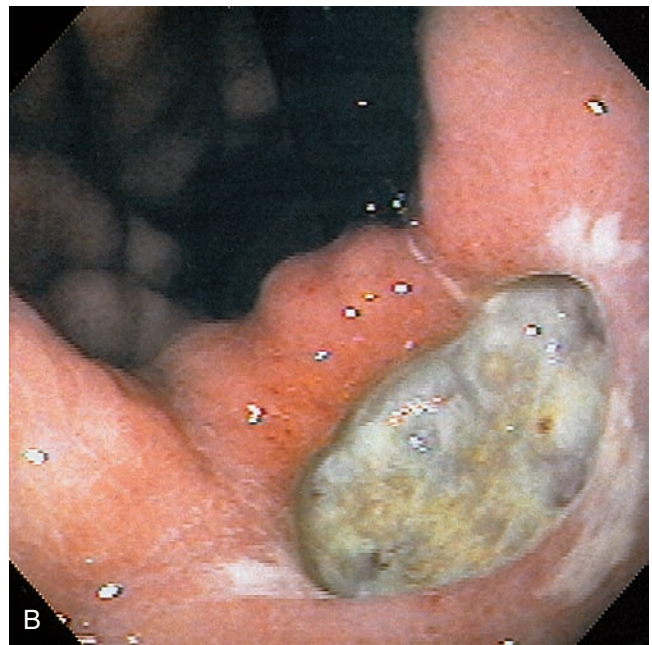
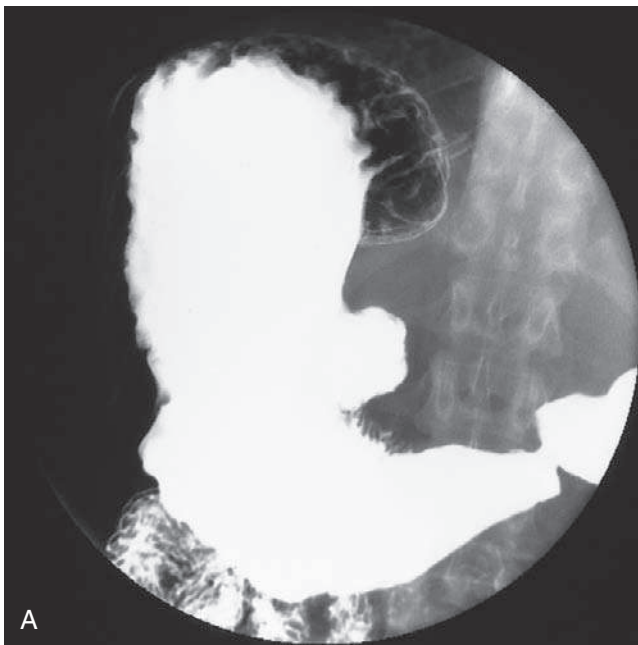


FIGURE 3.47 BENIGN GASTRIC ULCER

A, Ulcer on the angularis projecting away from the gastric lumen, suggesting a benign lesion. **B**, Large benign-appearing ulcer on the angularis. Exudate covers the base. The ulcer has a symmetrical punched-out appearance, and no abnormal-appearing rugal folds appear around the lesion.

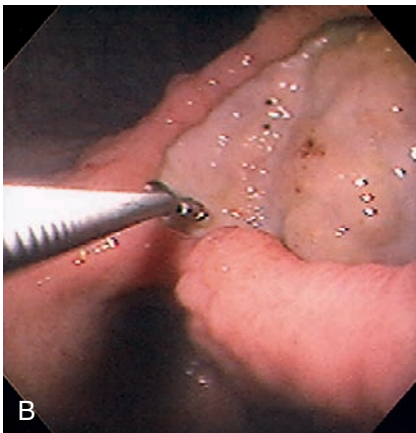
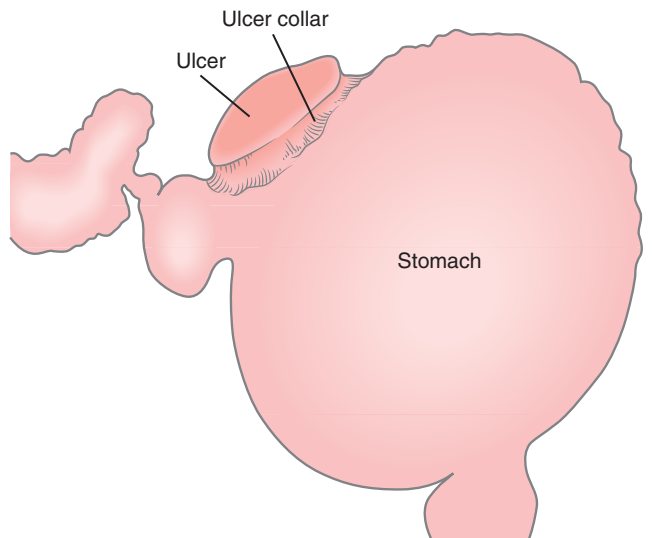
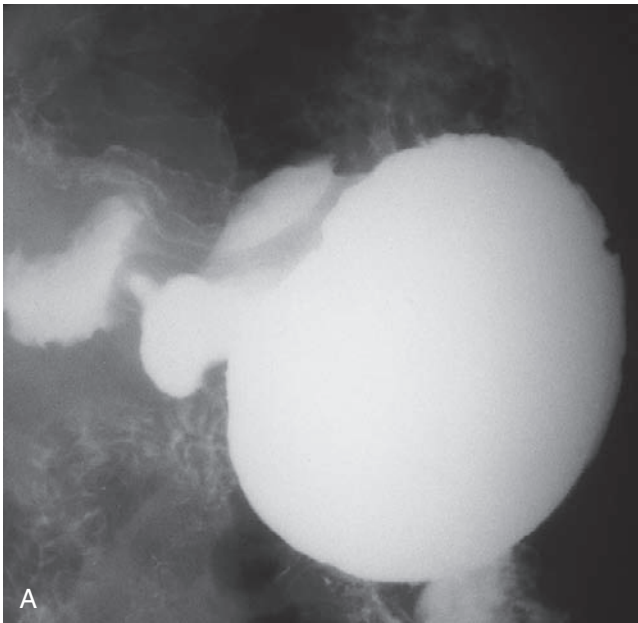


FIGURE 3.48 BENIGN GASTRIC ULCER

A, Large ulcer projecting off the lesser curve at the angularis. An ulcer collar is present, suggesting a benign lesion. **B**, Large, well-circumscribed ulcer on the angularis seen by retroflexion. The size of the ulcer is evident by comparison with the open biopsy forceps (6 mm in width). **C**, Close-up shows the size and depth of the lesion. The base has a nodular appearance suggestive of involvement of surrounding abdominal structures.



Differential Diagnosis

Adenocarcinoma
Lymphoma
Extragastric neoplasm

Benign Gastric Ulcer (Figure 3.48)



FIGURE 3.49 BENIGN GASTRIC ULCER

Well-circumscribed ulcer of moderate depth on the angularis. The borders are smooth and the ulcer is relatively symmetrical, all of which are features suggestive of a benign as compared with a malignant ulcer.

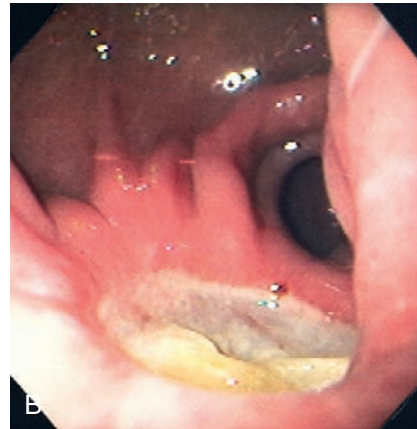
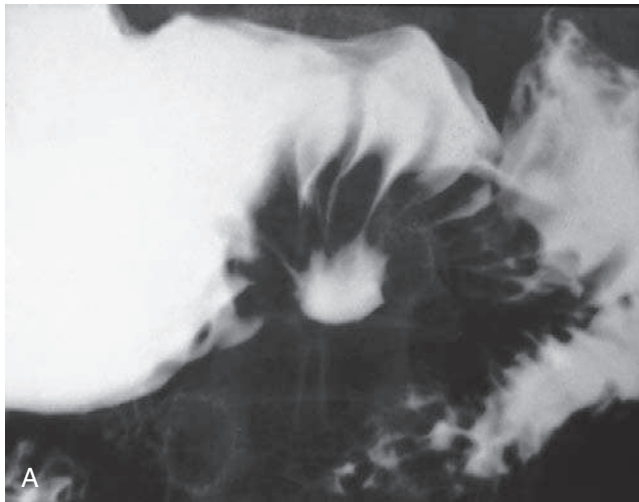


FIGURE 3.50 BENIGN GASTRIC ULCER

A, Benign-appearing gastric ulcer as demonstrated by the well-circumscribed nature of the barium collection (ulcer), with multiple smooth folds radiating to the ulcer. A smooth, round, homogeneous mound of edema surrounding the crater, with smooth radiating folds extending all the way to the crater, suggests a benign ulcer. Other signs of a benign ulcer include Hampton's line or an ulcer collar and projection beyond the lumen. **B**, Large, well-circumscribed antral ulceration, with folds radiating to the ulcer base.



FIGURE 3.51
PERIPYLORIC ULCER
Circumferential ulceration surrounds the pylorus.



FIGURE 3.52
BENIGN GASTRIC ULCER
Small prepyloric ulceration, with surrounding erythema superior and posterior to the pylorus. There is cicatrization of the stomach toward the ulceration.



FIGURE 3.53 BENIGN GASTRIC ULCER
Bile-stained peripyloric ulcer.

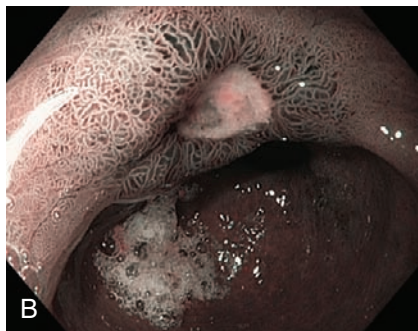
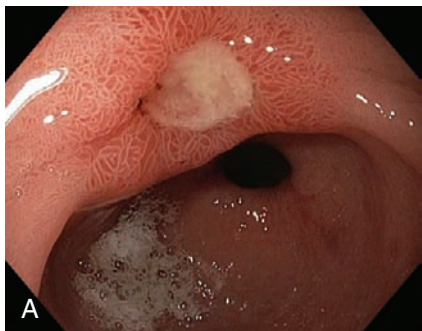


FIGURE 3.54 ANTRAL ULCER
Well-circumscribed, benign-appearing ulcer in the antrum anteriorly on high-resolution (A) and narrow band imaging (B).

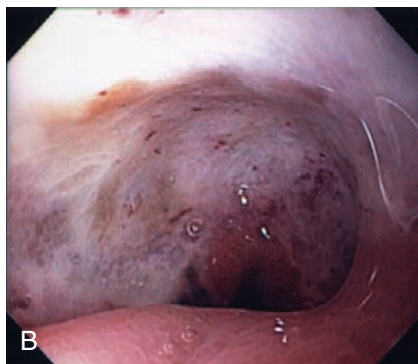


FIGURE 3.55 BENIGN GASTRIC ULCER
Large deep ulceration at the pylorus (A, B).



FIGURE 3.56 BENIGN GASTRIC ULCER

Large ulceration with a heaped-up appearance in the distal gastric body. The raised appearance is unusual and suggests primary or metastatic malignancy. Follow-up endoscopy after therapy showed ulcer healing.



Differential Diagnosis

Benign Gastric Ulcer (Figure 3.56)

- Adenocarcinoma
- Metastatic carcinoma
 - Melanoma
 - Breast carcinoma
 - Lung carcinoma

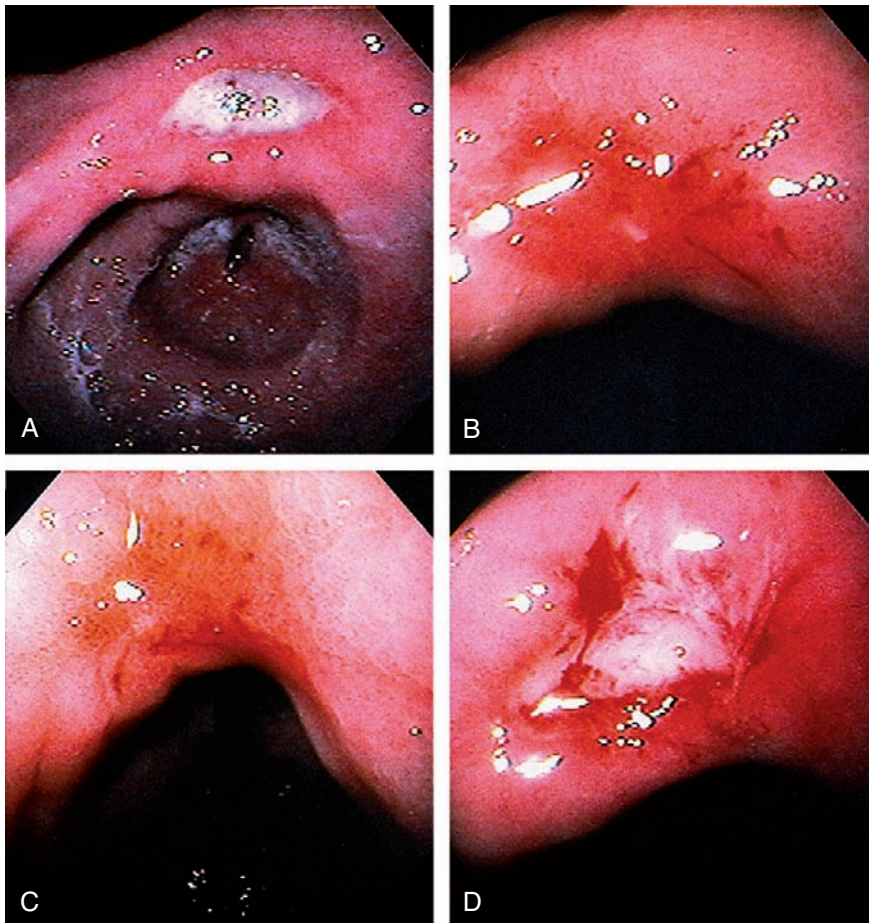


FIGURE 3.57 BENIGN GASTRIC ULCER

Deep, well-circumscribed, benign-appearing ulcer on the angularis (A). One month after standard ulcer therapy, the ulceration has almost completely healed; there is a small central erosion, deformity, and diffuse erythema and friability (B). After 2 months of therapy, complete healing is seen; friability is still present (C). One month after discontinuation of therapy, the ulcer has recurred in the same location and with endoscopic characteristics similar to those of the initial ulcer (D).

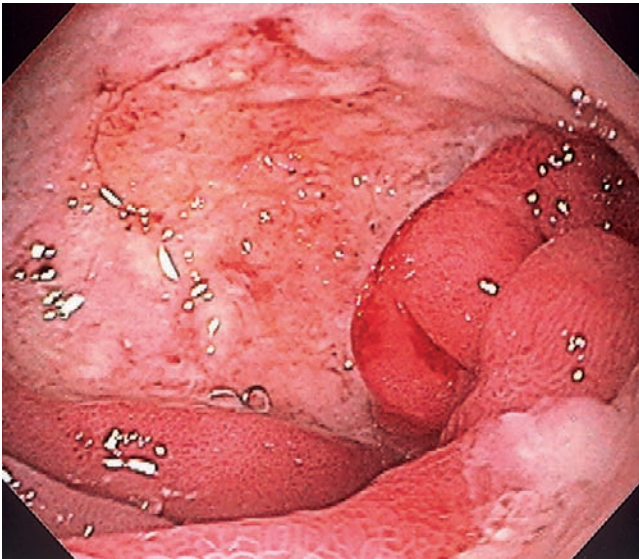


FIGURE 3.58 BENIGN ULCER IN GASTRIC POUCH
Hemicircumferential ulceration in a small gastric pouch after gastric bypass.

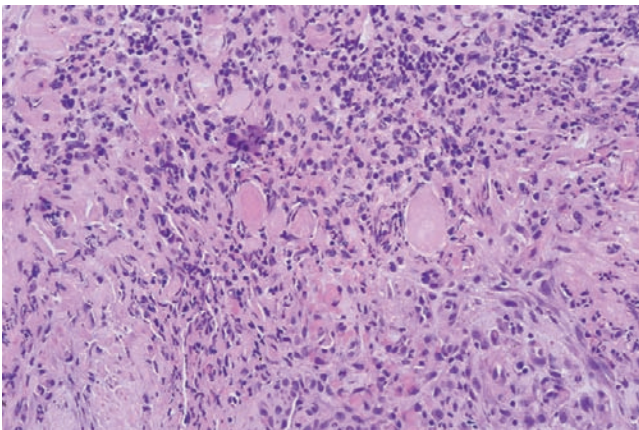


FIGURE 3.59 HISTOLOGY OF AN ULCER BASE
Characteristic histopathologic changes of an ulcer base, including acute and chronic inflammatory cells, fibroplasia, and neovascularization. Careful examination must be performed to differentiate reactive atypia from neoplasia in this area.

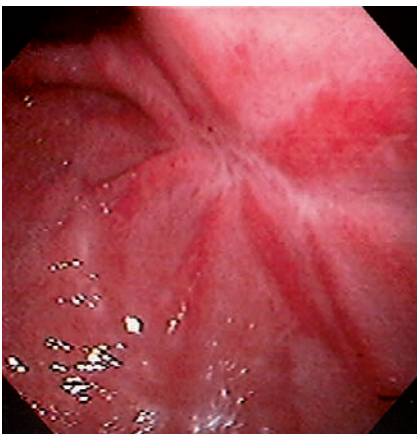


FIGURE 3.60 ULCER SCAR
Retraction of the mucosa with radiating folds and erythema typical for an area of prior large ulceration.

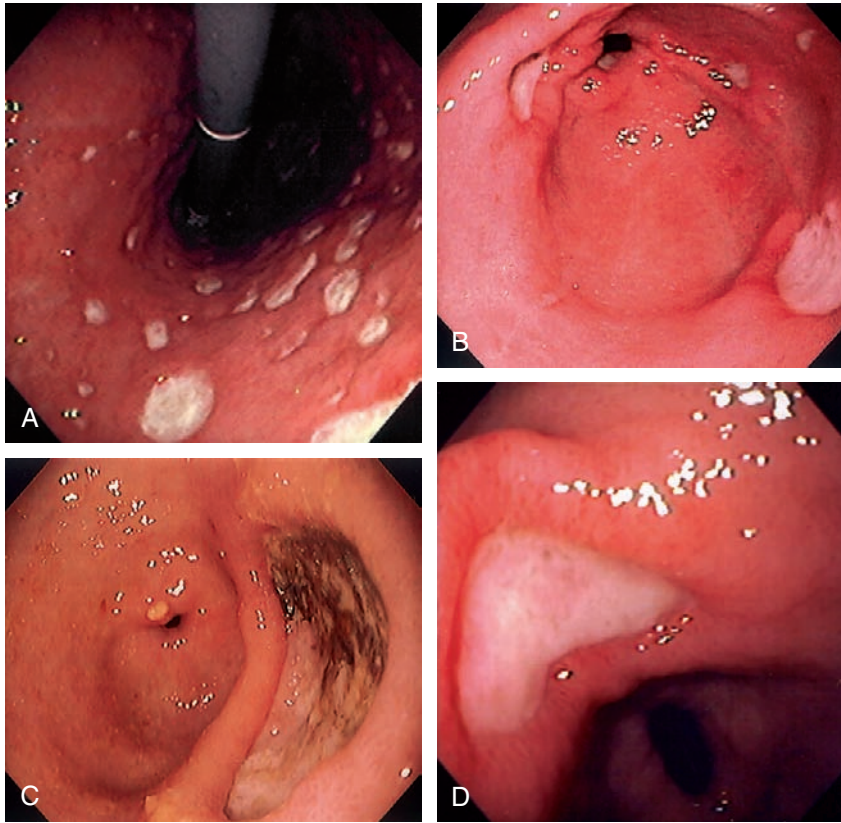


FIGURE 3.61 NONSTEROIDAL ANTIINFLAMMATORY DRUG (NSAID)-INDUCED GASTRIC ULCERS

A, Numerous well-circumscribed ulcers involving the gastric body and fundus seen on retroflexion. **B**, Multiple well-circumscribed ulcerations of the antrum and pyloric canal. **C**, Solitary chronic-appearing ulcer of moderate depth on the posterior wall of the antrum. Note the xanthomatous lesion at the pylorus. **D**, Large, triangular-shaped ulcer in the distal antrum.

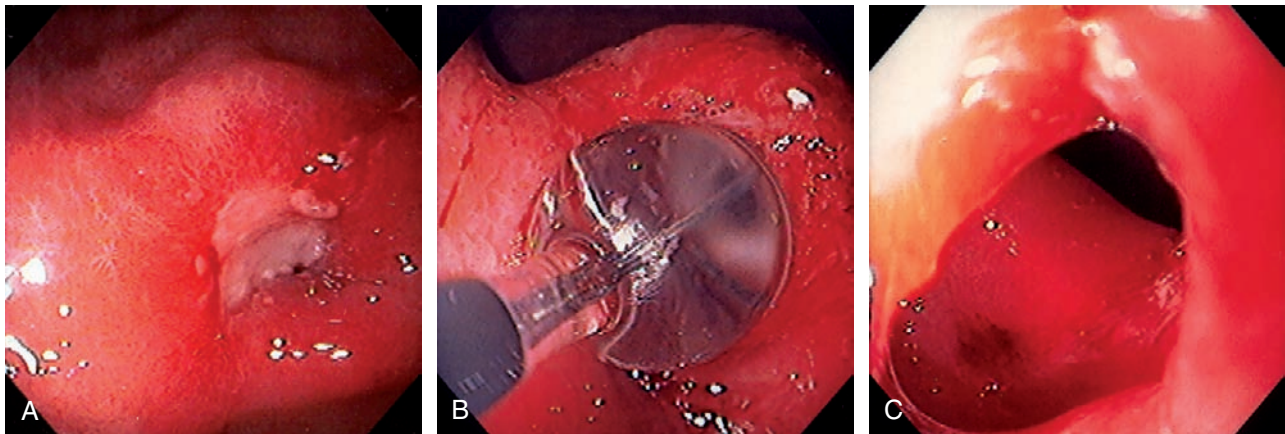


FIGURE 3.62 PYLORIC STENOSIS CAUSED BY ULCER

A, Exudate and edema at the pylorus. The opening is not visible. **B**, A balloon was inflated across the ulceration. **C**, The luminal caliber is now much improved.

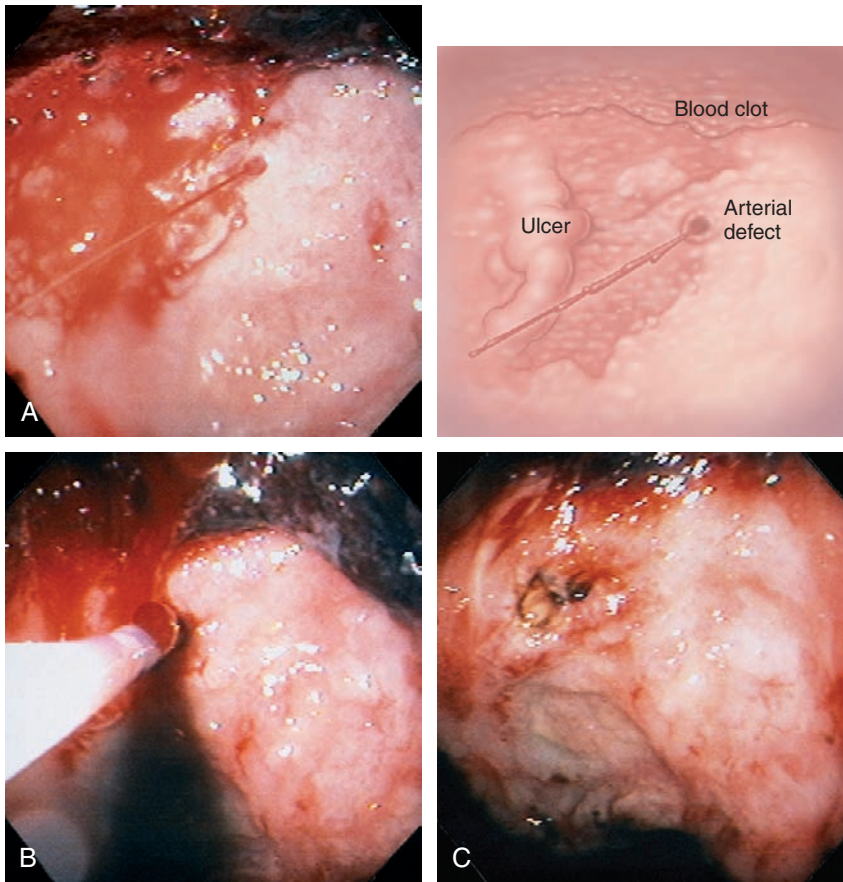


FIGURE 3.63 BLEEDING GASTRIC ULCER
A, Large gastric ulcer with a central arterial defect. Blood is spurting in a pulsatile fashion, characteristic of an arterial bleeding source. **B**, A heater probe is applied with firm pressure to the defect, causing cessation of bleeding. **C**, After multiple pulses of energy and washing, the defect is coagulated, as represented by the black areas. With washing, the large size of the ulceration is evident.

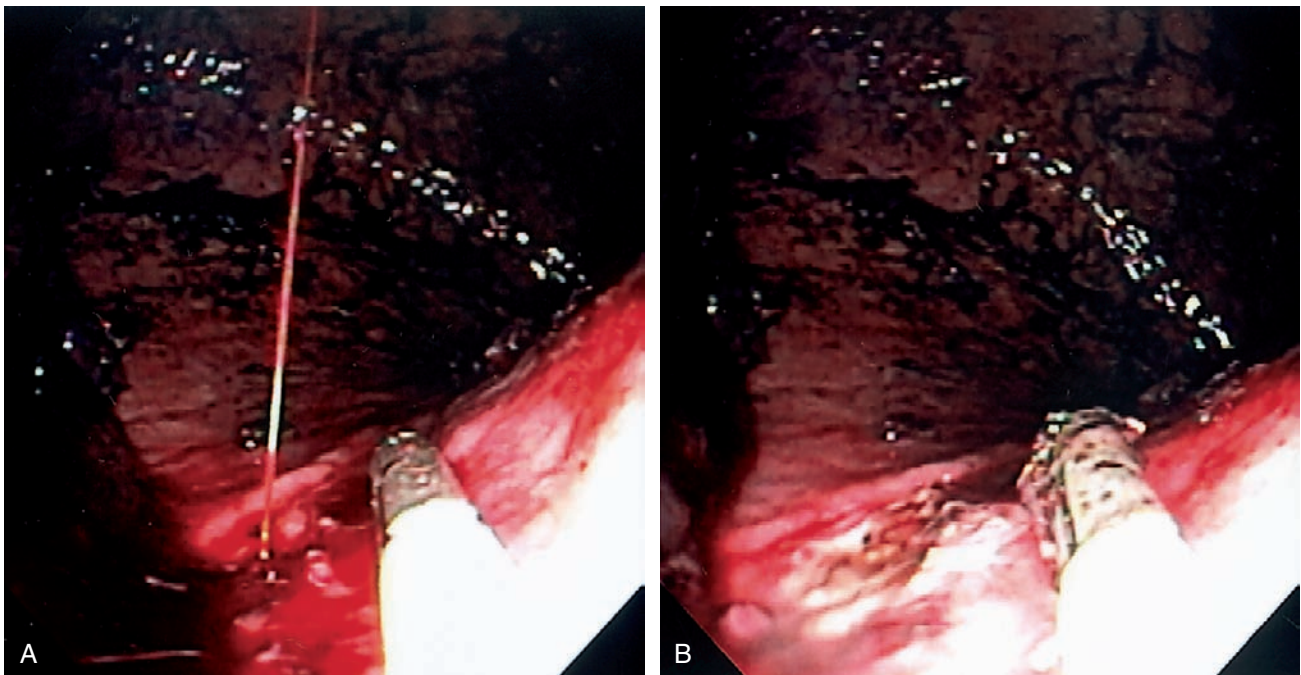


FIGURE 3.64 BLEEDING GASTRIC ULCER

A, Arterial jet pulsating from an area in the proximal gastric body. The heater probe is alongside the lesion. **B**, Thermal therapy was then applied to the area, resulting in a black eschar and hemostasis.

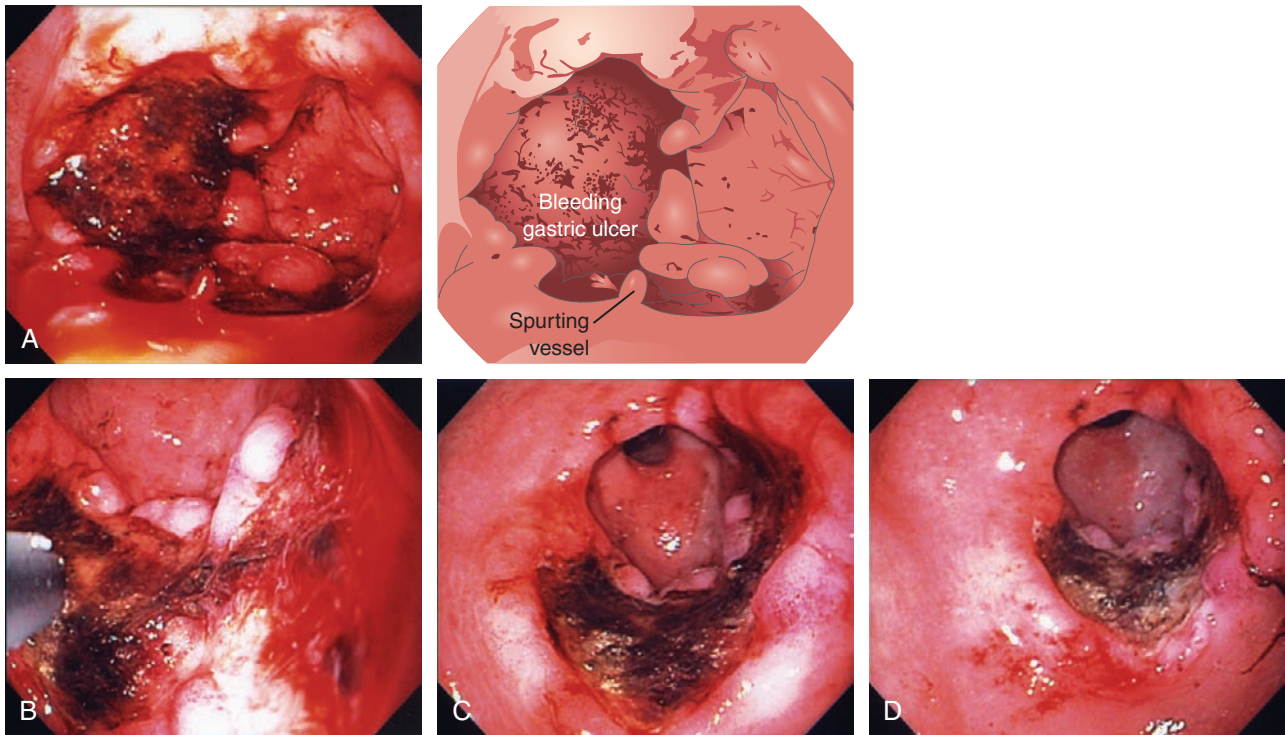


FIGURE 3.65 BLEEDING GASTRIC ULCER

A, Large ulceration with fresh bleeding and an actively pulsating jet. **B**, Epinephrine was injected and the heater probe used to ablate the area, resulting in a large eschar (**C**). Now that the bleeding has ceased, the extensiveness of the ulcer can be identified (**D**).

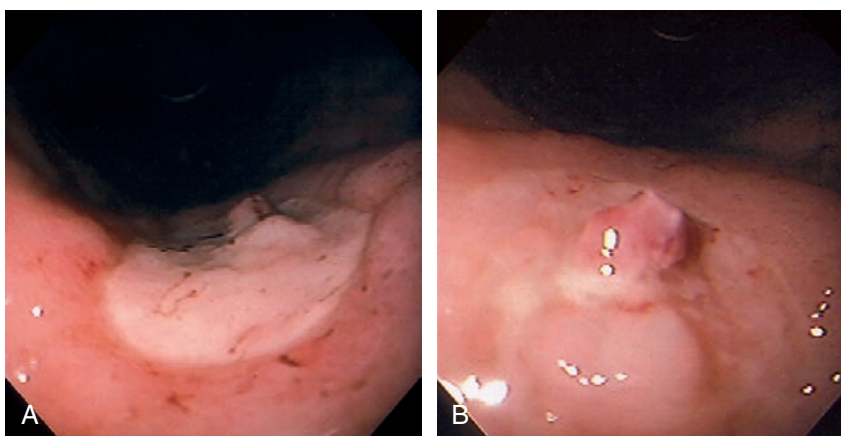


FIGURE 3.66 GASTRIC ULCER WITH VISIBLE VESSEL

A, Large ulcer on the angularis with central raised lesion. **B**, Fleshy visible vessel in the center of the ulcer.

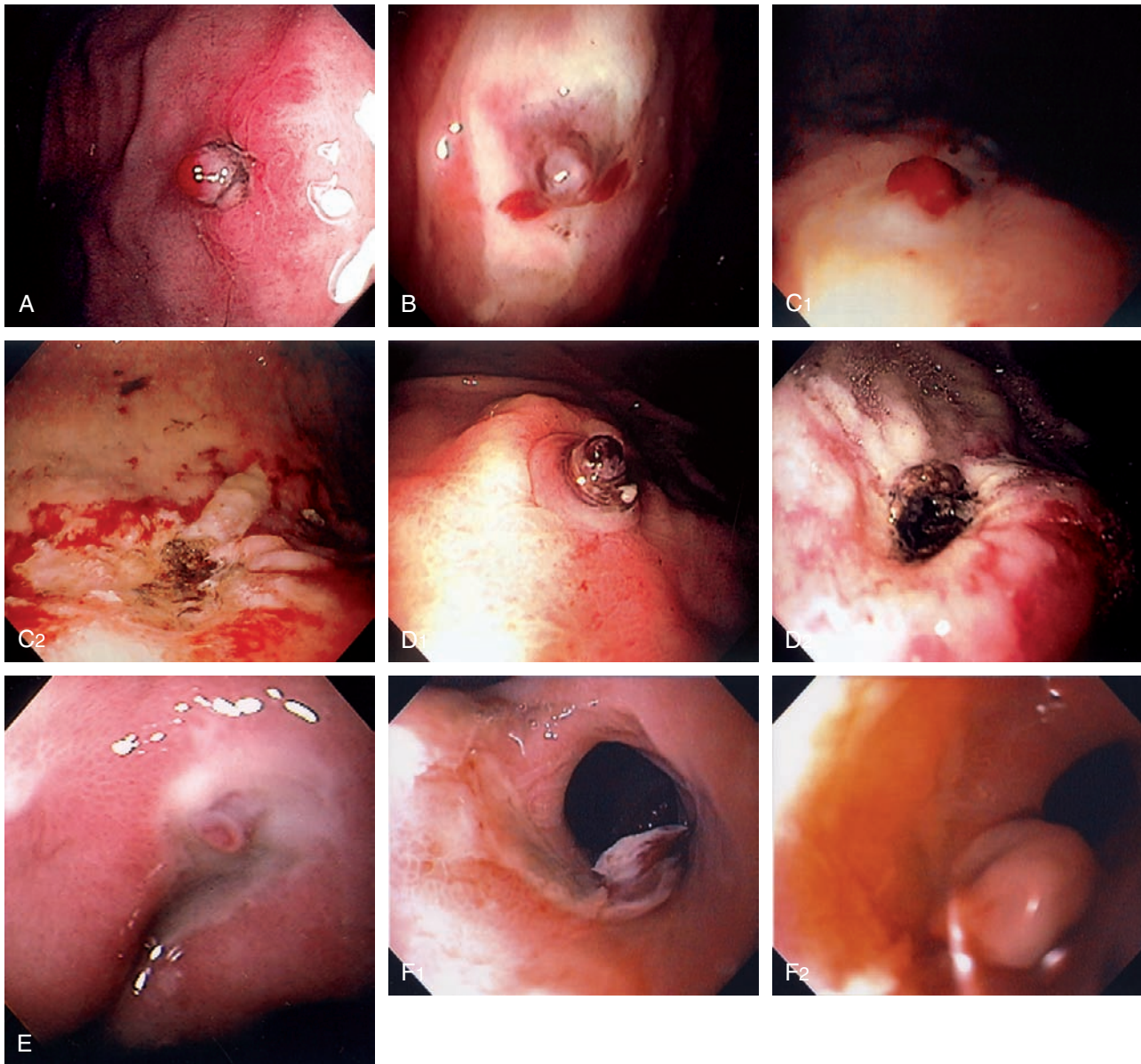


FIGURE 3.67 GASTRIC ULCER WITH VISIBLE VESSEL

A, Nipple-like projection emanating from a small mucosal defect. **B**, Fleshy nipple-like projection from a superficial ulceration. **C1**, Linear ulcer with raised area with reddish covering. **C2**, After thermal therapy, the vessel has been obliterated, leaving a black eschar with depth. **D1**, Dark nipple-like projection of the gastric body. **D2**, Thermal therapy obliterated the lesion, resulting in a deep black eschar. **E**, A small gastric ulcer displays a nipple-like projection, which has all the appearance of an artery. **F1**, **F2**, Large visible vessel with associated ulcer at a narrowed gastrojejunal anastomosis in a patient with a Roux-en-Y gastric bypass.

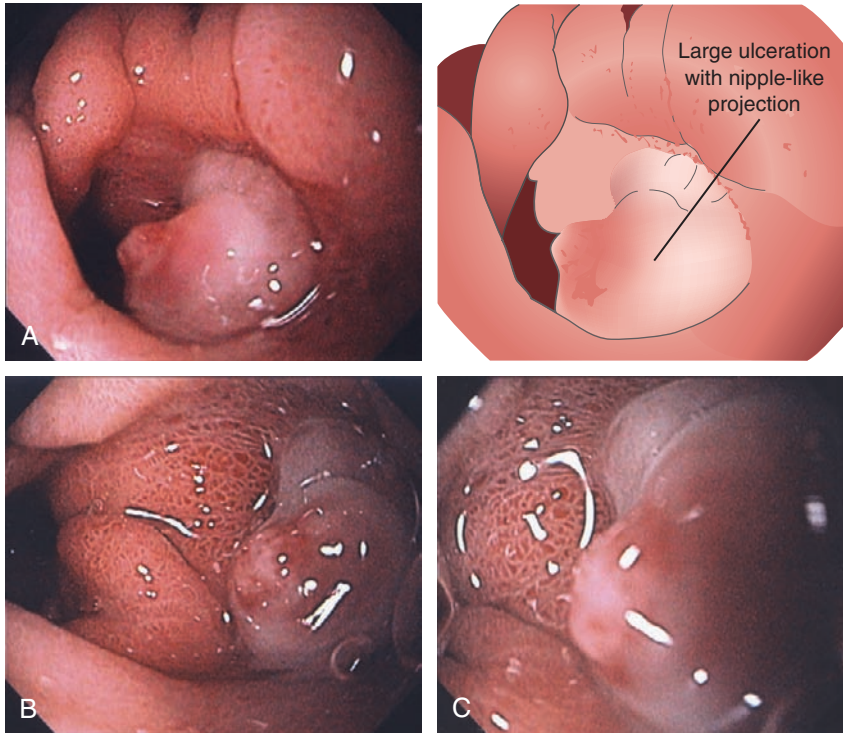


FIGURE 3.68 BLEEDING ANTRAL ULCER WITH VISIBLE VESSEL

A-C, Large ulceration in the posterior antrum with a nipple-like projection emanating from the base of the lesion. Because of recurrent bleeding, surgery was performed demonstrating that the visible vessel was a middle colic artery, a branch of the superior pancreaticoduodenal arcade.

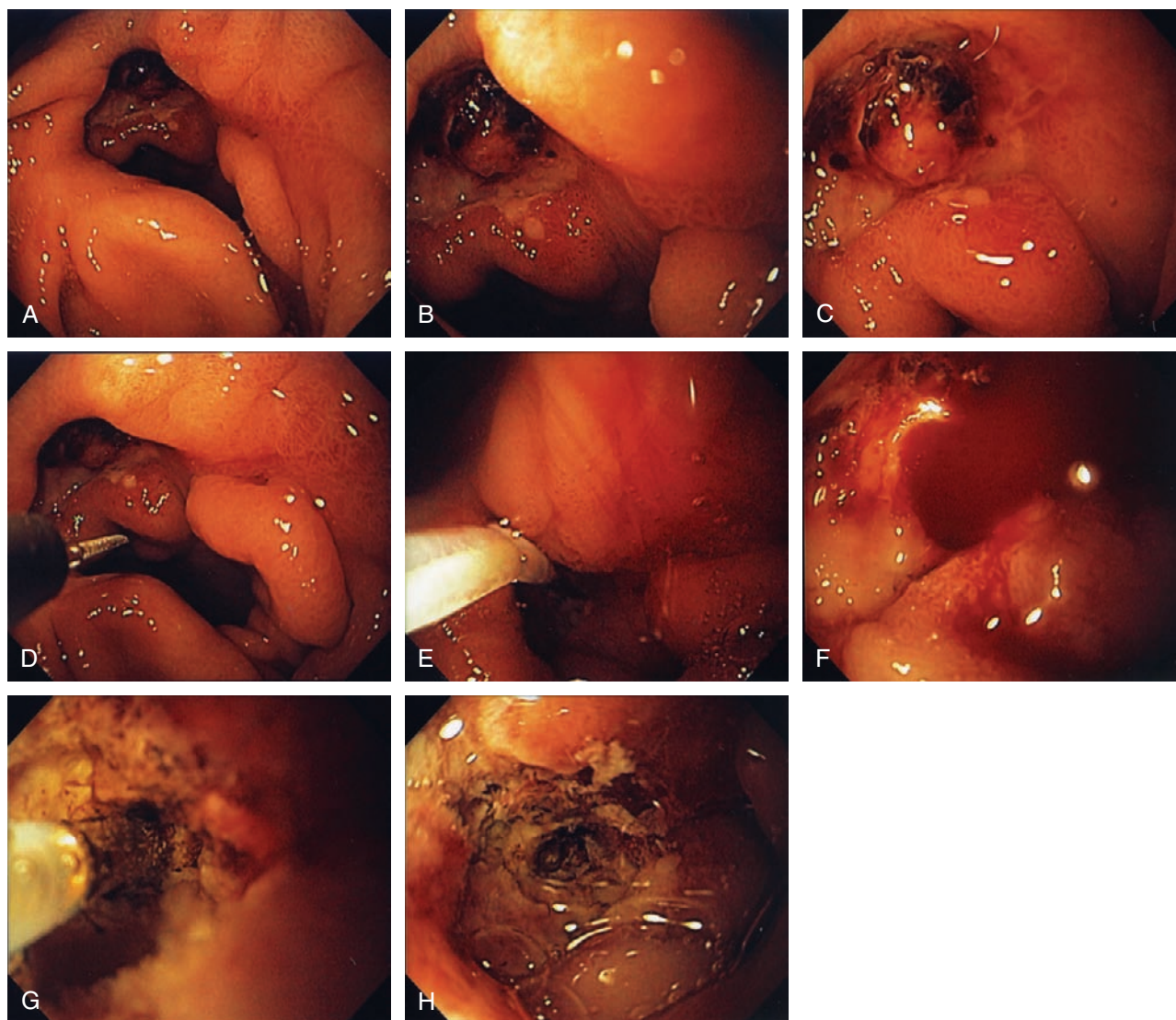


FIGURE 3.69 PREPYLORIC ULCER WITH VISIBLE VESSEL

A-C, Large, deep ulceration in the pyloric ring. Black eschar is shown, as well as a nipple-like projection. **D**, Epinephrine is first injected, **(E, F)** followed by multiple pulses of the 10-French heater probe precipitating some bleeding. **G, H**, The visible vessel has been ablated, resulting in a black eschar.

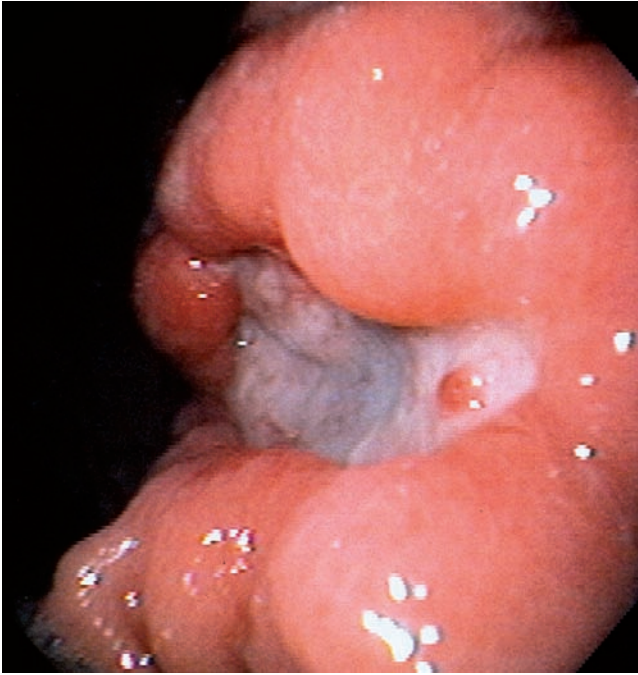


FIGURE 3.70 MALIGNANT GASTRIC ULCER WITH VISIBLE VESSEL
Visible vessel at the inferior margin of a malignant gastric ulcer.
The gastric ulcer has large, heaped-up margins.

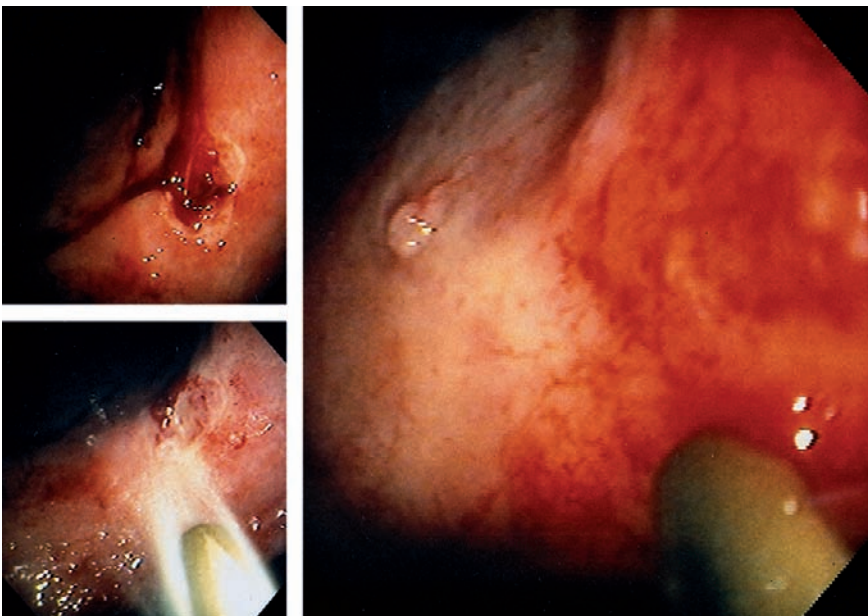


FIGURE 3.71 BLEEDING GASTRIC ULCER WITH VISIBLE VESSEL

Gastric ulcer is actively oozing (*top left*).
With washing, the bleeding area is
cleaned of blood (*bottom left*). A
transparent piece of fleshy tissue is seen,
representing a visible vessel. Such a
transparent visible vessel may have the
highest incidence of rebleeding.

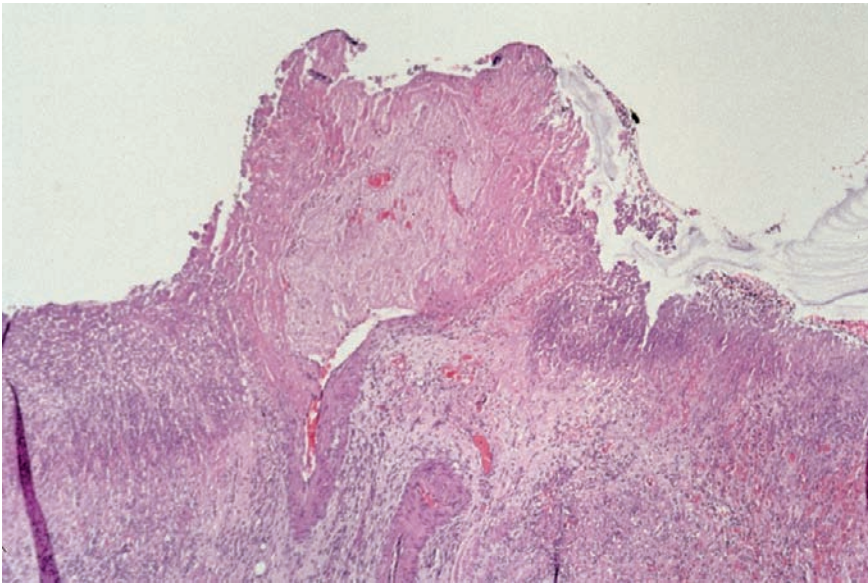
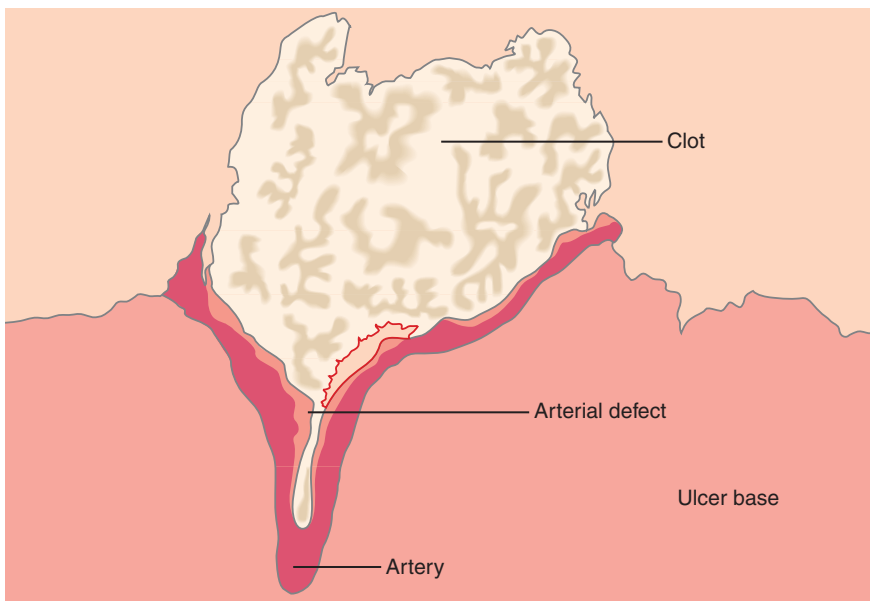


FIGURE 3.72 HISTOPATHOLOGY OF A VISIBLE VESSEL

The vessel wall is ruptured at the luminal surface and is filled by thrombus. The surrounding tissue shows extensive ulceration.



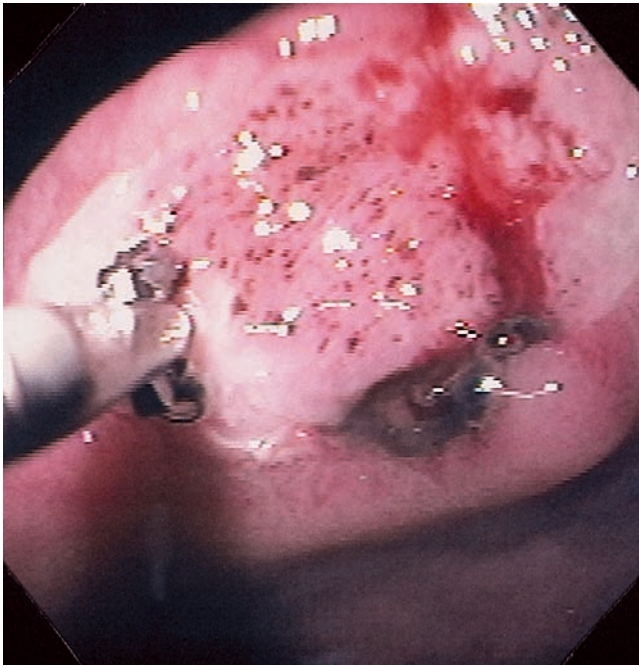


FIGURE 3.73 BLEEDING GASTRIC ULCER

Large, well-circumscribed ulcer on the angularis, with blood clot and area of active oozing. The open biopsy forceps (6 mm) documents ulcer size.



FIGURE 3.74 GASTRIC ULCER WITH CLOTS

Giant gastric ulcer on the angularis with multiple areas of adherent clot.

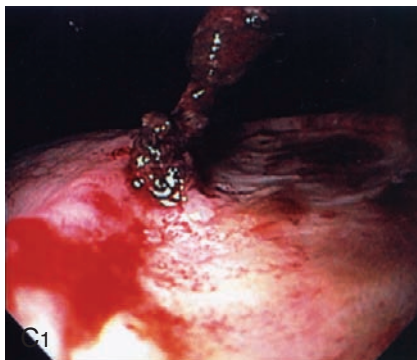
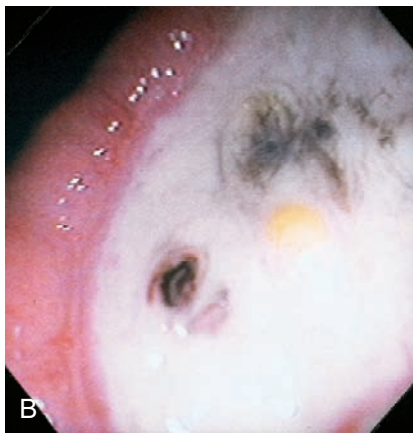
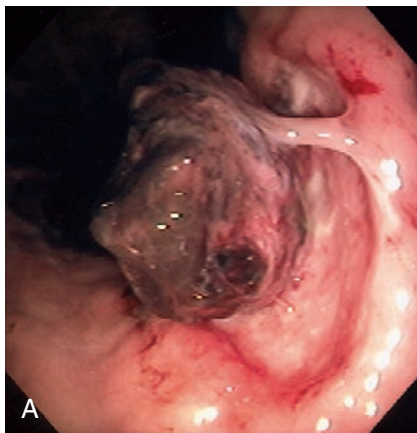


FIGURE 3.75 GASTRIC ULCER WITH BLOOD CLOT

A, Gastric ulcer with large blood clot adherent to a focal point. **B**, Rebleeding occurred 1 week later. The clot is now gone, and the bleeding point is evident. Debris can be seen adherent to the ulcer base. **C1**, A blood clot is seen at the edge of a benign gastric ulcer. **C2**, Appearance of the lesion after epinephrine injection.

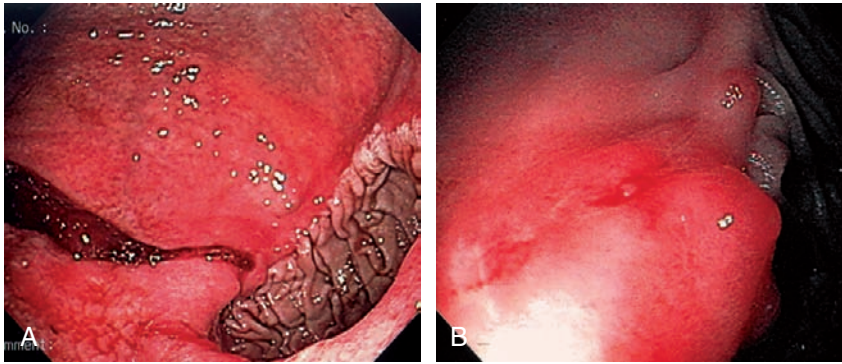


FIGURE 3.76 SMALL GASTRIC ULCER WITH FRESH BLOOD CLOT

A, Long blood clot emanating from a small area at the site of a Billroth-I anastomosis. Biopsies were recently taken from this site. **B**, After washing, a small ulcer, created by the mucosal biopsy, with an area of active bleeding is apparent.

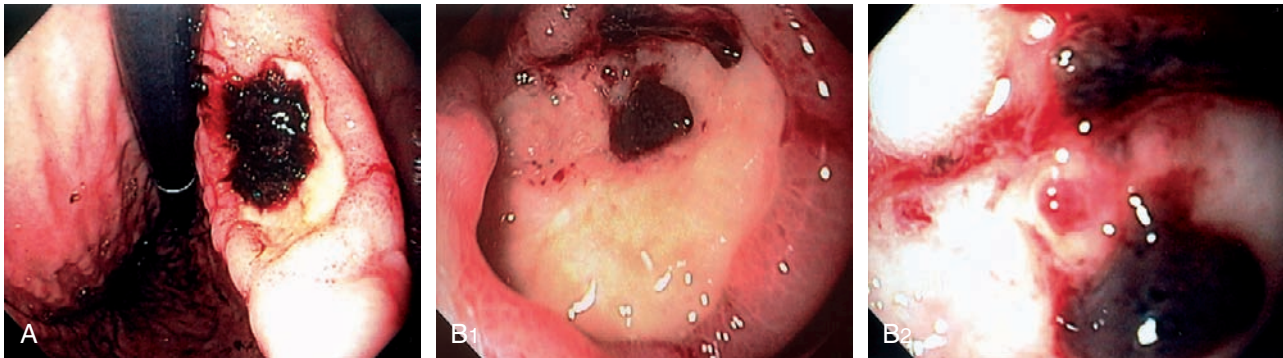


FIGURE 3.77 GASTRIC ULCER WITH BLOOD CLOT

A, Large gastric ulcer on the angularis with focal overlying clot. **B1, B2**, After clot removal by washing, a visible vessel is exposed.

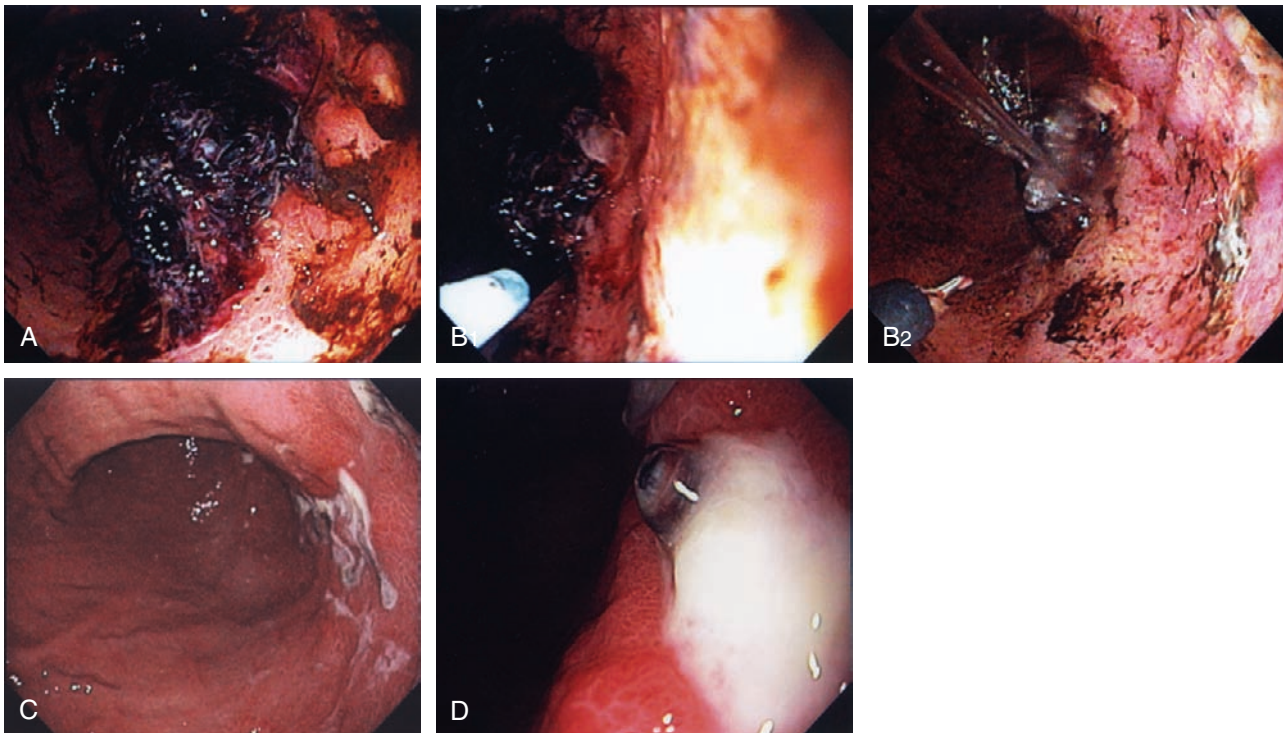


FIGURE 3.78 GASTRIC ULCER WITH ADHERENT BLOOD CLOT

A, Large blood clot on an ulceration in the midgastric body posteriorly near the angularis. The blood clot could not be removed. **B**, Large-volume epinephrine was injected (**B1, B2**). With washing, the lesion is now more visible. **C**, Forty-eight hours later, second look endoscopy is performed showing that the blood clot is now gone with shallow ulceration, and at one of the lesions an area suggestive of a visible vessel is present (**D**).

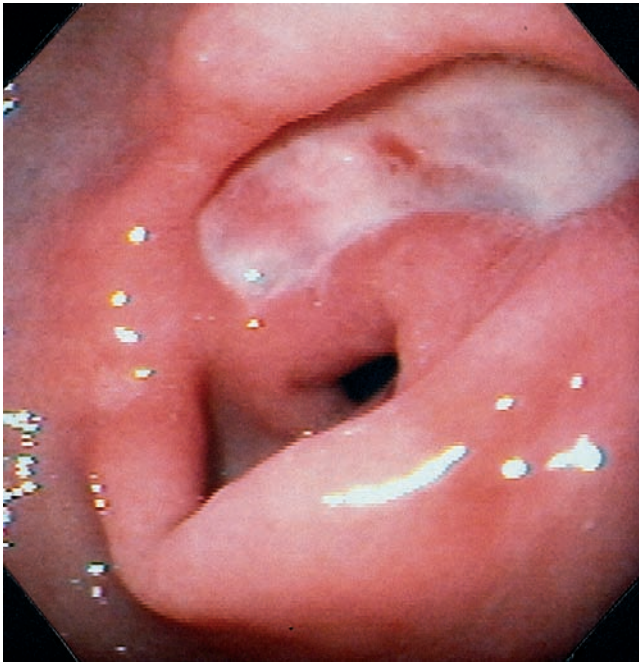


FIGURE 3.79 PERIPYLORIC ULCER WITH RED SPOT
Large ulcer with a central flat red spot. There is associated edema, with a small erosion near the ulcer.



FIGURE 3.80 GASTRIC ULCER WITH BLACK BASE

A, Raised gastric ulcer with a black base. The surrounding mucosa has a prominent areae gastricae pattern. **B**, Deep ulcer with black base in the gastric body.

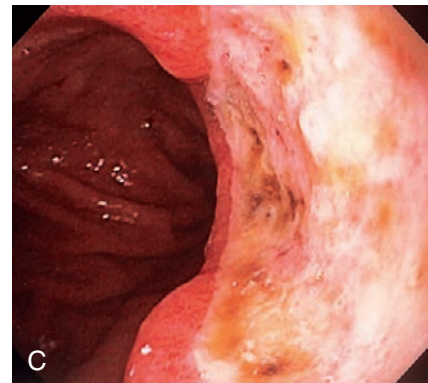
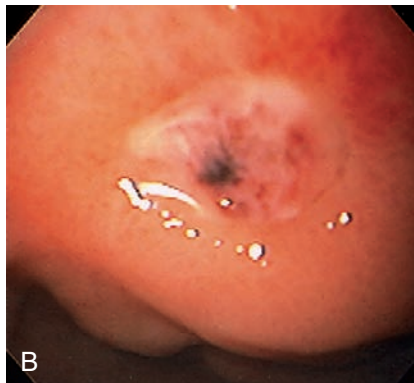
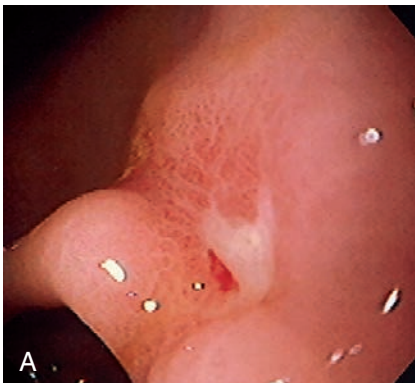


FIGURE 3.81 GASTRIC ULCER WITH SPOTS

A, Small gastric ulcer with a linear red spot. **B**, Well-circumscribed, small gastric ulcer with both black and red spots. **C**, Large gastric ulcer on the angularis with multiple black spots.

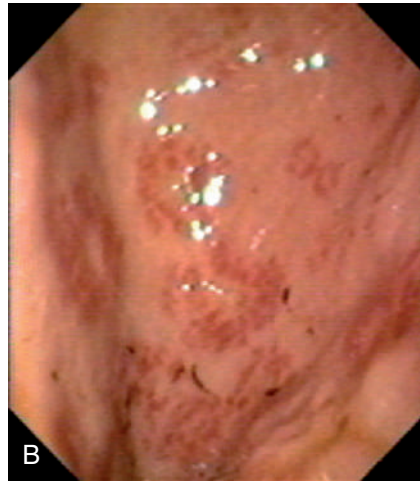


FIGURE 3.82 HENOCH-SCHÖNLEIN PURPURA

A, Diffuse purpuric lesions of the skin. **B**, Focal subepithelial hemorrhage in the gastric antrum. (A courtesy P. Redondo, MD, Pamplona, Spain.)

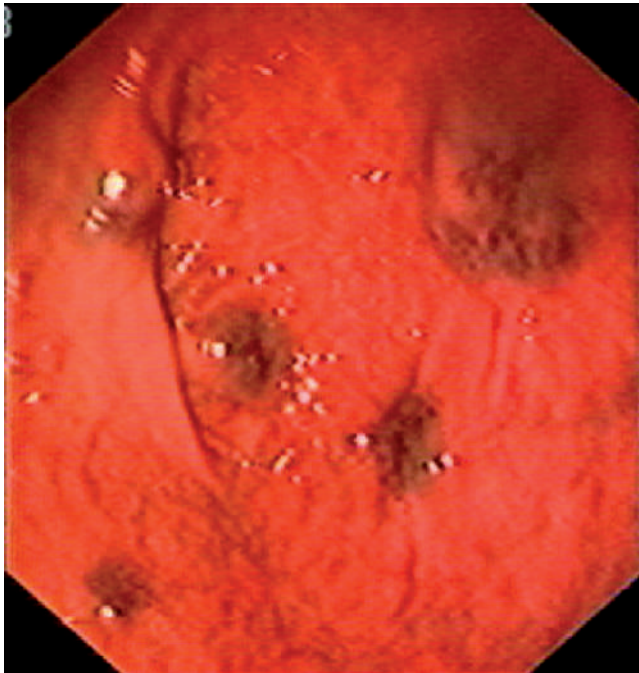


FIGURE 3.83 BLUE RUBBER BLEB NEVUS SYNDROME

Multiple subepithelial blebs in the proximal stomach. This patient had concomitant esophageal (see [Figure 2.148](#)) and colonic lesions.

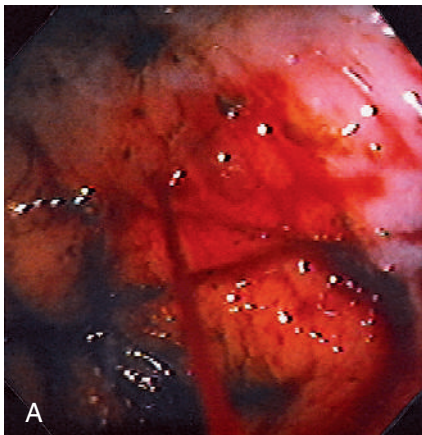
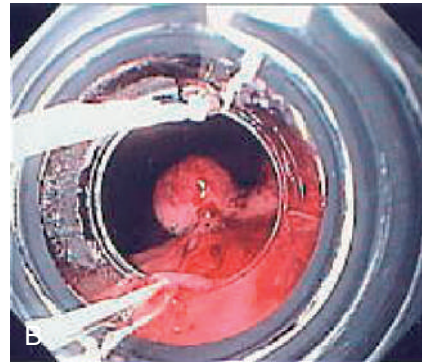
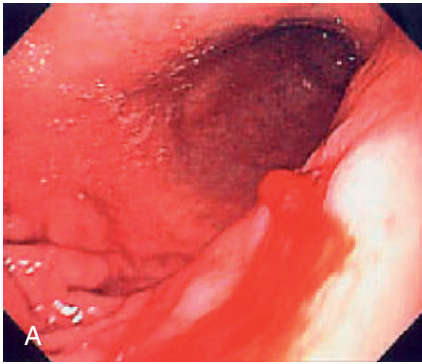
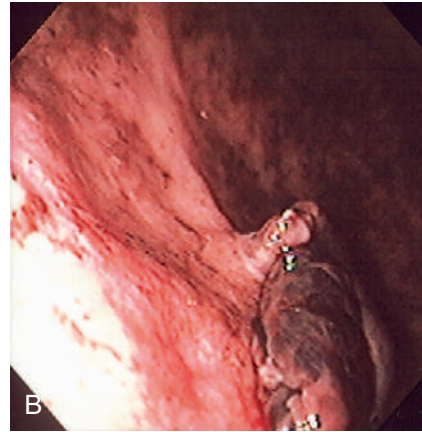
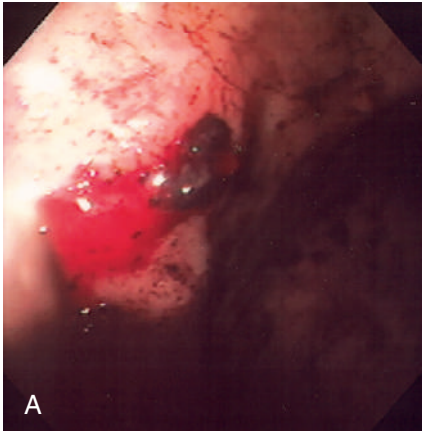


FIGURE 3.84 DIEULAFOY LESION

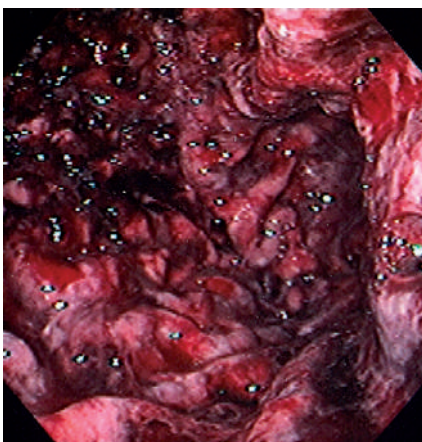
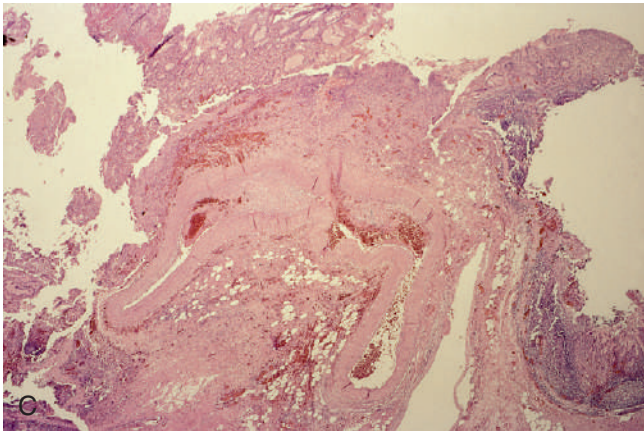
A, Arterial bleeding (spurting) just distal to the gastroesophageal junction. **B**, The bleeding point was a small defect without endoscopic evidence of ulceration.

**FIGURE 3.85** DIEULAFOY LESION

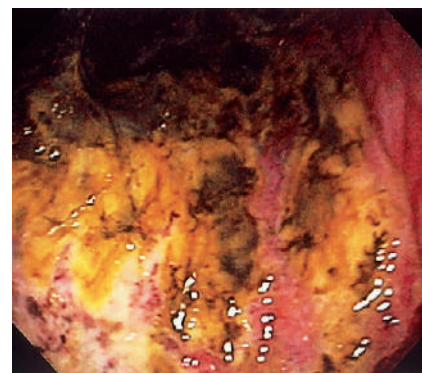
A, Active arterial bleeding from a pinpoint area along the lesser curvature. **B**, Band applied to lesion.

**FIGURE 3.86** DIEULAFOY LESION

A, Active bleeding from a small lesion in the gastric fundus. **B**, Bleeding spontaneously stopped, and with washing a visible vessel and blood clot are apparent. **C**, Histopathology of the lesion shows a large tortuous artery at the mucosal surface.

**FIGURE 3.87****STRESS GASTROPATHY**

Diffuse hemorrhage of the gastric body after a prolonged episode of hypotension.

**FIGURE 3.88****GASTRIC ISCHEMIA**

Diffuse ulceration of the gastric body caused by a gastric volvulus.

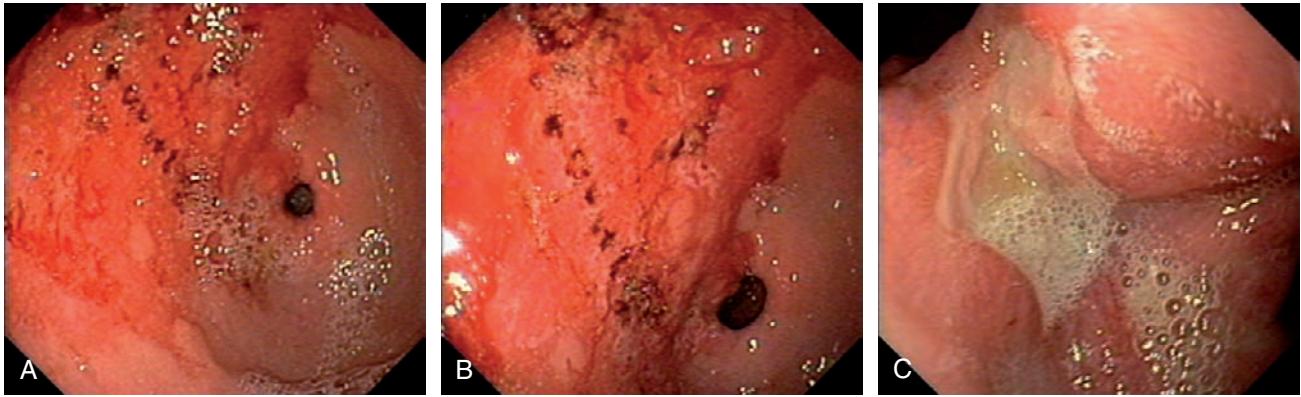


FIGURE 3.89 ISCHEMIC GASTROPATHY

A, B, Well-demarcated giant ulcer in the antrum with erythema and fresh hemorrhage. Note the geographic distribution. This patient had intraarterial chemotherapy for hepatic metastases. **C,** Nine months later, follow-up endoscopy shows a well-defined ulcer in the ischemic area.

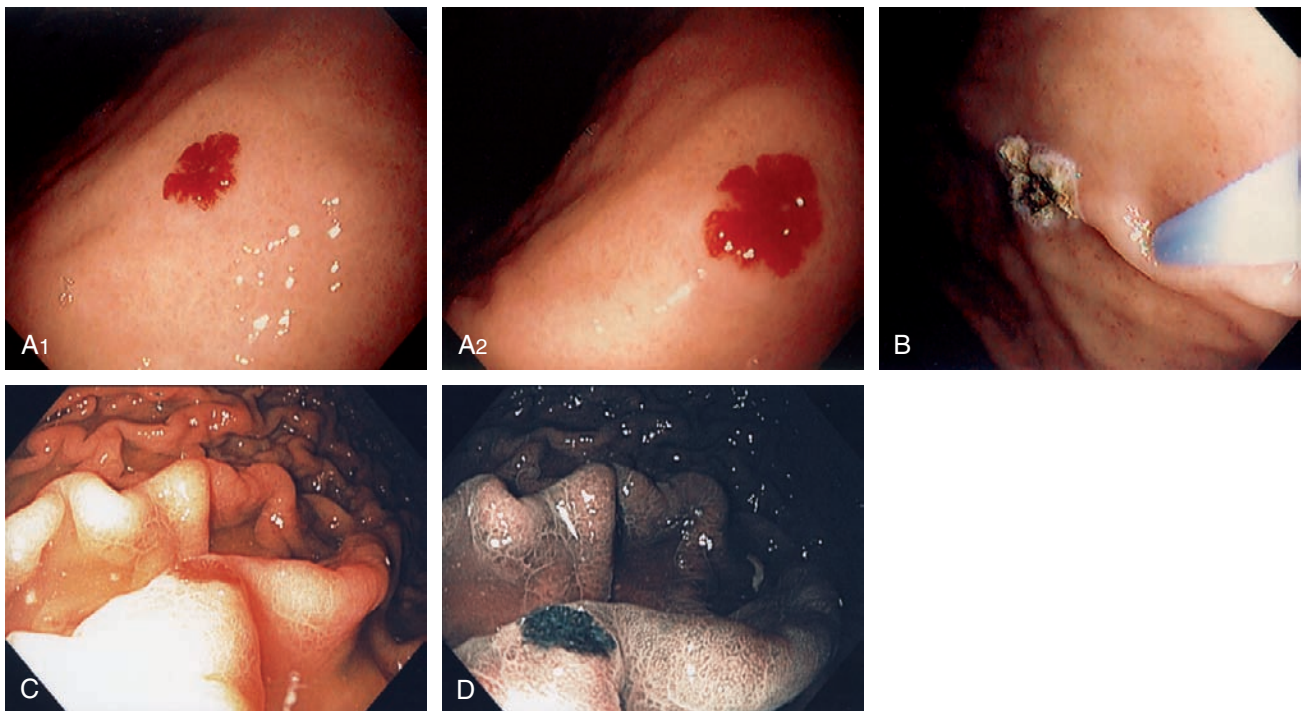


FIGURE 3.90 VASCULAR ECTASIA

A1, A2, Large ectasia in the gastric body with a typical spider-web appearance. **B,** The lesion was ablated with argon plasma coagulation. **C,** Well-circumscribed ectasia in the midgastric body as seen on standard and **(D)** narrow band imaging.



FIGURE 3.91 VASCULAR ECTASIA ASSOCIATED WITH CIRRHOSIS

This ectasia has well-defined blood vessels emanating from the center of the lesion.

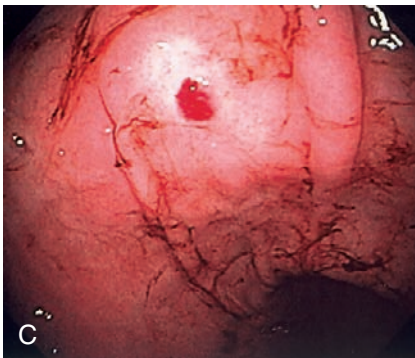
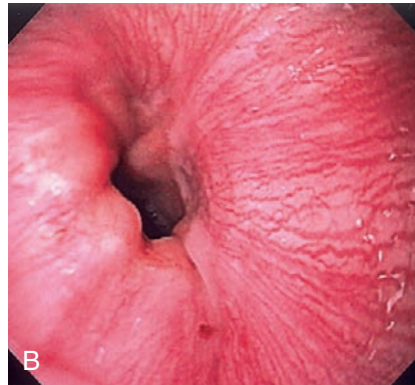


FIGURE 3.92 VASCULAR ECTASIAS OF OSLER-WEBER-RENDU SYNDROME

A, Multiple telangiectasias on the nose and lips. **B**, Pinpoint ectasia at the GE junction. **C**, Large ectasia of the gastric body. **D**, Large ectasia in the duodenal bulb.

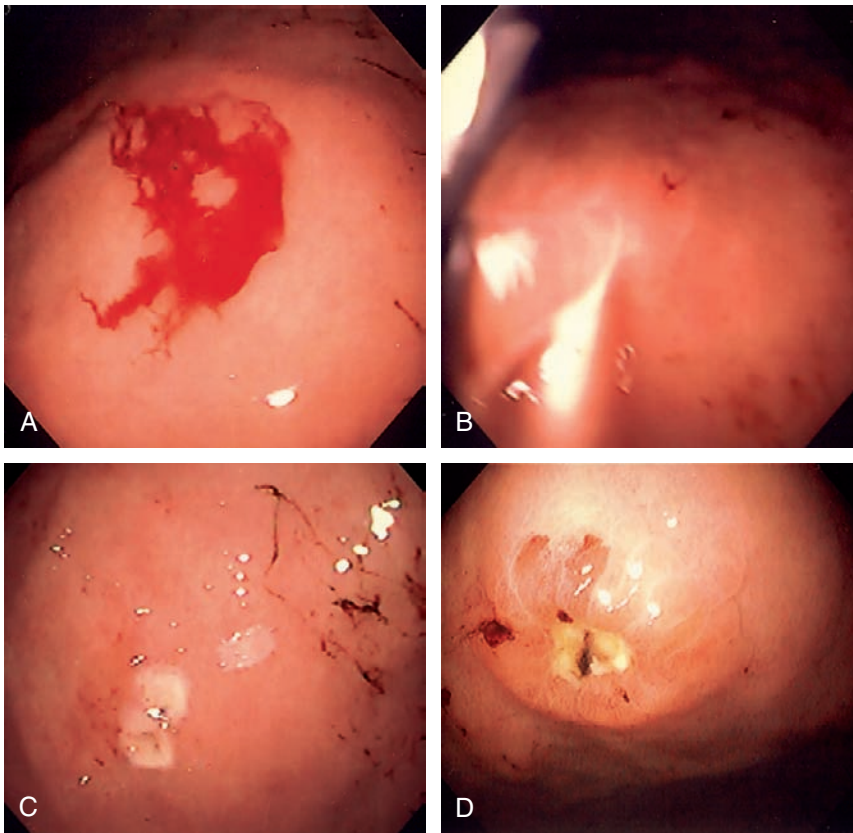


FIGURE 3.93 HEATER PROBE COAGULATION OF BLEEDING VASCULAR ECTASIAS

A, Active bleeding from the gastric body. **B**, With washing, bleeding is seen to emanate from a pinpoint area consistent with a vascular ectasia. **C**, The thermal probe is applied to the lesion, resulting in a white eschar and hemostasis. **D**, Follow-up endoscopy 3 days later shows the ectasia is ablated and a small ulcer has been iatrogenically created.

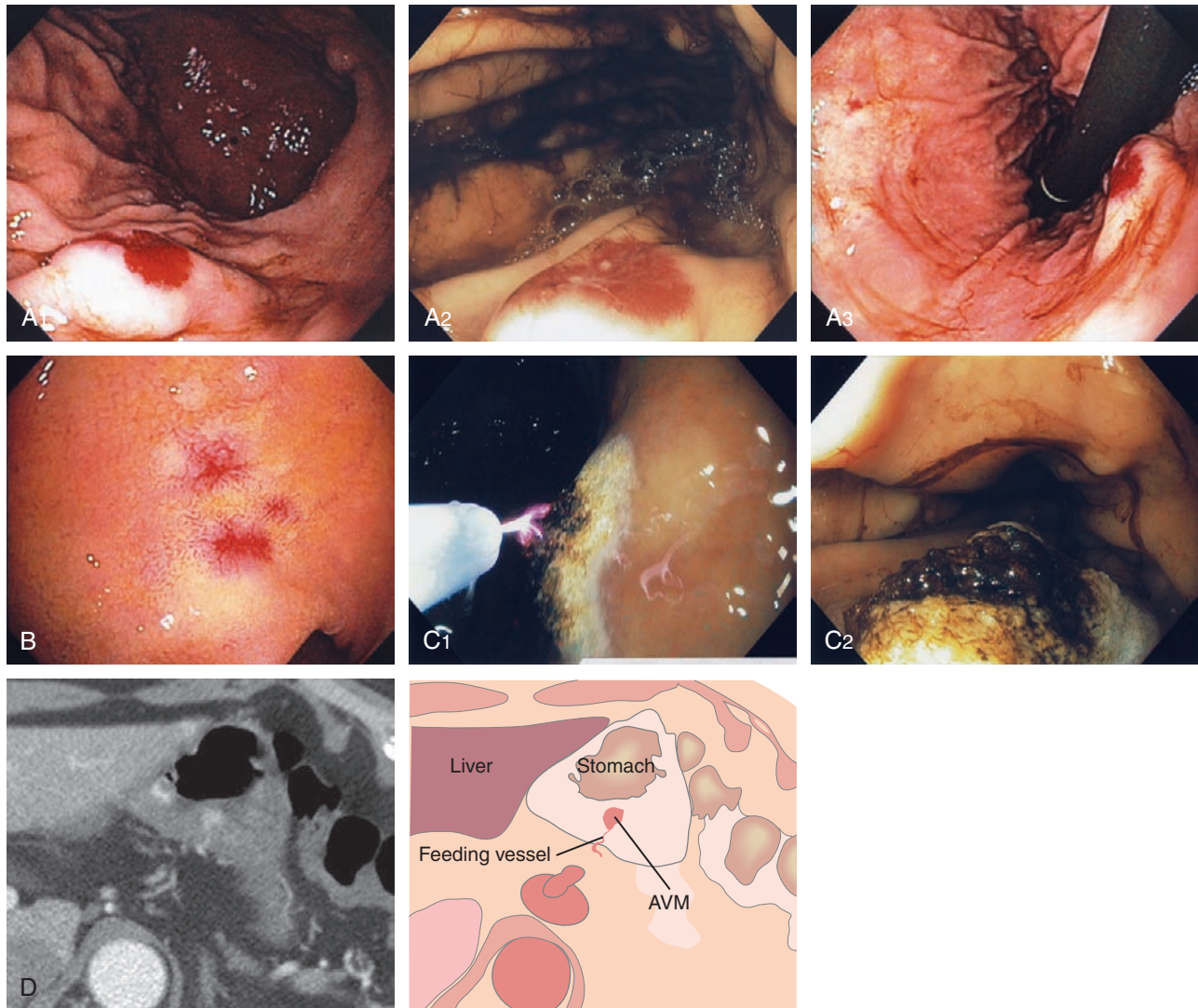


FIGURE 3.94 ARTERIAL VENOUS MALFORMATION

A1, Large, raised structure with central area of apparent fresh bleeding in the midgastric body. After washing, the raised lesion has a typical vascular ectasia appearance on its surface with an ulcer (**A2**). **A3**, The lesion is also well shown on retroflexion. **B**, Several other ectasias are also shown in the duodenum. **C1**, **C2**, The ERBE laser is used to ablate the lesion, resulting in eschar. **D**, Computed tomography scanning with contrast shows a large arterial venous (AV) malformation (AVM) in the body of the stomach.

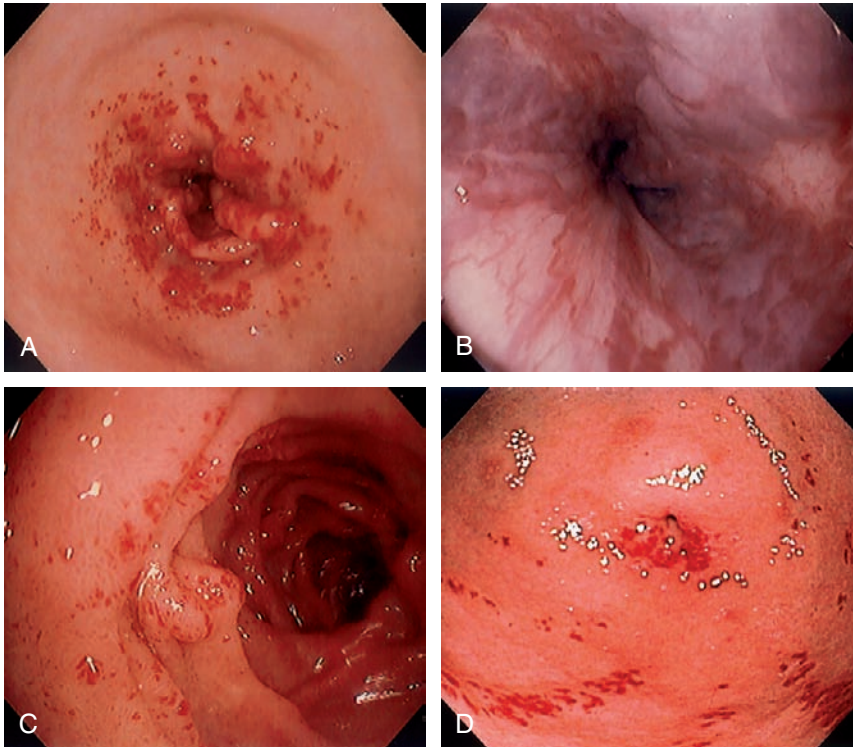


FIGURE 3.95 GASTRIC ANTRAL VASCULAR ECTASIA (GAVE) SYNDROME ASSOCIATED WITH PORTAL HYPERTENSION
A, Multiple ectasias in the antrum in a patient with small esophageal varices (**B**).
C, Multiple similar-appearing lesions were present in the second duodenum.
D, Cluster of ectasias surrounds the pylorus, and scattered lesions are seen in the antrum. This patient had small esophageal varices.

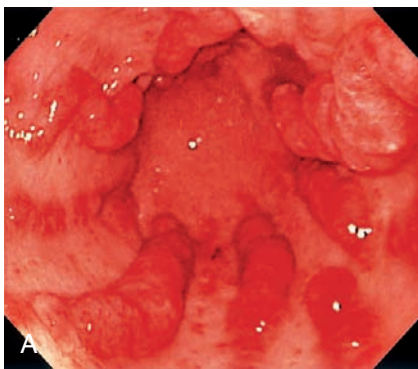
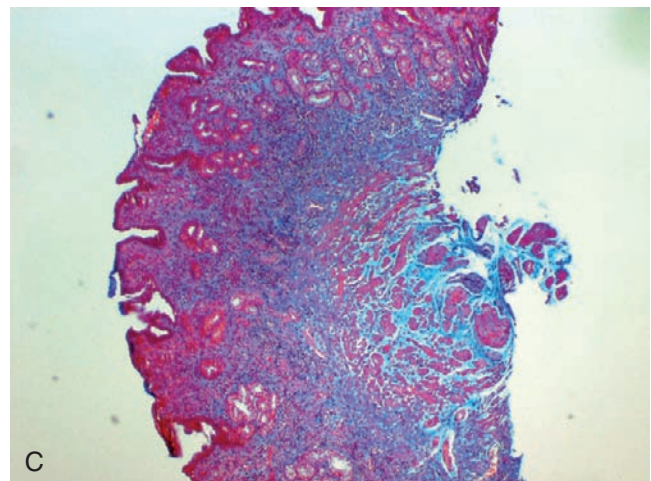
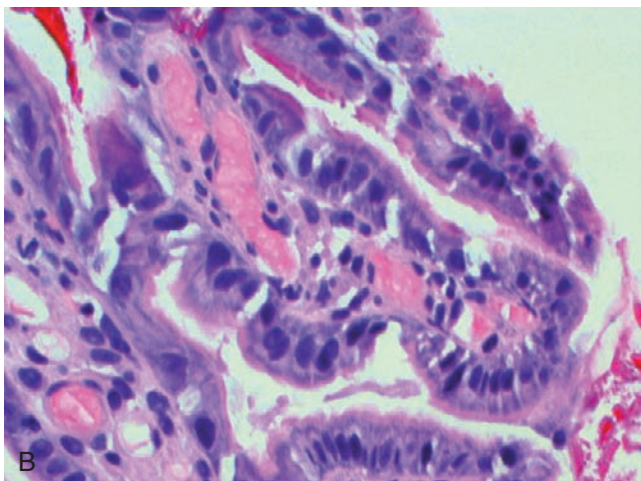


FIGURE 3.96 GASTRIC ANTRAL VASCULAR ECTASIA (GAVE) SYNDROME (WATERMELON STOMACH)

A, Multiple red stripes with a nodular appearance emanate from the antrum. **B**, Multiple dilated capillaries in the submucosa and epithelium. **C**, Fibroproliferation, highlighted by trichrome stain, is characteristic of GAVE.



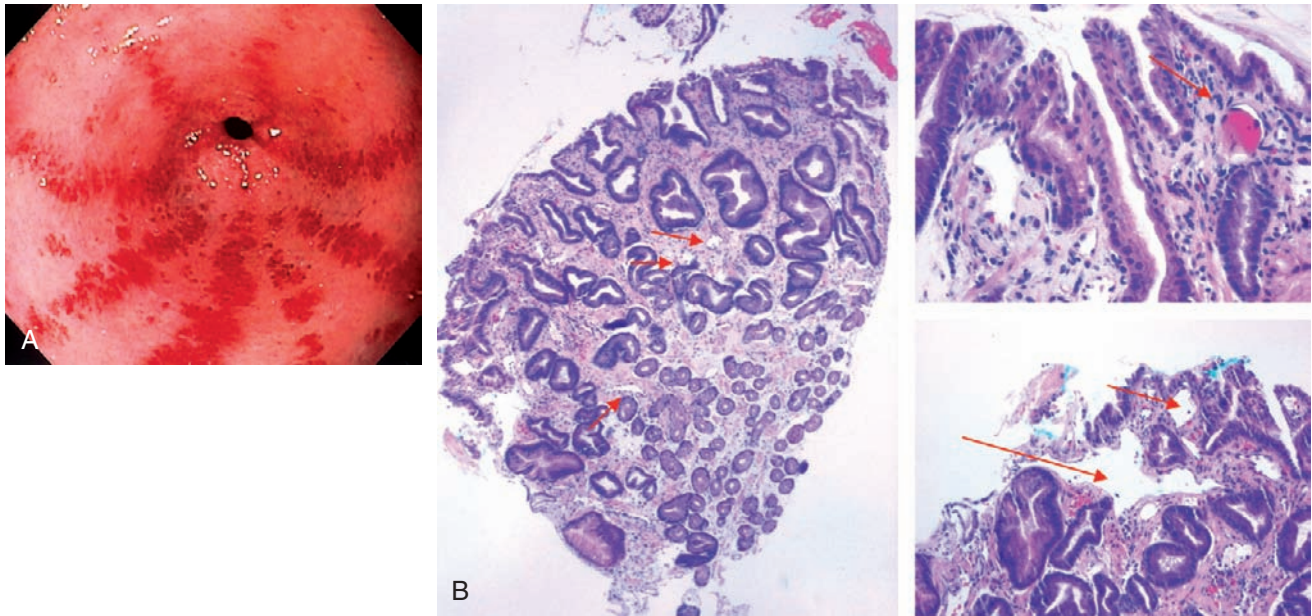


FIGURE 3.97 GASTRIC ANTRAL VASCULAR ECTASIA (GAVE) SYNDROME (WATERMELON STOMACH)

A, Multiple red hemorrhagic stripes emanating from the pylorus. **B**, Dilated capillaries (*arrow*) and a fibrin thrombus are present.

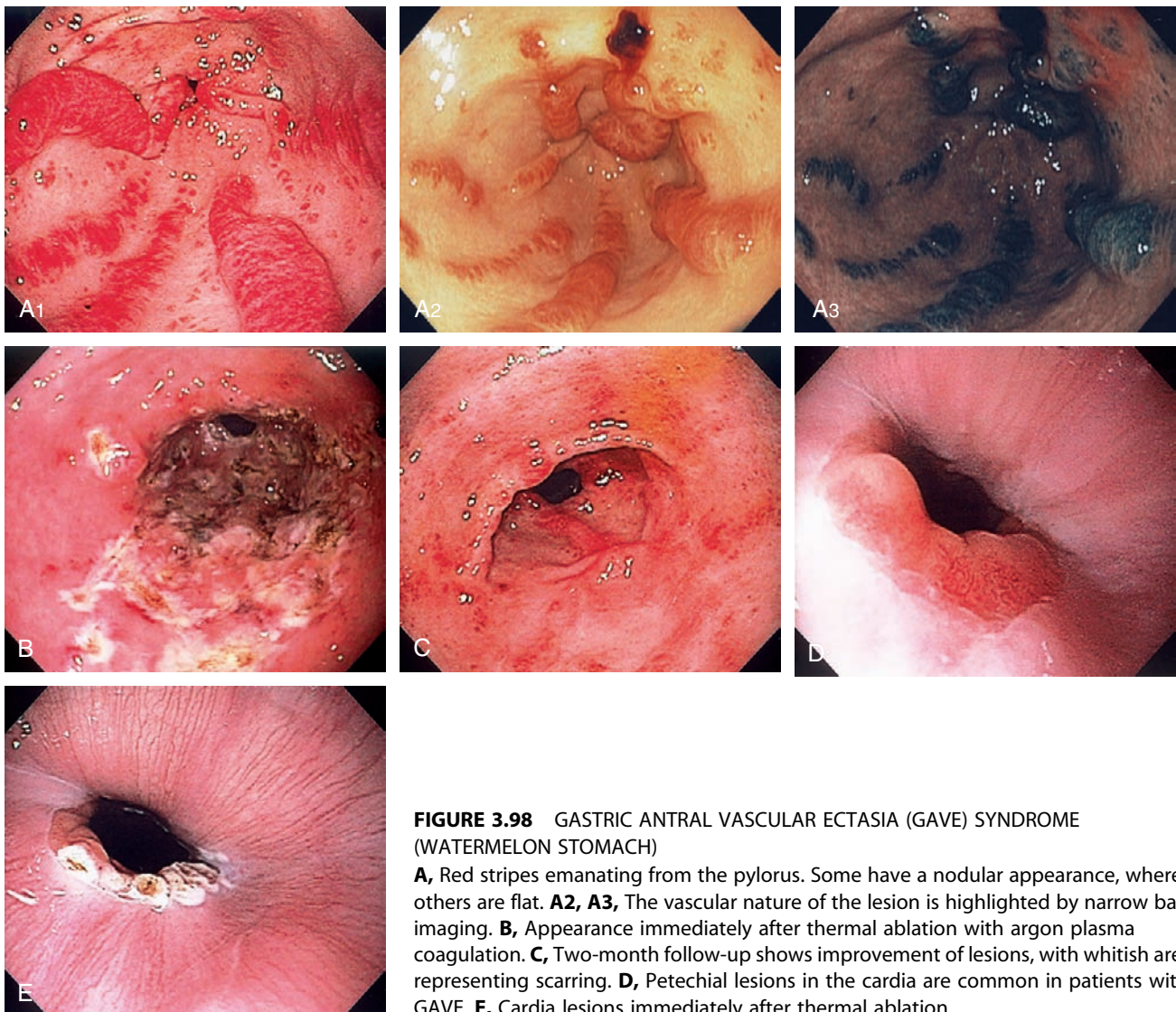


FIGURE 3.98 GASTRIC ANTRAL VASCULAR ECTASIA (GAVE) SYNDROME (WATERMELON STOMACH)

A, Red stripes emanating from the pylorus. Some have a nodular appearance, whereas others are flat. **A2**, **A3**, The vascular nature of the lesion is highlighted by narrow band imaging. **B**, Appearance immediately after thermal ablation with argon plasma coagulation. **C**, Two-month follow-up shows improvement of lesions, with whitish areas representing scarring. **D**, Petechial lesions in the cardia are common in patients with GAVE. **E**, Cardia lesions immediately after thermal ablation.

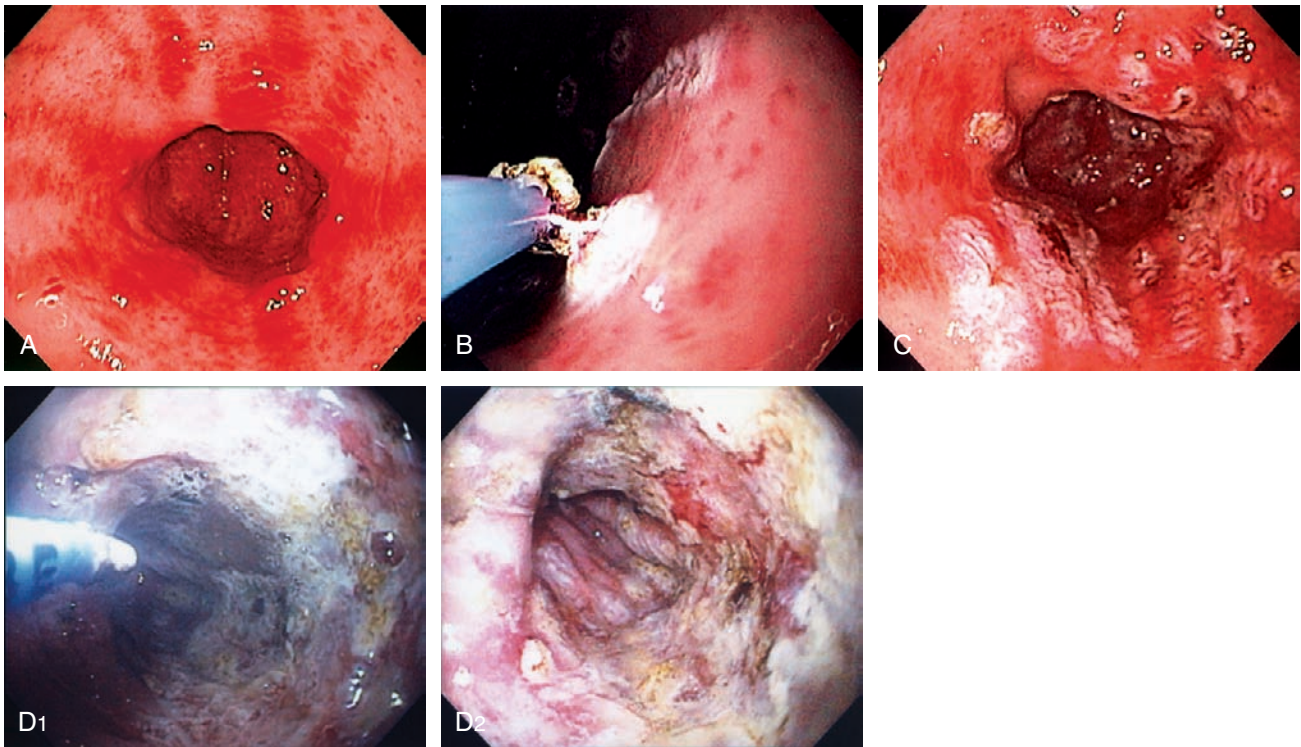


FIGURE 3.99 GASTRIC ANTRAL VASCULAR ECTASIA (GAVE) SYNDROME (WATERMELON STOMACH)

A, More diffuse involvement of the antrum; although more proximally, the lesions do retain a watermelon appearance. Such an appearance is often attributed inappropriately to gastritis. **B**, Laser ablation performed. **C**, Partial ablation. **D1, D2**, Complete ablation of the antrum.

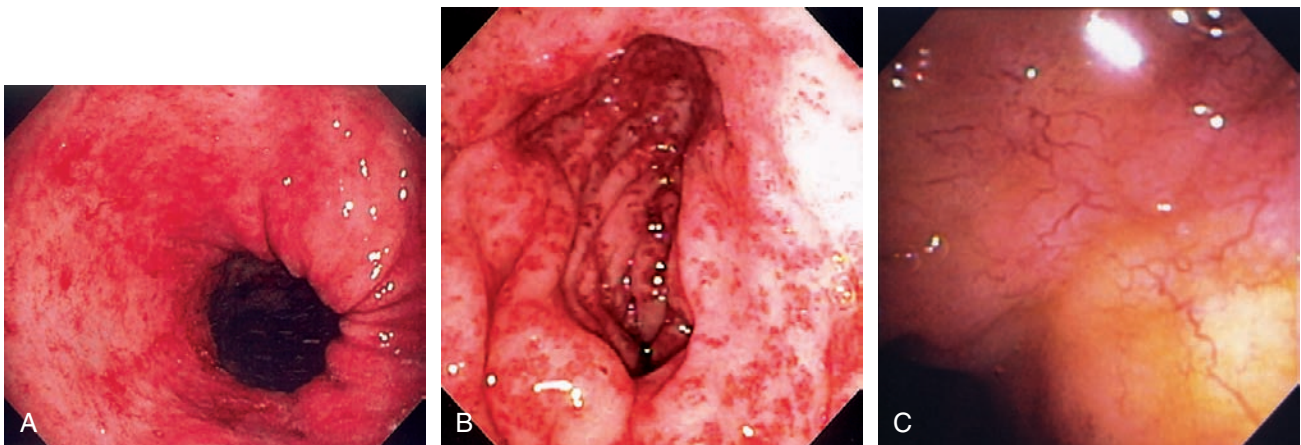


FIGURE 3.100 RADIATION-INDUCED VASCULAR ECTASIAS

A, Multiple ectasias in the proximal stomach. This patient had radiation therapy after resection for gastric adenocarcinoma of the cardia. **B**, Marked edema with diffuse vascular ectasias of the gastric antrum after radiation therapy for pancreatic cancer. **C**, Multiple delicate blood vessels posteriorly in the antrum.

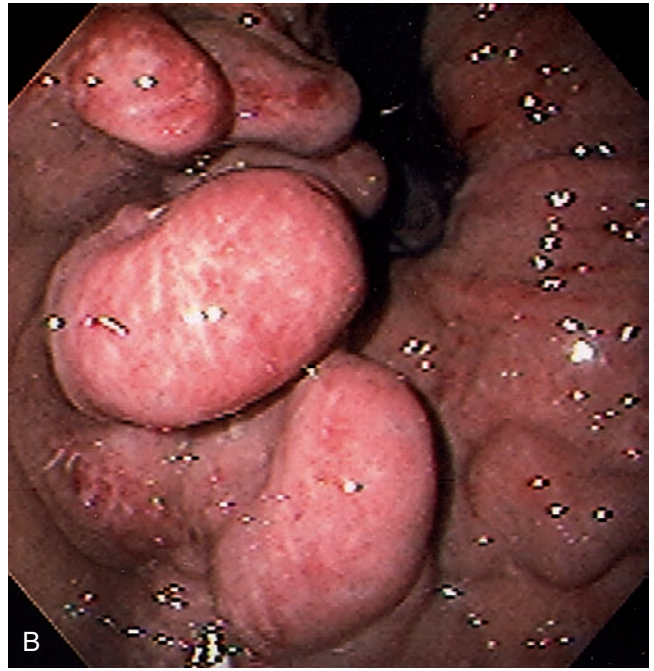


FIGURE 3.101 GASTRIC VARICES

A, Irregularly shaped, masslike lesion in the gastric fundus.

B, C, Retroflex view of the fundus demonstrates dilated veins with a "sack of grapes," representing a cluster of gastric varices.

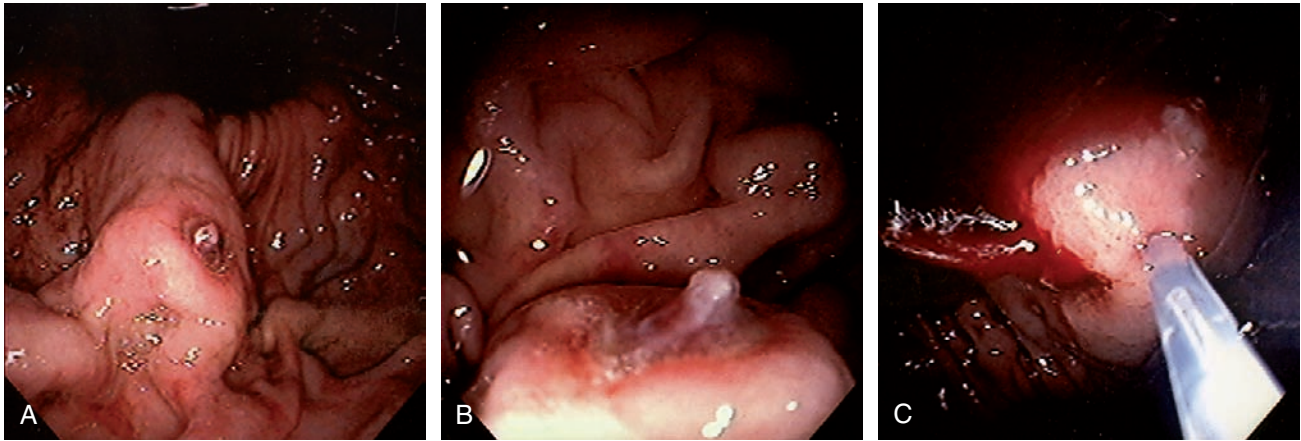


FIGURE 3.102 GASTRIC VARIX

A, Large gastric varix with mucosal defect representing recent bleeding. **B**, Close-up of the mucosal defect shows ulceration with a visible vessel. **C**, Variceal sclerotherapy was performed for spontaneous bleeding.

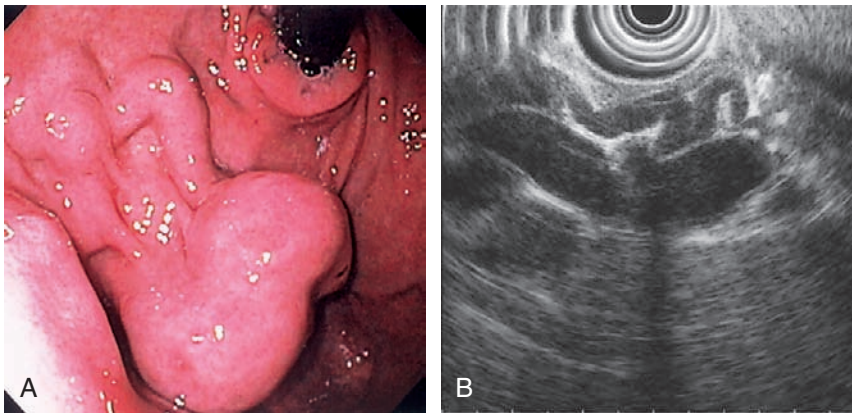


FIGURE 3.103 GASTRIC VARIX

A, Typical-appearing cluster of fundal varices. **B**, Endoscopic ultrasonography shows the small varices feeding into the larger varix.

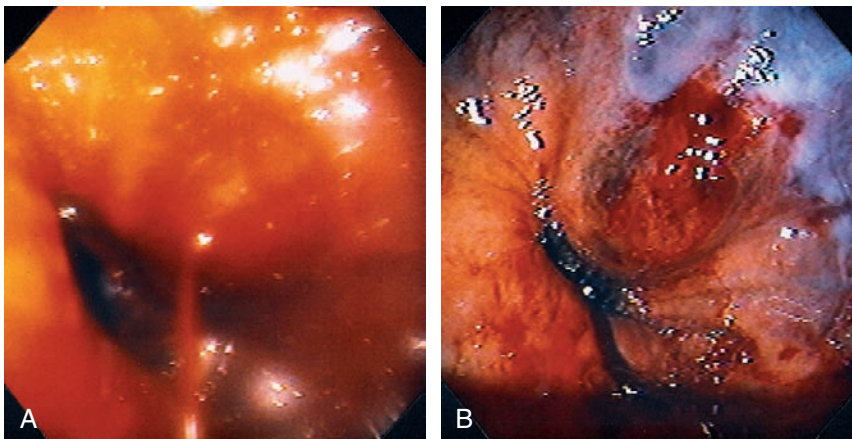


FIGURE 3.104 BLEEDING GASTRIC VARIX

A, Bleeding varix just distal to the gastroesophageal junction. **B**, After injection sclerotherapy and cessation of bleeding, the varix has a dark discoloration. The bleeding point is clearly below the gastroesophageal junction.

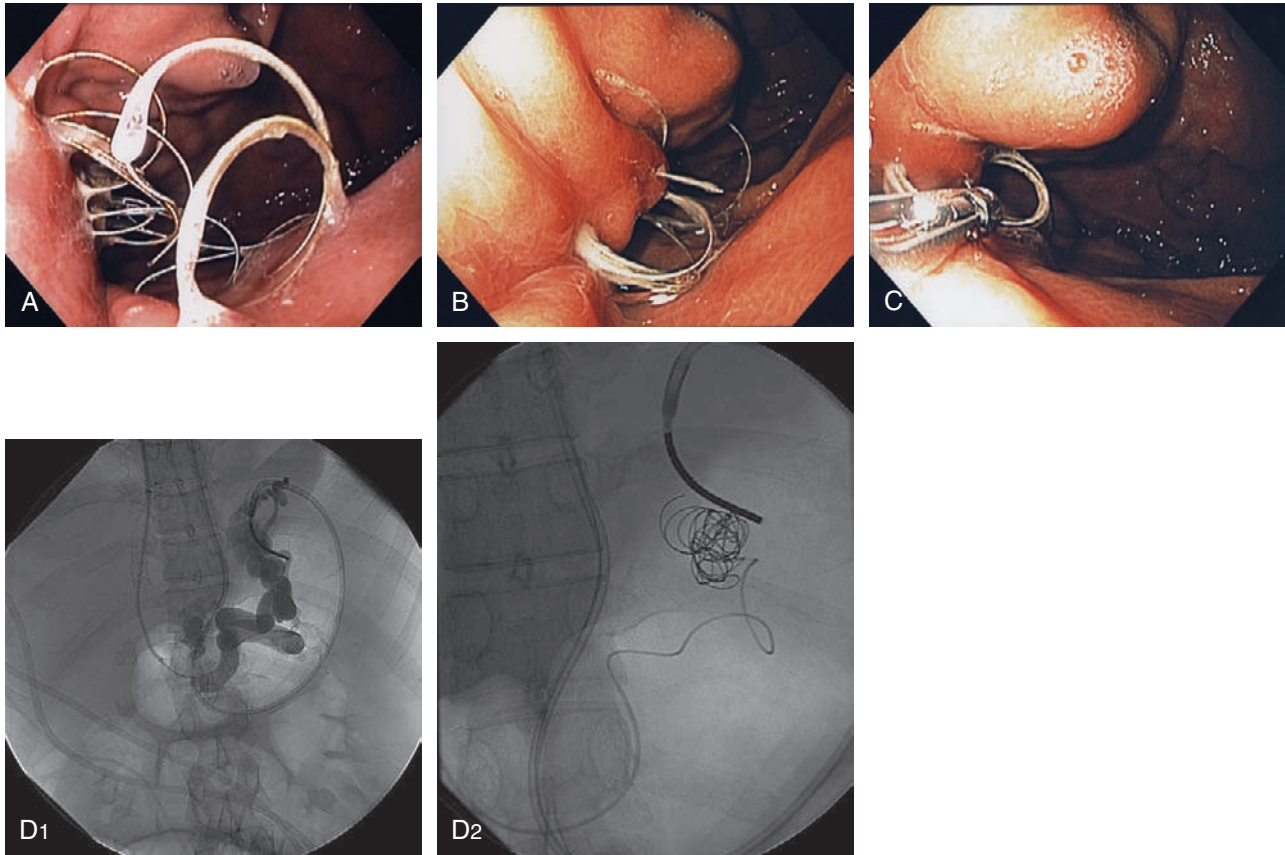


FIGURE 3.105 PRIOR GASTRIC VARICEAL EMBOLIZATION

A, B, The coil material is now emanating from the prior gastric ulcer in the proximal stomach. **C,** Forceps are used to grasp the material, but it could not be removed. **D1,** Appearance of the embolized vessel at the time of the initial procedure 2 years earlier. Note the presence of large gastric varices and a transjugular intrahepatic portosystemic shunt (TIPS). Multiple coils were placed (**D2**).

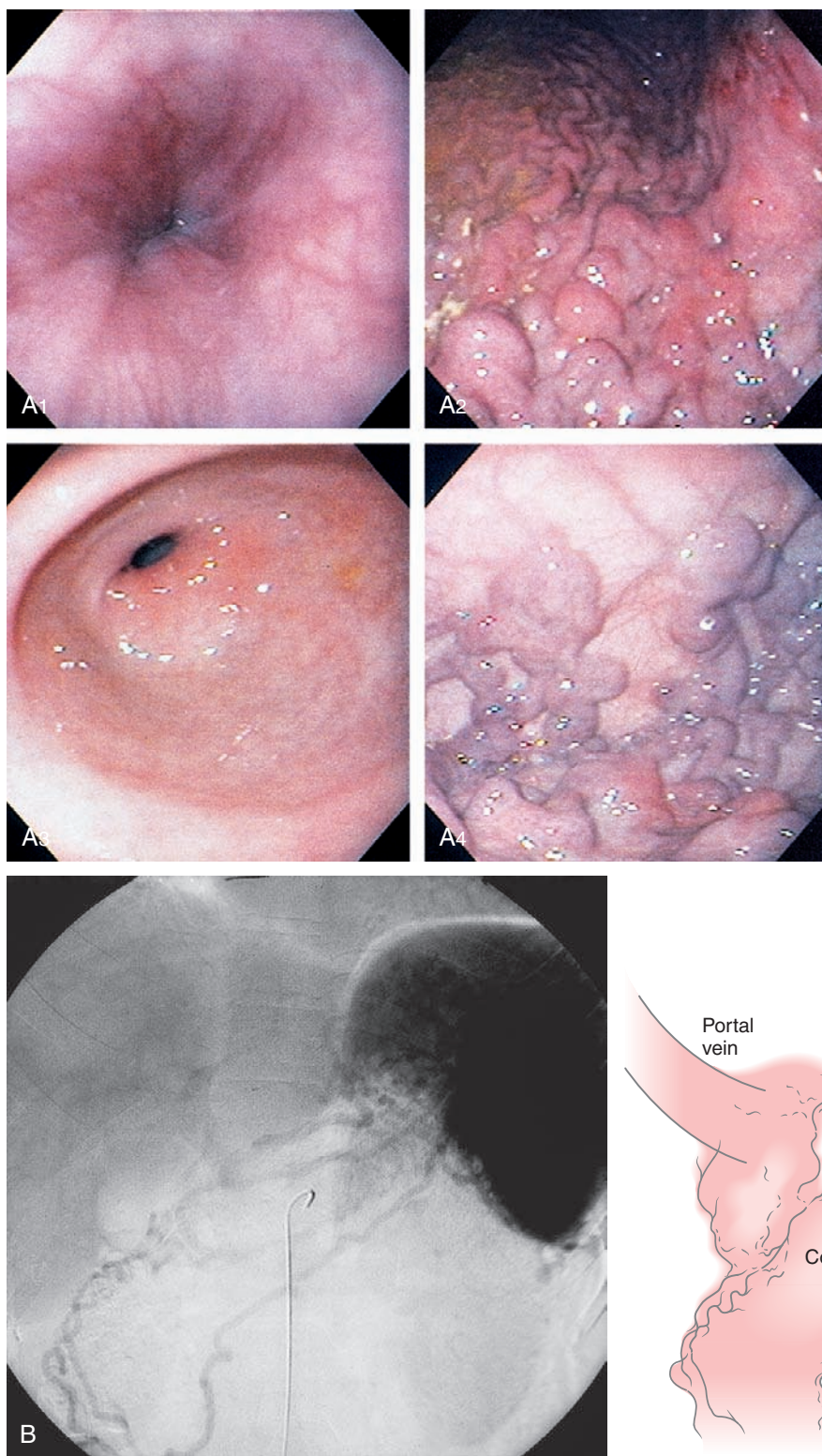


FIGURE 3.106 GASTRIC VARICES AND SPLENIC VEIN THROMBOSIS
A, The distal esophagus is normal (**A1**). The rugae of the gastric body are prominent, as a result of dilated veins (**A2**). The gastric antrum is normal (**A3**). Retroflex view of the fundus demonstrates clusters of dilated veins (**A4**).
B, Drawing of the venous phase of the abdominal angiogram shows dilated veins (varices), as well as collaterals in the proximal stomach. Portal vein flow is barely visible, given the collateral flow. The splenic vein is not seen.

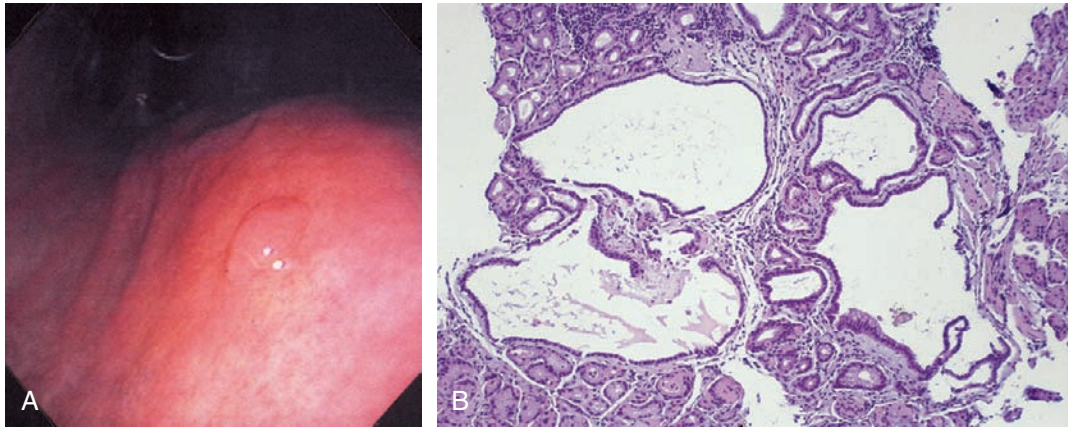


FIGURE 3.107 FUNDIC GLAND POLYP

A, Small polyp in the proximal stomach. **B**, Multiple irregular glands with dilated lumen, forming cystic structures.

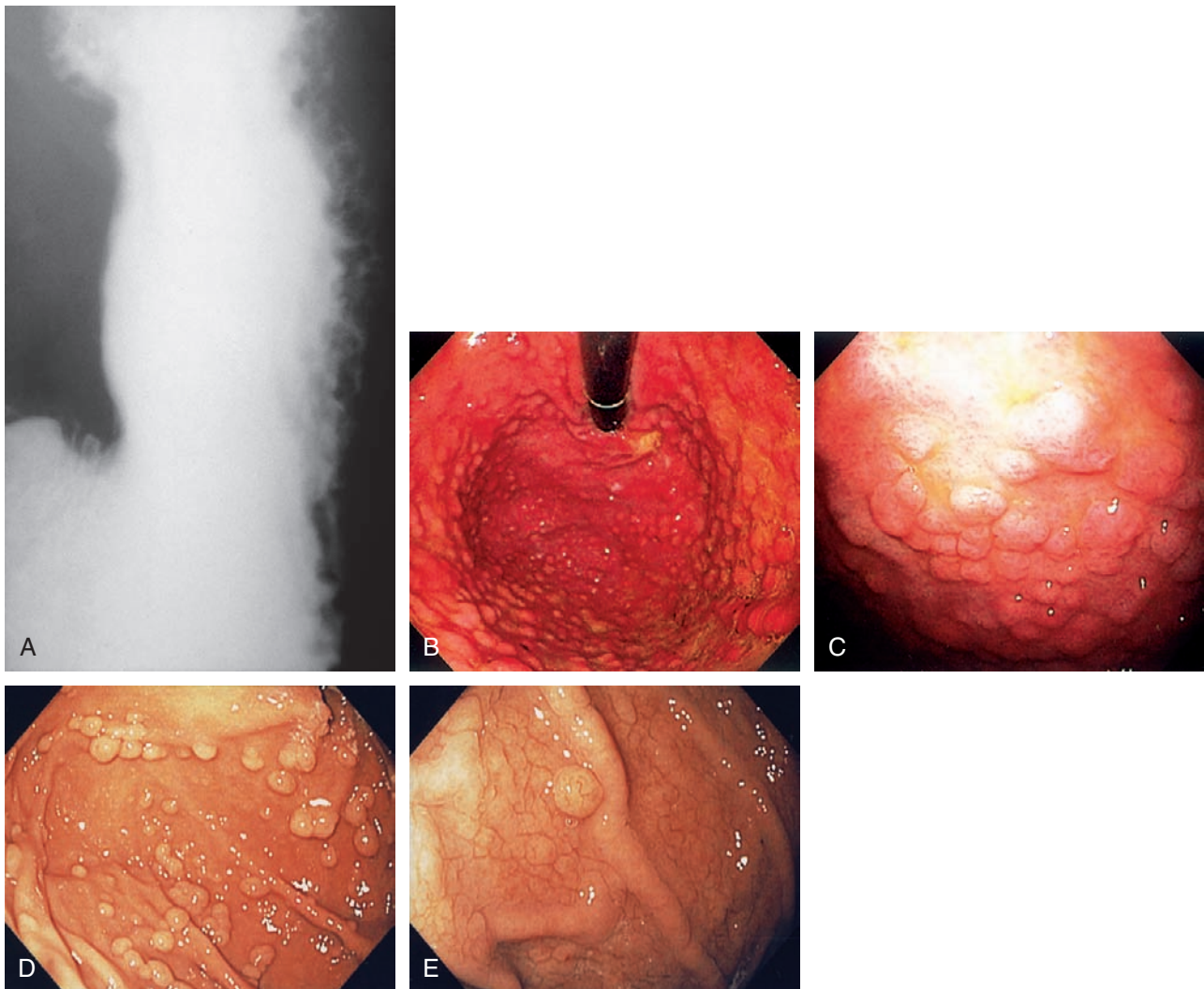


FIGURE 3.108 FUNDIC GLAND POLYPS IN FAMILIAL ADENOMATOUS POLYPOSIS SYNDROME

A, Multiple polyps produce filling defects. **B**, Multiple small polyps of similar appearance studding the proximal stomach. **C**, Close-up shows the appearance of the polyps. **D**, Multiple well-circumscribed polyps typical for fundic gland lesions. Note the smooth appearance and subtle vascular pattern (**E**).

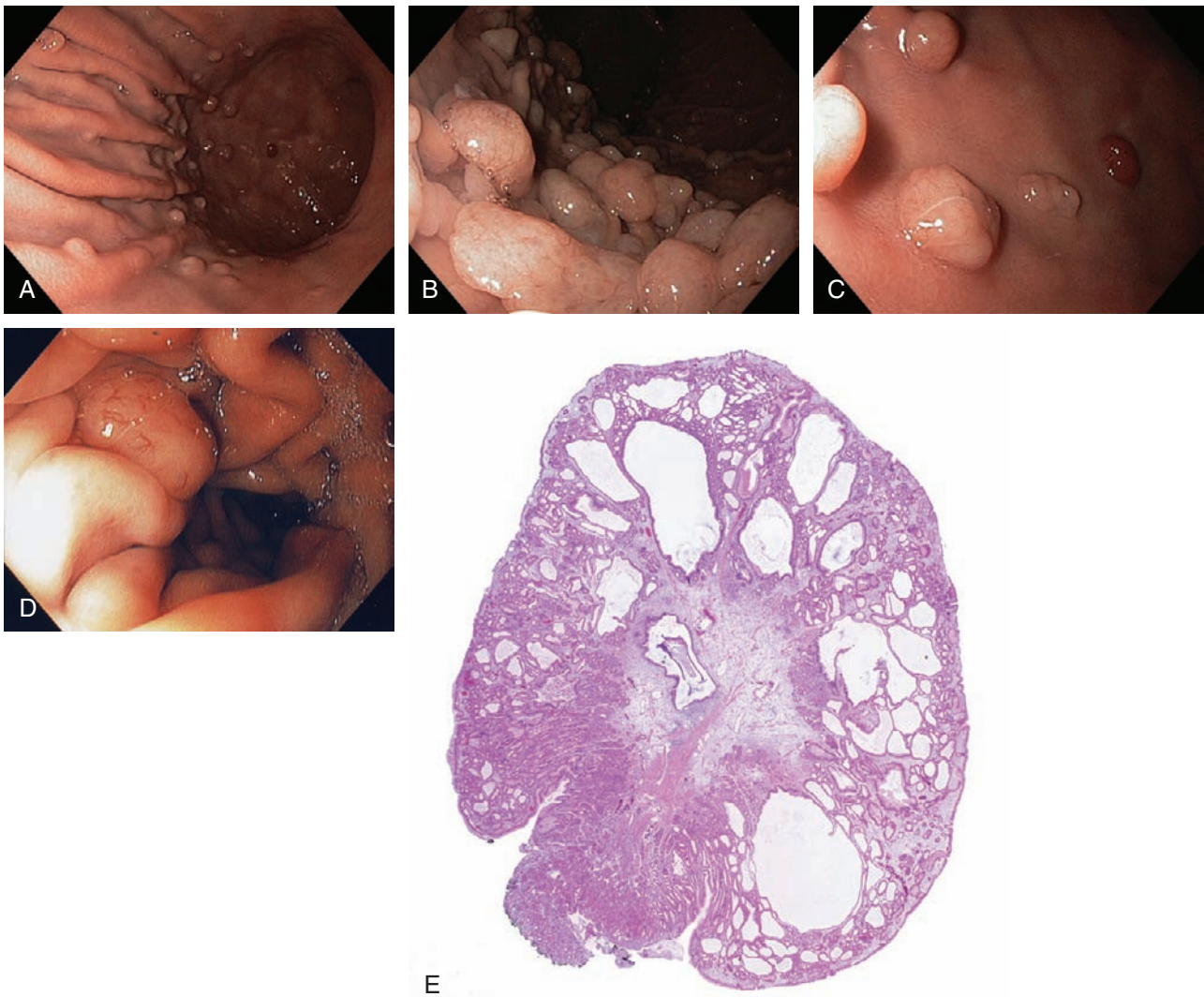


FIGURE 3.109 FUNDIC GLAND POLYPS

A, Multiple polyps in the gastric body. **B**, Close-up of the polyps demonstrates a “fleshy” appearance. **C**, More numerous polyps with similar appearance. **D**, Solitary polyp of modest size with subtle vascular pattern and smooth rather than fleshy overlying mucosa. **E**, Complete resection shows the characteristic findings with the numerous areas of cystic dilation.

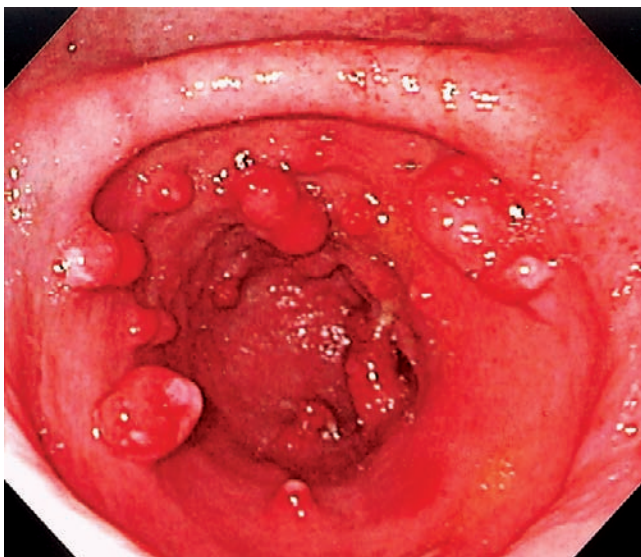


FIGURE 3.110 HYPERPLASTIC POLYPS

Multiple small polyps of the gastric antrum. Note that a number of the lesions have overlying exudate.

Differential Diagnosis

Hyperplastic Polyp (Figure 3.110)

- Inflammatory polyp
- Fundic gland polyp
- Adenomatous polyp

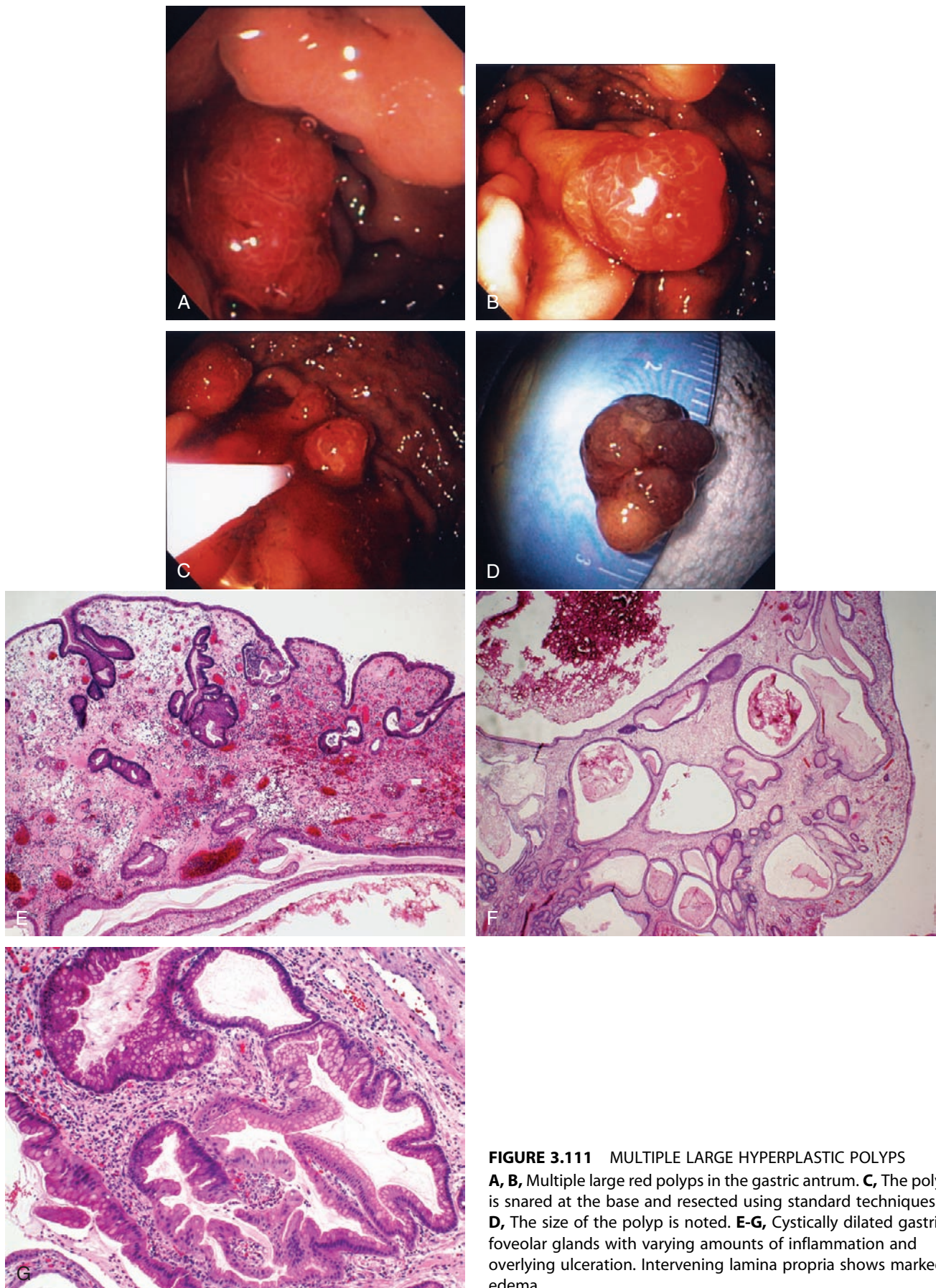


FIGURE 3.111 MULTIPLE LARGE HYPERPLASTIC POLYPS

A, B, Multiple large red polyps in the gastric antrum. **C,** The polyp is snared at the base and resected using standard techniques. **D,** The size of the polyp is noted. **E-G,** Cystically dilated gastric foveolar glands with varying amounts of inflammation and overlying ulceration. Intervening lamina propria shows marked edema.

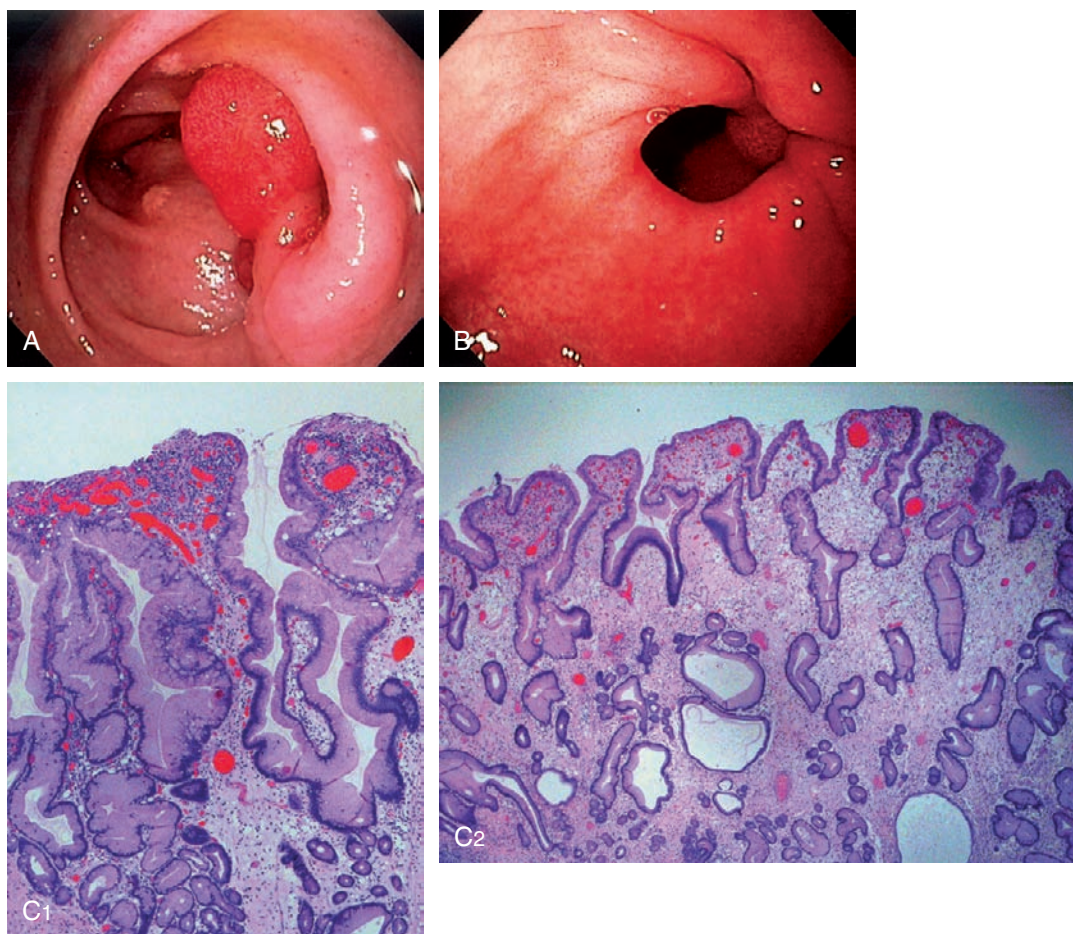
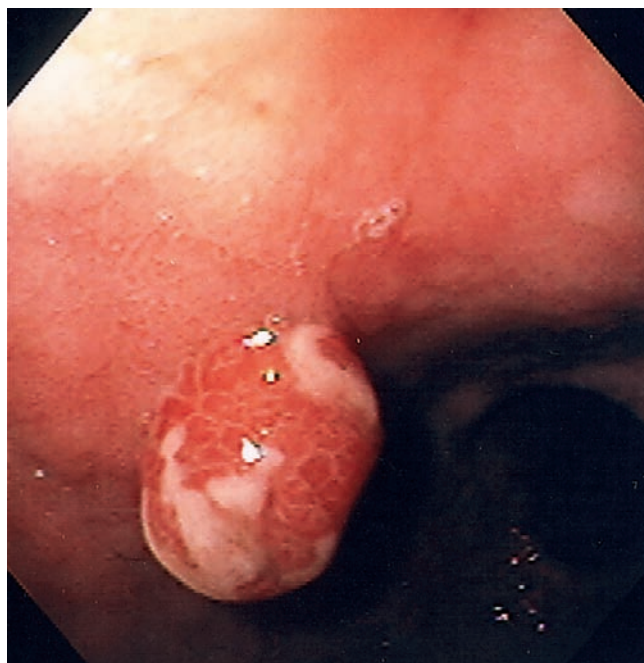
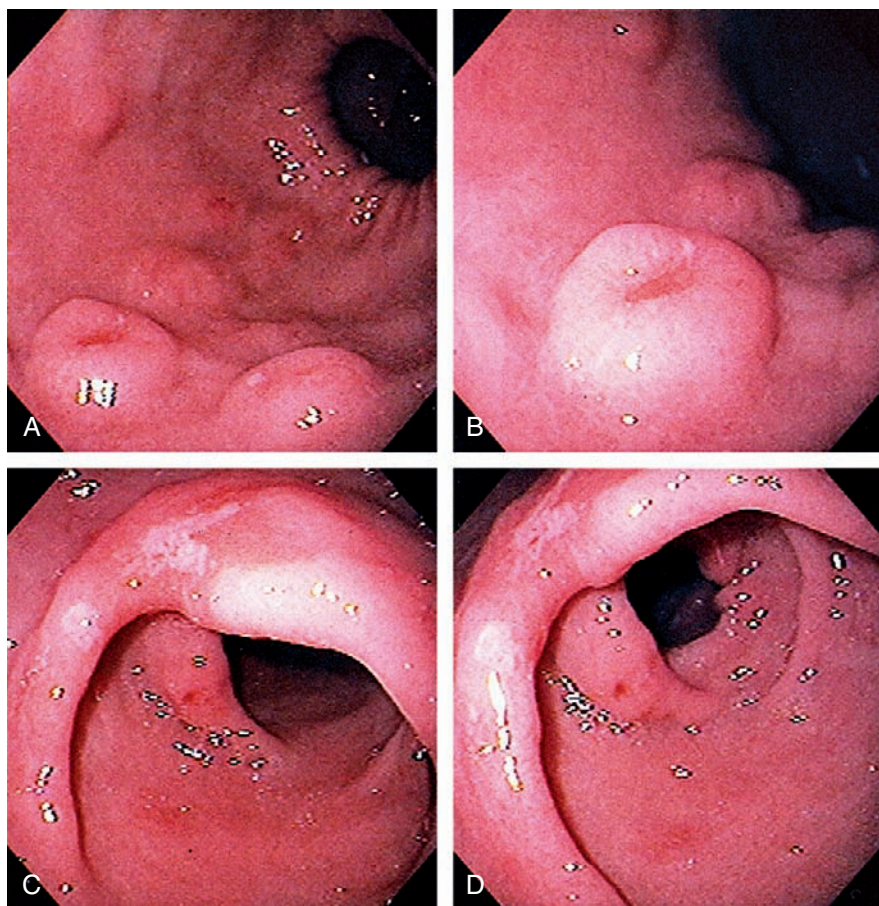


FIGURE 3.112 HYPERPLASTIC POLYP

A, Solitary pedunculated polyp in the peripyloric area. **B**, The polyp was seen to prolapse in and out of the pylorus. **C1**, **C2**, Marked foveolar hyperplasia and edema.

**FIGURE 3.113** HYPERPLASTIC POLYP

Solitary polyp in the distal gastric body anteriorly. Note the reddish discoloration of the polyp with overlying exudate typical for hyperplastic polyps.

**FIGURE 3.114** INFLAMMATORY POLYPS

Multiple nodular lesions with a central depression, resembling a volcano, in the gastric body (A, B). The gastric antrum is noted to be inflamed, with areas of erosion (C, D).

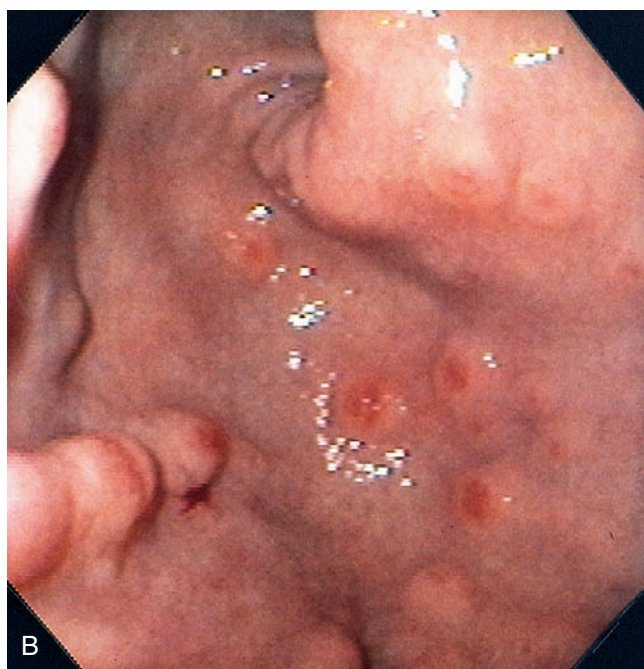
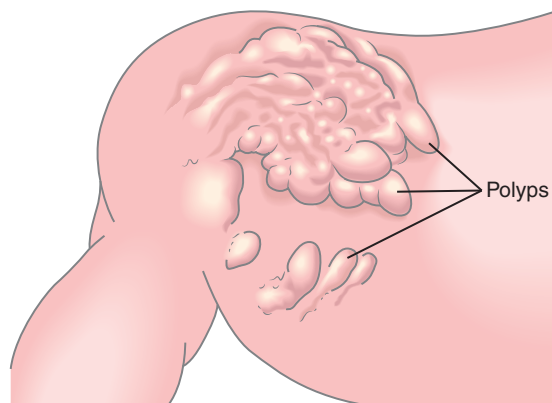
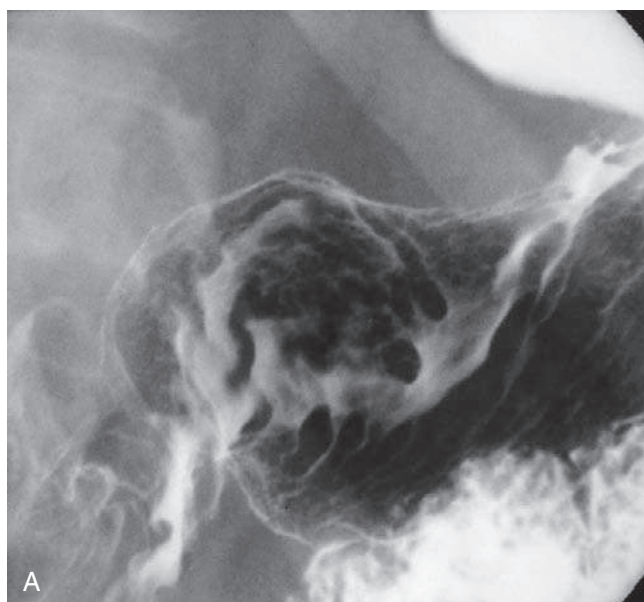


FIGURE 3.115 INFLAMMATORY POLYPS

A, Nodular defects of varying size and shape in the gastric antrum. A small fleck of barium is in the center of some of the lesions. **B**, Small round defects with a central depression in a linear pattern (*left*).



FIGURE 3.116 INFLAMMATORY POLYP

Single filiform lesion in the distal gastric body.

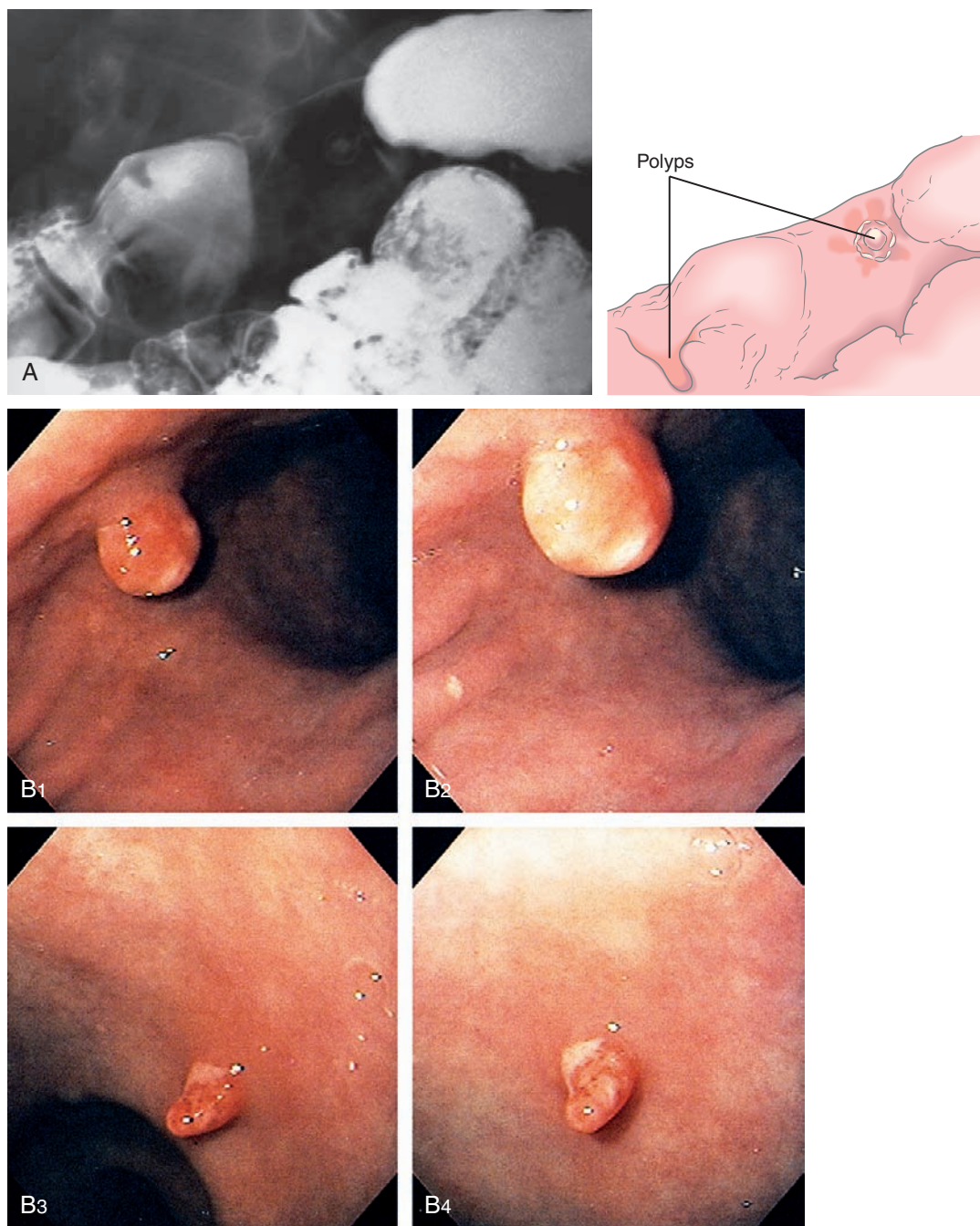


FIGURE 3.117 INFLAMMATORY POLYPS

A, Two defects in the gastric body and antrum: on the right, a round “bowler hat” lesion; on the left, a nipple-like lesion projecting into the lumen and surrounded by barium. **B**, The “bowler hat” lesion is seen to be a round polyp with overlying erosion (**B1**, **B2**). The distal lesion is a finger-like projection of inflammatory tissue, also with an erosion (**B3**, **B4**).

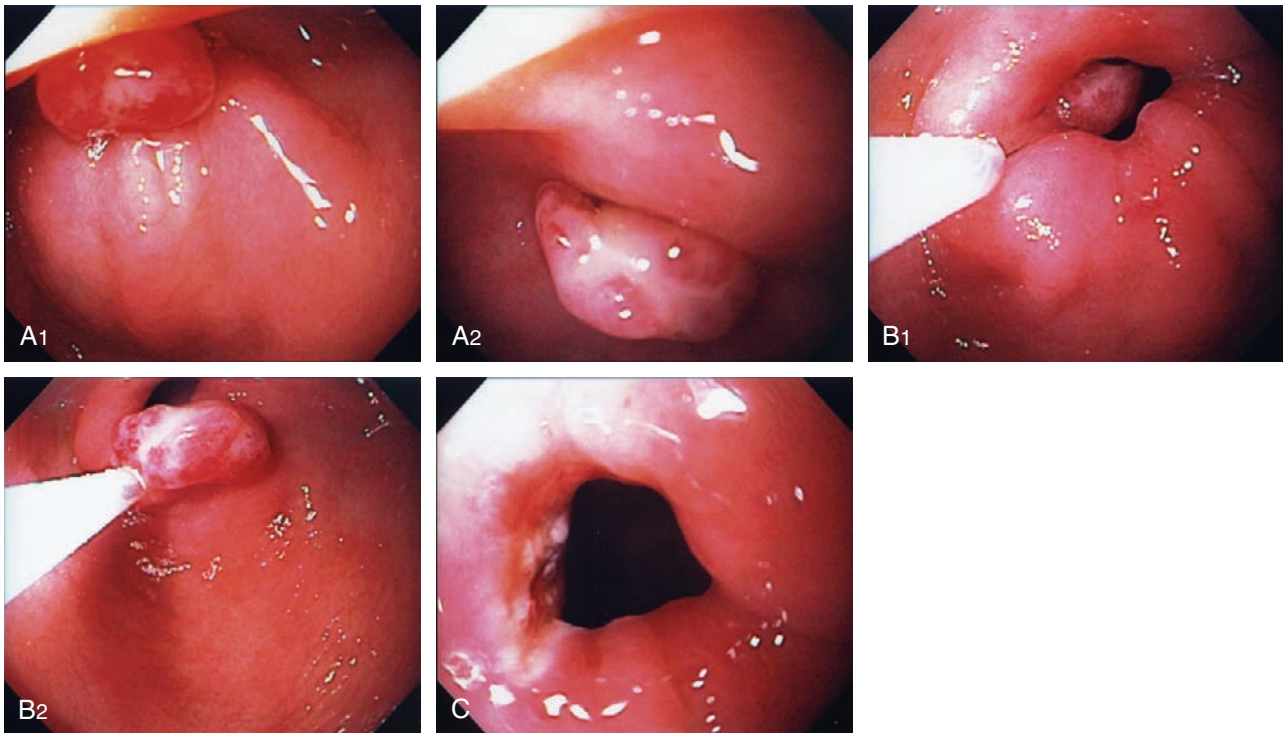


FIGURE 3.118 INFLAMMATORY POLYP

A1, A2, Round polypoid lesion with overlying ulceration at the pylorus. **B1, B2,** The polyp was snared and removed, leaving an eschar in the pyloric canal (**C**).



FIGURE 3.119 CRONKHITE-CANADA SYNDROME

This syndrome is characterized by the tetrad of cutaneous hyperpigmentation, alopecia, onychodystrophy, and intestinal polyps. **A1, A2**, Multiple polyps throughout the stomach, duodenum (**B**), and ileum (**C**). **D**, *Candida* esophagitis accompanies the syndrome. **E**, Hyperpigmentation of the torso with an area of vitiligo. **F**, Alopecia. **G**, Onycholysis of the nails. **H**, A neck brace is worn because of onychodystrophy.

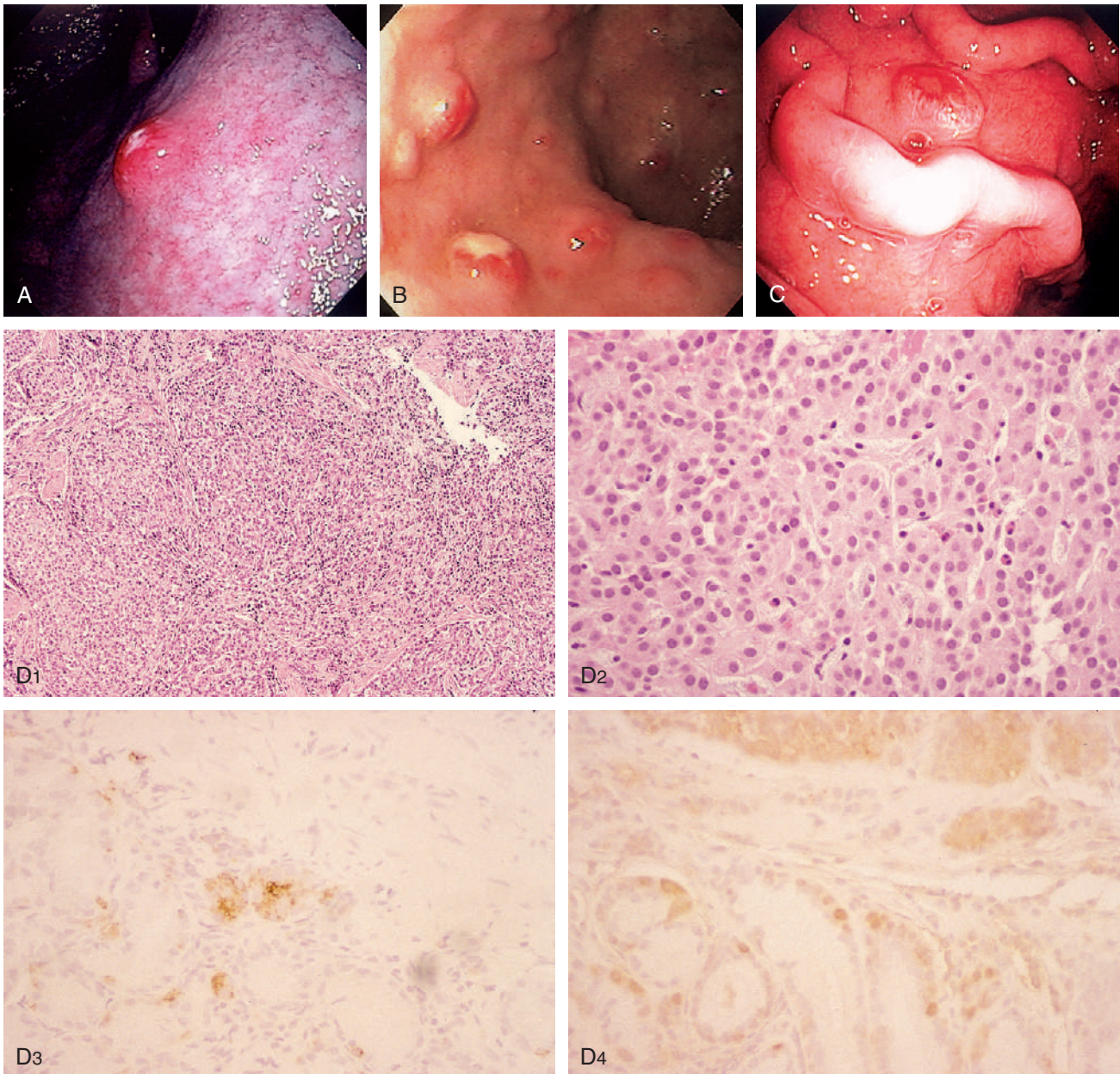


FIGURE 3.120 GASTRIC CARCINOID TUMOR

A, Solitary polyp with central erosion in the proximal stomach as shown on retroflexion. Note the marked gastric atrophy. **B**, Multiple small polyps throughout the gastric body, many with overlying exudate. **C**, Small lesion with erosion in a patient with Zollinger-Ellison syndrome and multiple endocrine neoplasia syndrome type 1. **D1**, **D2**, Small cells that form nests typical for carcinoid tumors. **D3**, Both chromogranin and neuron-specific enolase (NSE) (**D4**) often show positive staining in carcinoid tumors.

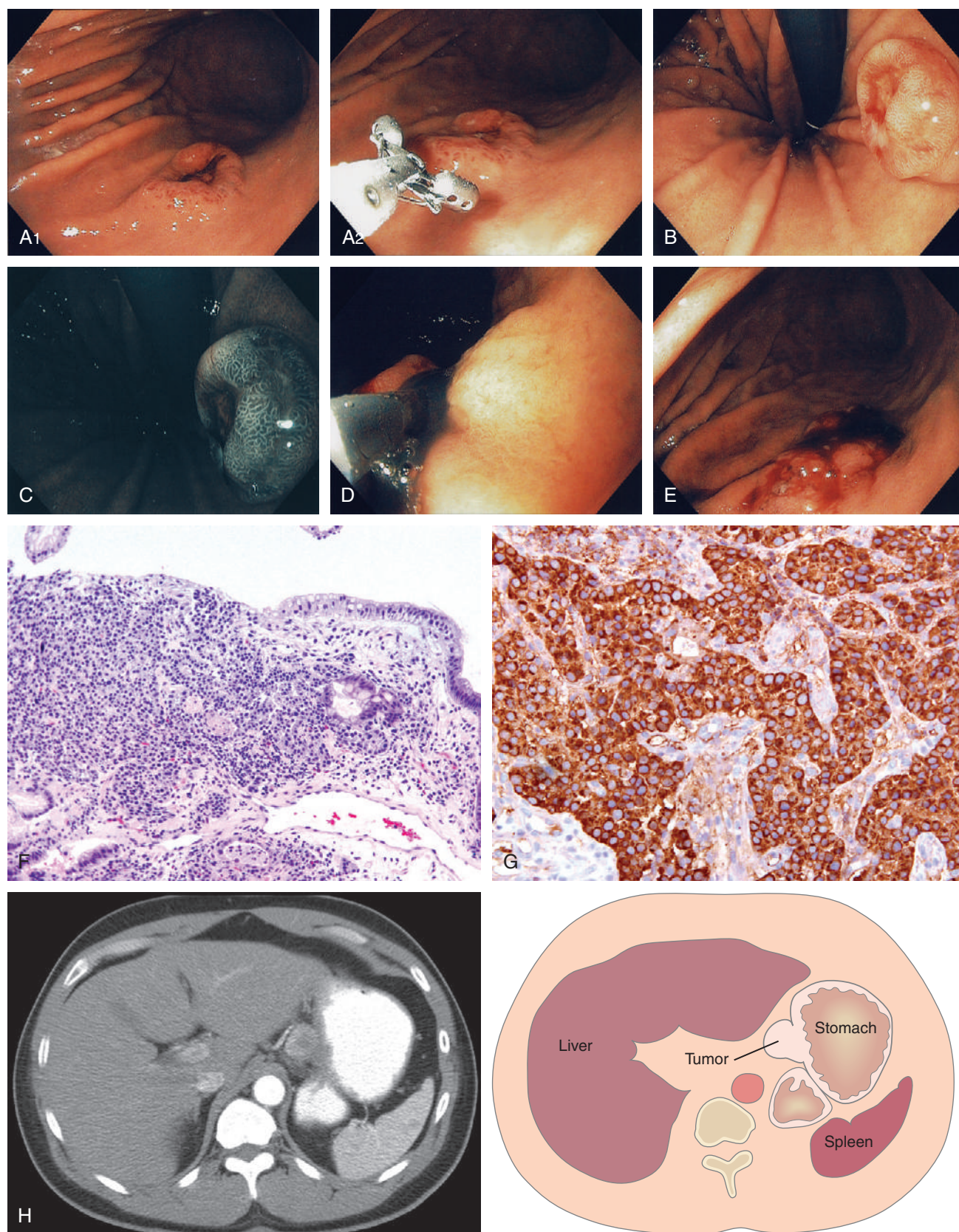


FIGURE 3.121 GASTRIC CARCINOID TUMOR

A1, Well-circumscribed donut-shaped lesion in the midgastric body posteriorly. Fresh heme is on the lesion. **A2**, The size of the lesion is measured using open biopsy forceps. Note the absence of gastric atrophy. The lesion is also well shown on retroflex view (**B**). **C**, The appearance of the lesion on narrow band imaging. The lesion is tattooed with India ink (**D**, **E**). **F**, Nests of small cells infiltrate the gastric mucosa typical for carcinoid tumor. **G**, Positive chromogranin staining of the tumor confirms the neuroendocrine origin. **H**, Well-circumscribed, hyperenhancing lesion in the gastric body corresponding with the tumor.



Differential Diagnosis

Gastric Carcinoid Tumor (Figure 3.121)

Metastatic lesion

Melanoma

Breast

Lung

Primary gastric lymphoma

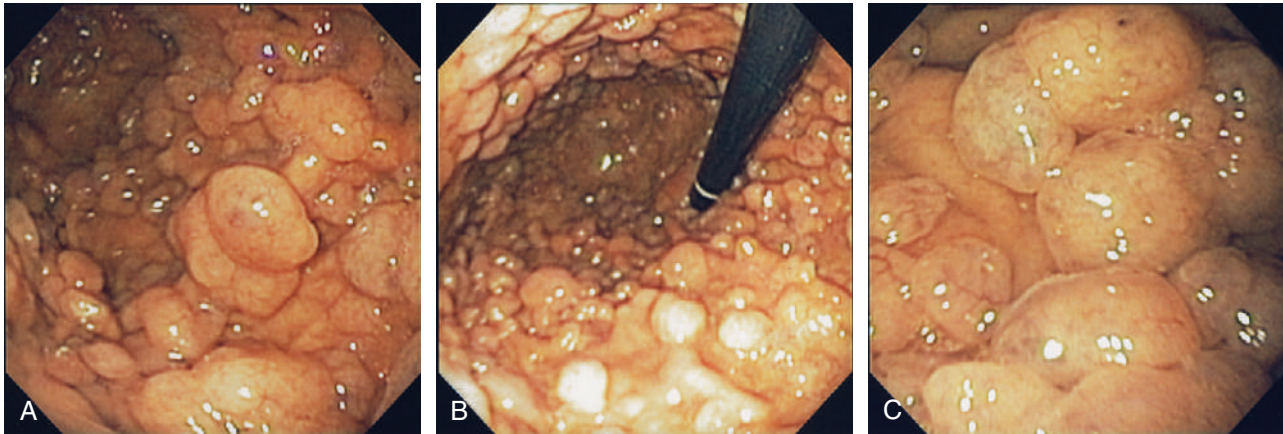


FIGURE 3.122 GARDNER'S SYNDROME

Multiple gastric polyps throughout the gastric body (**A**) and fundus (**B**). Histologically, these polyps are fundic gland polyps. **C**, Note on close-up the fleshy appearance of the polyps typical for fundic gland polyps. (See [Figure 3.109](#).)

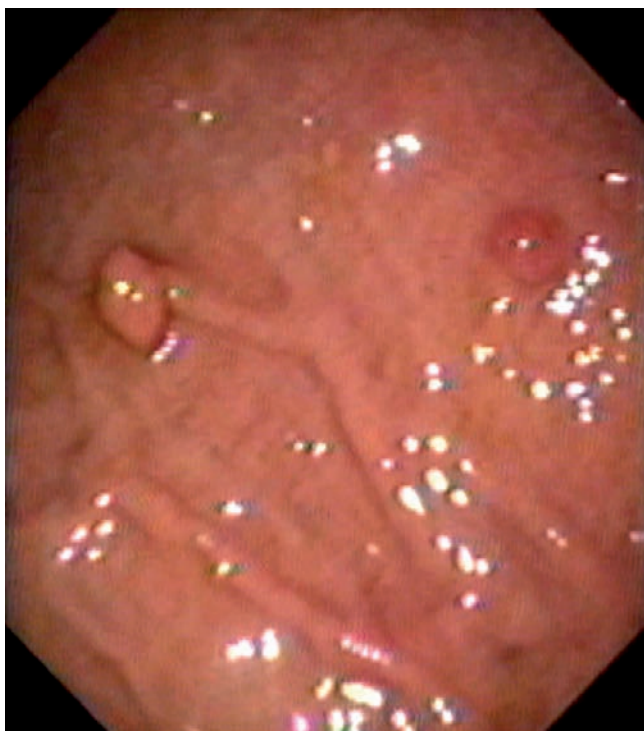


Differential Diagnoses

Gardner's Syndrome (Figure 3.122)

Hamartomatous polyps

Inflammatory polyps

**FIGURE 3.123** COWDEN SYNDROME

Multiple small, benign-appearing gastric polyps. In Cowden syndrome, these polyps are histologically hamartomas.

**FIGURE 3.124** PEUTZ-JEGHERS SYNDROME

Multiple small gastric polyps throughout the gastric body. Histologically, these polyps are hamartomas.

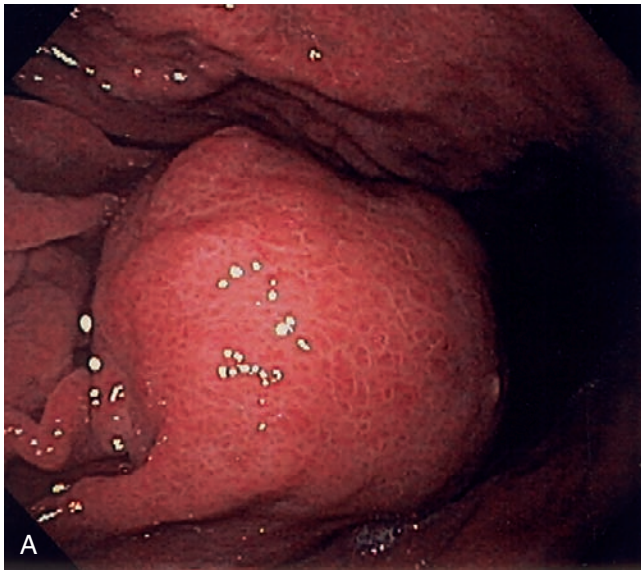


FIGURE 3.125 LEIOMYOMA

A, Large submucosal mass lesion in the gastric body.
B, Endoscopic ultrasonography (EUS) shows the lesion arises from the muscularis propria, confirming a leiomyoma.

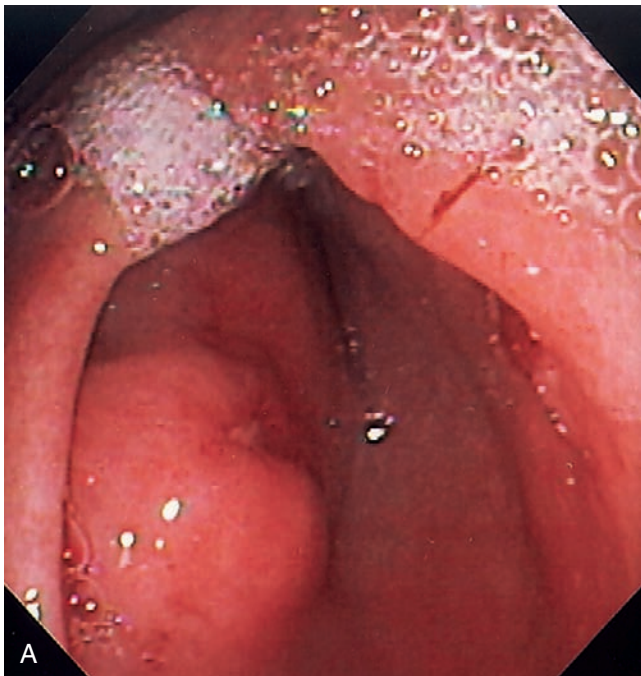
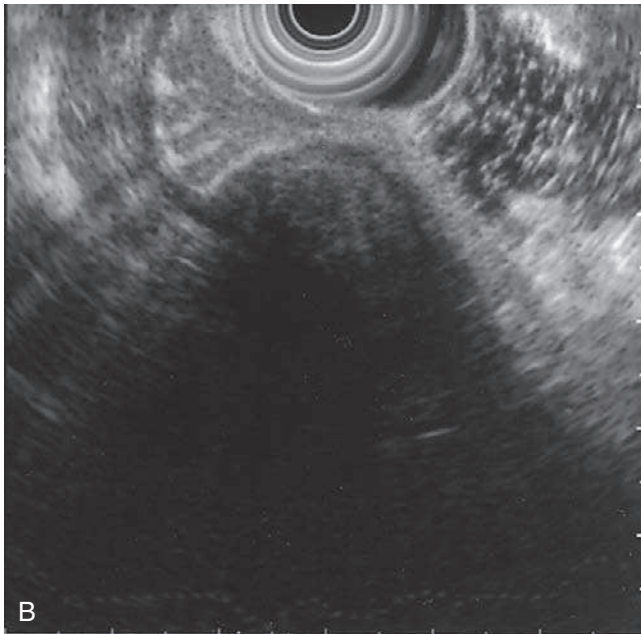
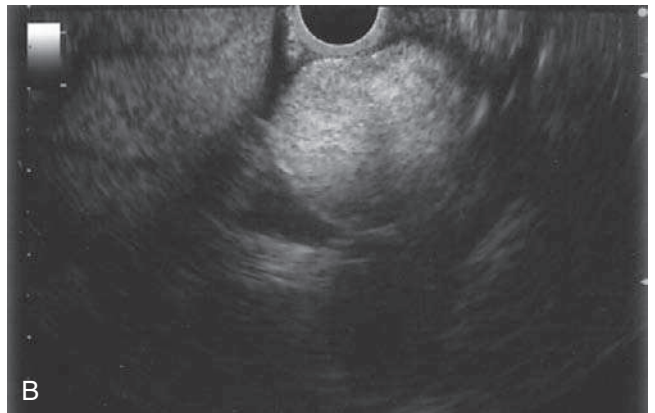
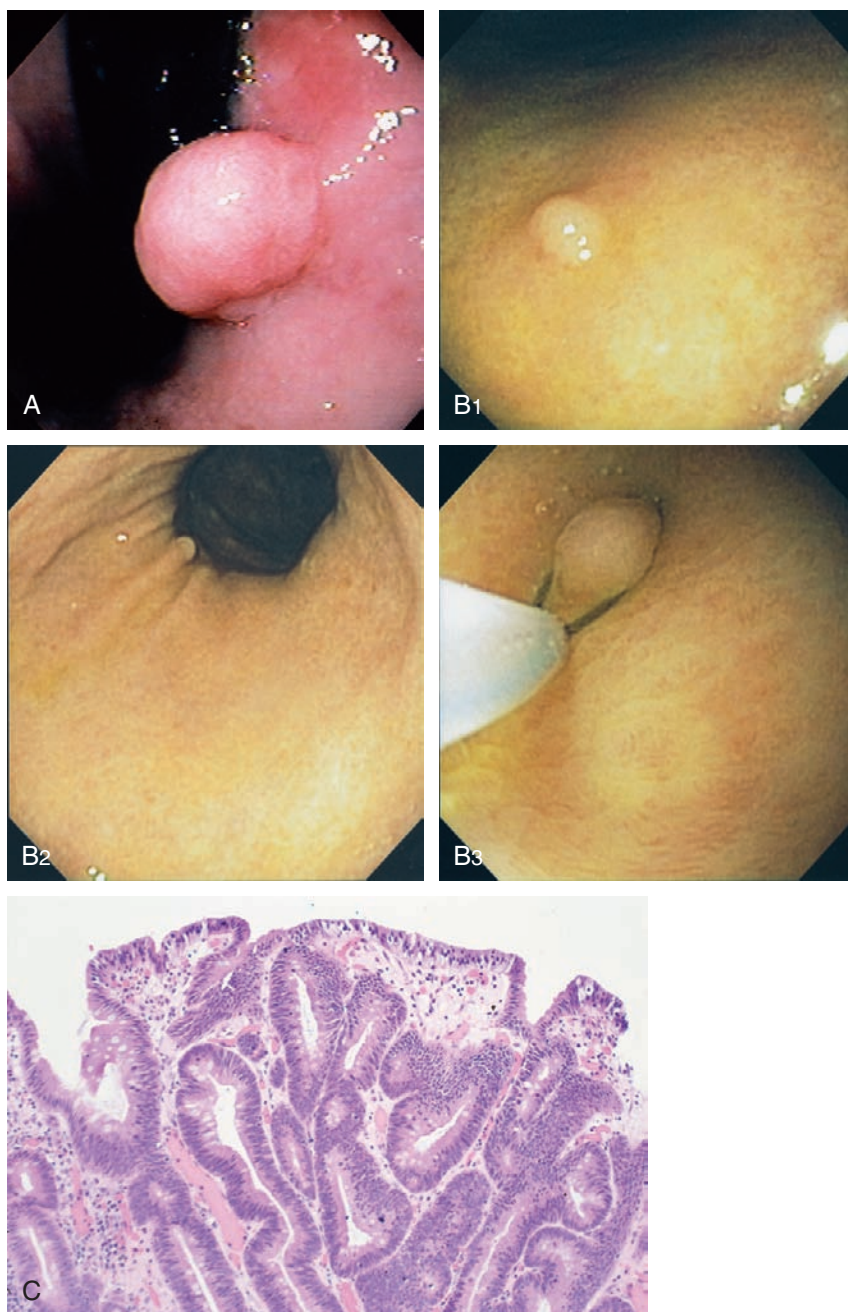


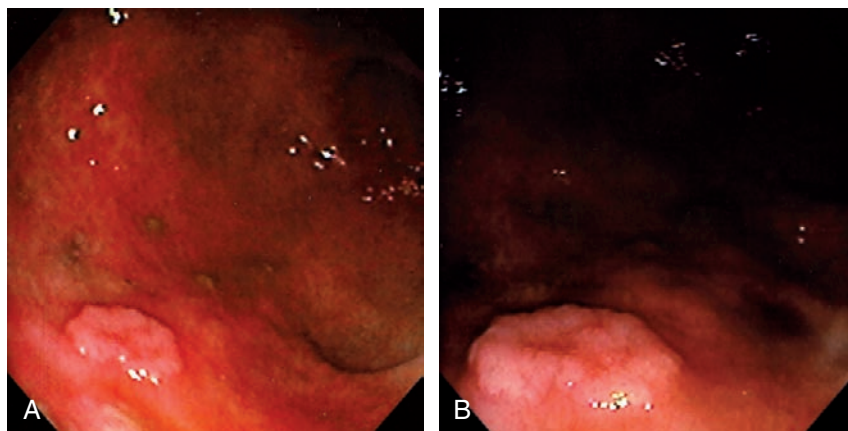
FIGURE 3.126 LIPOMA

A, Submucosal lesion with central erosion in the proximal antrum.
B, EUS shows a well-circumscribed lesion that is hyperechoic.



**FIGURE 3.127** TUBULAR ADENOMA

A, Large polyp just proximal to the angularis shown on retroflexion. The polyp has a serpentine appearance, typical of an adenoma. **B1**, Well-circumscribed small polyp of the distal gastric body in the setting of gastric atrophy and pernicious anemia, which was resected (**B2**). **C**, Polypectomy specimen shows typical adenomatous glands.

**FIGURE 3.128** TUBULAR ADENOMA

A, Small polyp of the distal gastric body. **B**, Note the whitish discoloration of the lesion, representing intestinal metaplasia, and the surrounding gastric atrophy.

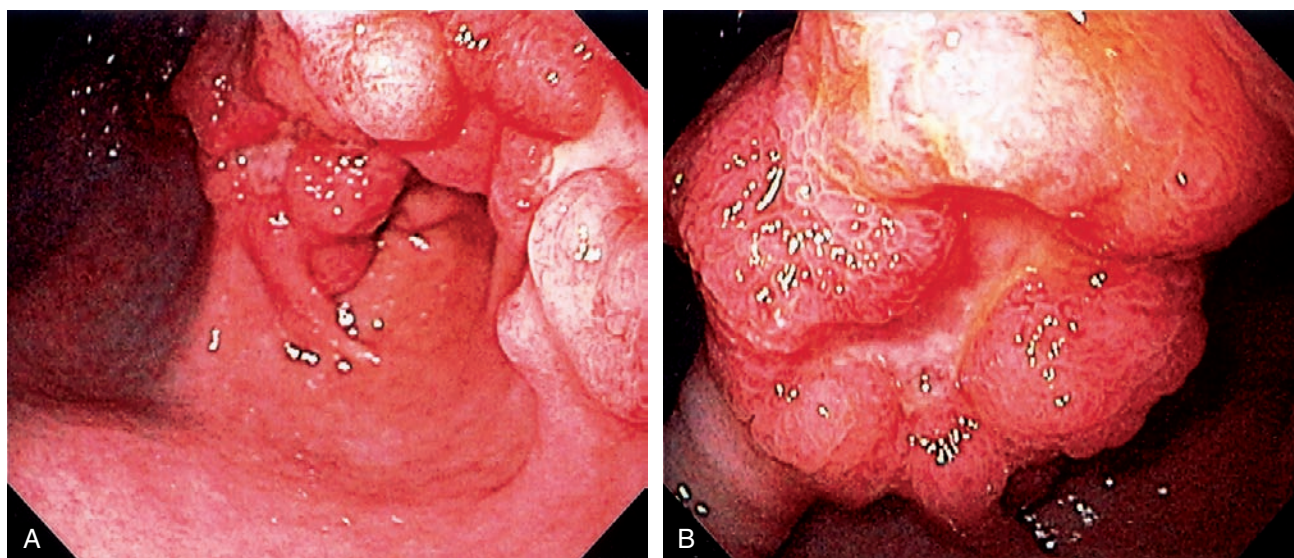


FIGURE 3.129 TUBULAR ADENOMA WITH CARCINOMA

A, Large polypoid lesion of the gastric antrum. **B**, Note the central ulceration that suggests carcinoma.

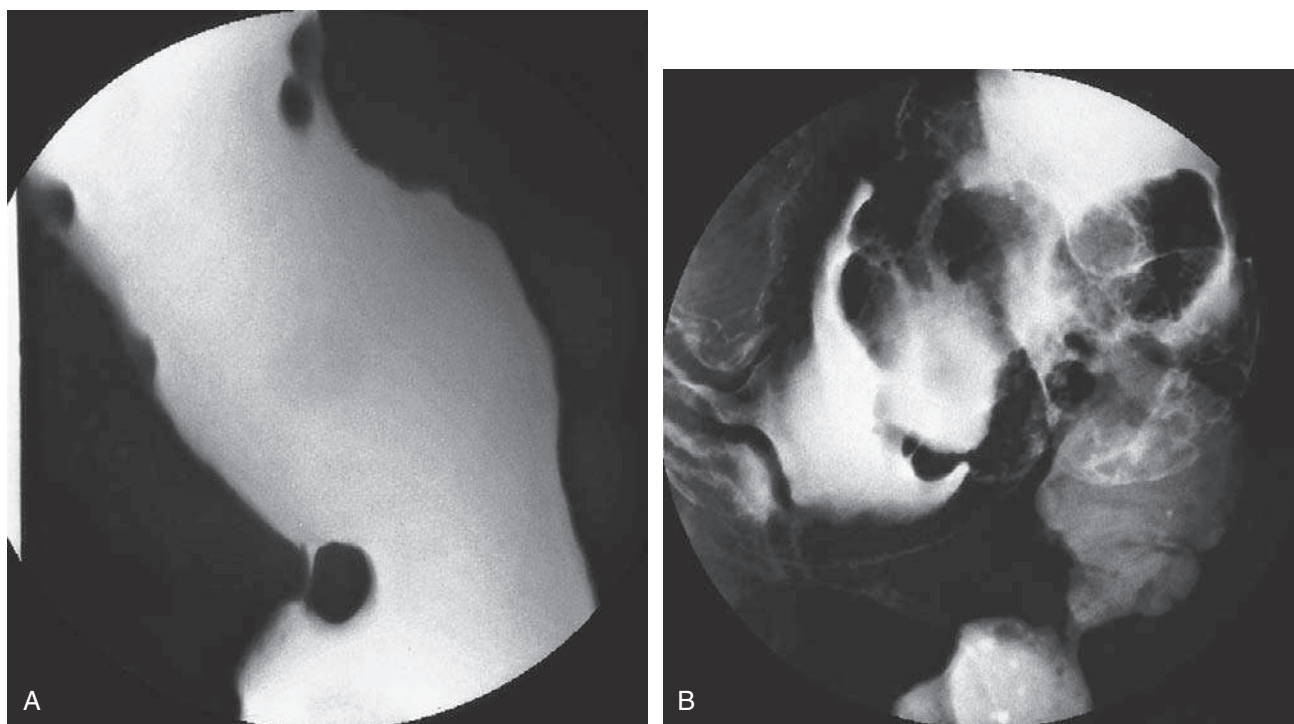


FIGURE 3.130 ADENOMATOUS POLYPS AND CARCINOMA

A, Multiple round filling defects in the proximal gastric body and a large lesion at the angularis. **B**, A large, masslike lesion is present along the greater curvature and antrum.

Continued

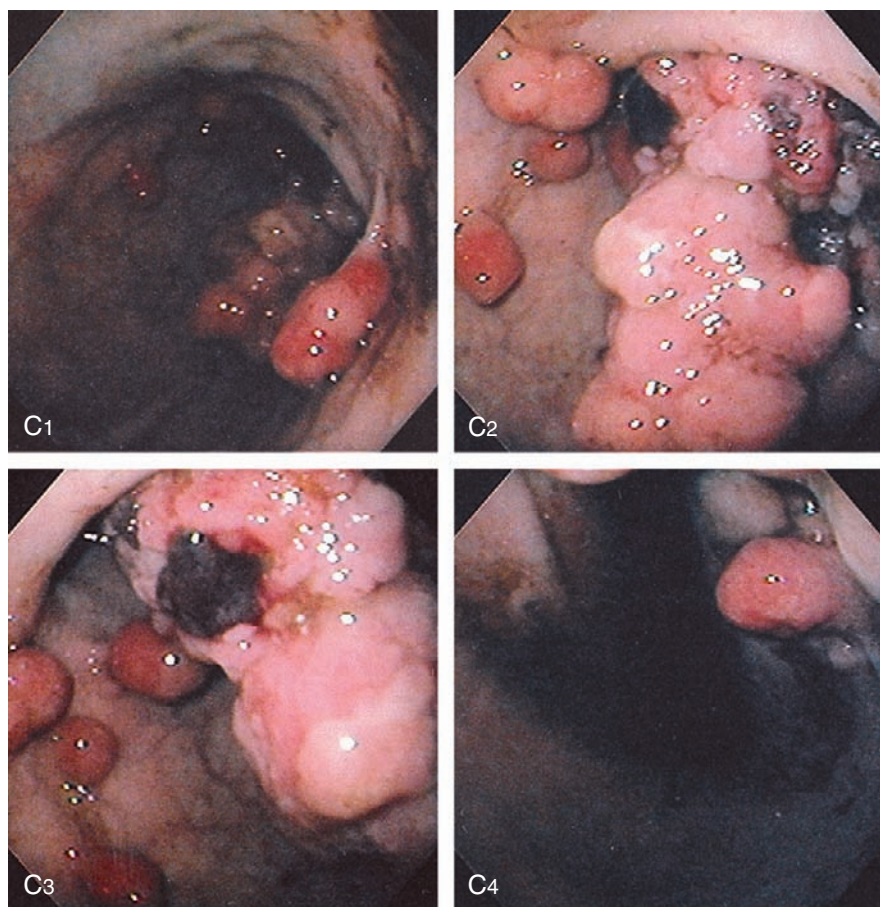


FIGURE 3.130 ADENOMATOUS POLYPS AND CARCINOMA

C, Multiple round polypoid lesions seen in the proximal gastric body along the lesser curvature (**C1, C4**). Associated with the polyps is a large, masslike lesion in the distal body and antrum, representing cancer (**C2, C3**).

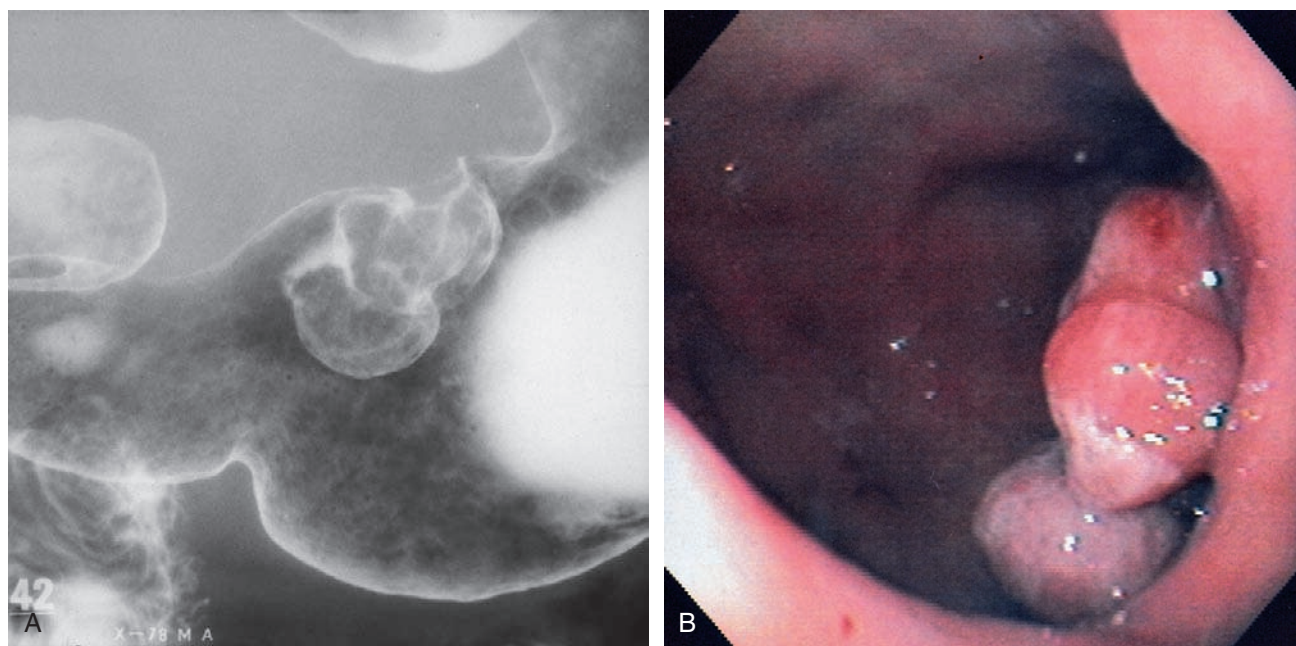
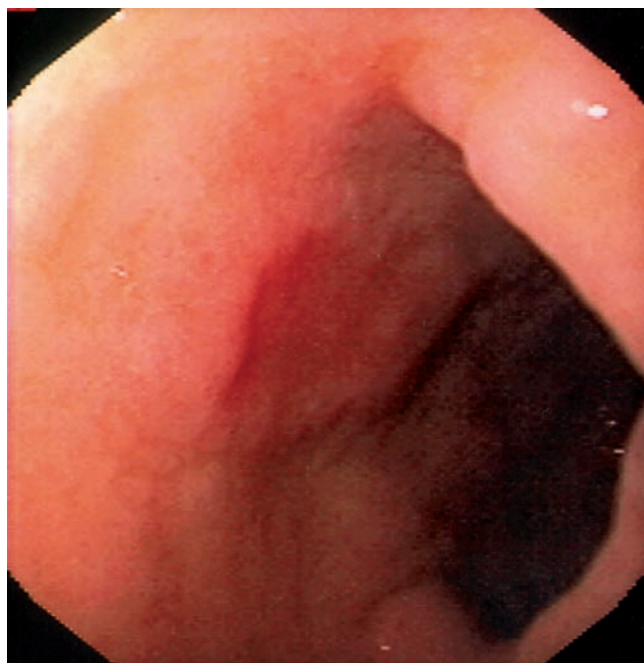
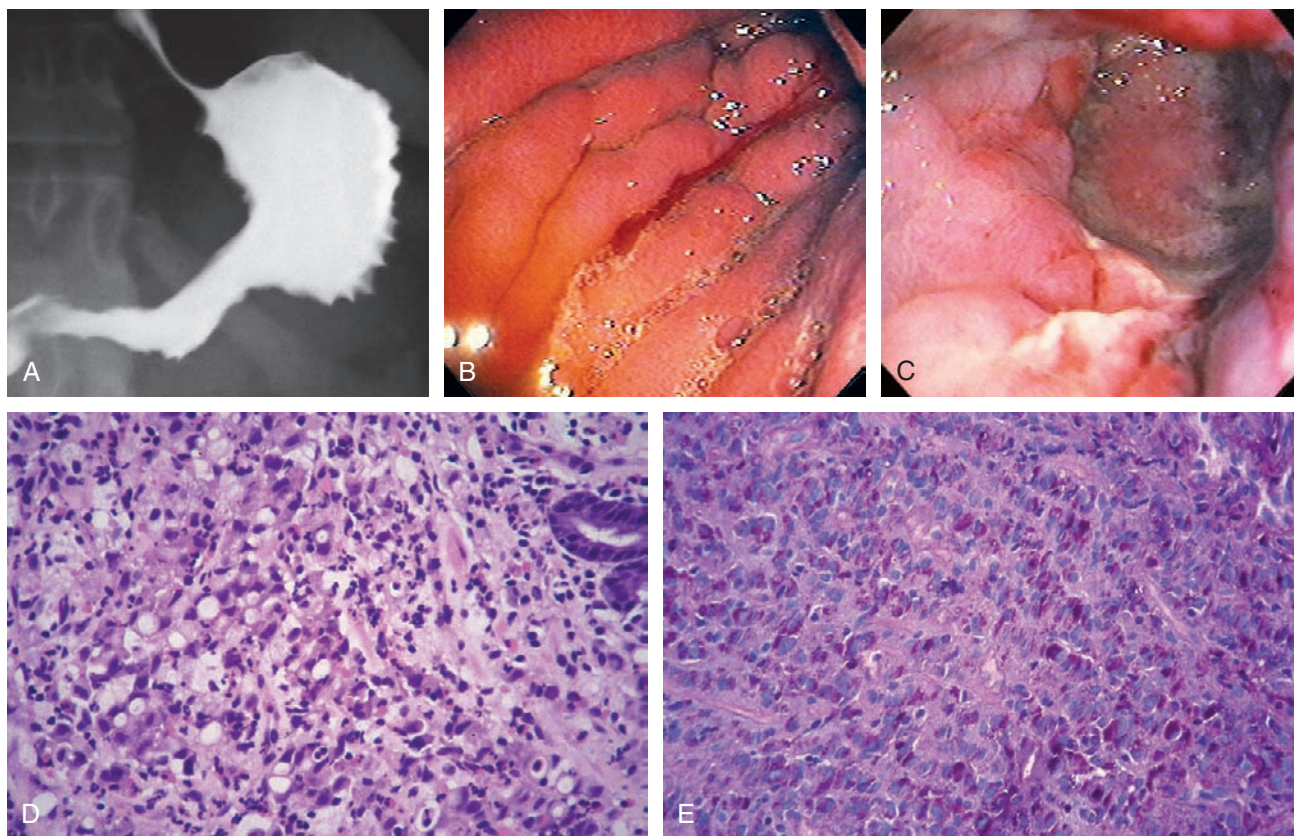


FIGURE 3.131 CARCINOMATOUS POLYP

A, Two polypoid defects originating from the lesser curvature in the distal gastric body. **B**, Trilobed polyp at the angularis.

**FIGURE 3.132** EARLY GASTRIC CANCER

Well-circumscribed, round, raised lesion of the distal gastric antrum.

**FIGURE 3.133** LINITIS PLASTICA

A, The gastric body and antrum are nondistensible and have a spiculated appearance, primarily along the greater curvature.

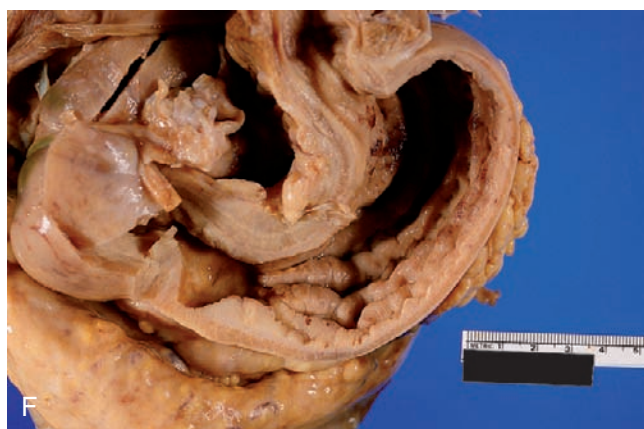
B, The gastric rugae are thickened, and spontaneous bleeding is present in the distal body. Despite maximal insufflation, there was no further distention.

C, Circumferential ulceration in the distal body and antrum.

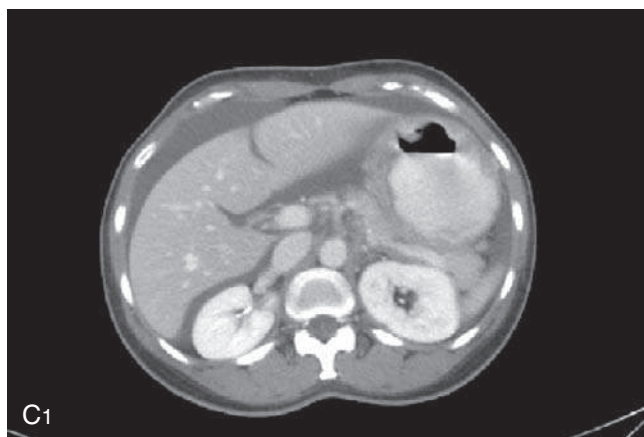
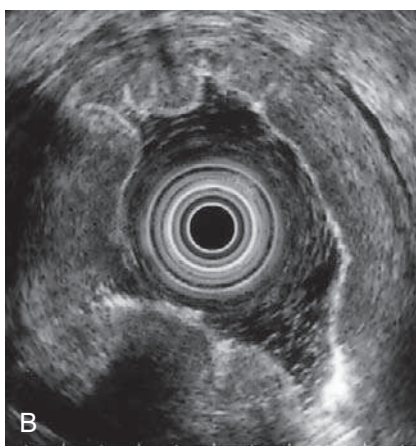
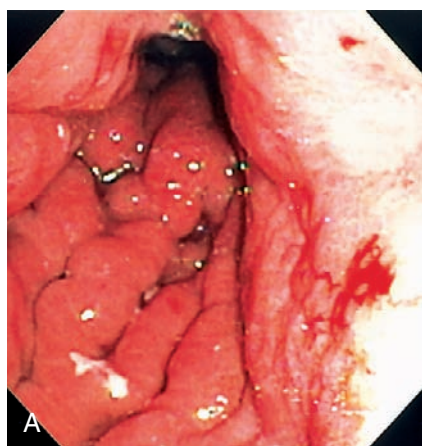
D, Poorly differentiated gastric carcinoma. Malignant signet ring cells are present, characterized by an intracytoplasmic mucin vacuole, which can compress the nucleus.

E, Signet ring cells are demonstrated by histochemical stains for mucin, including mucicarmine and, in this figure, periodic acid-Schiff (PAS) reagent.

Continued

**FIGURE 3.133** LINITIS PLASTICA

F, Postmortem specimen demonstrates the marked thickening of the entire stomach, as well as the thickened rugae.

**FIGURE 3.134** LINITIS PLASTICA

A, The rugae are prominent, the mucosa is friable, and the stomach is poorly distensible. **B**, The gastric wall is diffusely thickened. **C**, Oral contrast and air help to highlight the circumferential wall thickening (**C1**, **C2**).

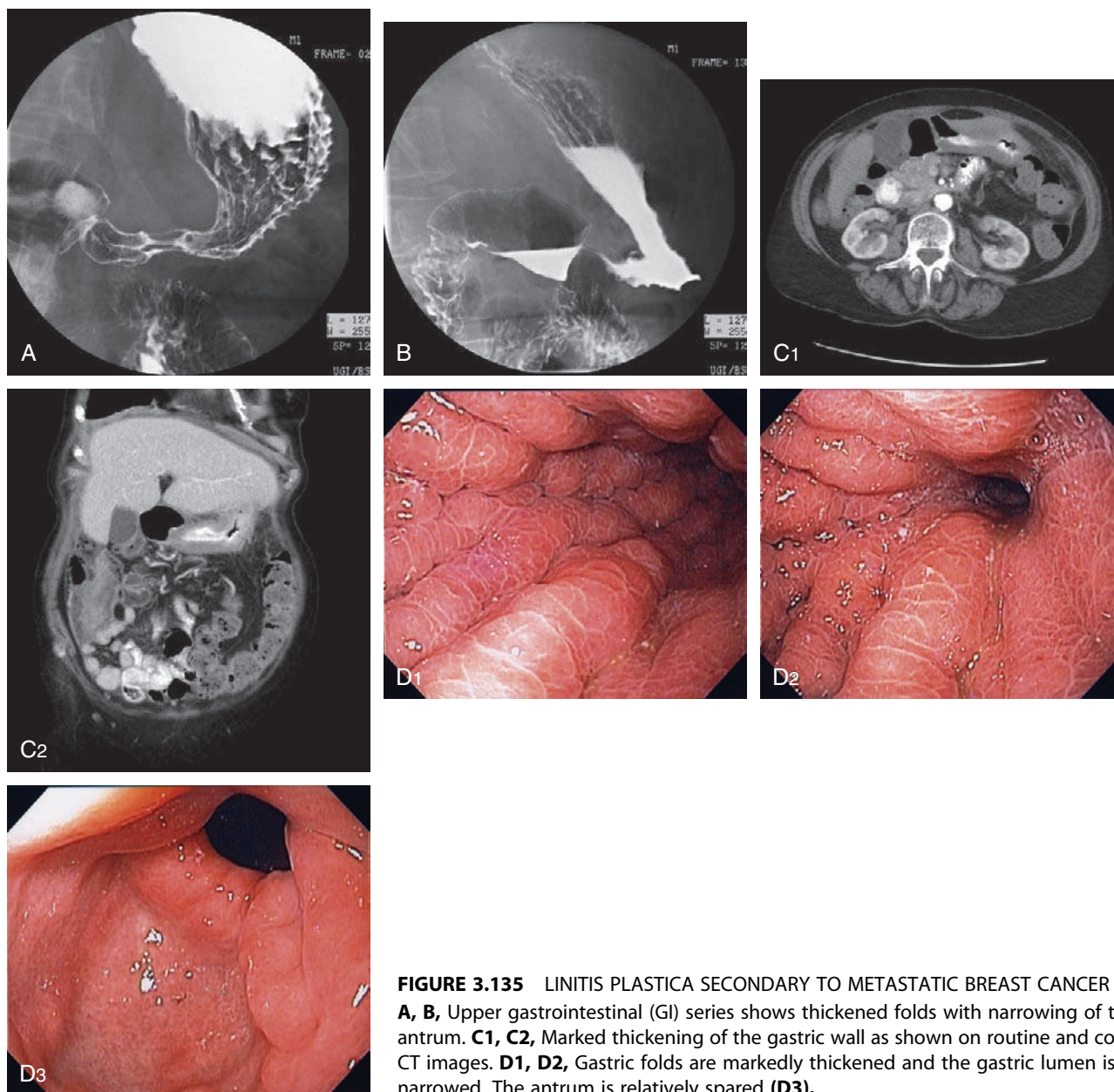


FIGURE 3.135 LINITIS PLASTICA SECONDARY TO METASTATIC BREAST CANCER
A, B, Upper gastrointestinal (GI) series shows thickened folds with narrowing of the antrum. **C1, C2**, Marked thickening of the gastric wall as shown on routine and coronal CT images. **D1, D2**, Gastric folds are markedly thickened and the gastric lumen is narrowed. The antrum is relatively spared (**D3**).

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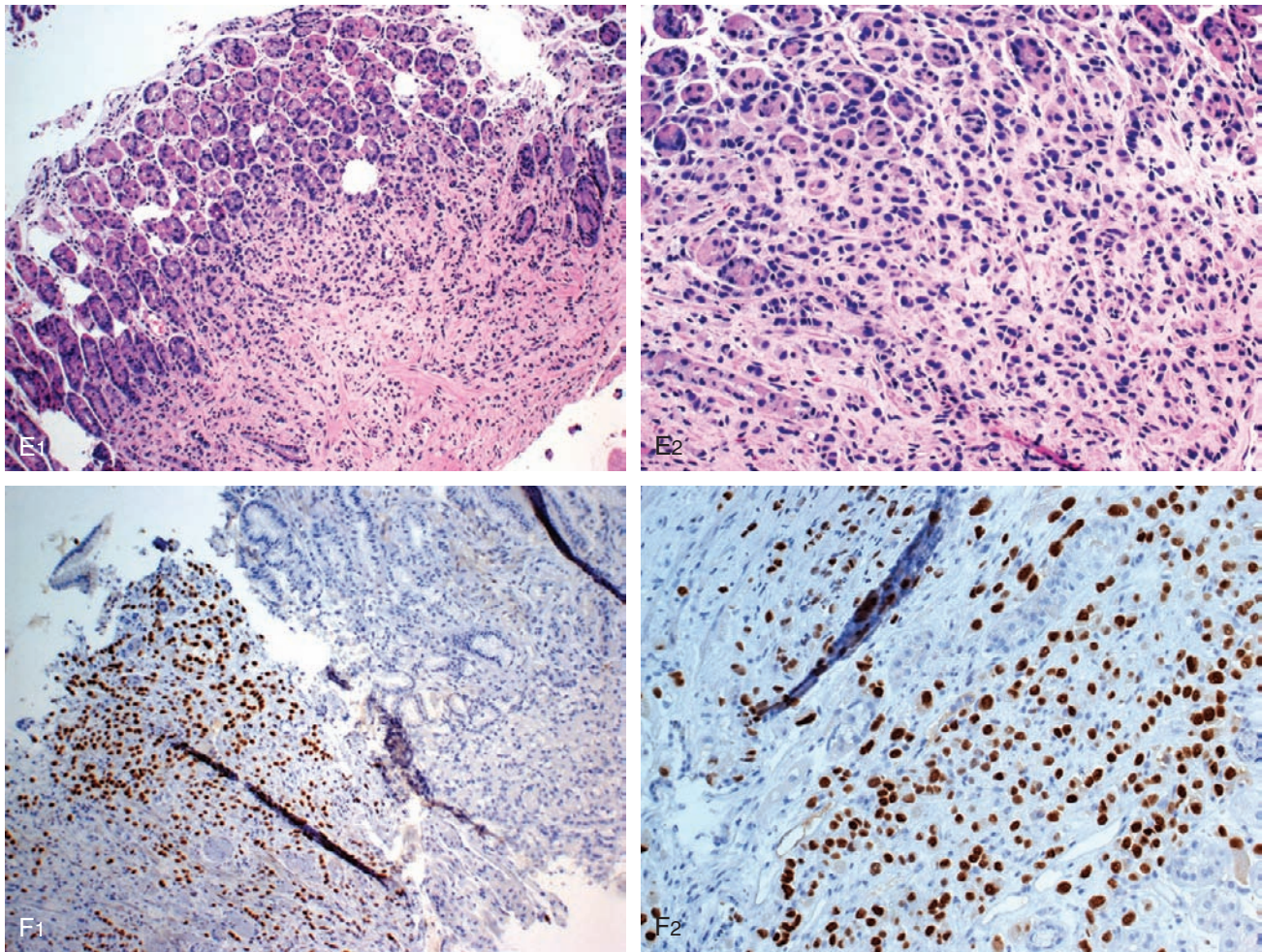


FIGURE 3.135 LINITIS PLASTICA SECONDARY TO METASTATIC BREAST CANCER

E1, E2, Numerous malignant cells fill the submucosa. The cells are estrogen receptor positive on special staining, confirming metastatic breast cancer (**F1, F2**).

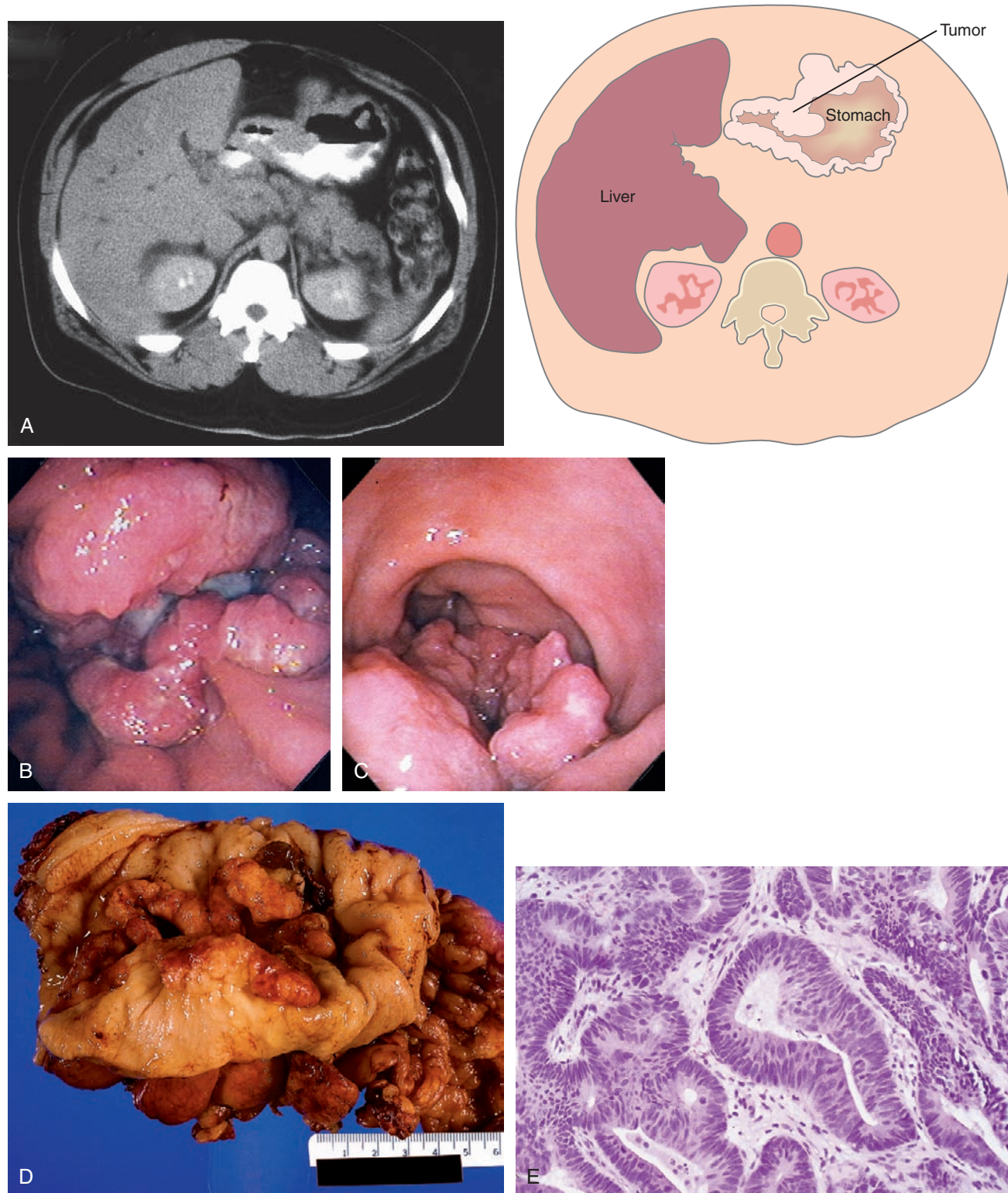


FIGURE 3.136 ADENOCARCINOMA

A, Marked thickening of the gastric body and antrum. **B**, Ulcerated mass originating in the gastric body. The surrounding mucosa does not appear to be involved. **C**, The ulcerated neoplasm extends toward the pylorus, with the lesser curvature uninvolved. **D**, The stomach has been everted, showing the tumor. **E**, Well-differentiated adenocarcinoma.

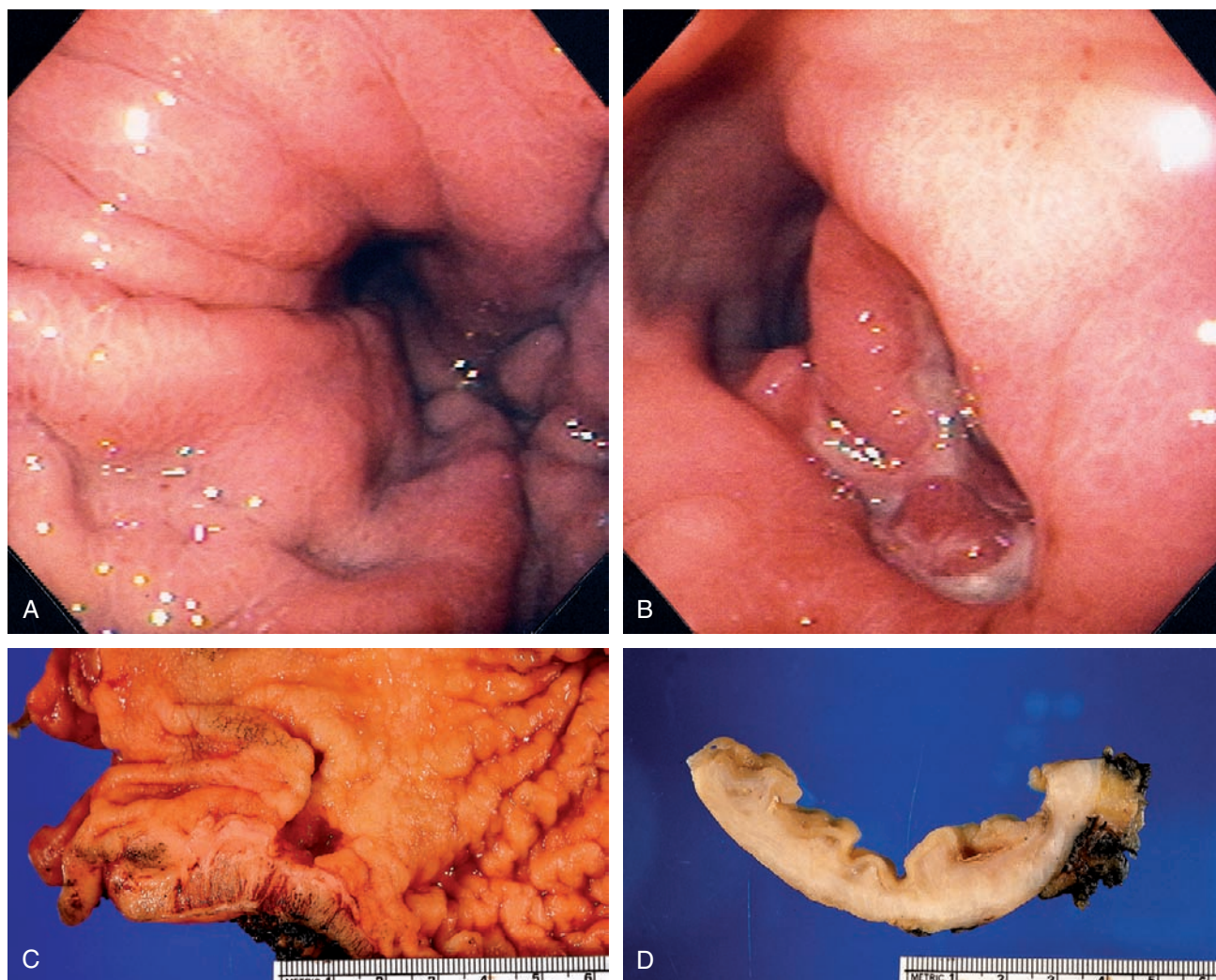


FIGURE 3.137 ADENOCARCINOMA

A, The gastric body appears to be fixed toward the antrum. The areae gastricae are prominent. **B**, An irregularly shaped ulceration in the center of the antrum. The gastric body is fixed toward this lesion. The antrum, in the distance, appears normal. **C**, The thickened rugae and irregular shape of the ulcer are apparent. **D**, The gastric wall and rugal folds are markedly thickened at the level of the ulceration.

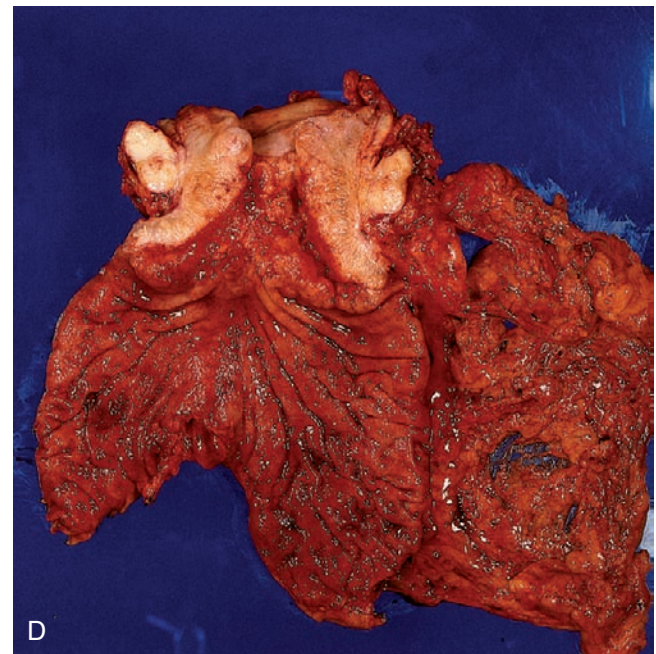
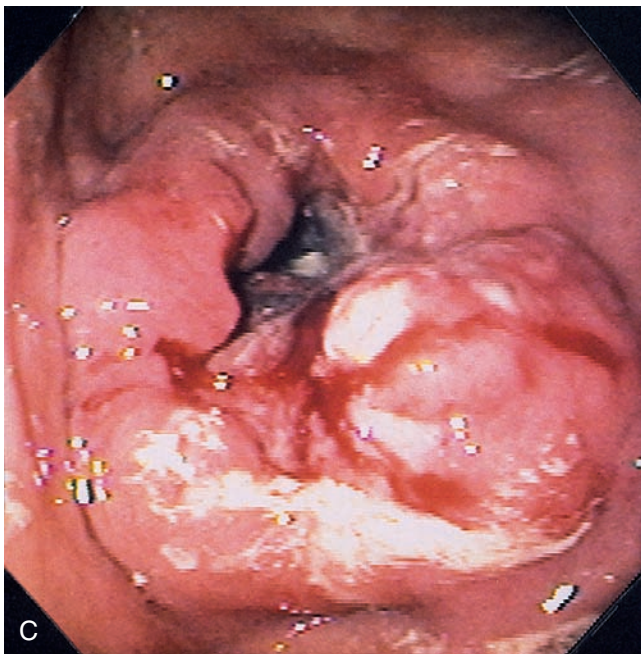
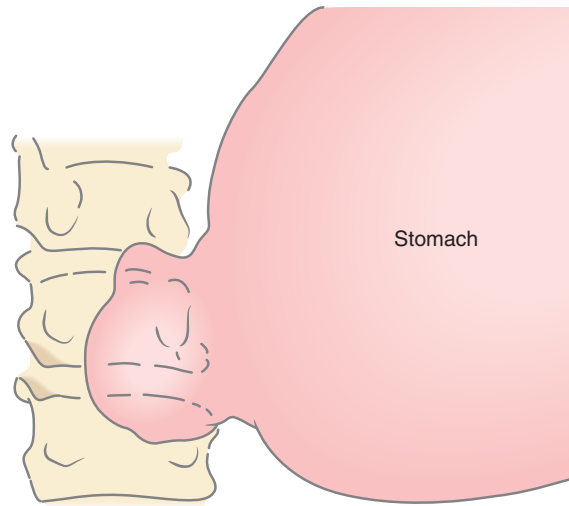
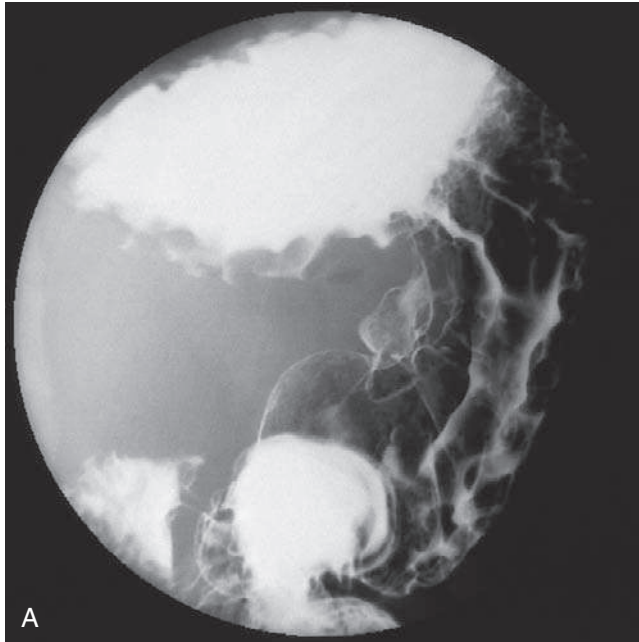
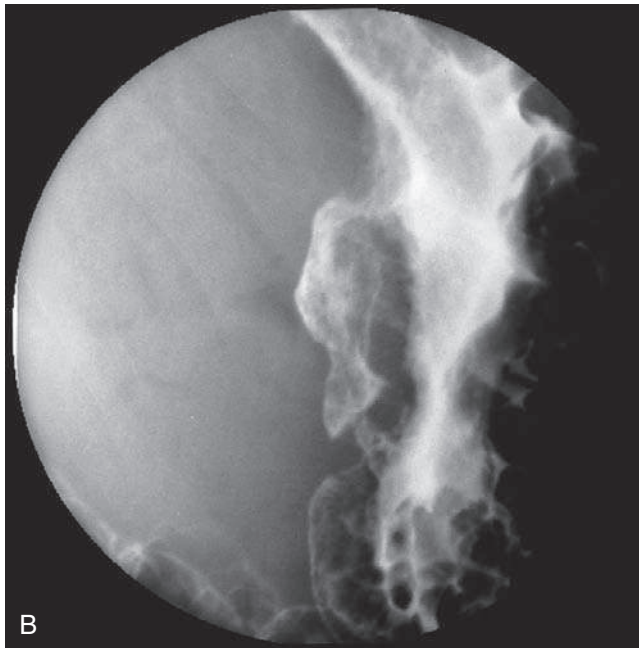


FIGURE 3.138 ADENOCARCINOMA

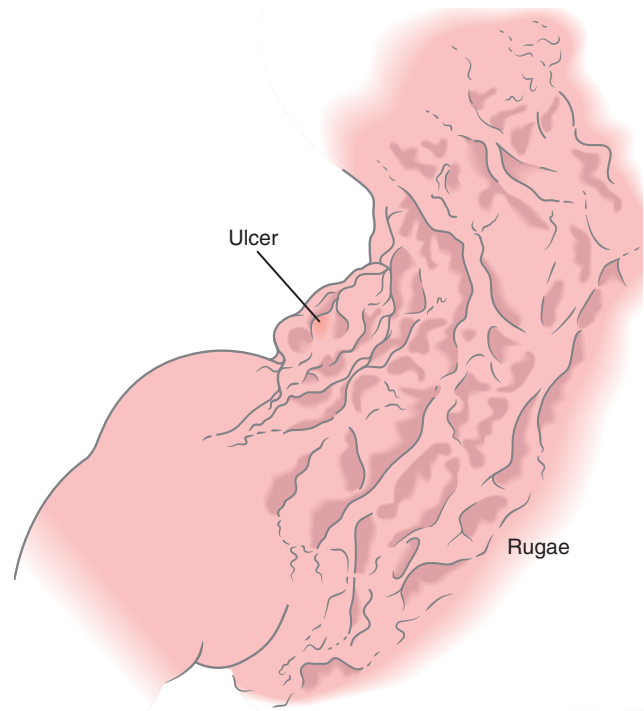
A, Markedly dilated stomach with an abrupt cutoff in the antrum. **B**, Markedly dilated stomach is outlined by barium. An apple-core-like lesion can be seen in the antrum. **C**, Circumferential masslike lesion involving the gastric body and collapsing the antrum. **D**, An annular constricting neoplasm with a fibrotic appearance is demonstrated on this surgical specimen.



A



B



Ulcer

Rugae

FIGURE 3.139 ADENOCARCINOMA

A, Irregularly shaped ulceration on the angularis. There is associated thickening of the gastric rugae, some of which are not smooth in appearance. **B**, Close-up view of the ulcer demonstrates the irregular appearance of the ulcer mound, especially along the distal margin, with associated thick gastric folds surrounding the crater. The nodular appearance of both the distal ulcer mound and the folds suggests malignancy.

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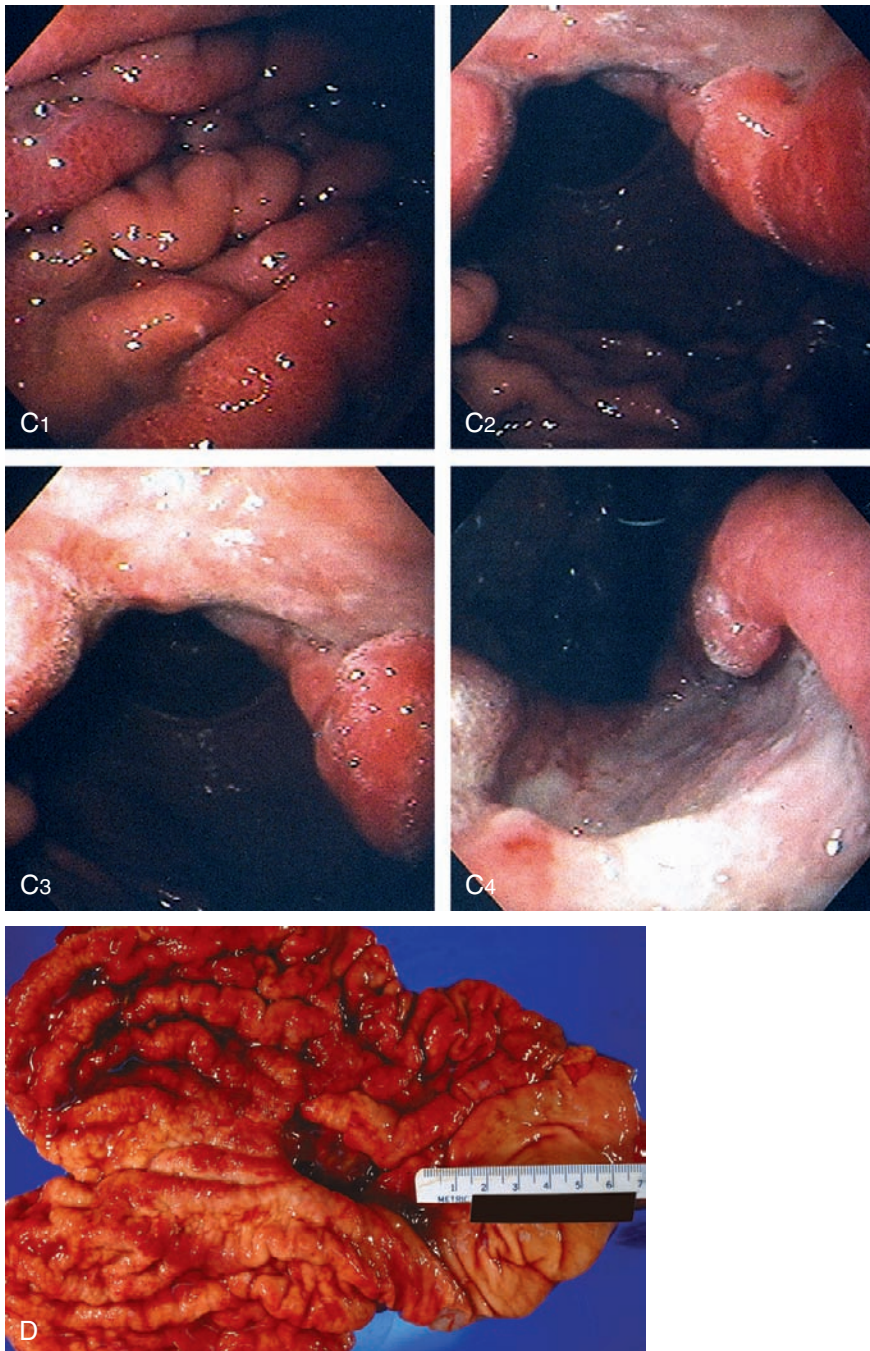


FIGURE 3.139 ADENOCARCINOMA
C, Marked thickening and erythema of the gastric rugae (**C1**). A large gastric ulcer with heaped-up margins extends from the midbody to the angularis (**C2, C3**). Retroflex view demonstrates the irregularity of the surrounding margin in relation to the ulcer base (**C4**). **D**, The malignant ulcer is deep, and the prominent rugal folds are identified in the surgical specimen.

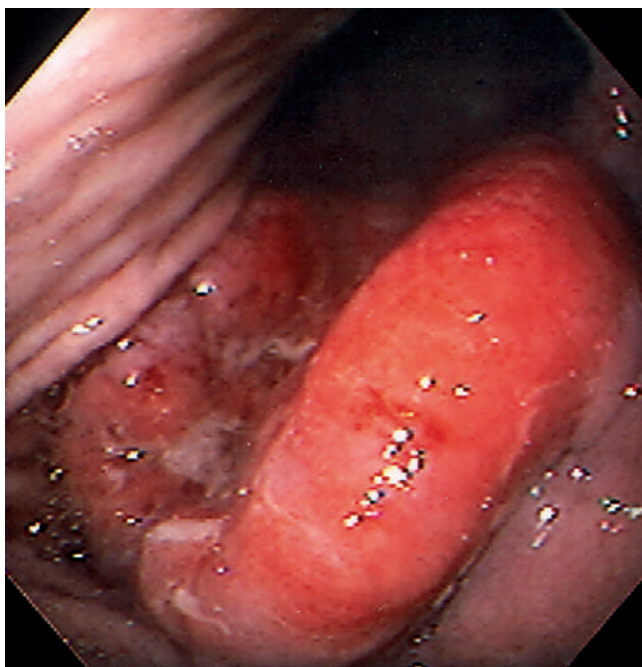


FIGURE 3.140 ADENOCARCINOMA
Round, masslike lesion of the gastric body.



Differential Diagnosis

Adenocarcinoma (Figure 3.140)

- Neuroendocrine neoplasm
- Metastatic tumor
 - Melanoma
 - Breast cancer
 - Lung cancer
 - Other
- Primary gastric lymphoma

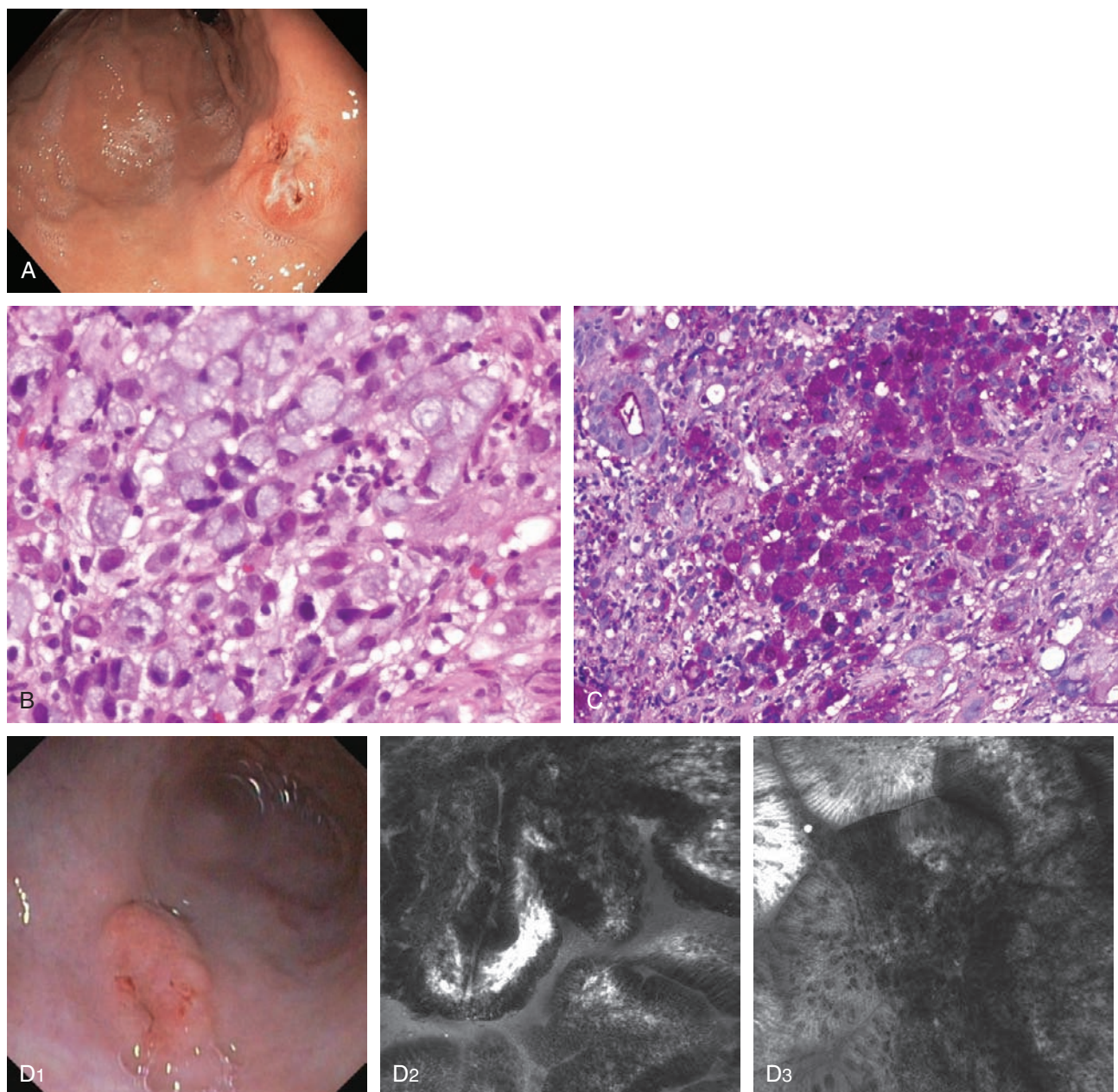


FIGURE 3.141 GASTRIC ADENOCARCINOMA

A, Well-circumscribed lesion in the posterior gastric body. **B**, Typical adenocarcinoma with signet ring cells shown on close-up. Mucicarmine stain also highlights the type of tumor (**C**). **D1**, Elevated polypoid lesion in the proximal antrum. **D2**, Endoscopic image with optical coherence tomography shows abnormal glands with clusters of dark neoplastic cells. **D3**, Intestinal metaplasia is in the mucosa surrounding the tumor. (**B** courtesy Javier Pardo-Mindan, MD, Pamplona, Spain.)

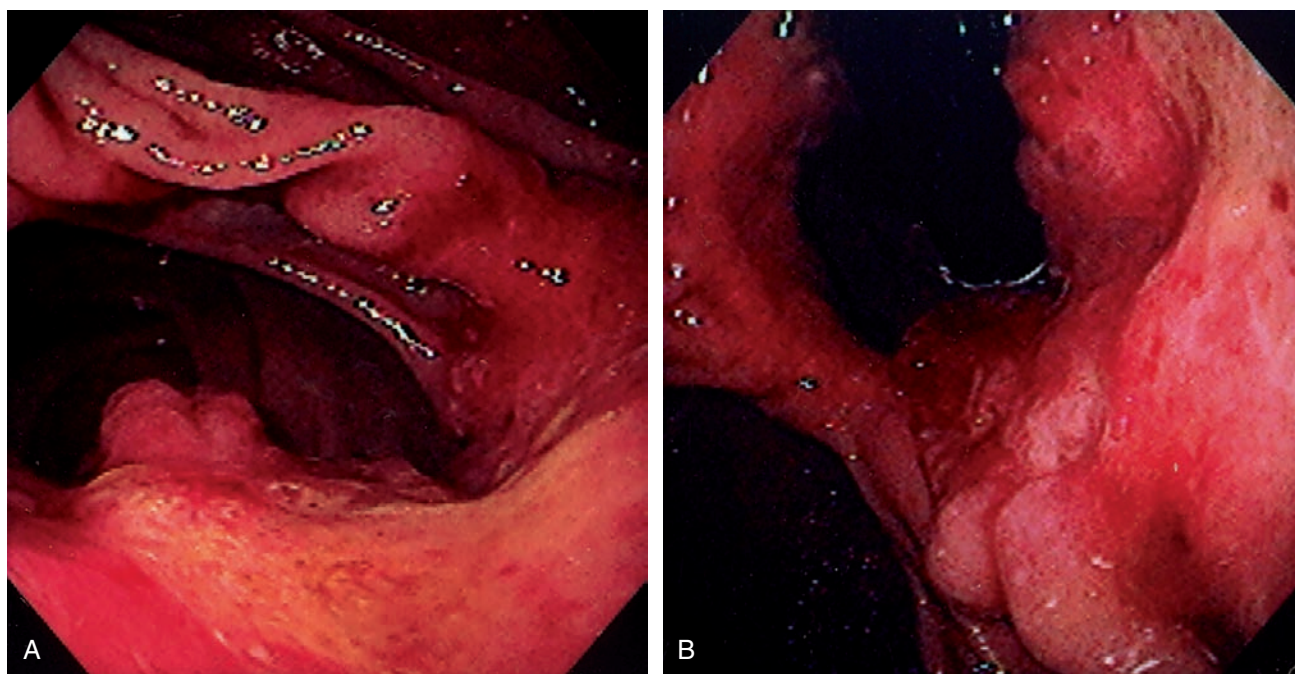


FIGURE 3.142 GASTRIC ADENOCARCINOMA AFTER BILLROTH-II ANASTOMOSIS (STUMP CARCINOMA)
A, Ulcerated mass lesion at the anastomosis. **B**, Retroflexion shows the extent of proximal progression.

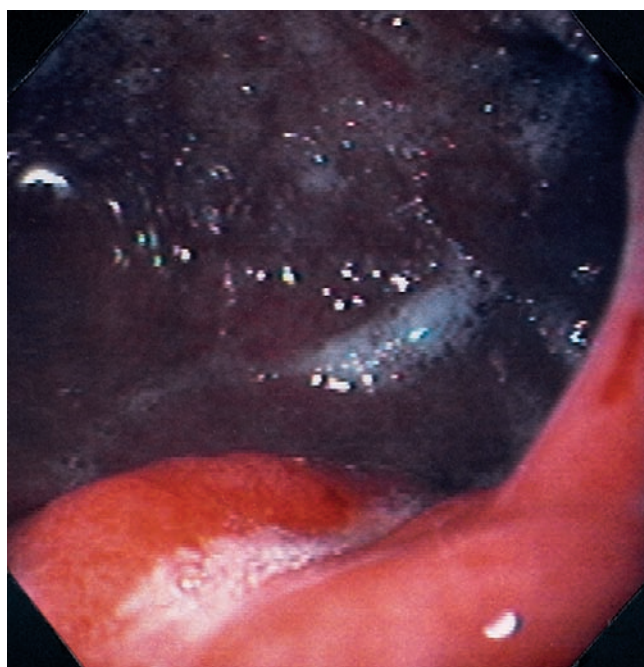


FIGURE 3.143 MALIGNANT GASTRIC ULCER
 This gastric ulcer is linear but irregular and has heaped-up lips to the margin. The lips do not form a circumferential pattern around the ulcer base.

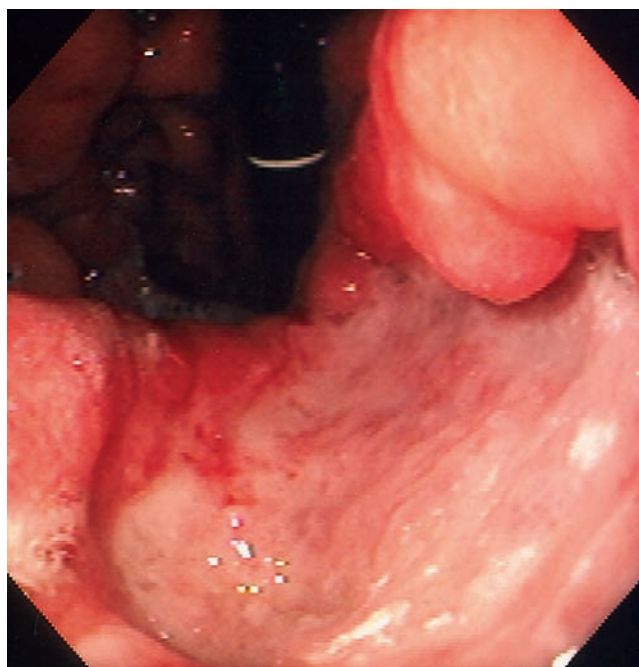


FIGURE 3.144 MALIGNANT GASTRIC ULCER
 Large, deep ulcer on the lesser curvature.

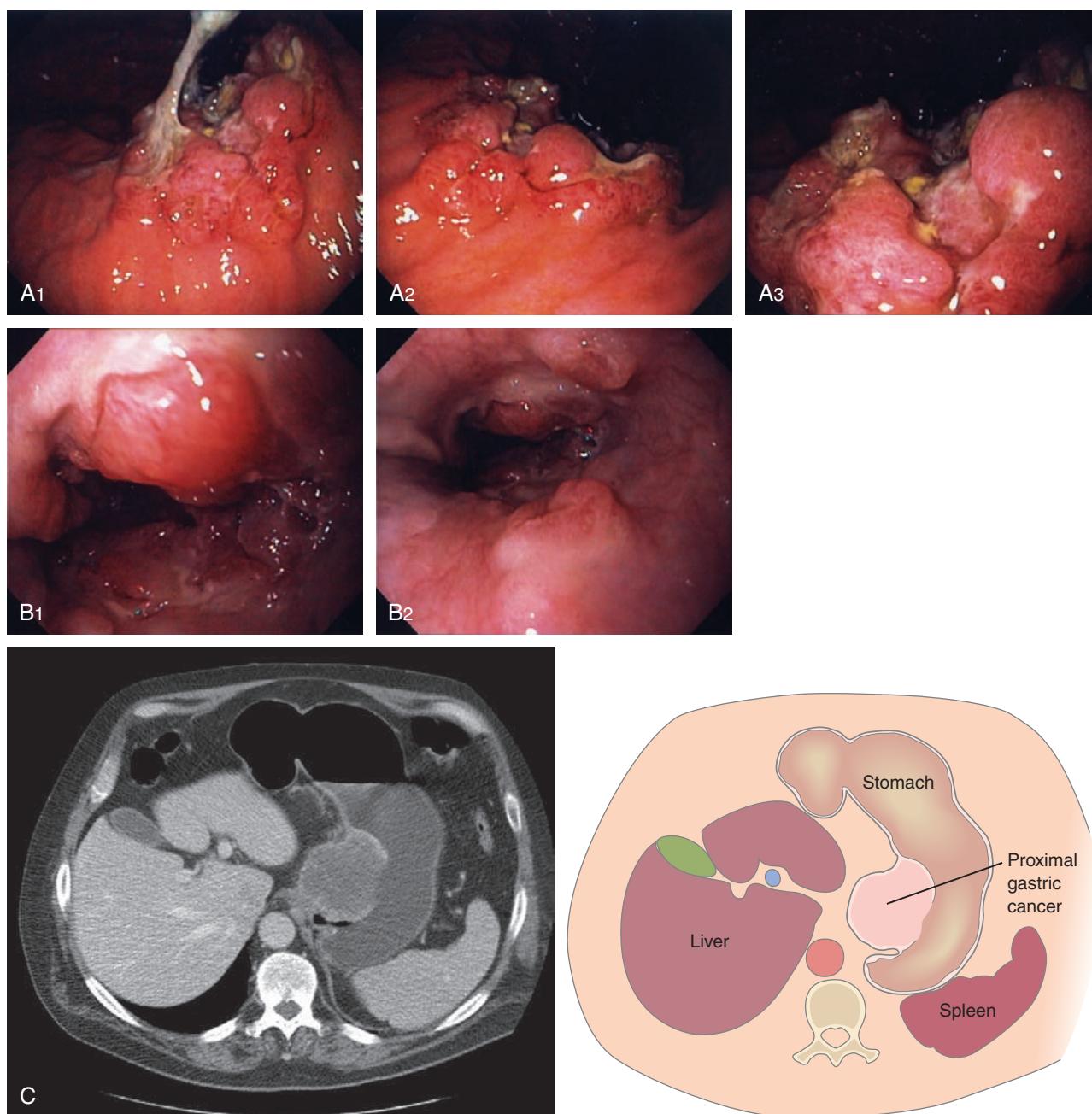
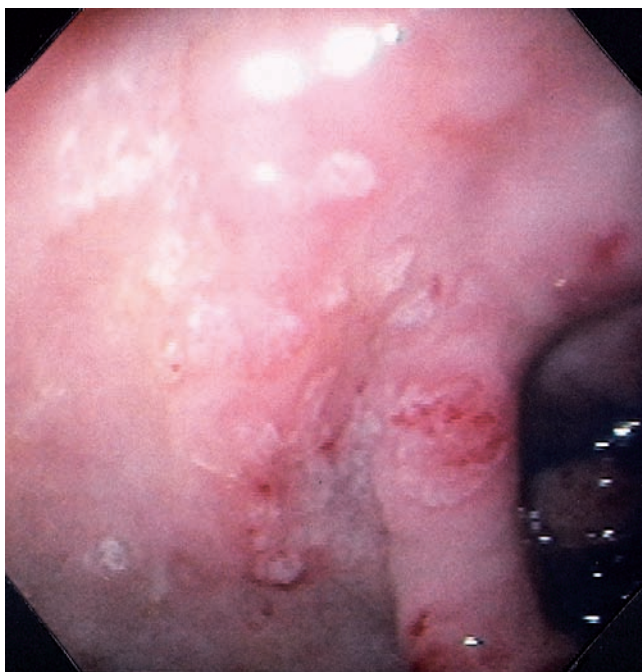
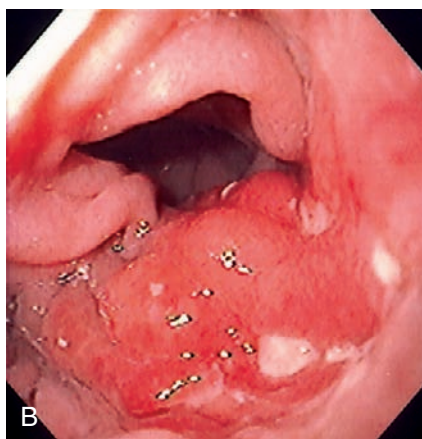


FIGURE 3.145 PROXIMAL GASTRIC CANCER

A1-A3, Large ulcerated lesion in the gastric cardia with thick exudate. Note the extension to the gastroesophageal junction (**B1**) and distal upper with multiple submucosal nodular lesions (**B2**). **C**, Large mass lesion in the proximal stomach posteriorly.

**FIGURE 3.146** EARLY GASTRIC CANCER

Multiple white verrucous-appearing plaques along the greater curvature in the antrum.

**FIGURE 3.147** RECURRENT GASTRIC CANCER

A, Normal-appearing esophagogastric anastomosis after proximal gastric resection. **B**, Masslike lesion just distal to the anastomosis.

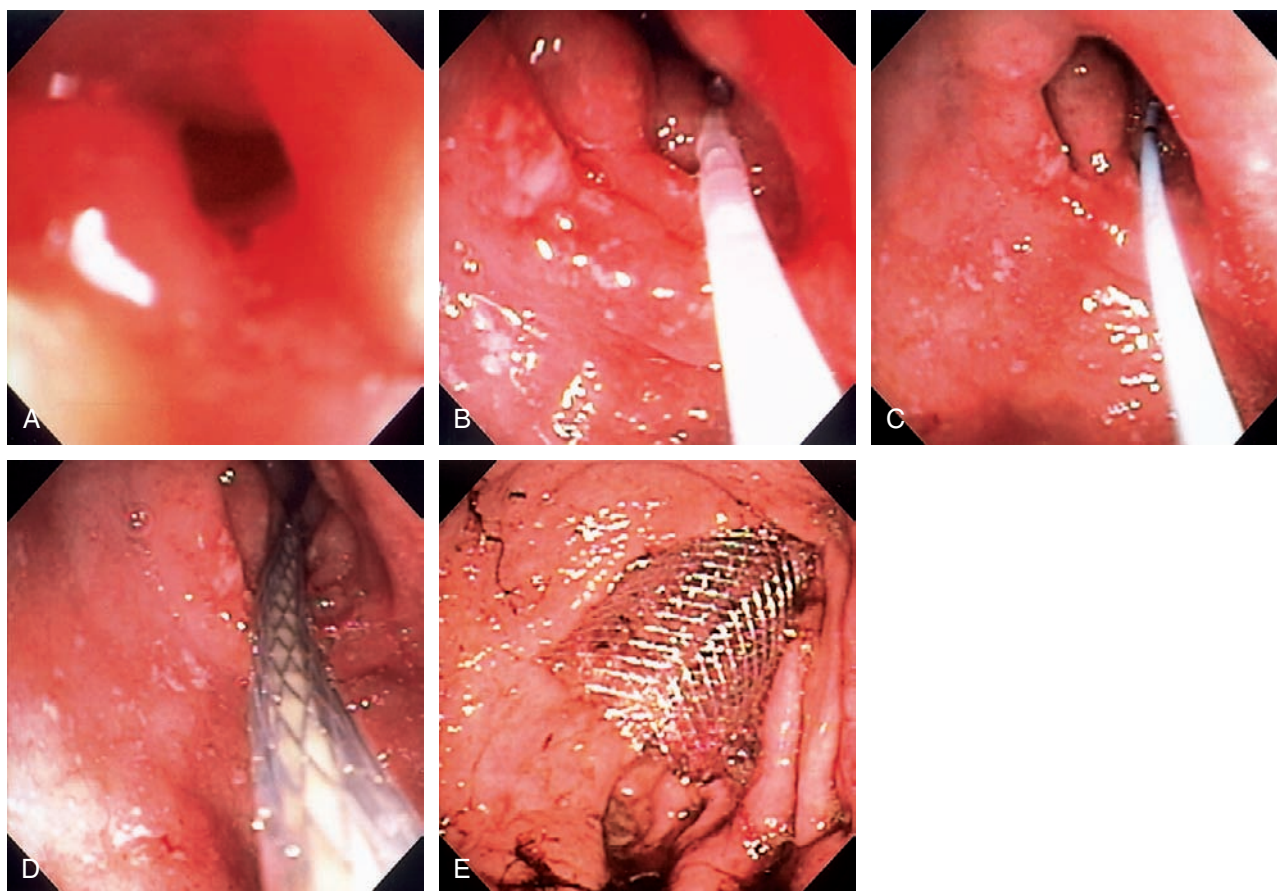


FIGURE 3.148 ENTERAL STENT PLACEMENT FOR OBSTRUCTING ADENOCARCINOMA OF THE ANTRUM

A, Endoscopic view shows a pinpoint opening in the antrum. **B**, A floppy guidewire was passed through the lesion under fluoroscopic guidance and exchanged for a stiffer wire. **C**, The catheter is seen for the wire exchange. **D**, Over this wire, the metal prosthesis is advanced. **E**, The stent has been fully deployed.

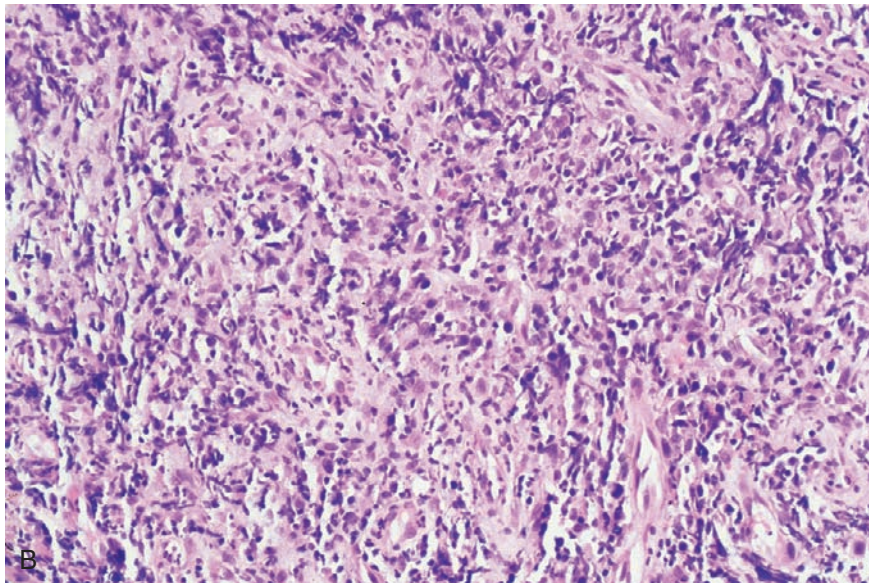
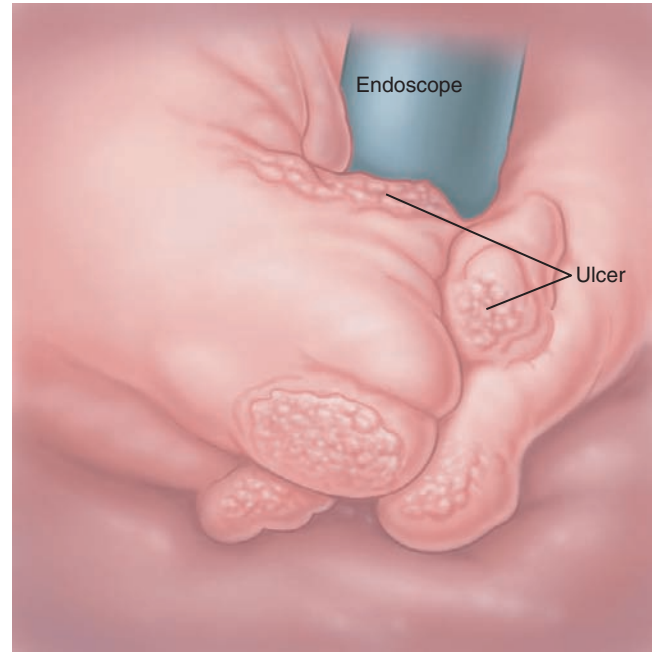
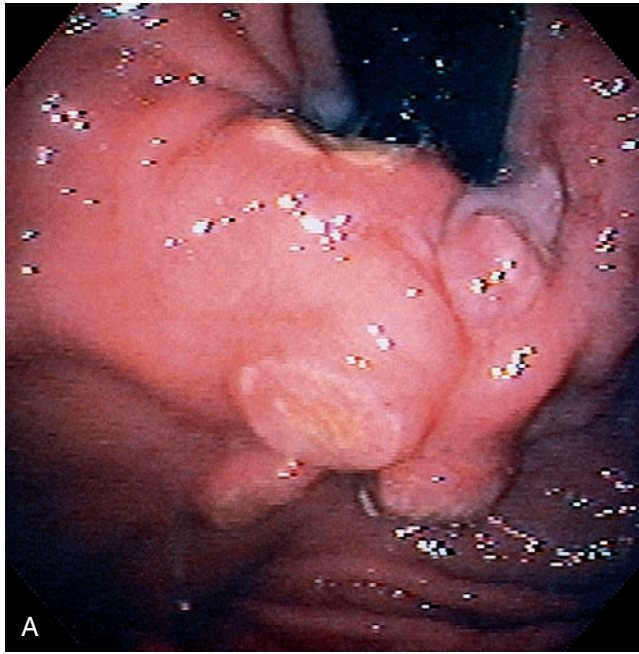


FIGURE 3.149 GASTRIC LYMPHOMA
A, Multiple umbilicated lesions distal to the gastroesophageal junction. One large ulceration is just distal to the squamocolumnar junction. **B**, Atypical lymphoid infiltrate with large immunoblastic-type cells.

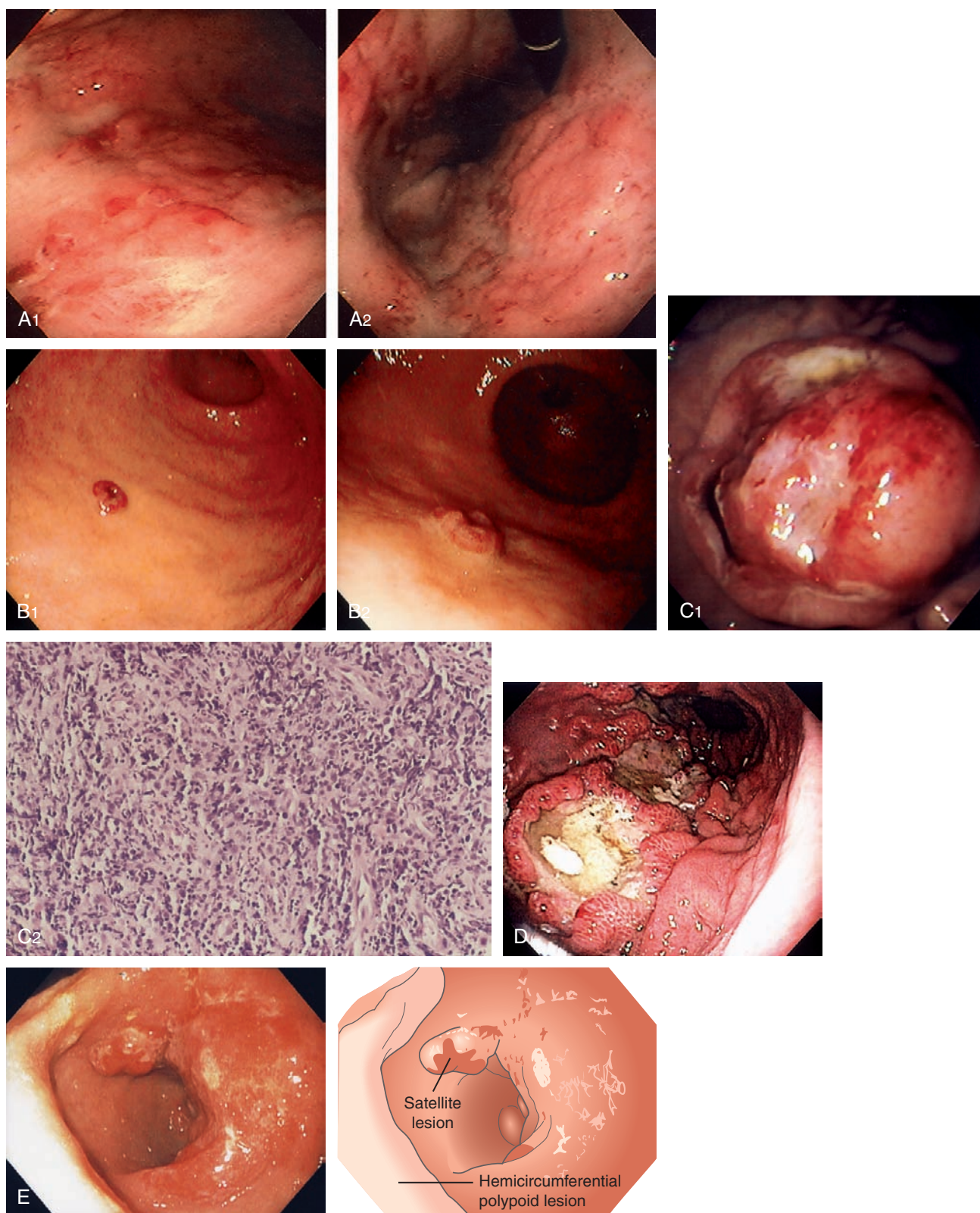


FIGURE 3.150 GASTRIC LYMPHOMA

A1, A2, Diffuse erythema, hemorrhage, and nodularity of the gastric body. **B1**, Small reddish raised lesion of the distal gastric body. **B2**, Close-up shows a central defect. **C1**, Large, well-circumscribed, ulcerated, masslike lesion in a patient with acquired immunodeficiency syndrome (AIDS). The lesion was soft on biopsy. **C2**, Atypical lymphoid infiltrate with large immunoblastic-type cells. **D**, Ulcer with raised margin extending distally in a serpiginous fashion. **E**, Hemicircumferential polypoid lesion with overlying exudate occupying the gastric antrum posteriorly. Note the satellite lesion anteriorly by the pylorus (*drawing*).

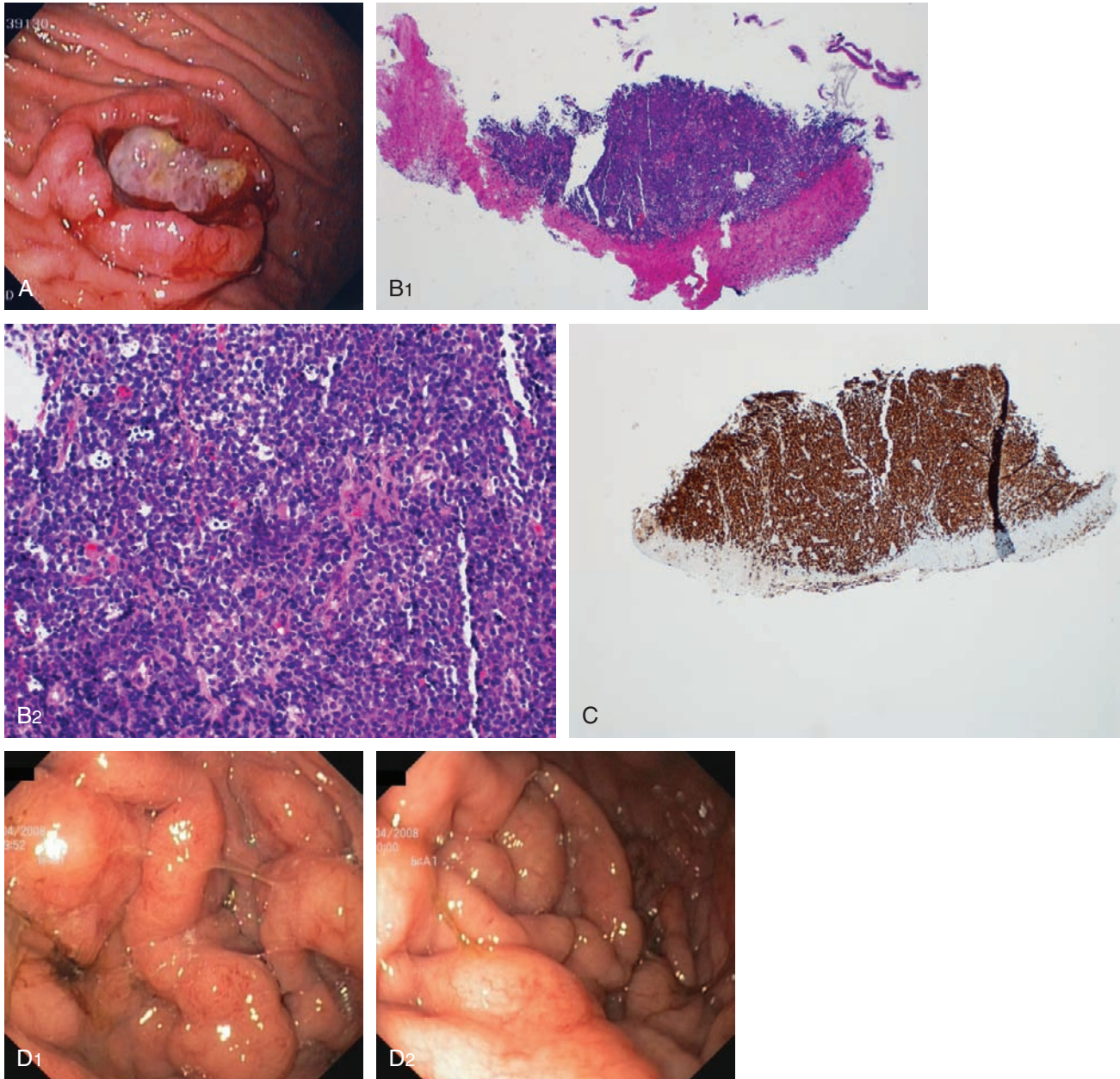


FIGURE 3.151 B CELL GASTRIC LYMPHOMA

A, Well-circumscribed donut lesion with central ulceration and fresh bleeding in the gastric body anteriorly. **B1, B2**, Ulcerated gastric mucosa with malignant lymphomatous infiltrate (diffuse large B cell lymphoma). **C**, Special stain for MUM1 demonstrated activated B lymphocytes, confirming the diagnosis and type of lymphoma. **D1, D2**, This B cell lymphoma resulted in diffuse thickening of the gastric folds.



Differential Diagnosis

B Cell Gastric Lymphoma (Figure 3.151)

- Gastric adenocarcinoma
- MALT lymphoma
- Metastatic lesion
 - Melanoma
 - Lung cancer
 - Breast cancer

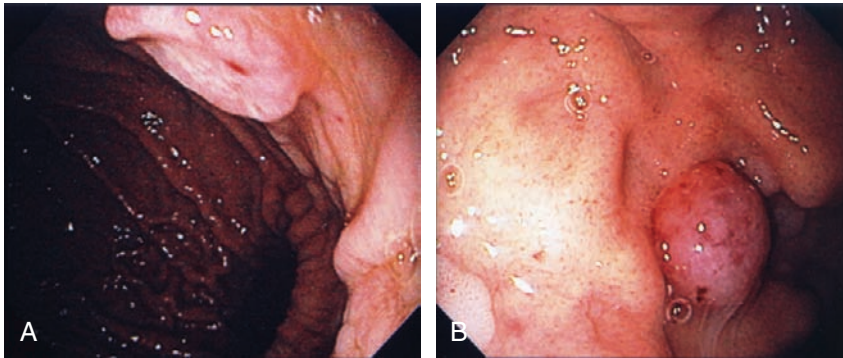


FIGURE 3.152 BURKITT'S LYMPHOMA
A, B, Multiple nodular lesions, some of which resemble the esophageal lesions (see [Figure 2.72](#)).



FIGURE 3.153 MUCOSA-ASSOCIATED LYMPHOID TUMOR (MALT) LYMPHOMA
Thickened gastric folds with scattered ulceration.

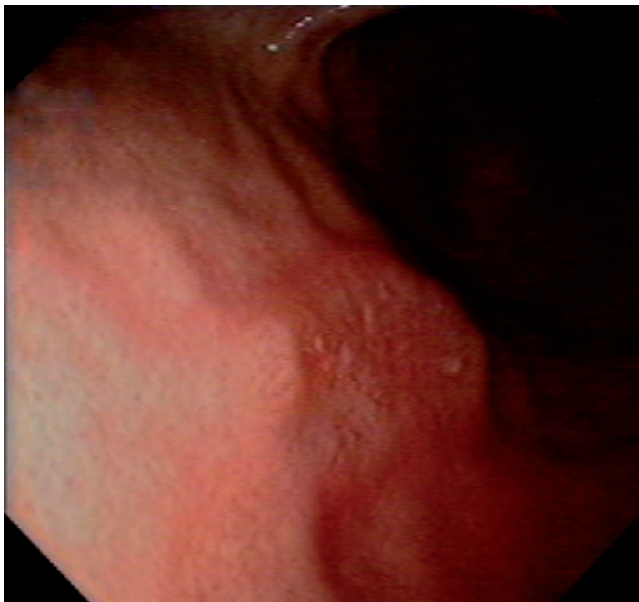


FIGURE 3.154 MUCOSA-ASSOCIATED LYMPHOID TUMOR (MALT) LYMPHOMA
Raised lesion of anterior gastric body.



FIGURE 3.155 NEUROENDOCRINE CARCINOMA
Raised donut-like lesion with central ulceration.

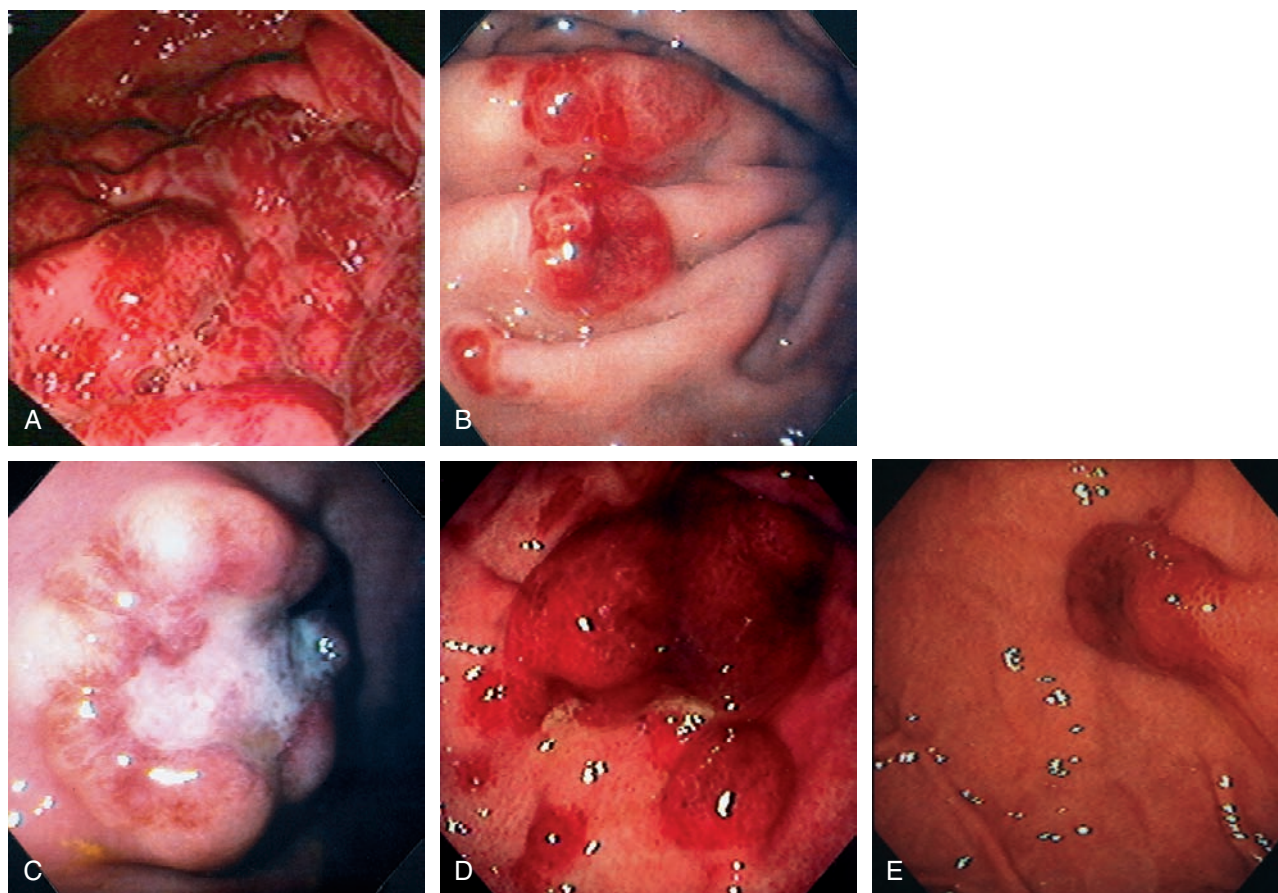


FIGURE 3.156 KAPOSI'S SARCOMA

A, Large, confluent, plaque-like lesions. **B**, Multiple well-demarcated, violet-red lesions, some of which are flat and some elevated. **C**, With progression, they may form large ulcerated lesions, with the margins maintaining this violaceous red appearance. The lesion is well circumscribed, and the surrounding mucosa is normal. **D**, Multiple confluent polypoid lesions with a characteristic violaceous red appearance. **E**, Solitary round nodular lesion, central raised area, and indentation in the proximal stomach.

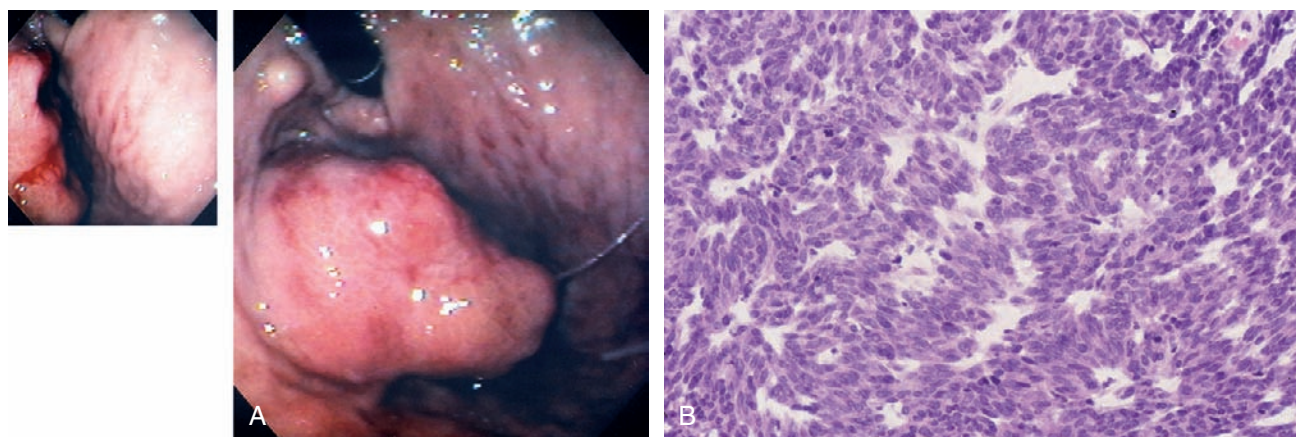


FIGURE 3.157 GASTROINTESTINAL STROMAL TUMOR (GIST)

A, A masslike lesion resembling a thigh appears to be protruding from the gastric wall. An associated nodule is seen by the endoscope. The middle of the lesion has two ulcerations with spontaneous bleeding (*inset*). **B**, Sheets of malignant spindle cells.

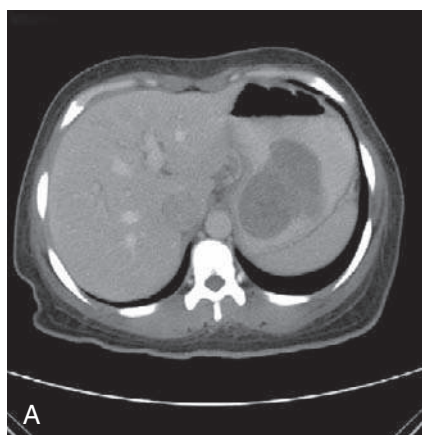
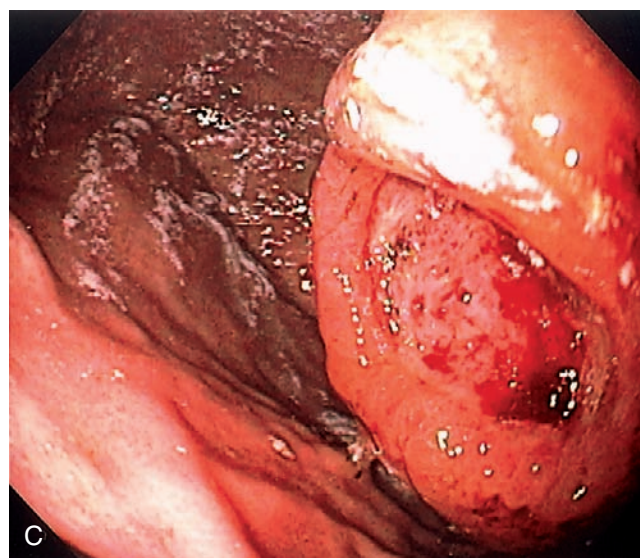
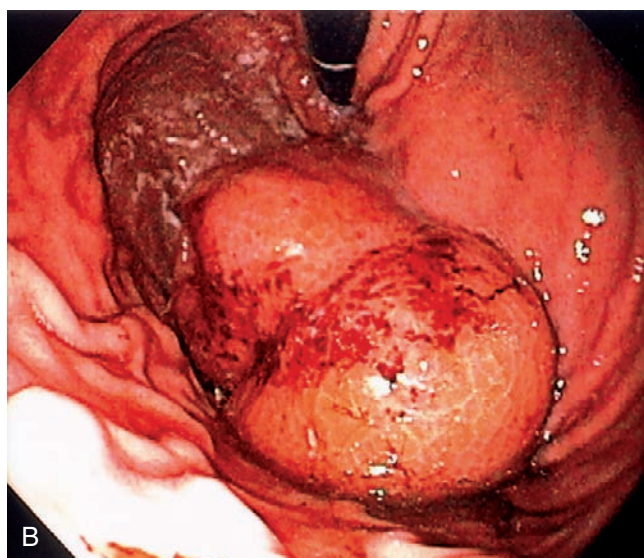


FIGURE 3.158 GASTROINTESTINAL STROMAL TUMOR (GIST)

A, Large luminal mass. **B**, Large, masslike lesion of the proximal stomach with fresh hemorrhage. **C**, Close-up shows a well-circumscribed ulcer in the center of the lesion, the site of bleeding.



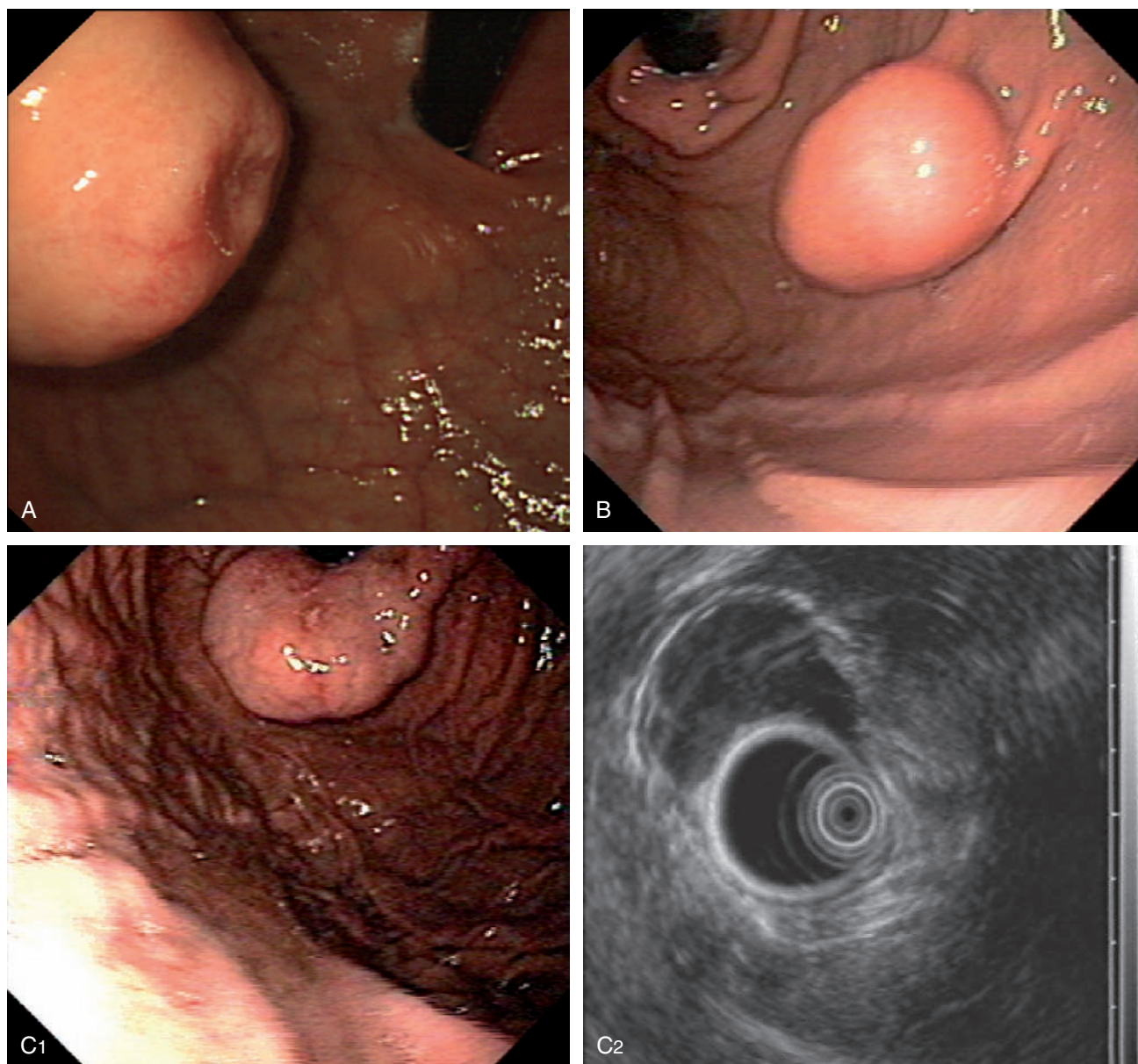


FIGURE 3.159 GASTROINTESTINAL STROMAL TUMOR (GIST)

A, Large lesion with central ulceration in the fundus. **B**, Round submucosal lesion in the fundus. **C1**, Submucosal lesion hanging from the GE junction. **C2**, EUS shows that the lesion arises from the muscle layer.

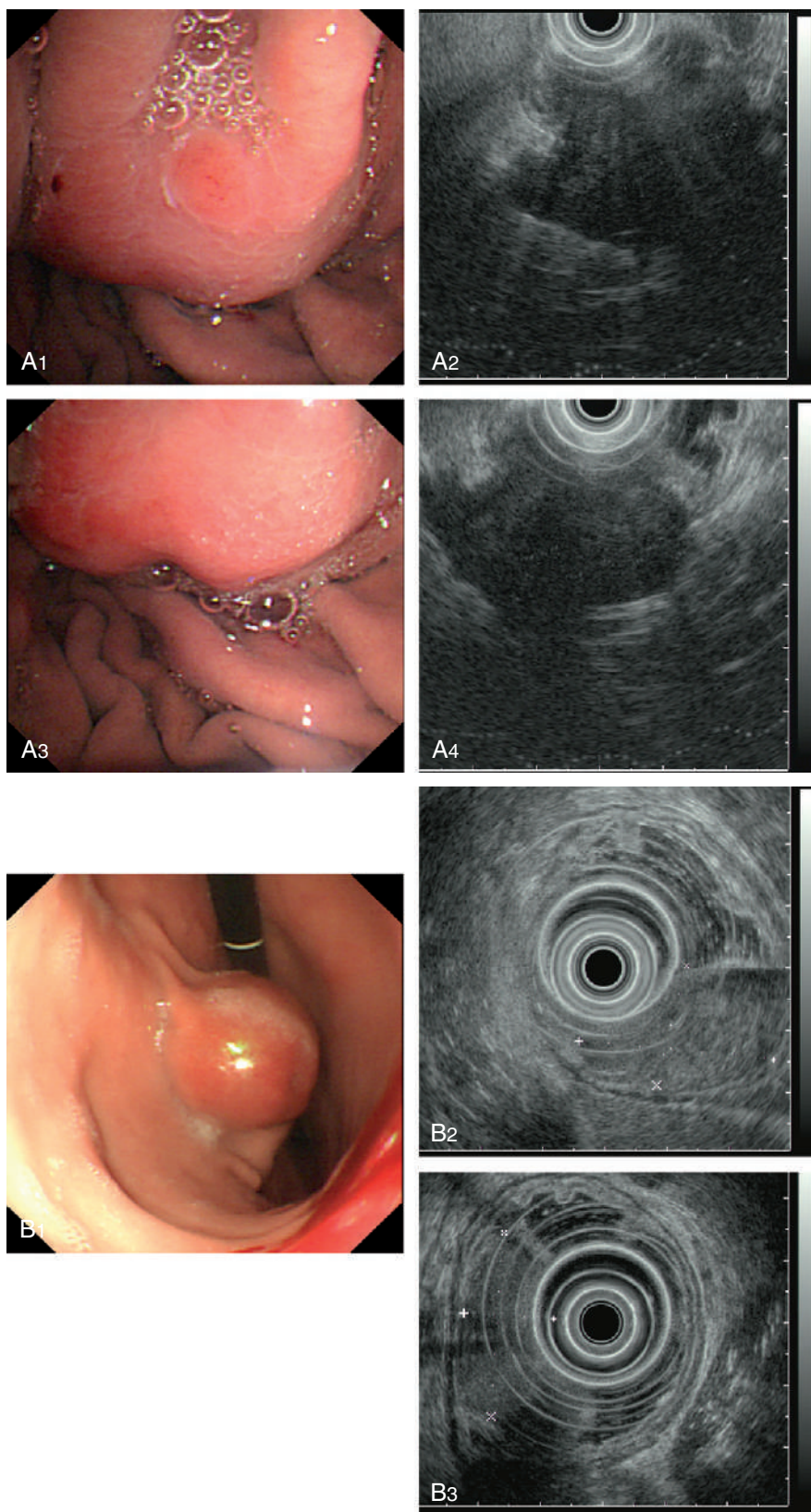
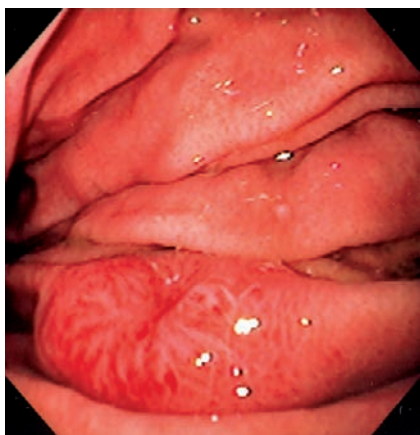
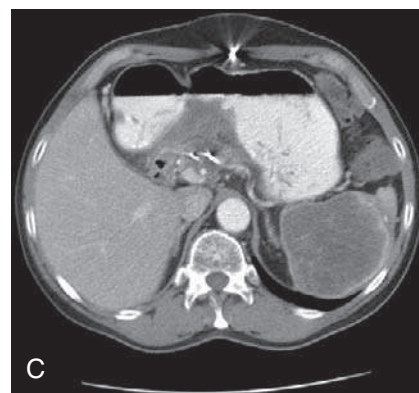


FIGURE 3.160 GASTROINTESTINAL STROMAL TUMOR (GIST)
A1-A4, Gastrointestinal stromal tumor arising from the muscularis propria. The tumor is suspected to be malignant.
B1-B4, Gastrointestinal stromal tumor arising from the muscularis mucosae.

**FIGURE 3.161** METASTATIC BREAST CANCER

Well-circumscribed raised lesion with central indentation in the gastric body.

**FIGURE 3.162** METASTATIC RECTAL CANCER

A, Well-circumscribed ulcerated lesion in the midbody posteriorly. The tumor extends into the antrum with a polypoid configuration (**B**). **C**, CT scan shows the large lesion invading the distal stomach.

**FIGURE 3.163** METASTATIC LUNG CANCER

Well-circumscribed elevated ulcerative lesion as seen on retroflexion. Evidence of recent bleeding is present.



Differential Diagnosis

Metastatic Lung Cancer ([Figure 3.163](#))

- Metastatic melanoma
- Metastatic breast cancer
- Gastrointestinal stromal tumor
- Lymphoma

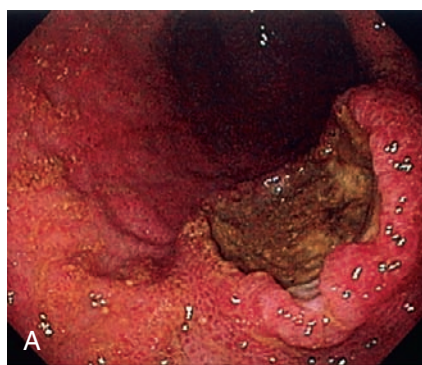
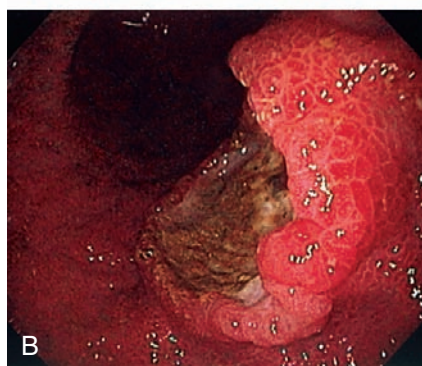


FIGURE 3.164
METASTATIC MELANOMA
A, B, Well-circumscribed raised (volcano) ulcerated lesion.



Differential Diagnosis

Metastatic Melanoma (Figure 3.164)

- Adenocarcinoma
- Metastatic neoplasm, breast and lung
- Gastric lymphoma

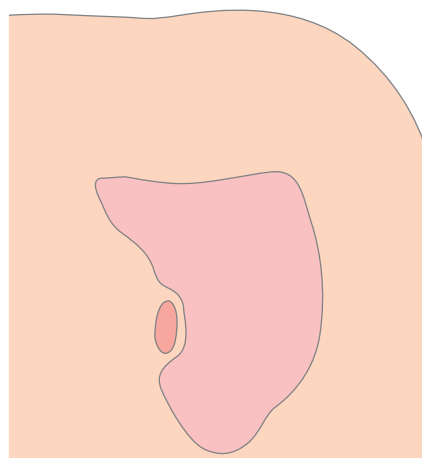
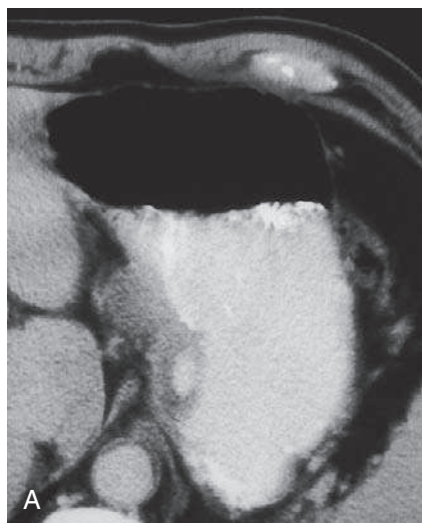
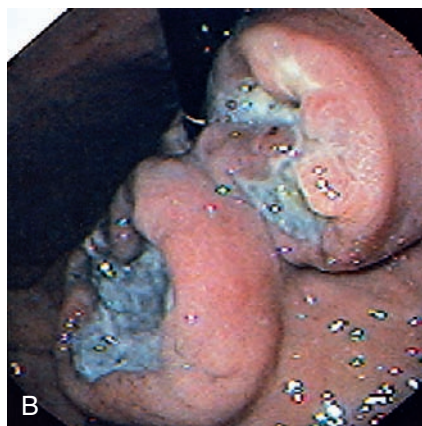


FIGURE 3.165 METASTATIC MELANOMA
A, Upper GI series shows raised lesion with central ulceration. **B,** Multiple raised lesions with central ulceration.



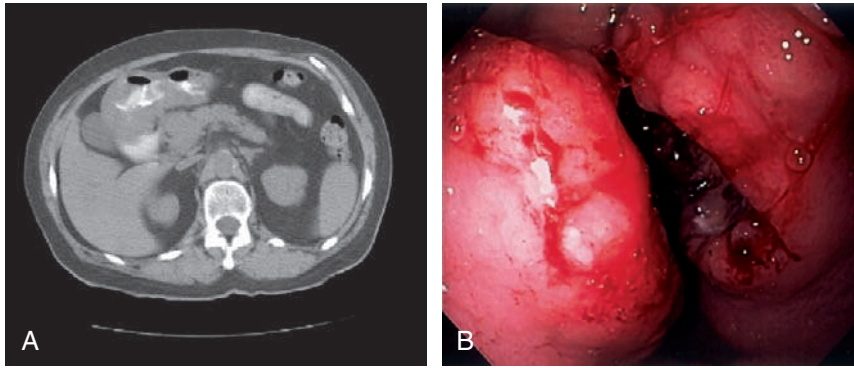


FIGURE 3.166 METASTATIC MELANOMA
A, Large, ulcerated, masslike lesions of the gastric antrum. **B**, Large ulcerated "kissing lesions" of the gastric antrum.

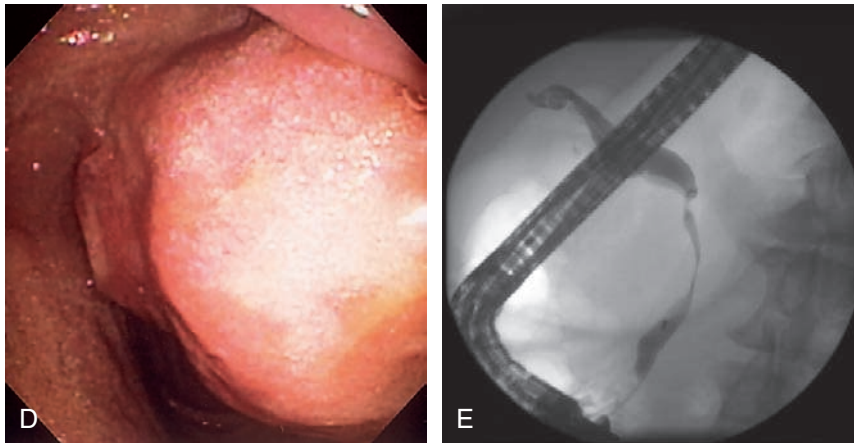
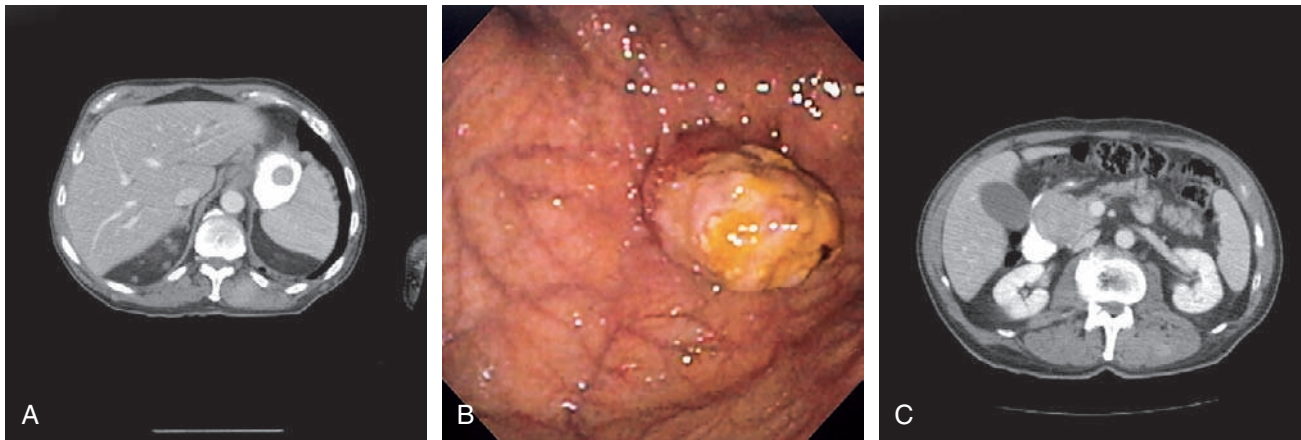


FIGURE 3.167 METASTATIC MELANOMA
A, Fundal mass. **B**, Nodular lesion with overlying exudate extending from the gastric fundus. **C**, Mass lesion representing a nodal mass at the pancreatic head impinging on the duodenum. **D**, The mass is submucosal in nature. **E**, The bile duct stricture correlates well with the characteristics of the lesion. **F1**, **F2**, Small black lesions typical for melanoma.

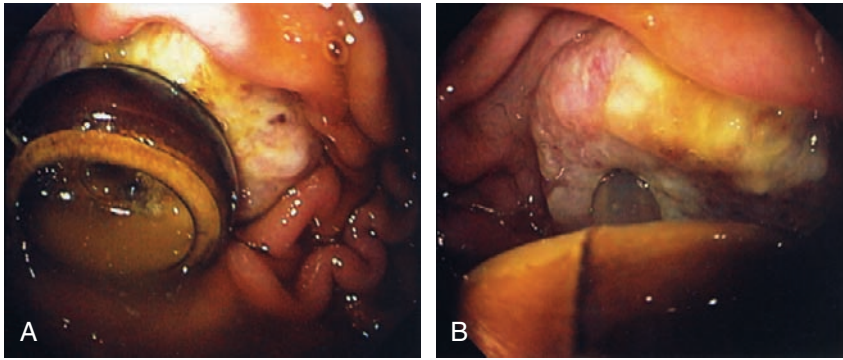


FIGURE 3.168 SQUAMOUS CELL CANCER AT THE SITE OF A PERCUTANEOUS ENDOSCOPIC GASTROSTOMY (PEG) TUBE
A, Ulceration is seen around the PEG tube.
B, When the PEG tube is advanced inward, the large nodular lesion is seen. Biopsy confirms squamous cell cancer presumably seeding at the time of gastrostomy tube placement for squamous cell cancer of the esophagus.

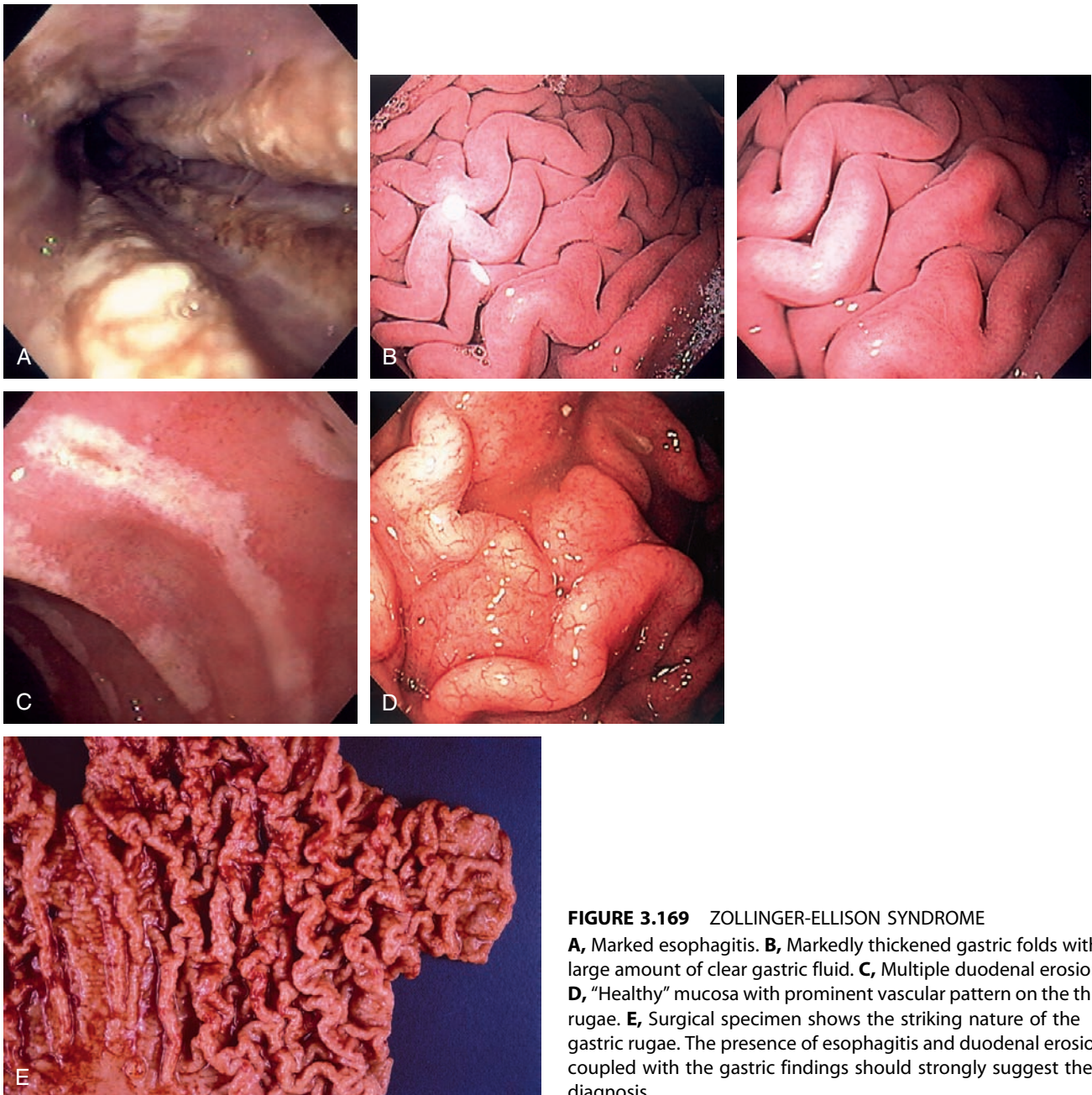


FIGURE 3.169 ZOLLINGER-ELLISON SYNDROME
A, Marked esophagitis. **B**, Markedly thickened gastric folds with a large amount of clear gastric fluid. **C**, Multiple duodenal erosions. **D**, "Healthy" mucosa with prominent vascular pattern on the thick rugae. **E**, Surgical specimen shows the striking nature of the gastric rugae. The presence of esophagitis and duodenal erosions coupled with the gastric findings should strongly suggest the diagnosis.

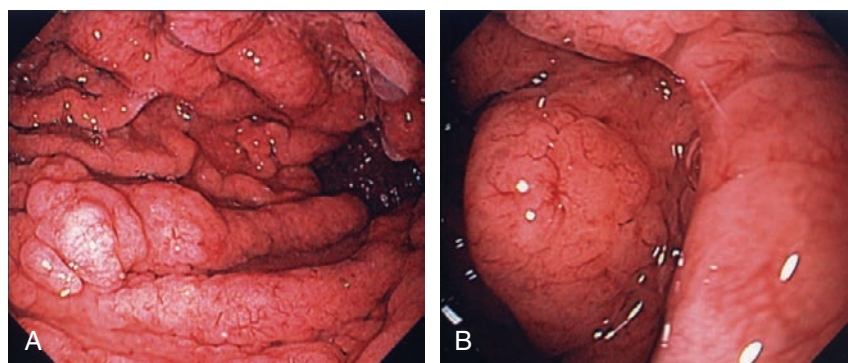


FIGURE 3.170 ZOLLINGER-ELLISON SYNDROME

A, B, In this patient, the gastric folds were more pronounced and nodular, and the mucosa was hypervascular.

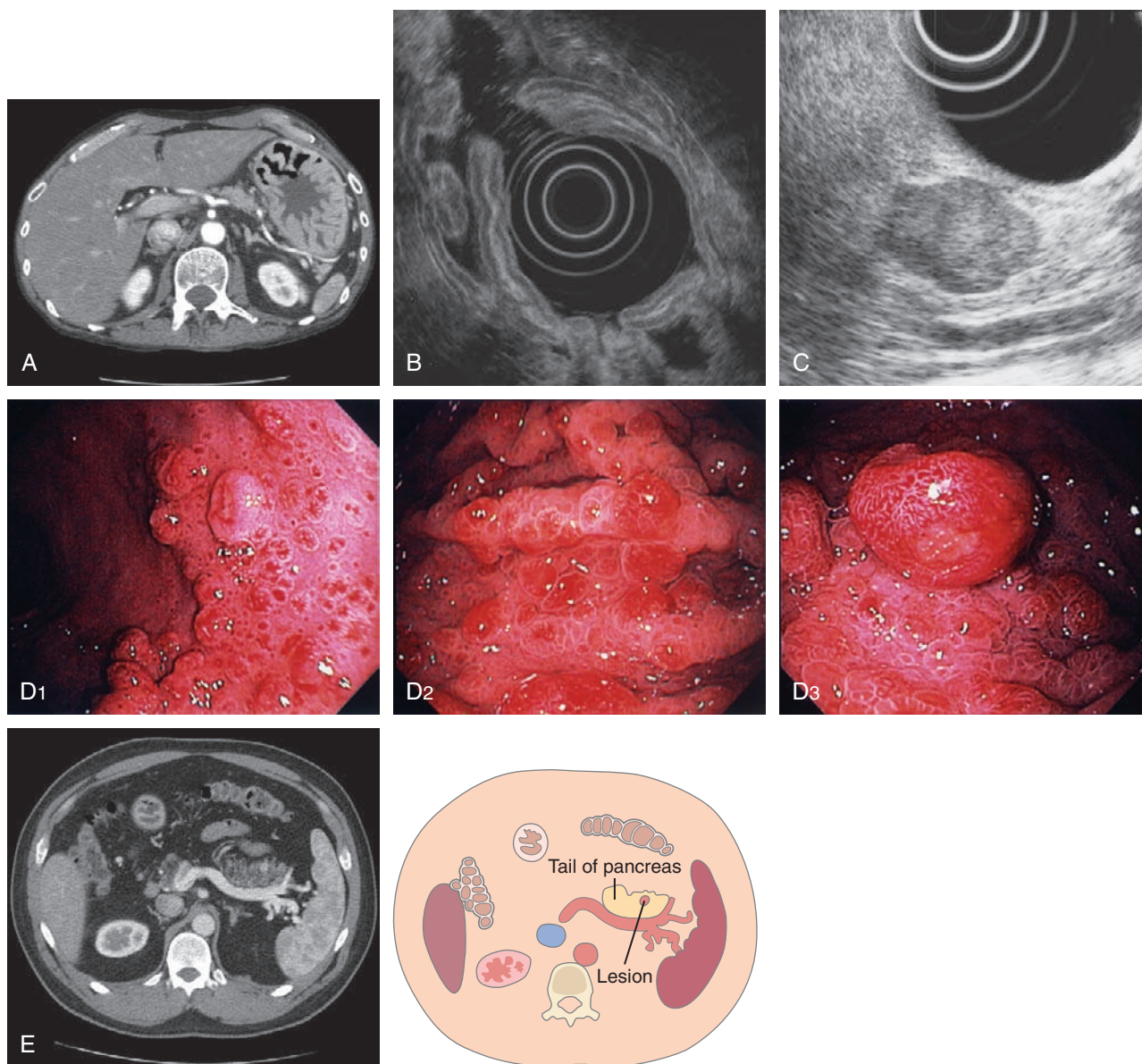


FIGURE 3.171 ZOLLINGER-ELLISON SYNDROME ASSOCIATED WITH MULTIPLE ENDOCRINE NEOPLASIA TYPE 1

A, CT scan performed for upper abdominal pain shows marked gastric fold thickening. **B,** Endoscopic ultrasonography (EUS) confirms the strikingly thickened gastric folds. **C,** In addition, multiple pancreatic tumors are present. **D1, D2,** The gastric folds are markedly thickened with numerous small overlying red polypoid lesions. **D3,** Some of the polyps are much larger and are ulcerated. Note even the very tiny red lesions are carcinoid tumors. **E,** A hyperenhancing lesion is in the pancreatic tail corresponding to one of the lesions (gastrinomas) shown on EUS in **C**.

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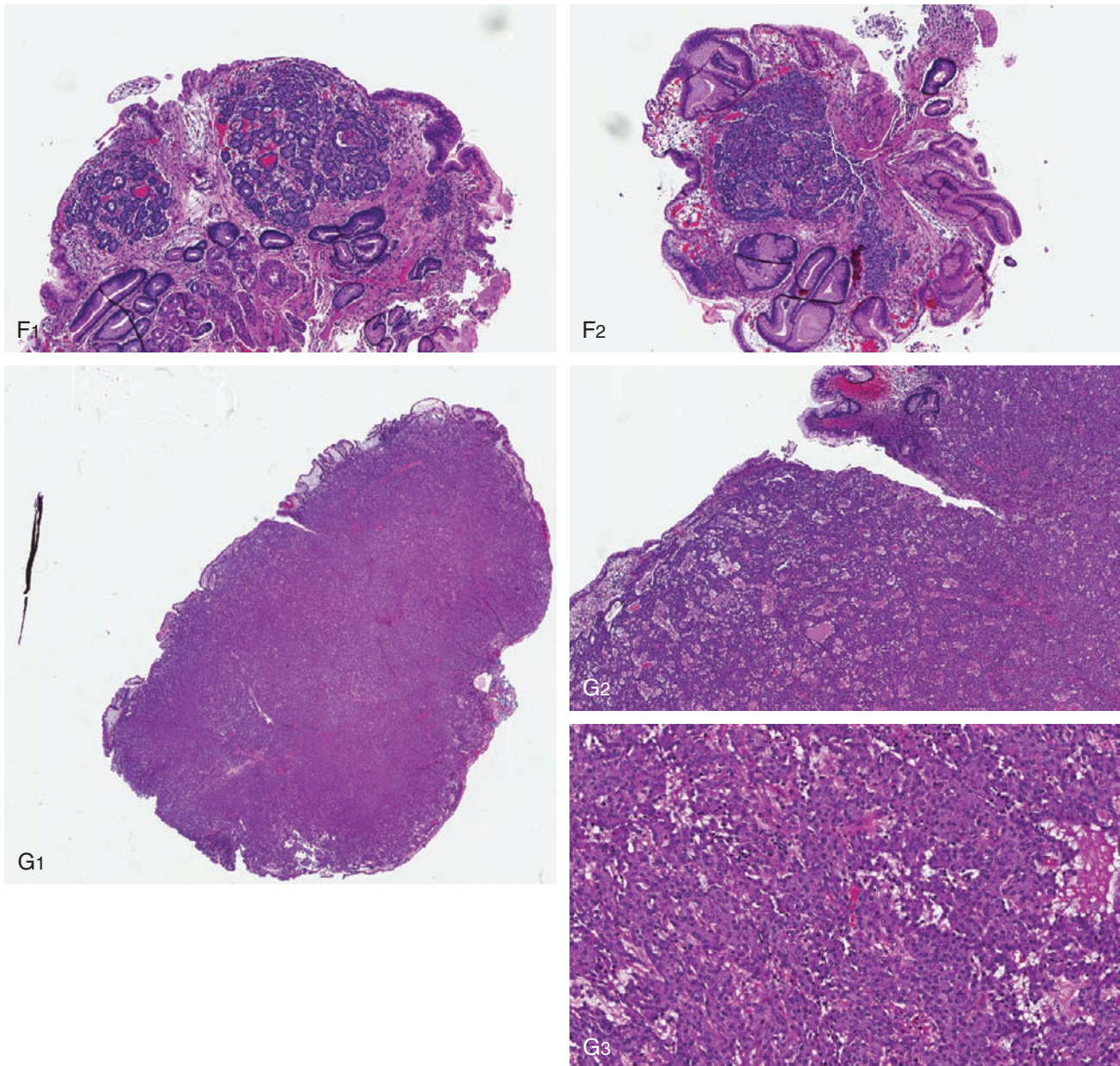


FIGURE 3.171 ZOLLINGER-ELLISON SYNDROME ASSOCIATED WITH MULTIPLE ENDOCRINE NEOPLASIA TYPE 1

F1, F2, Biopsy of one of the numerous small red circumscribed areas demonstrates nests of cells typical for a small carcinoid tumor (microcarcinoid) corresponding to the endoscopic lesions. Also note the marked subepithelial hemorrhage, which corresponds to the endoscopic appearance (**D3**). **G1**, The large gastric polyp has been removed showing a carcinoid tumor. **G2**, Shallow ulceration is present on the mucosal surface, confirming the endoscopic impression. **G3**, The tumor is well differentiated and benign.

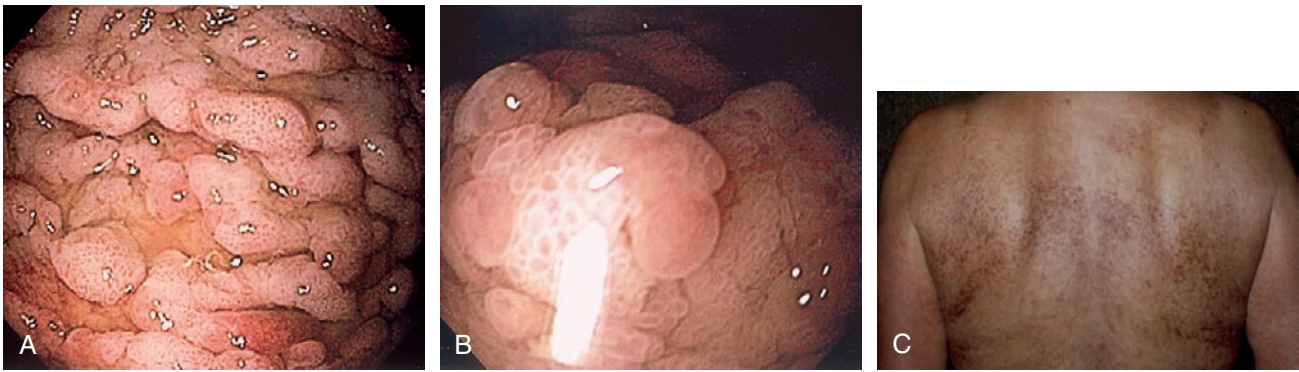


FIGURE 3.172 SYSTEMIC MASTOCYTOSIS

A, Marked thickening of the gastric rugae. **B**, Marked prominence of the area gastricae. **C**, Hyperpigmented skin lesions on the back termed *urticaria pigmentosa*.

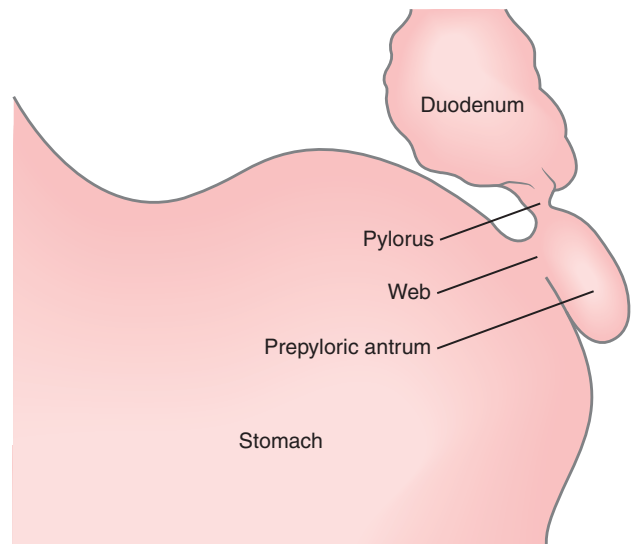
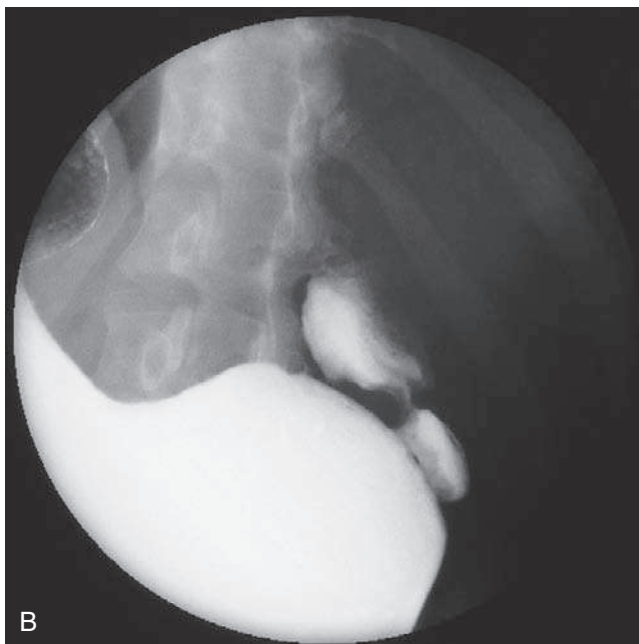
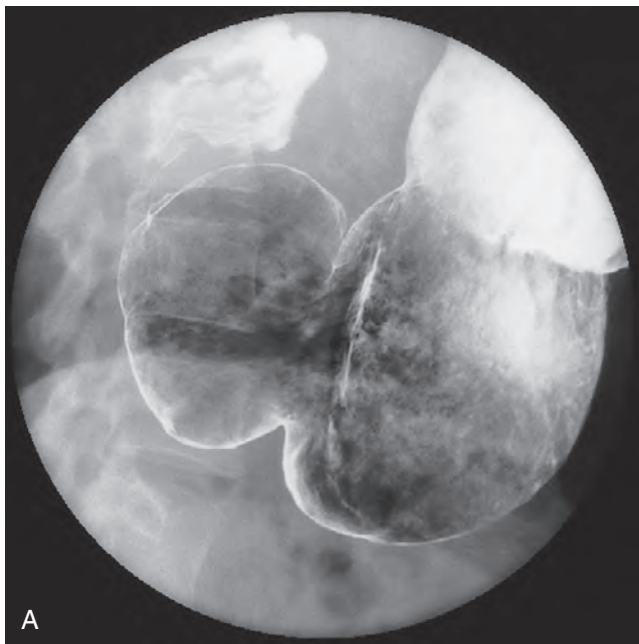


FIGURE 3.173 ANTRAL MUCOSAL DIAPHRAGM

A, A dilated stomach ends abruptly without evidence of ulceration or mass lesion. **B**, A portion of stomach, as well as normal-appearing pylorus and duodenal bulb.

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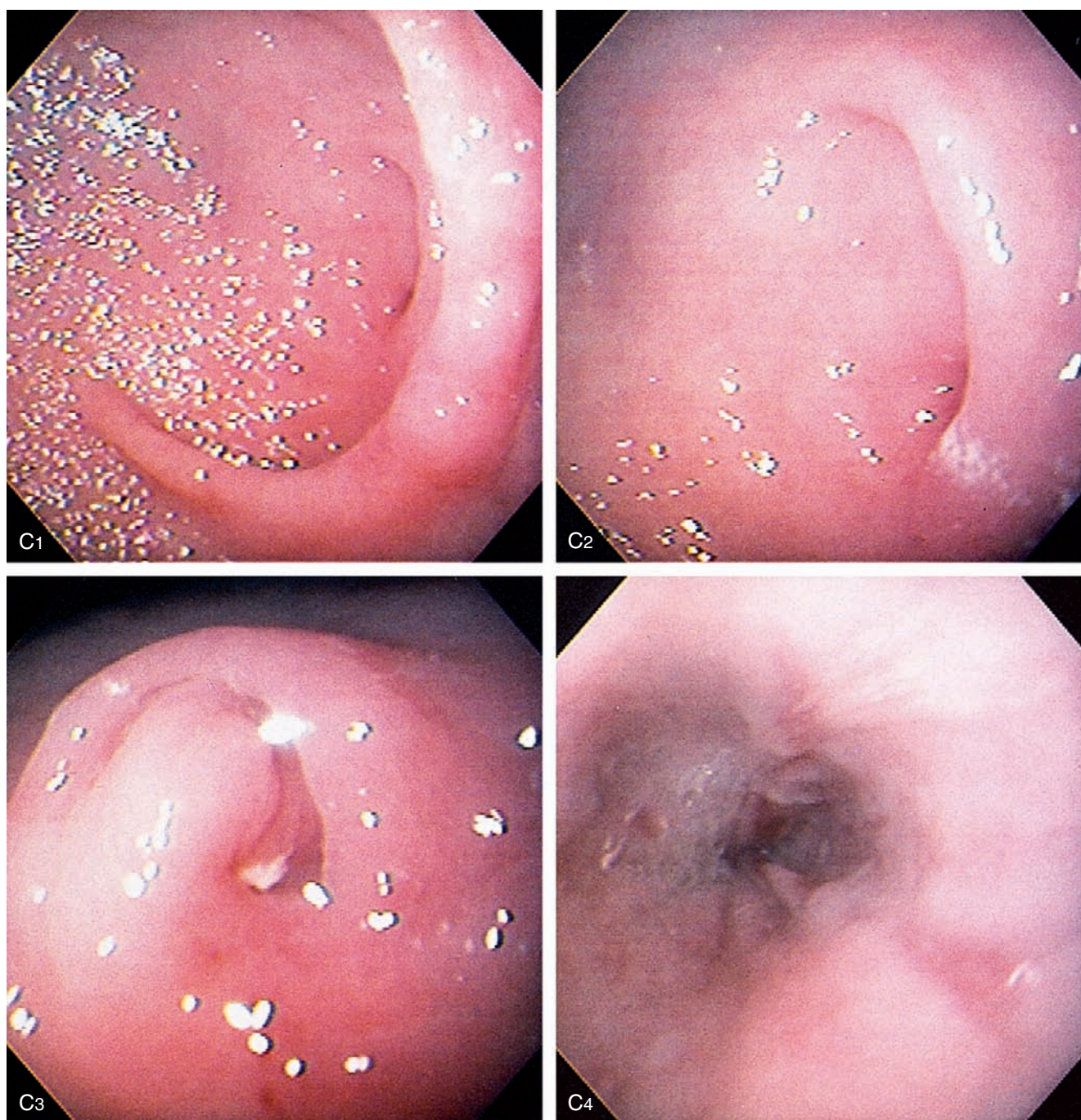


FIGURE 3.173 ANTRAL MUCOSAL DIAPHRAGM

C, A semicircular ring demarcates the abrupt end of the stomach (**C1, C2**). In the middle of this semicircular fold is a pinhole opening (**C3**). The endoscope could not be advanced through this area. There is associated reflux esophagitis resulting from the gastric outlet obstruction (**C4**).

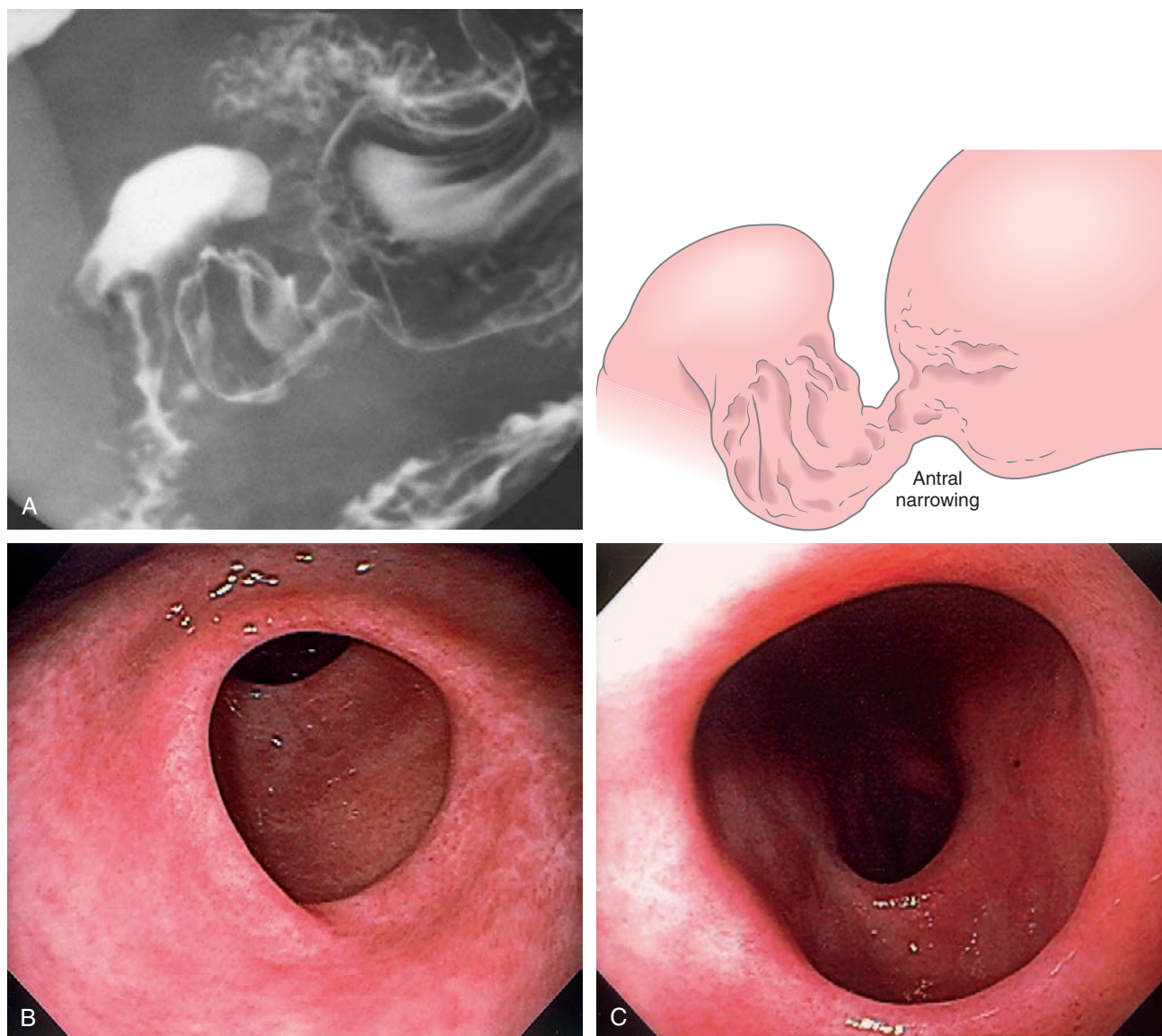


FIGURE 3.174 ANTRAL RING

A, Segmental area of nodular annular narrowing in the distal antrum. The proximal and distal portions of the antrum appear normal, as does the duodenal bulb. **B**, Ringlike abnormality with apparent mucosal thickening surrounding the area. **C**, Close-up view of the ring demonstrates normal-appearing mucosa, with the antrum and pylorus in the distance.

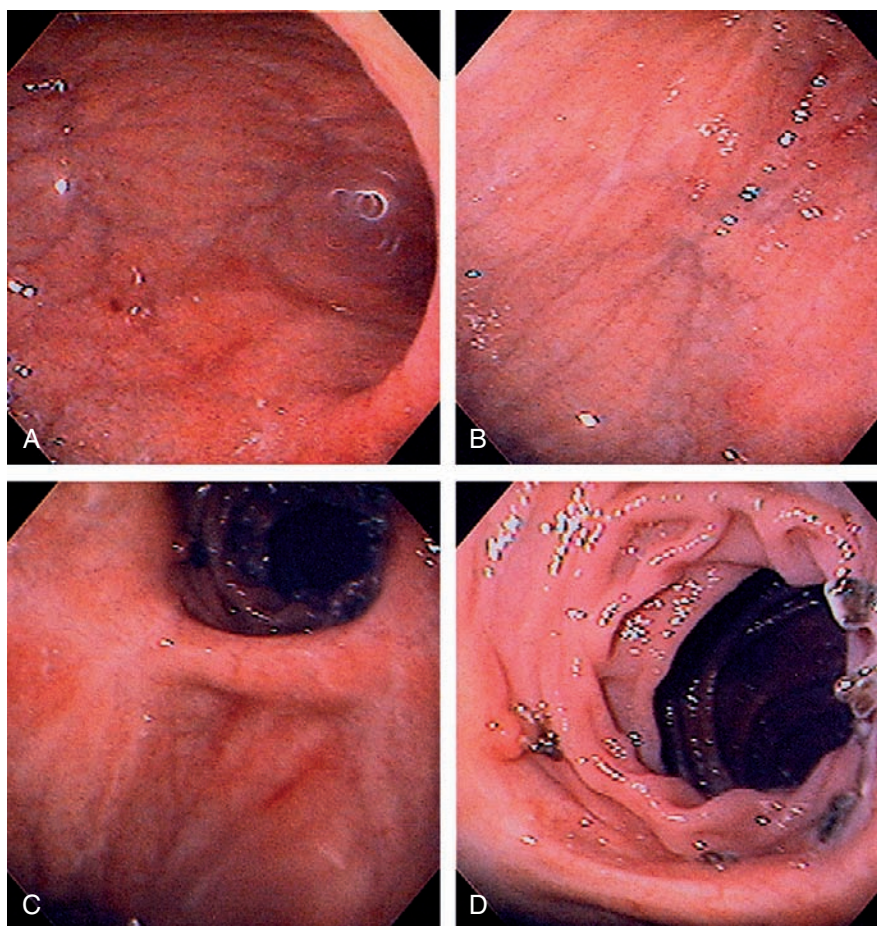


FIGURE 3.175 BILLROTH I ANASTOMOSIS

The gastric remnant appears somewhat atrophic (**A, B**). The anastomosis is visible at the level of the angularis and is widely patent, with suture material present (**C, D**).

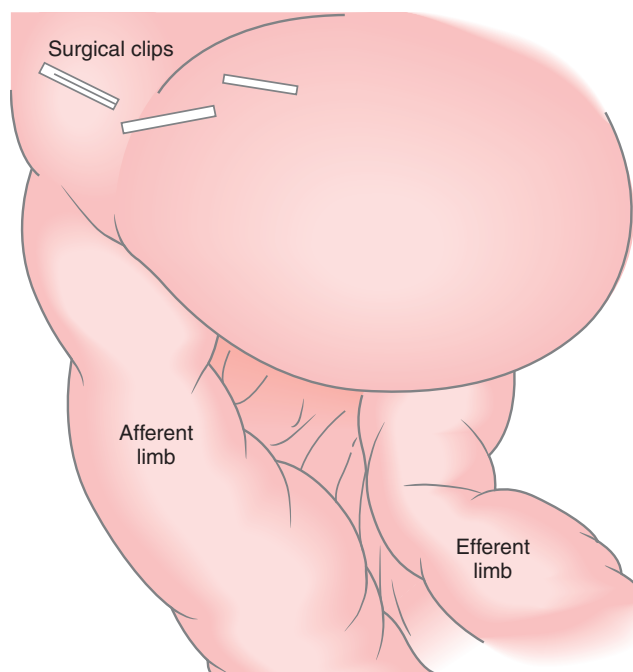


FIGURE 3.176 BILLROTH II ANASTOMOSIS
Gastric remnant with both small-bowel limbs visible.

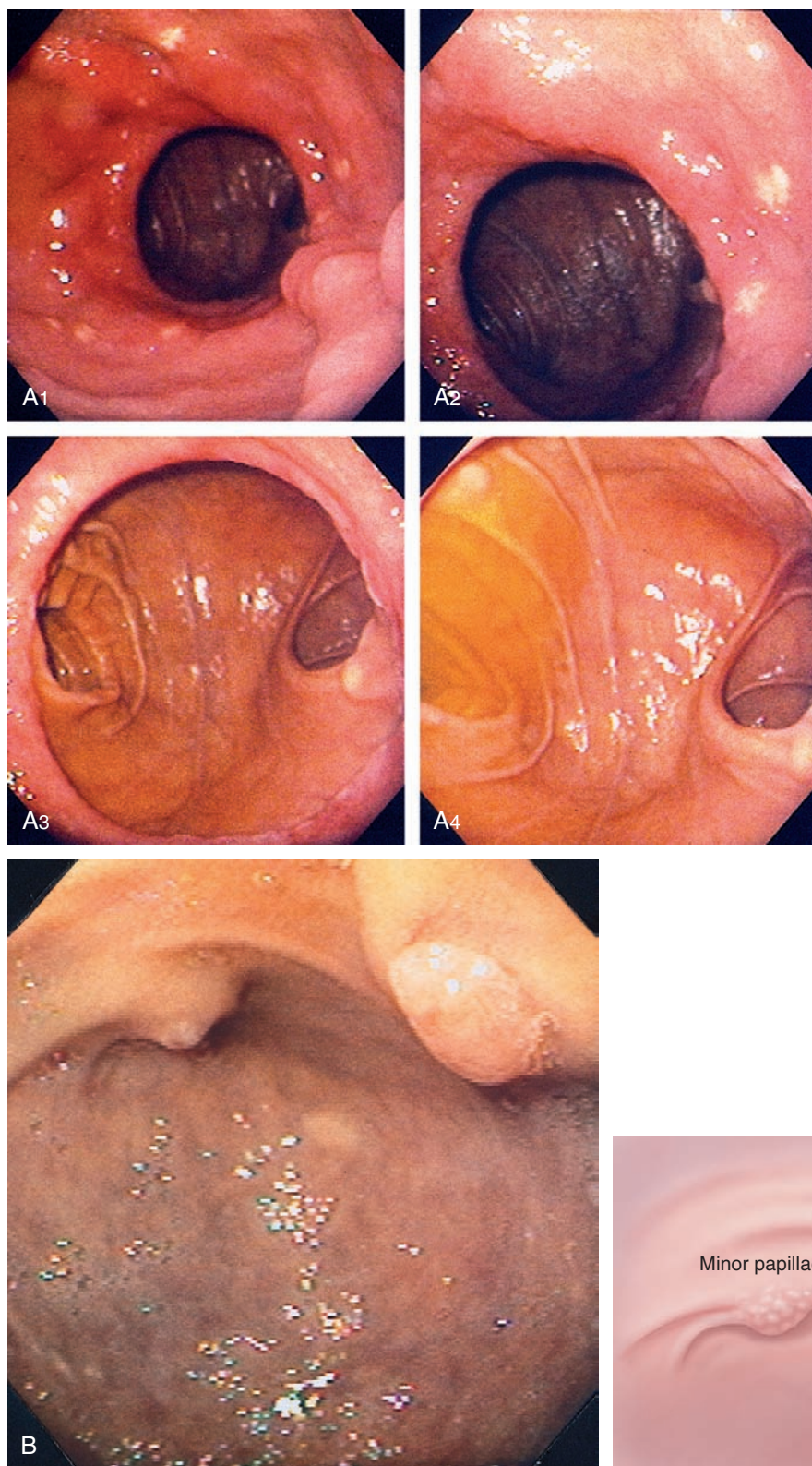


FIGURE 3.177 BILLROTH II ANASTOMOSIS

A, Diffuse erythema is present in the distal gastric remnant. Multiple yellow plaques represent xanthelasma (**A1**, **A2**). Both afferent and efferent limbs are at the anastomosis (**A3**, **A4**). The afferent limb is on the right and the efferent on the left. **B**, At the end of the afferent limb, the major and minor papillae are shown.

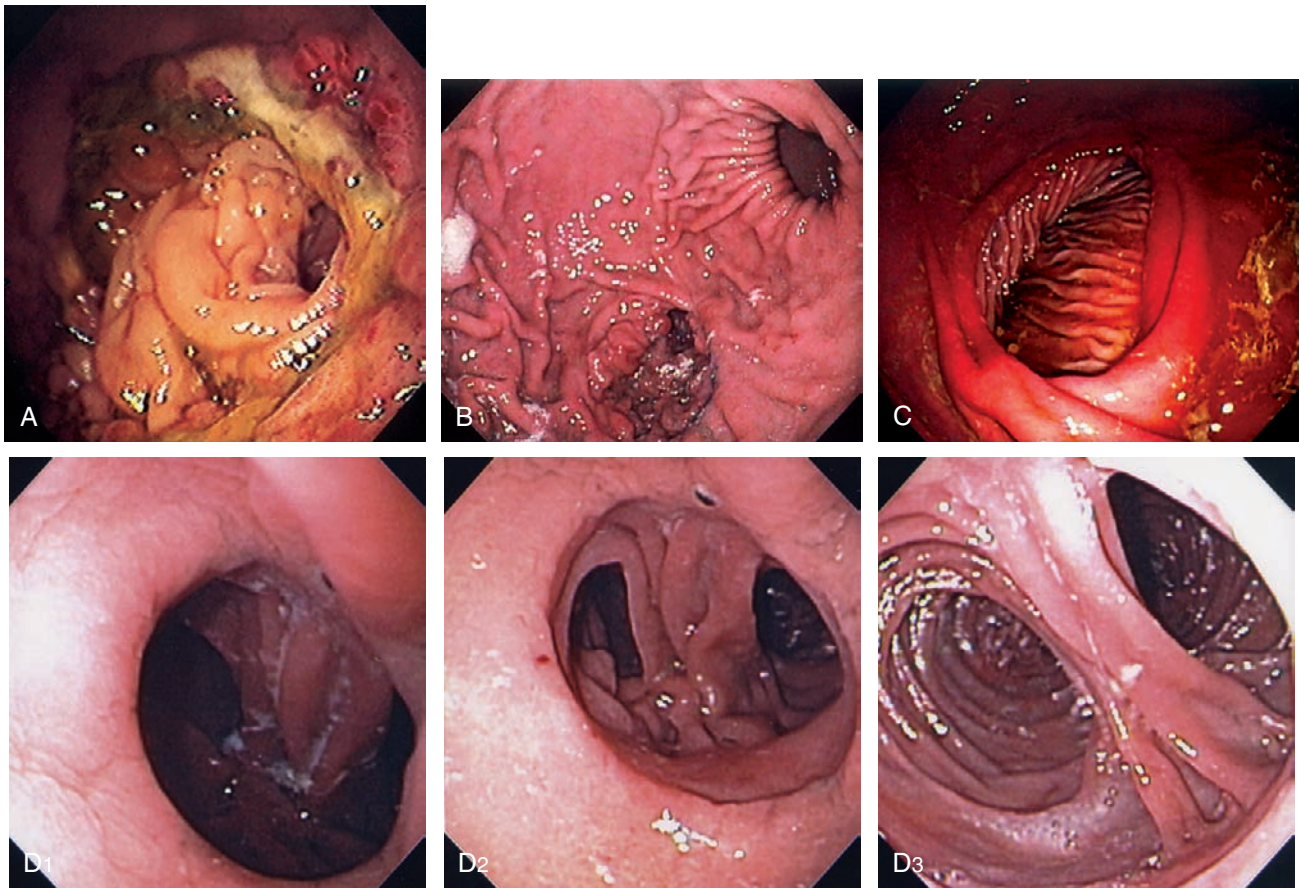


FIGURE 3.178 GASTROJEJUNOSTOMY

A, The jejunum is anastomosed to the posterior gastric body. Ulceration around the anastomosis is frequent in the immediate perioperative period. **B**, Note the relationship of the anastomosis to the antrum seen to the right. **C**, Widely patent anastomosis. **D1**, In a patient with prior Roux-en-Y gastric bypass, the gastric pouch is seen from the gastroesophageal junction. **D2**, The gastric pouch is small and the small-bowel limbs are visible. **D3**, Both small-bowel limbs are shown.

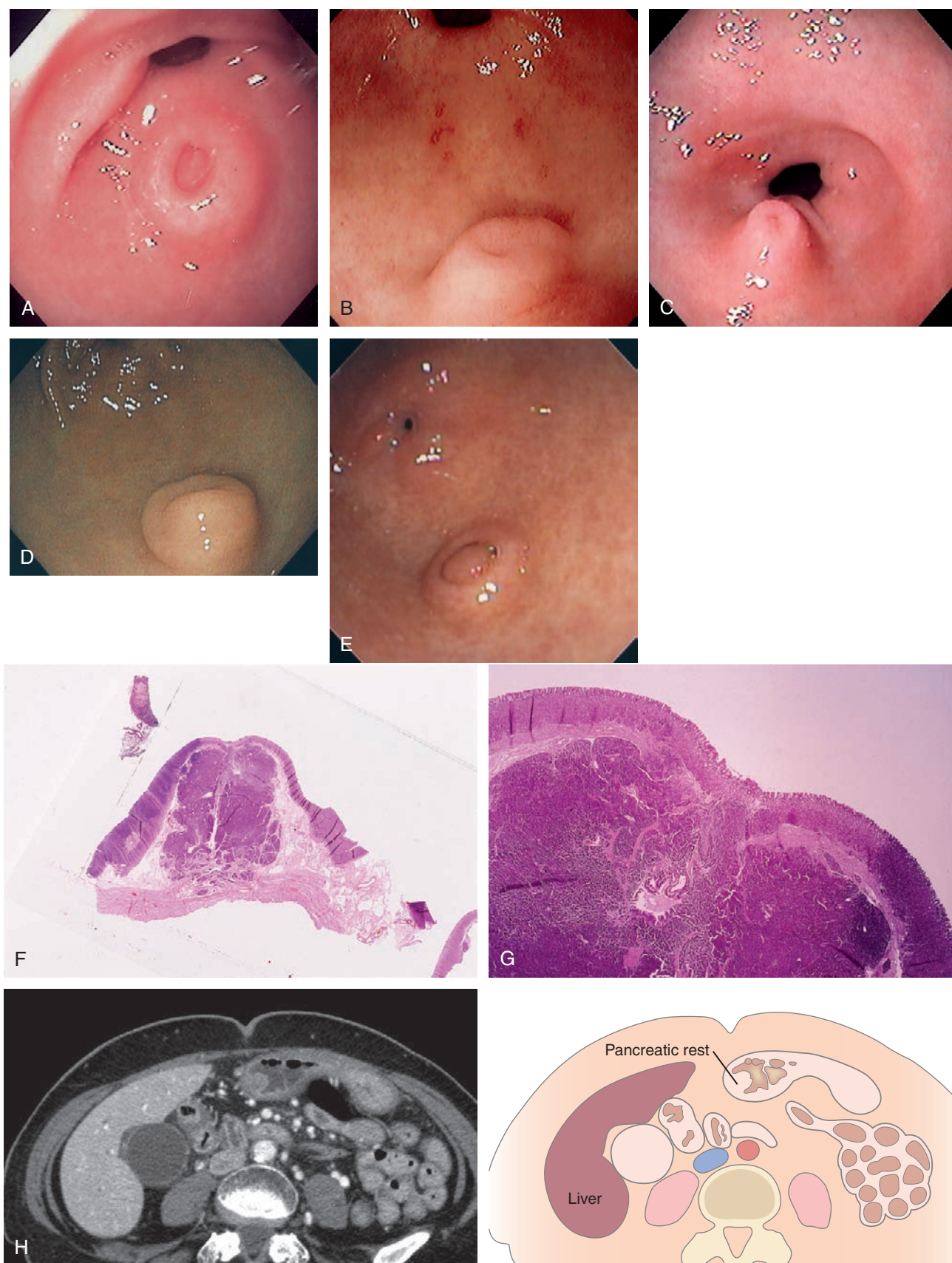


FIGURE 3.179 PANCREATIC REST

Variable appearance of a pancreatic rest (A-E). F, G, Pancreatic tissue present in this submucosal lesion. H, CT scan shows a small lesion corresponding to D.

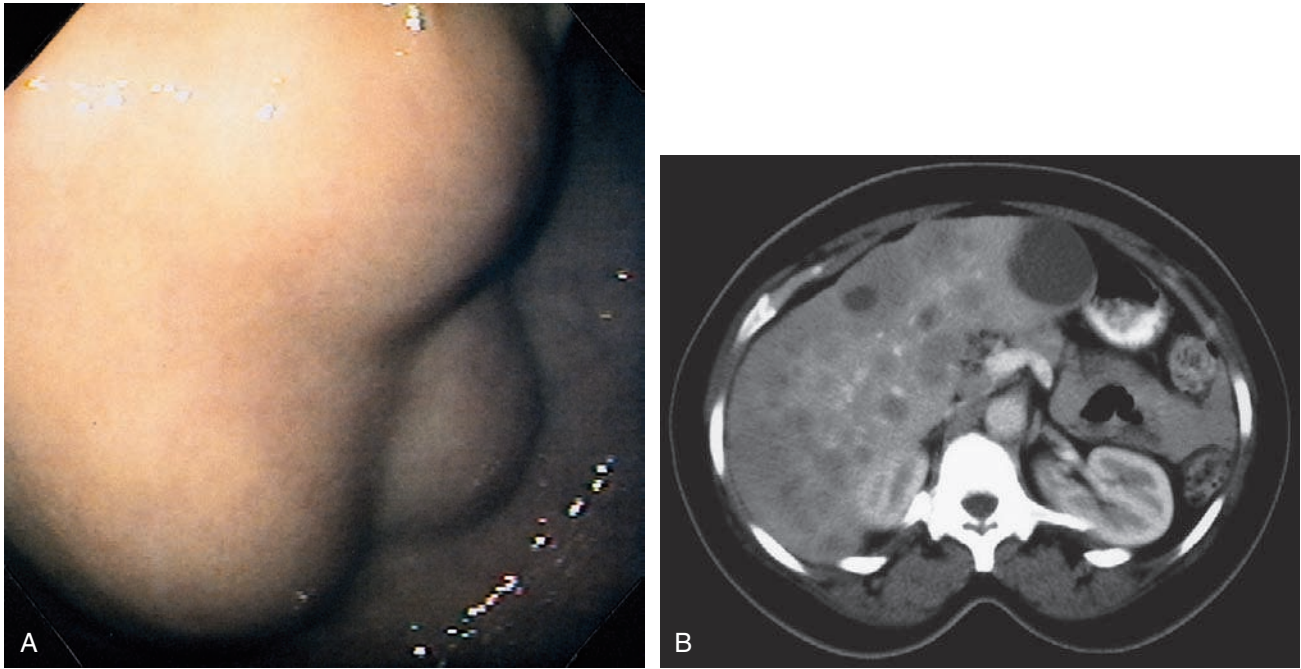


FIGURE 3.180 EXTRINSIC LESION

A, A multilobed nodular lesion is seen pushing into the gastric body anteriorly. The nodular lesion was manipulated with a closed biopsy forceps and found to be hard. **B**, Multiple metastatic lesions in the liver. A large lesion in the left lobe is impinging on the stomach, corresponding to the area of extrinsic compression.

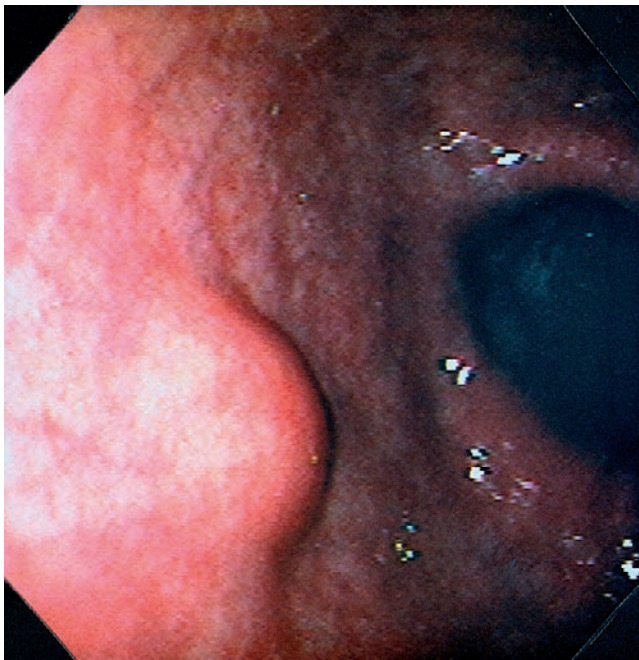


FIGURE 3.181 EXTRINSIC LESION

Round, well-circumscribed lesion in the anterior gastric body. The overlying mucosa is normal. When the lesion was probed with the closed biopsy forceps, it moved freely and was firm. This lesion might be a benign submucosal lesion, malignant submucosal lesion, or extrinsic lesion such as a lymph node.

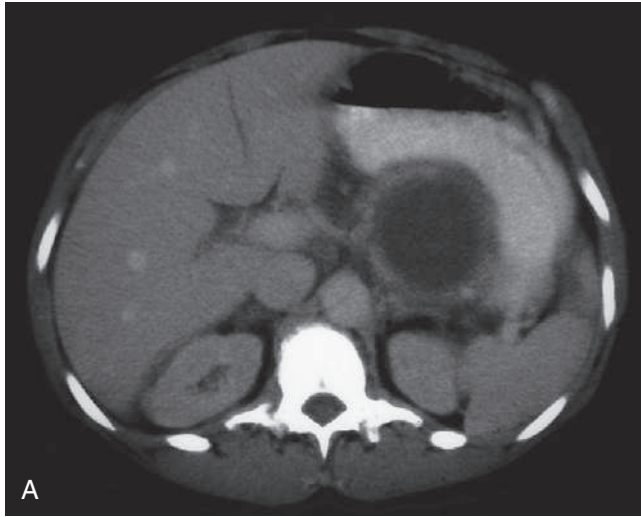
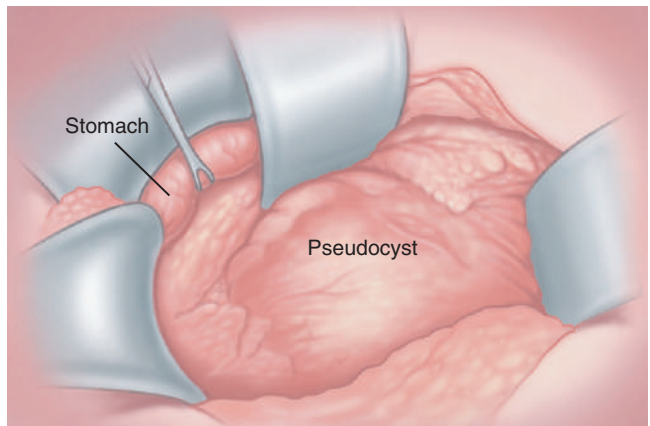
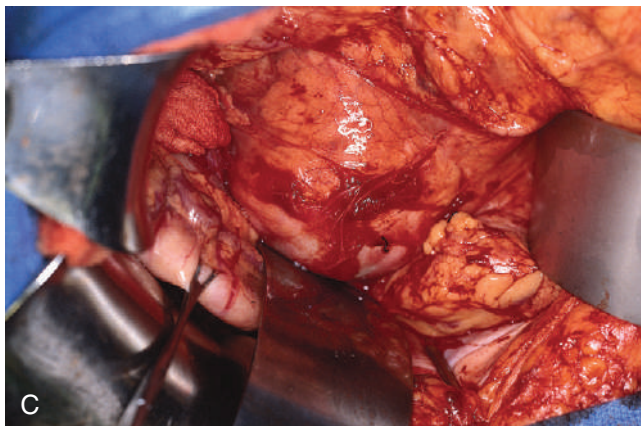
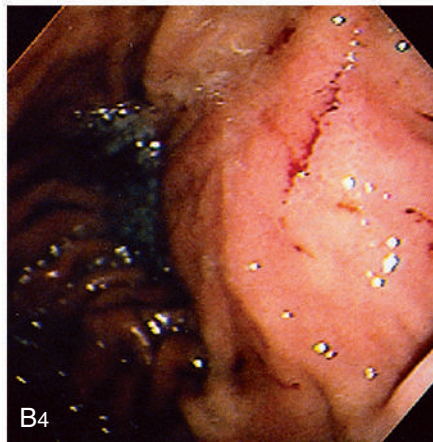
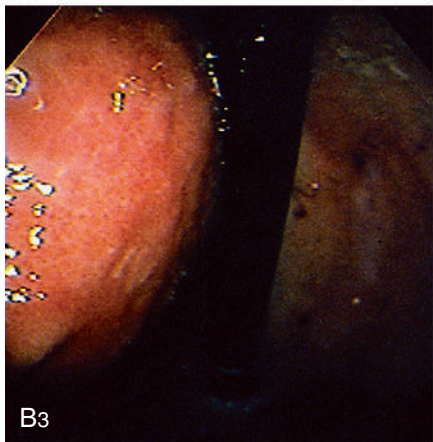
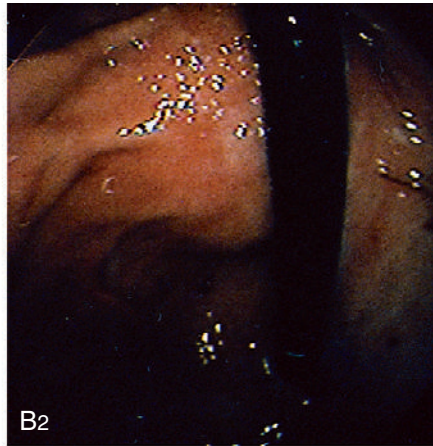
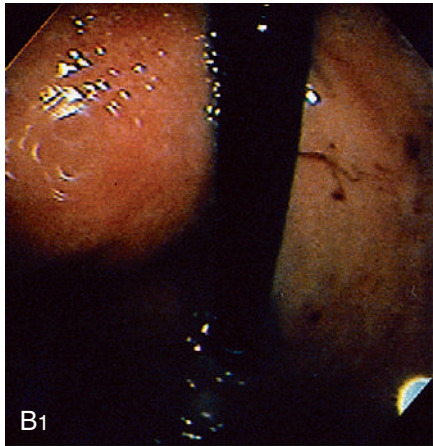


FIGURE 3.182 EXTRINSIC LESION: PANCREATIC PSEUDOCYST
A, Large pseudocyst in the tail of the pancreas, causing compression on the posterior gastric wall. **B1-B4**, Extrinsic compression occurring posteriorly in the proximal stomach. **C**, Large pseudocyst and its relationship to the stomach.



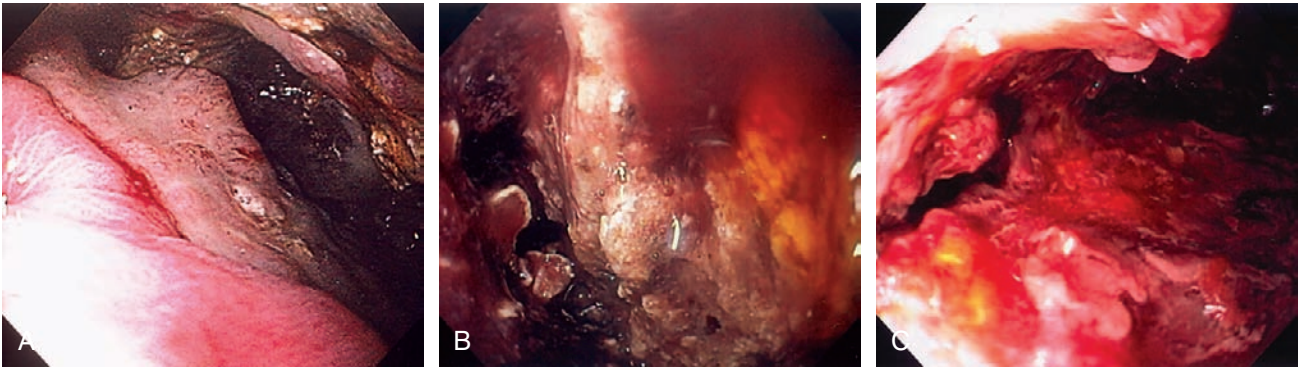


FIGURE 3.183 PSEUDOCYST CAVITY AFTER SURGICAL CYST GASTROSTOMY

A, Widely patent anastomosis to the cyst cavity. **B**, Marked nodularity and exudate representing the pseudocyst cavity. **C**, Cavity entered from stomach.



FIGURE 3.184 PRIOR SURGICAL CYST GASTROSTOMY

A1, A2, Large adherent exudate on the posterior gastric wall. **B1, B2**, After removal of some of the exudate, the endoscope was passed through an opening into a large cavity representing the pseudocyst (**C1-C3**).

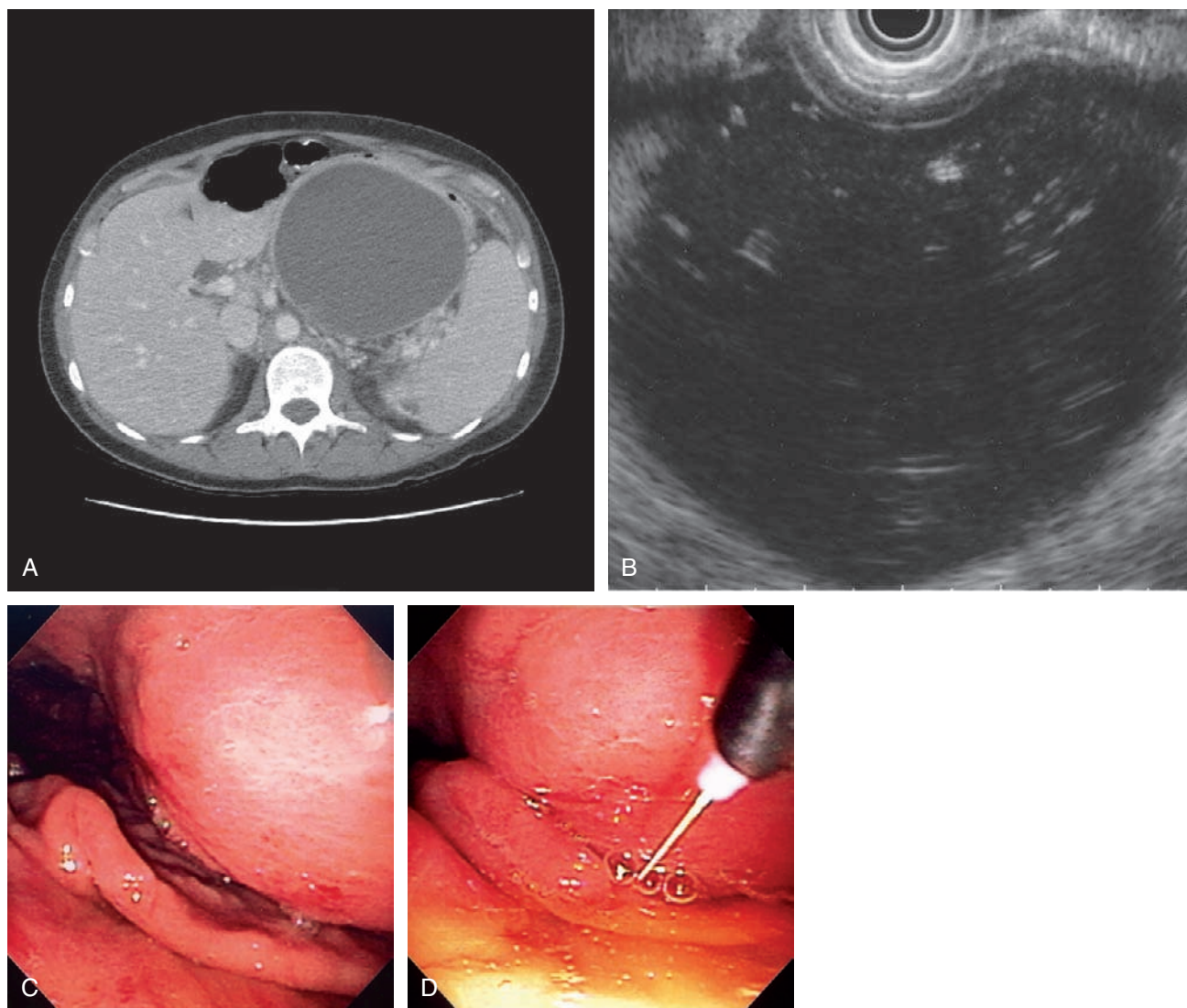


FIGURE 3.185 ENDOSCOPIC CYST GASTROSTOMY

A, Large retrogastric fluid collection. Note the stomach is compressed. **B**, The cyst cavity is large and contains some internal echoes suggestive of debris. **C**, A large bulge is along the posterior gastric wall. **D**, The needle knife is exposed.

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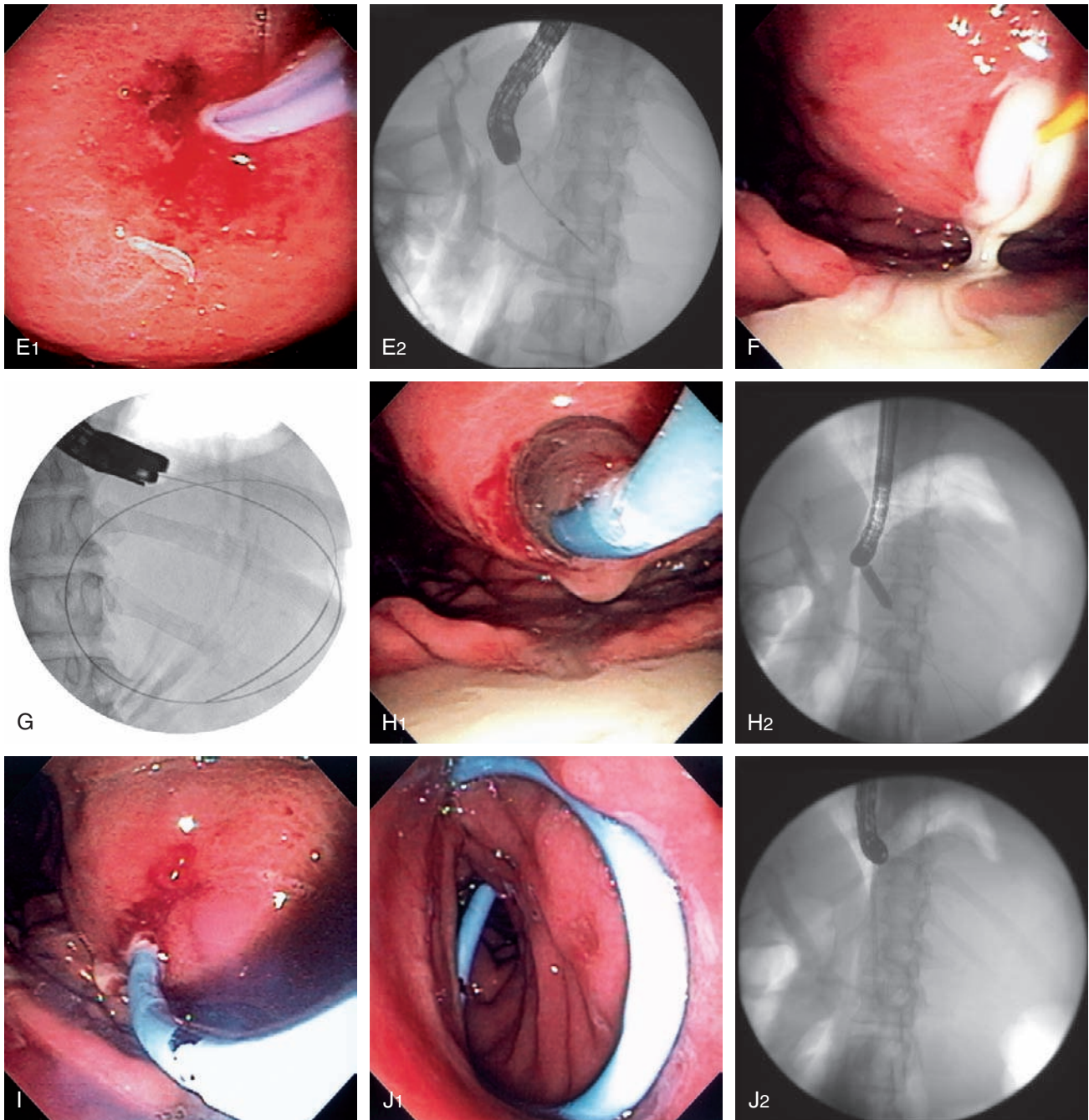


FIGURE 3.185 ENDOSCOPIC CYST GASTROSTOMY

E1, E2, The cyst is punctured and deeply entered, as confirmed by aspiration of cyst contents. **F**, With the catheter removed, purulent material is seen draining around a guidewire, which has been coiled in the cyst cavity (**G**). **H1, H2**, The cyst wall is dilated with a balloon. **I**, A 10-French pigtail stent is being advanced into the cavity. **J1, J2**, The double pigtail stent has been deployed.

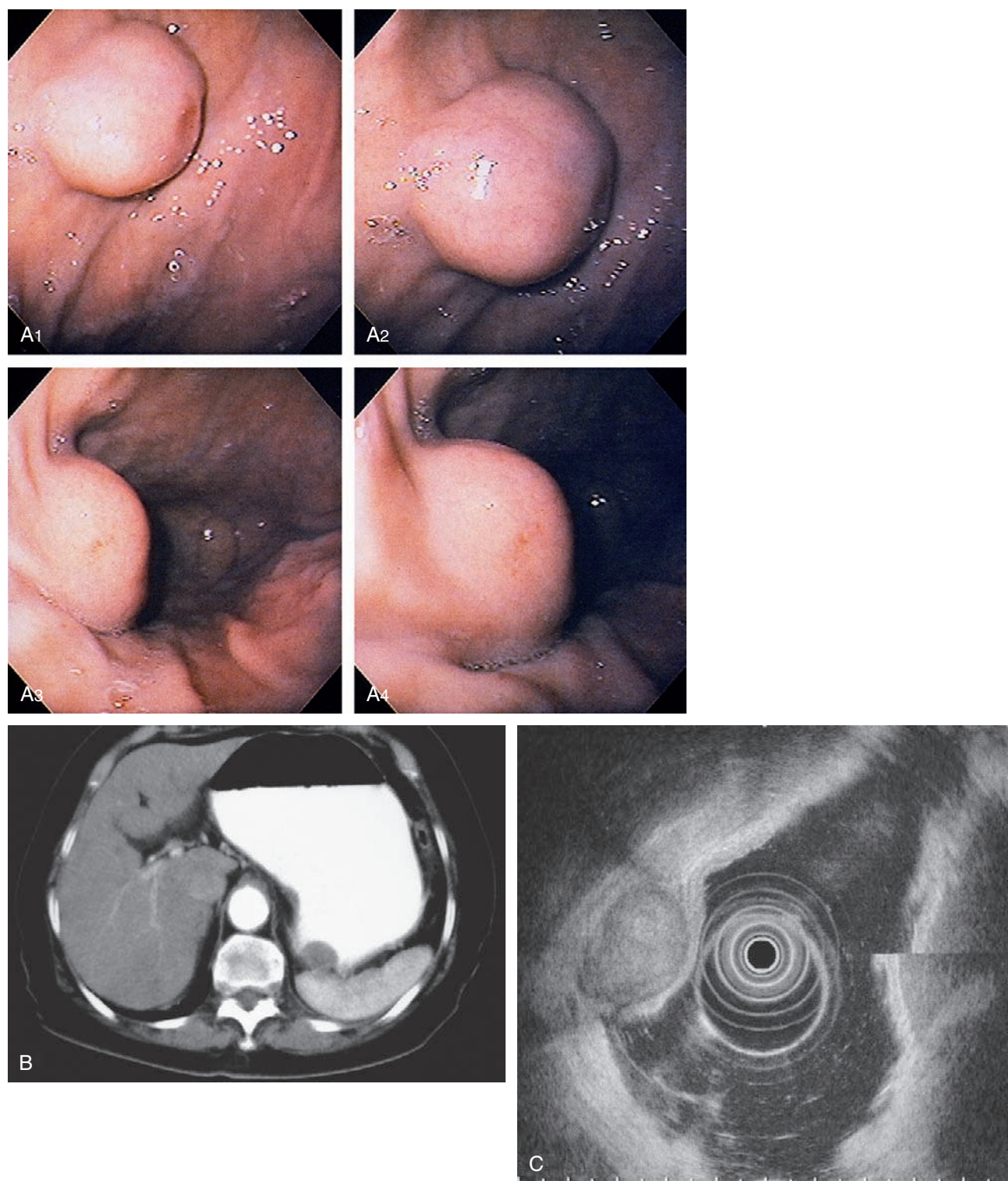


FIGURE 3.186 EXTRINSIC LESION

A, Round, masslike lesion in the proximal gastric body. An area of depression is at the apex (**A1**). Both antegrade (**A1**, **A2**) and retroflex (**A3**, **A4**) views suggest an extrinsic lesion. The overlying mucosa is normal. **B**, The mass lesion appears in the lumen, making differentiation between an extrinsic and an intrinsic lesion difficult. **C**, Endoscopic ultrasonography shows the mass lesion with all layers of the mucosa intact and displaced, suggesting an extrinsic lesion.



Differential Diagnosis

Leiomyoma
Gastrointestinal stromal tumor

Extrinsic Lesion (Figure 3.186)

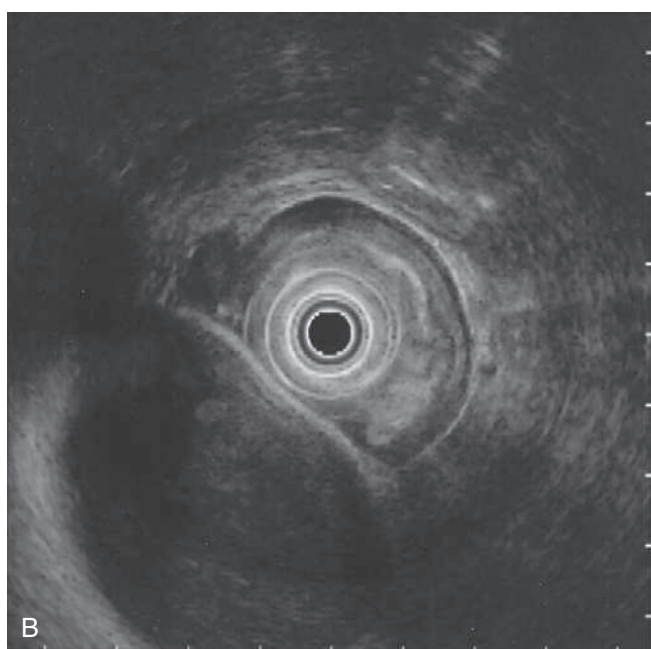
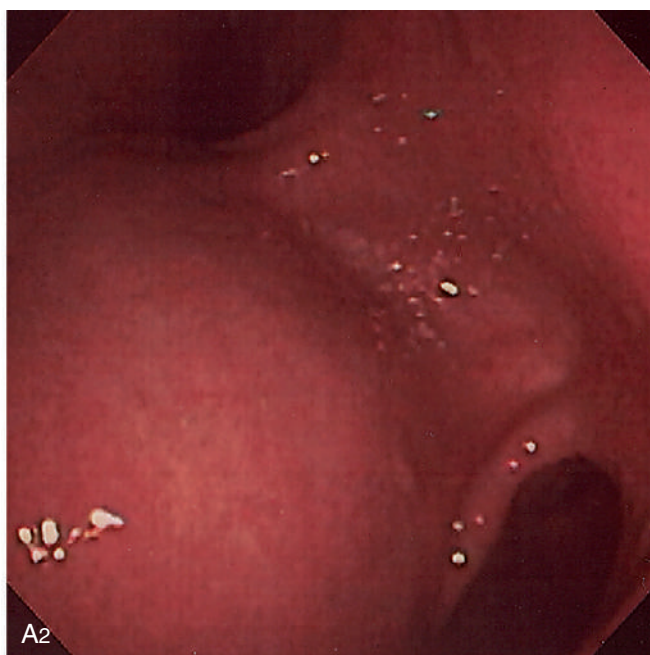
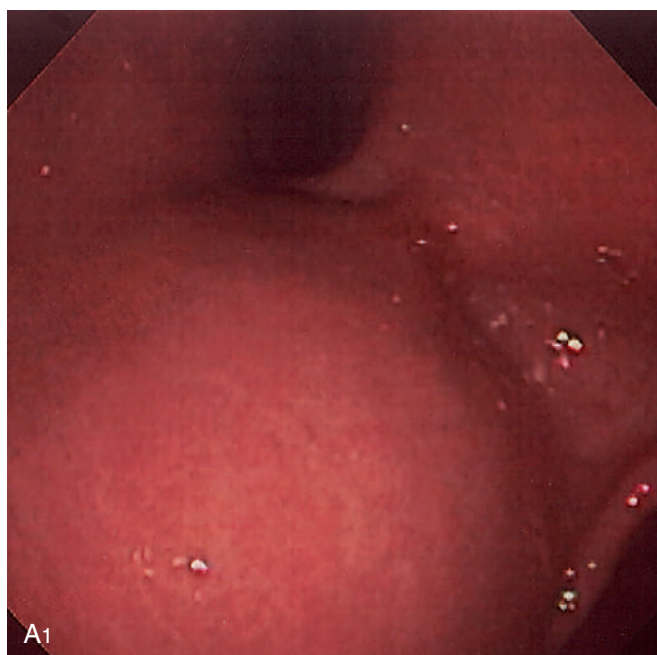


FIGURE 3.187 EXTRINSIC LESION: DILATED GALLBLADDER
A1, A2, Extrinsic compression of the gastric antrum anteriorly.
B, Large, fluid-filled stricture represents the gallbladder.

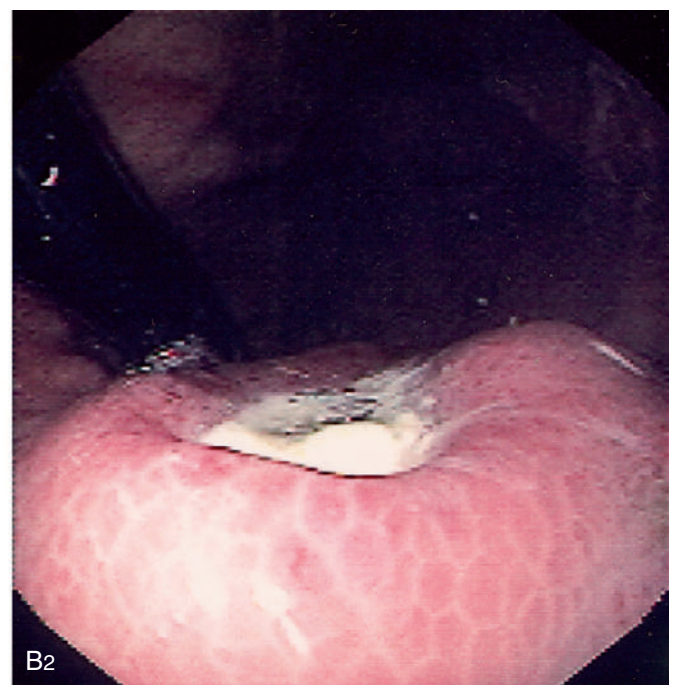
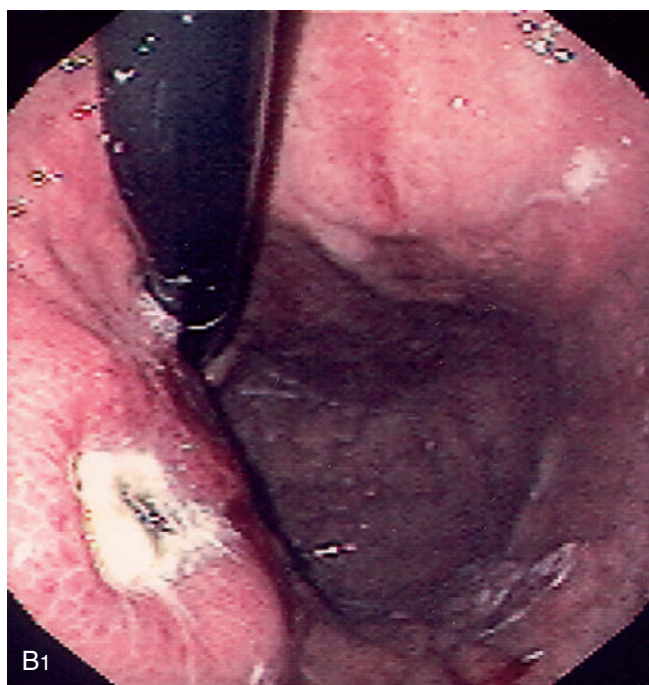
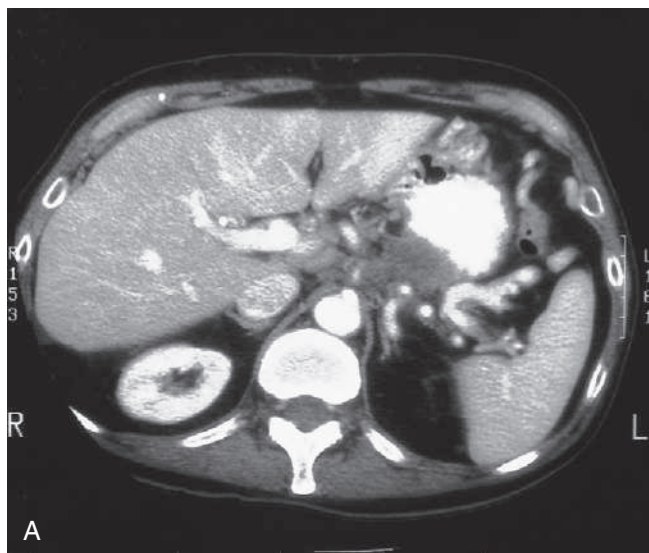


FIGURE 3.188 EXTRINSIC LESION: PANCREATIC CANCER

A, Mass lesion extending from the pancreas to the posterior wall of the stomach. **B1, B2**, Raised donut-like lesion with large central ulceration.

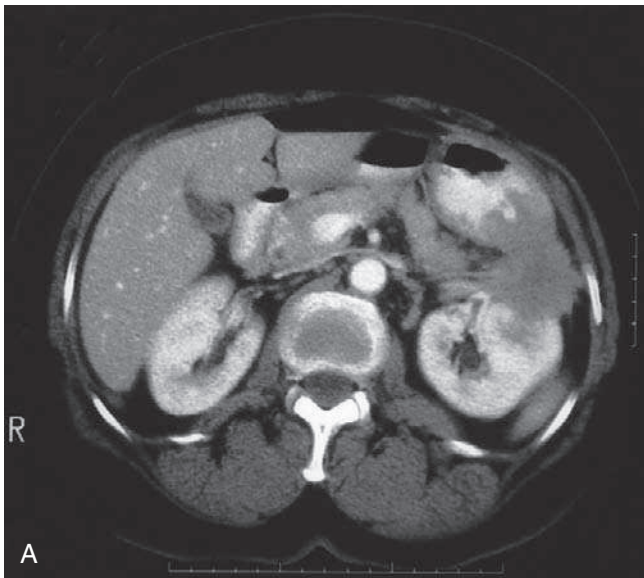
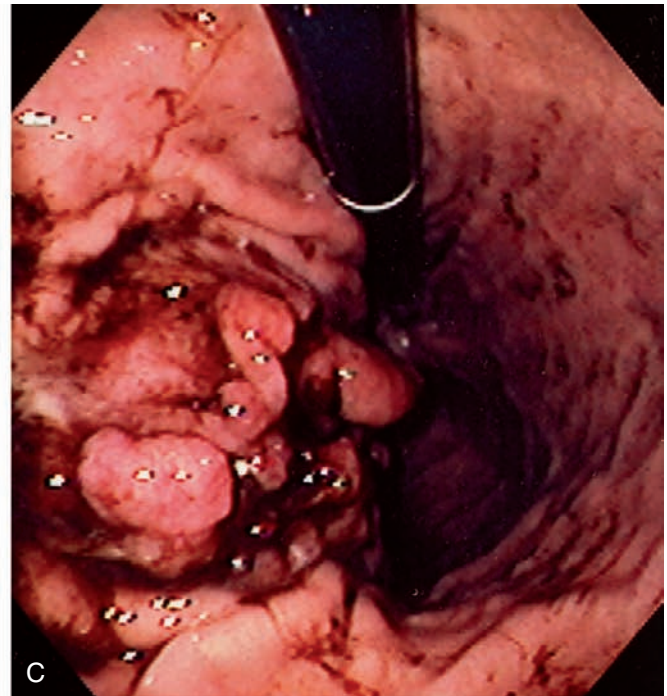
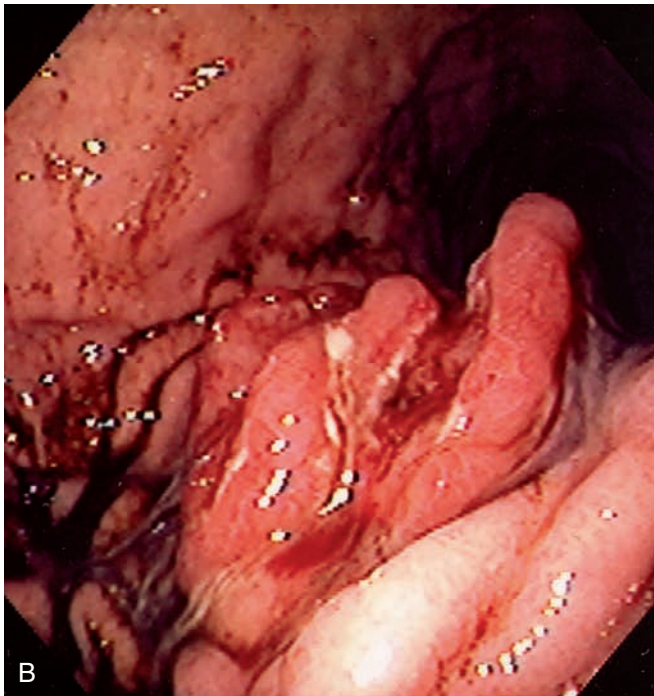


FIGURE 3.189 EXTRINSIC LESION: COLONIC CARCINOMA

A, Masslike lesion in the left upper quadrant involving the posterior wall of the stomach, as well as kidney. **B, C**, Focal area of thickened gastric folds with recent bleeding as seen on both antegrade (**B**) and retroflex (**C**) views.



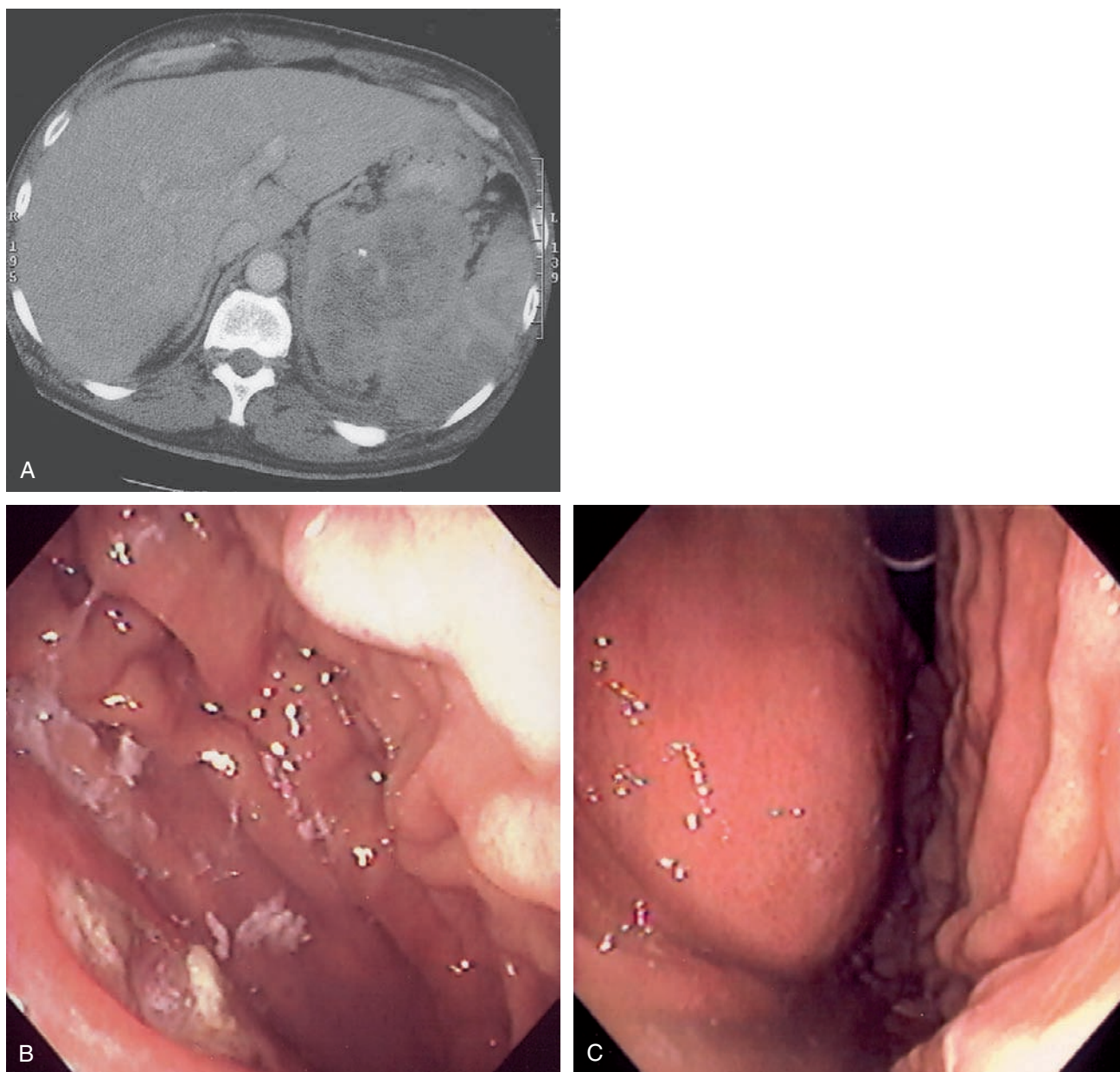


FIGURE 3.190 EXTRINSIC LESION: METASTATIC LUNG CANCER

A, Large mass involving left kidney with involvement of the posterior gastric wall. **B**, Ulcer on top of the mass. **C**, Retroflex view shows extrinsic compression.

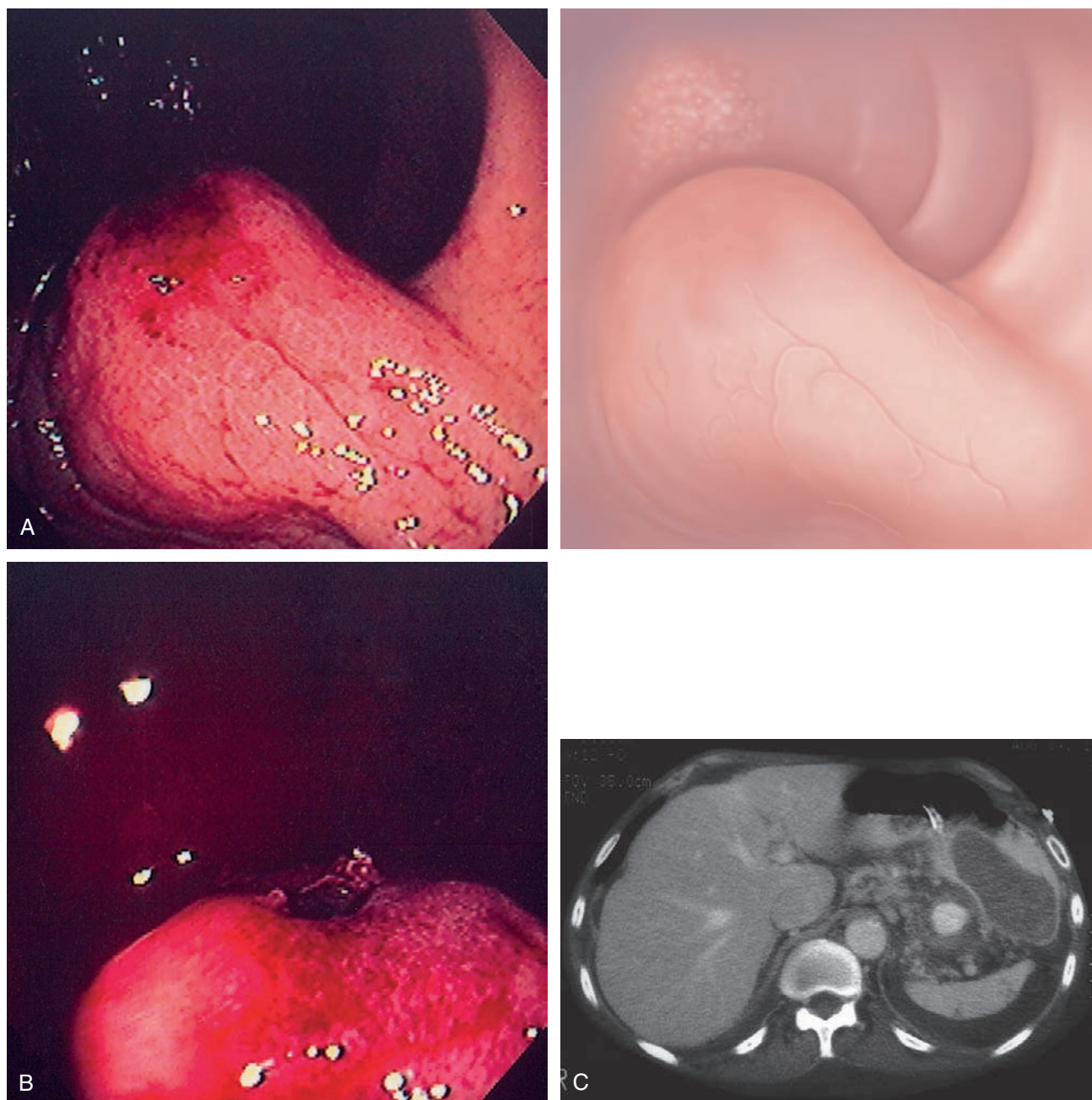


FIGURE 3.191 EXTRINSIC LESION: SPLENIC ARTERY PSEUDOANEURYSM

A, Extrinsic lesion in the proximal stomach. **B**, Close-up of the center of the lesion shows an ulceration with fresh blood clot. **C**, Vascular lesion posterior to the stomach representing a pseudoaneurysm. Old blood is seen in the gastric wall.

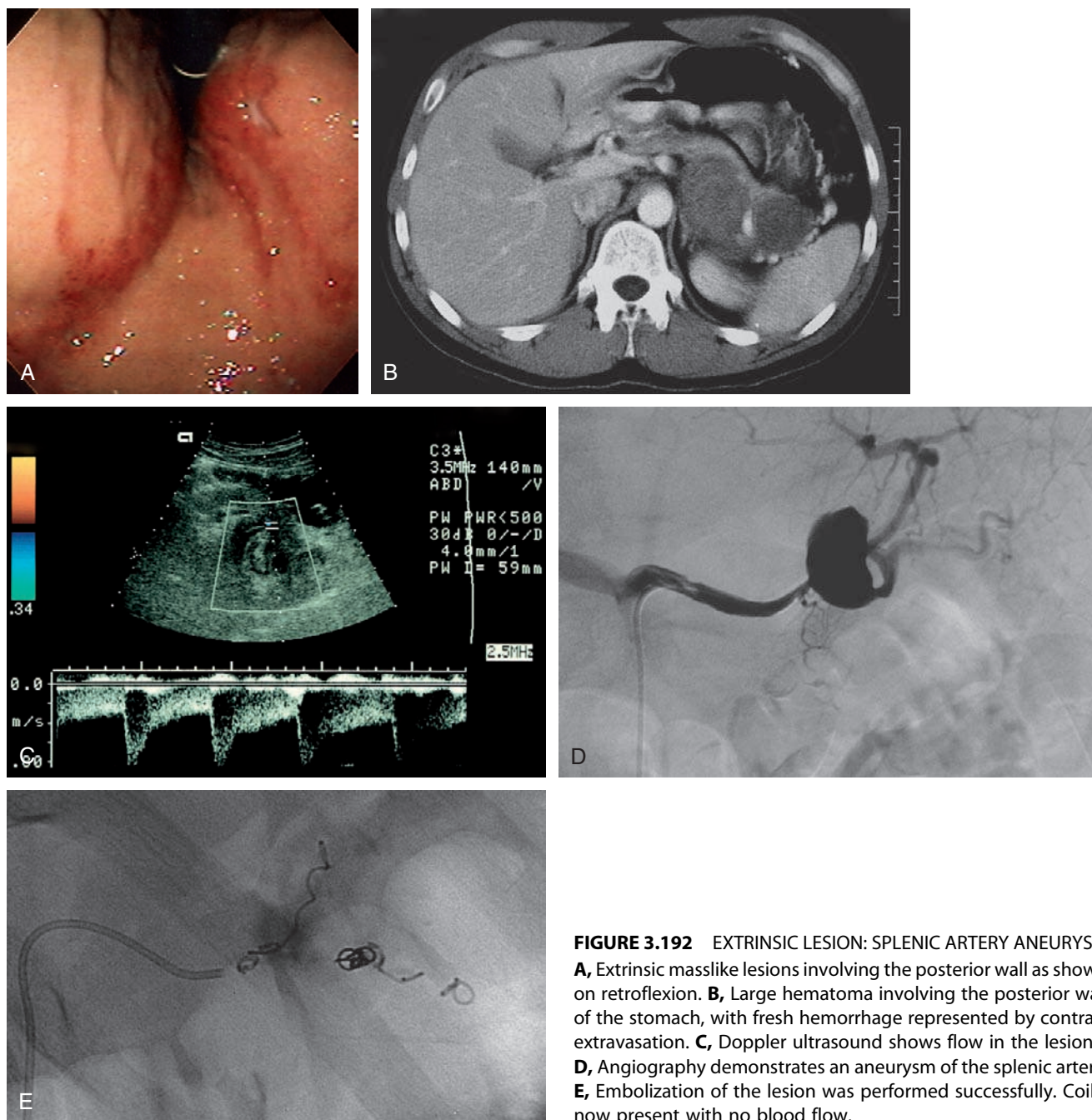


FIGURE 3.192 EXTRINSIC LESION: SPLENIC ARTERY ANEURYSM
A, Extrinsic masslike lesions involving the posterior wall as shown on retroflexion. **B**, Large hematoma involving the posterior wall of the stomach, with fresh hemorrhage represented by contrast extravasation. **C**, Doppler ultrasound shows flow in the lesion. **D**, Angiography demonstrates an aneurysm of the splenic artery. **E**, Embolization of the lesion was performed successfully. Coils now present with no blood flow.

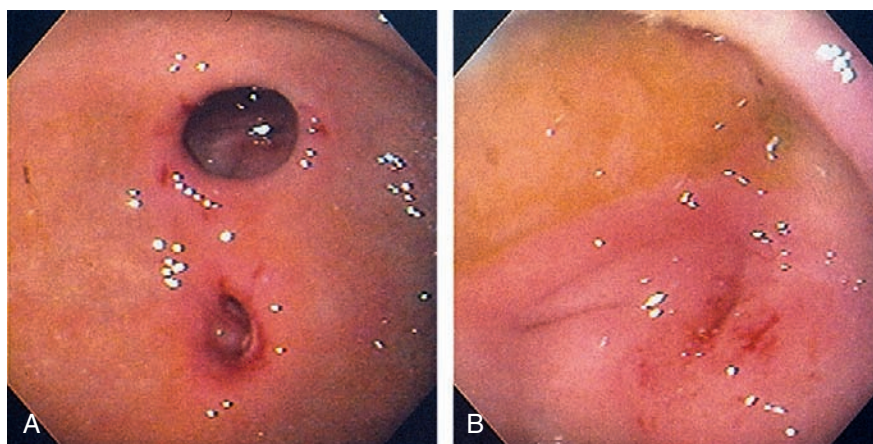


FIGURE 3.193 GASTRODUODENAL FISTULA

Two openings are in the gastric antrum (**A**). If the superior opening is entered, an obstructed duodenal bulb is shown (**B**). If the endoscope enters the inferior opening, ulceration is shown, with an entrance distally (**C**). With further advancement, the second portion of the duodenum is visualized (**D**).

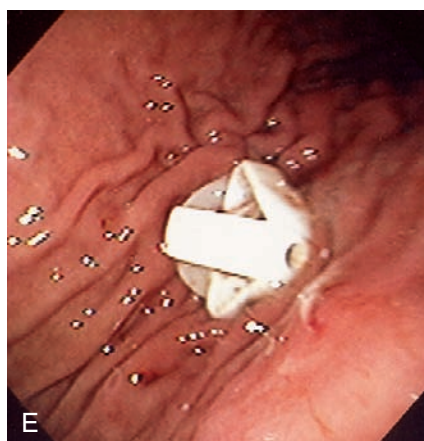
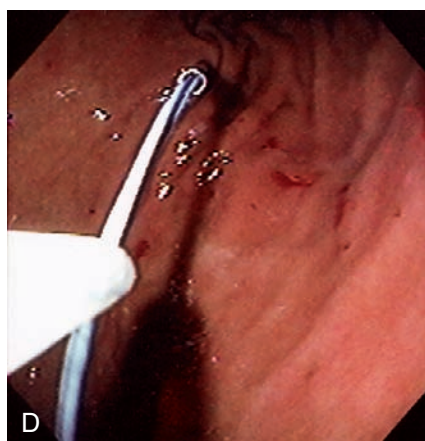
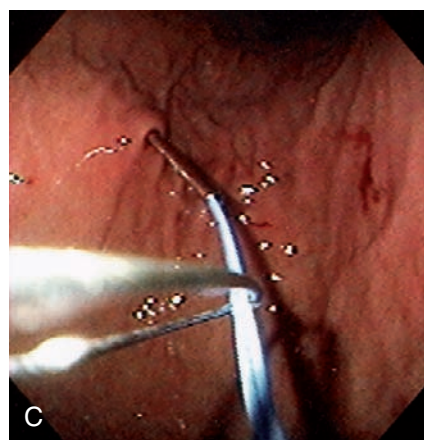
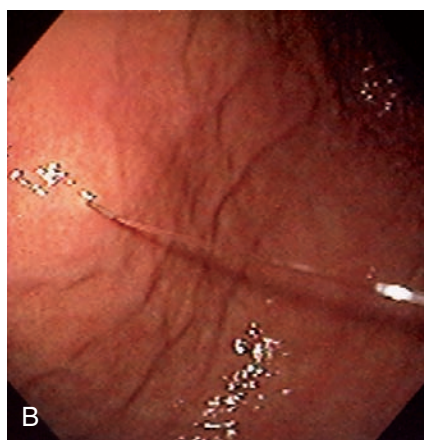
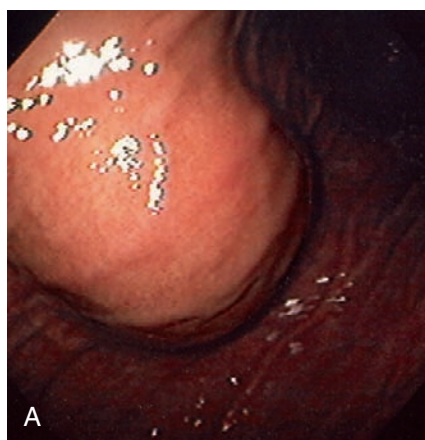
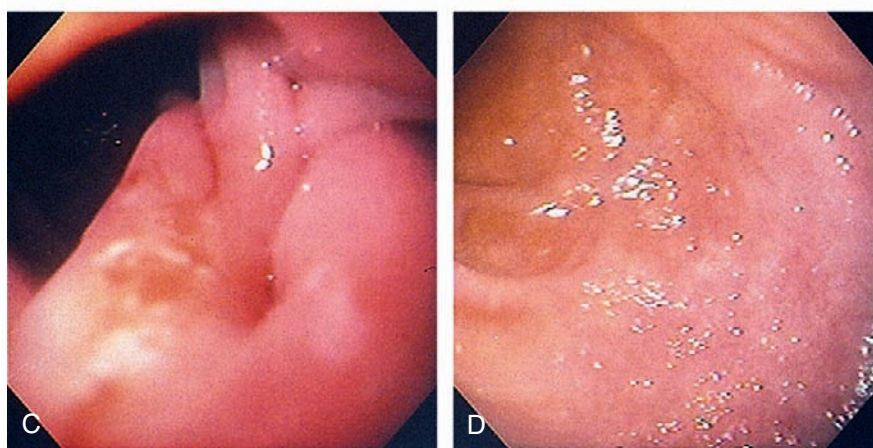


FIGURE 3.194 PERCUTANEOUS ENDOSCOPIC GASTROSTOMY (PEG) PLACEMENT

A, The anterior wall is palpated with a finger easily compressing the anterior gastric wall. **B**, The needle is passed into the gastric wall with injection of lidocaine. **C**, Through the needle, a wire is passed and grasped with a snare. **D**, The wire is removed. **E**, The bumper of the PEG tube is visible along the anterior gastric wall.

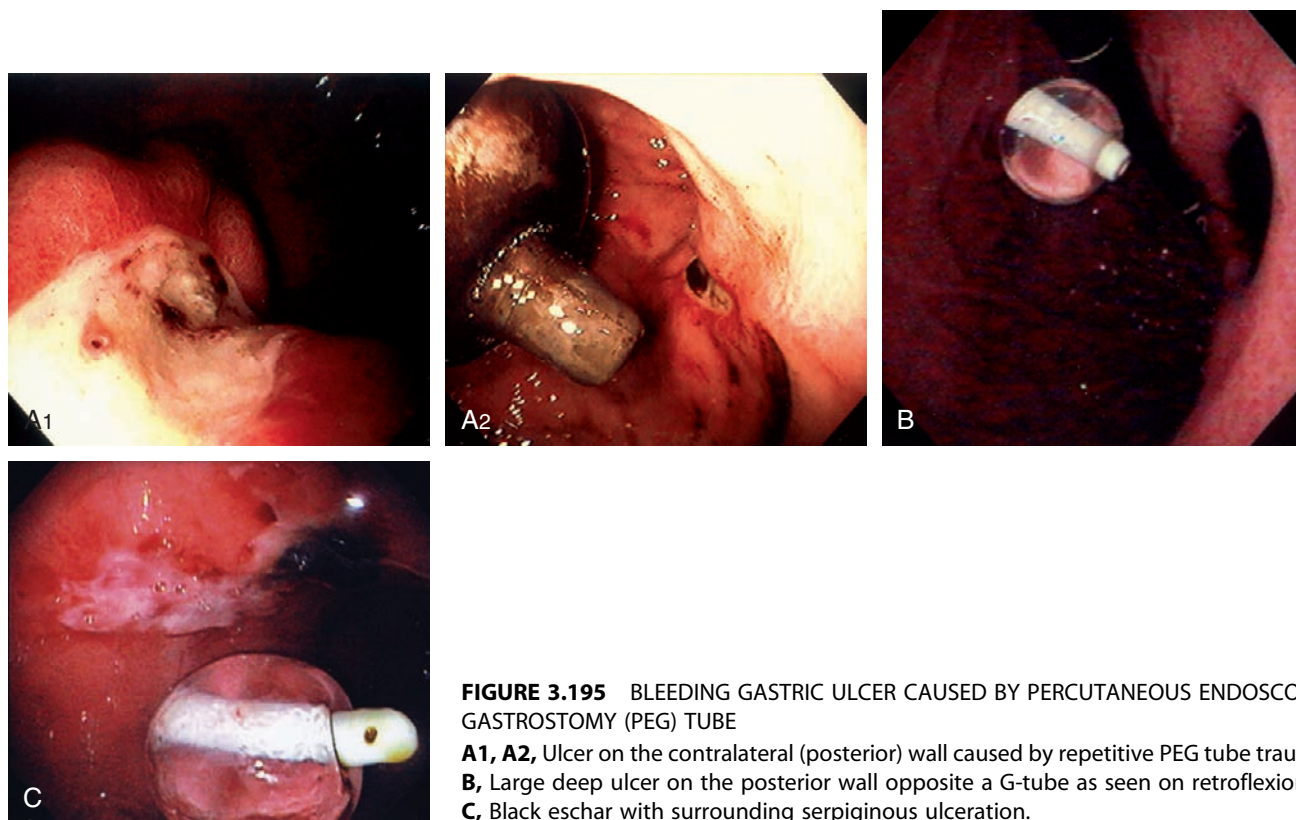


FIGURE 3.195 BLEEDING GASTRIC ULCER CAUSED BY PERCUTANEOUS ENDOSCOPIC GASTROSTOMY (PEG) TUBE

A1, A2, Ulcer on the contralateral (posterior) wall caused by repetitive PEG tube trauma. **B**, Large deep ulcer on the posterior wall opposite a G-tube as seen on retroflexion. **C**, Black eschar with surrounding serpiginous ulceration.

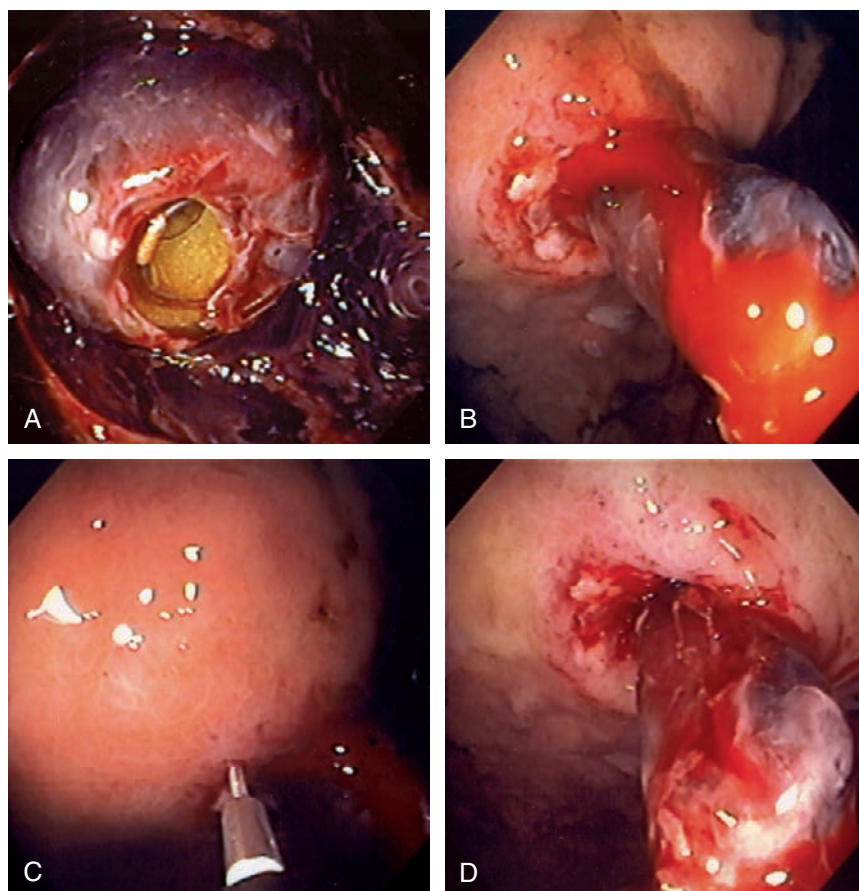
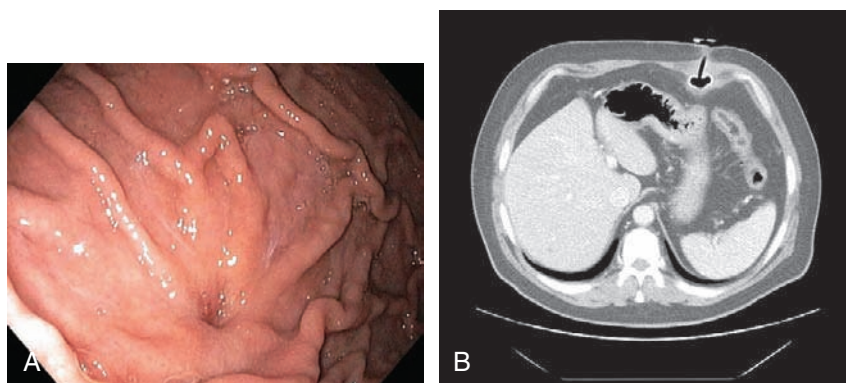
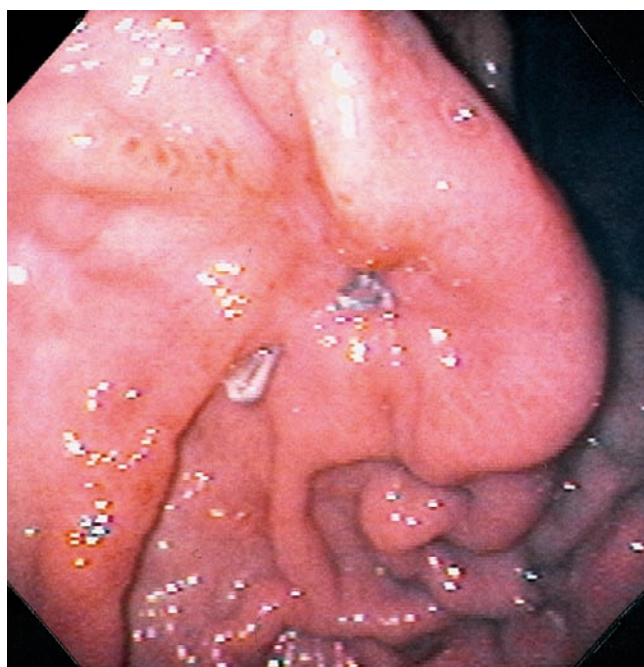


FIGURE 3.196 BLEEDING FROM PERCUTANEOUS ENDOSCOPIC GASTROSTOMY (PEG) TUBE

A, The G tube is covered with blood clot. **B**, With advancement of the G-tube, active bleeding can be seen from the abdominal wall. **C**, A sclerotherapy needle is placed into the anterior wall of the stomach with injection of a large volume of dilute epinephrine. **D**, Marked ischemia of the gastric wall with hemostasis.

**FIGURE 3.197** BURIED BUMPER

A, A round defect is present in the anterior gastric wall. **B**, CT shows the PEG in the anterior abdominal wall separate from the gastric lumen.

**FIGURE 3.198** SURGICAL GASTROSTOMY TUBE SITE

Two metallic sutures are present in the area of a prior surgical gastrostomy tube placement. The gastric folds are pulled up to the areas of suturing.

**FIGURE 3.199** PRIOR GASTROSTOMY TUBE SITE

A, Well-healed area with retraction and central indentation.

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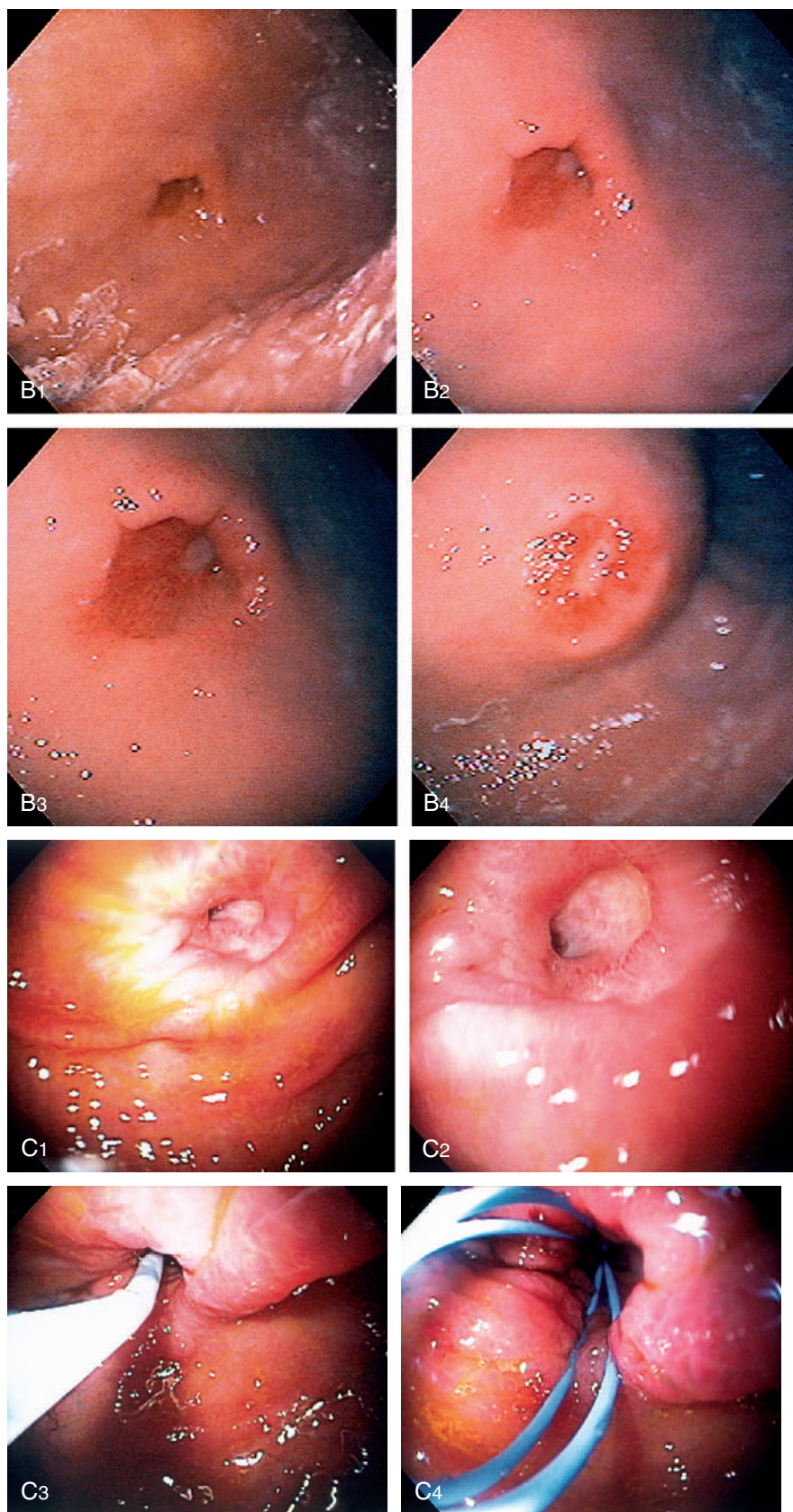


FIGURE 3.199 PRIOR GASTROSTOMY TUBE SITE

B, The gastrostomy tube was removed 1 week before endoscopy. An ulcer is present at the center of the old site (**B1-B3**). Extrinsic compression at the scar on the abdominal wall indicates the old site (**B4**). **C1, C2**, Ulcerated area of the anterior gastric wall representing a recently removed G-tube site. **C3**, A snare has been placed through the site and out through the skin. **C4**, The snare is then used to grasp the guidewire, which is then withdrawn through the stomach and oropharynx for subsequent PEG replacement.

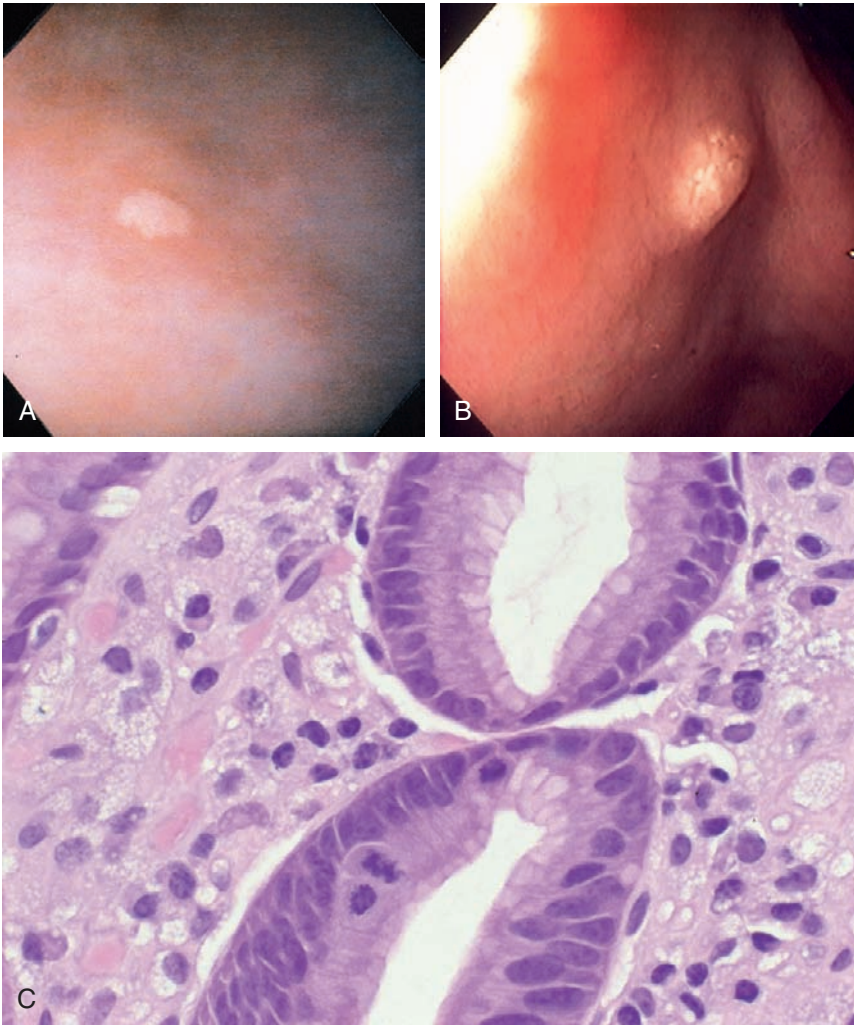


FIGURE 3.200 GASTRIC XANTHELASMA
A, Yellow plaque in the distal gastric body.
B, Yellow, well-circumscribed polypoid lesion on the anterior wall of the gastric body. **C**, Foamy macrophages can be identified.

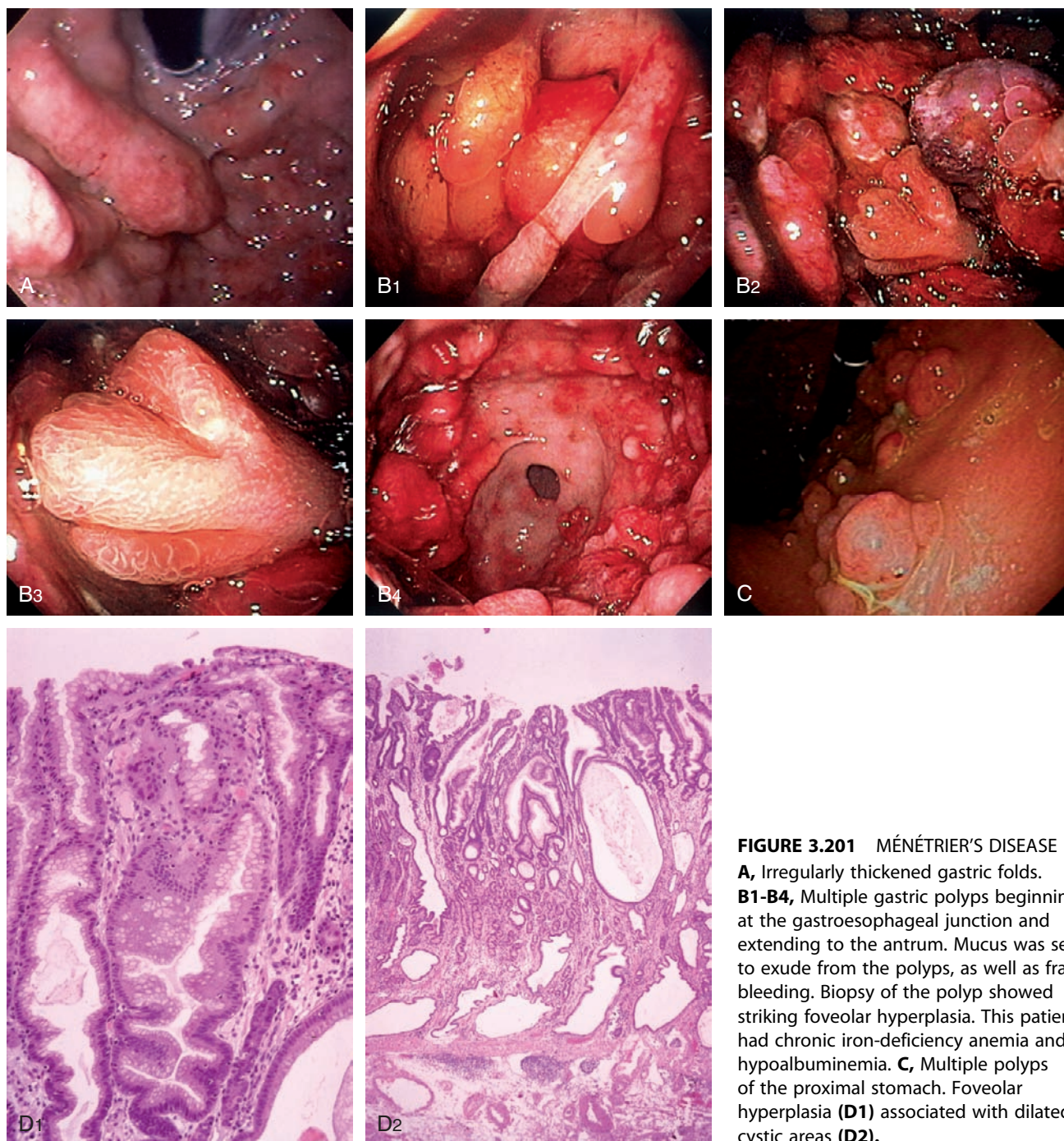


FIGURE 3.201 MÉNÉTRIER'S DISEASE

A, Irregularly thickened gastric folds.

B1-B4, Multiple gastric polyps beginning at the gastroesophageal junction and extending to the antrum. Mucus was seen to exude from the polyps, as well as frank bleeding. Biopsy of the polyp showed striking foveolar hyperplasia. This patient had chronic iron-deficiency anemia and hypoalbuminemia. **C**, Multiple polyps of the proximal stomach. Foveolar hyperplasia (**D1**) associated with dilated cystic areas (**D2**).

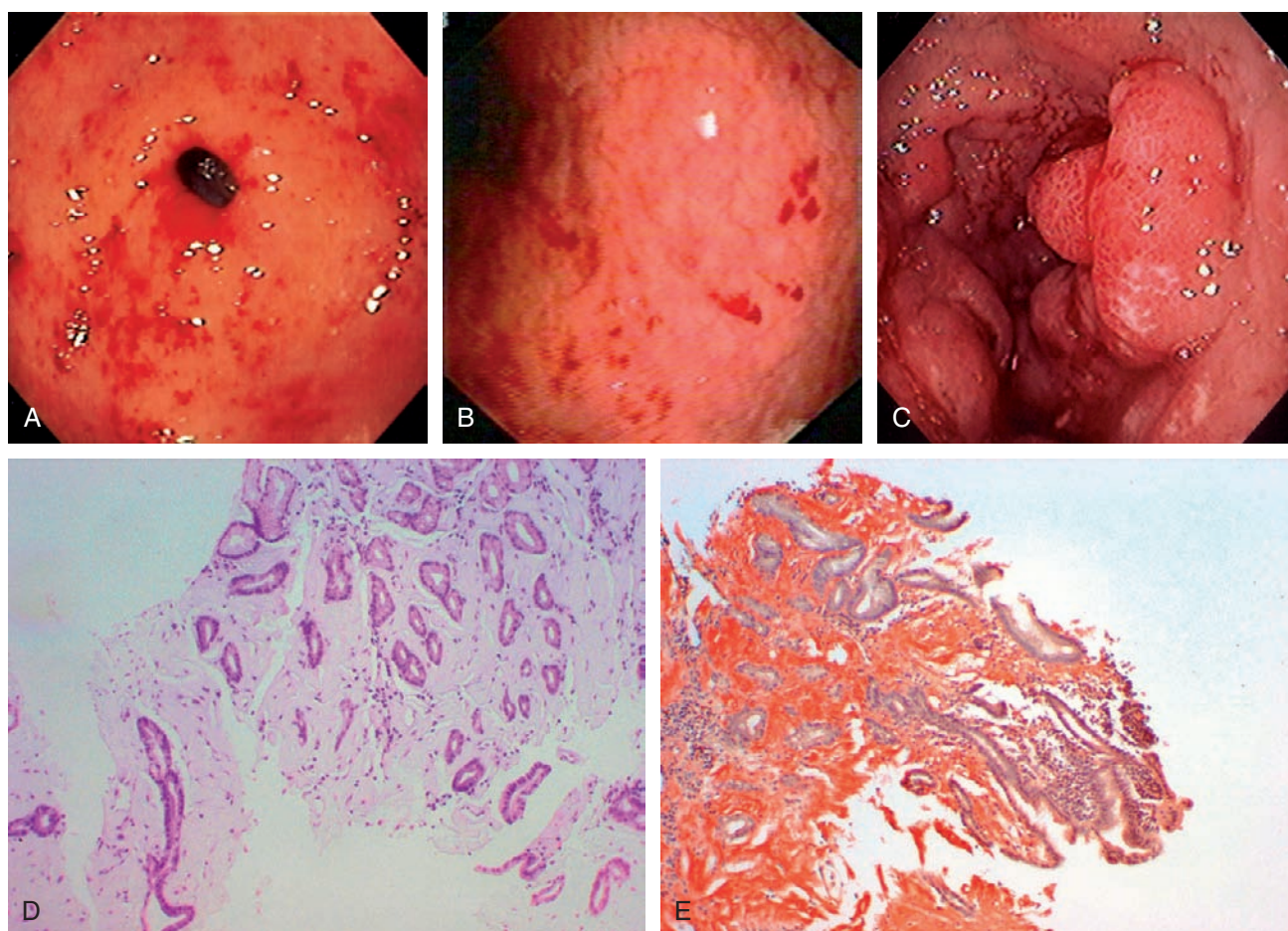


FIGURE 3.202 AMYLOID

A, Scattered petechial hemorrhage of the gastric antrum, which appears slightly yellow. **B**, Subepithelial hemorrhage with minimal abnormalities of the surrounding mucosa. **C**, Markedly thickened nodular antral folds with fresh hemorrhage. **D**, Amorphous material fills the submucosa. **E**, Congo red stain highlights the submucosal material, confirming the diagnosis.

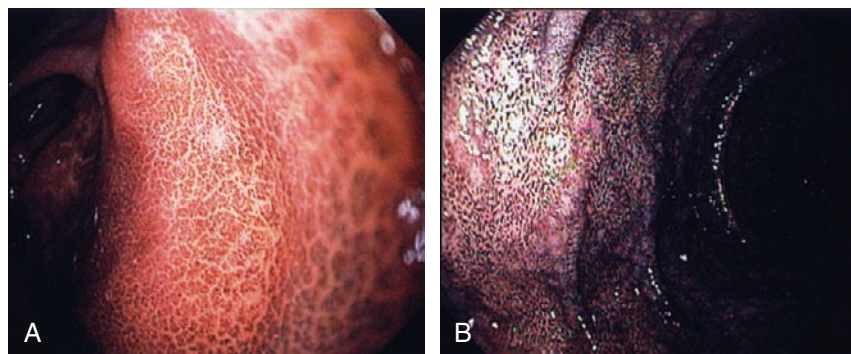


FIGURE 3.203 PSEUDOMELANOSIS

A, Black pigmented lesions throughout the gastric antrum. This patient also had pseudomelanosis duodena (**B**). (See [Figure 4.102](#).)

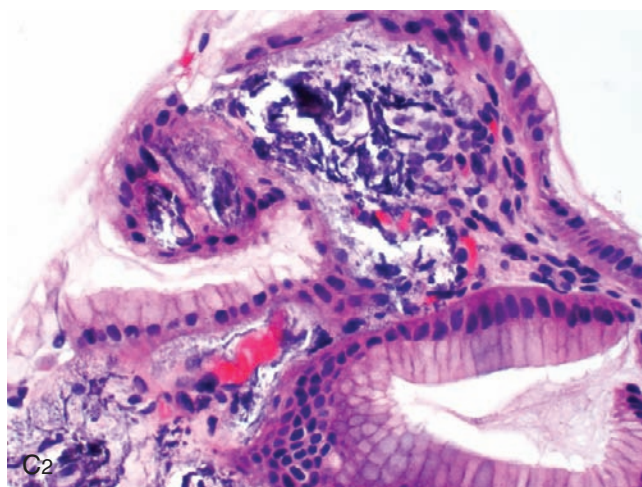
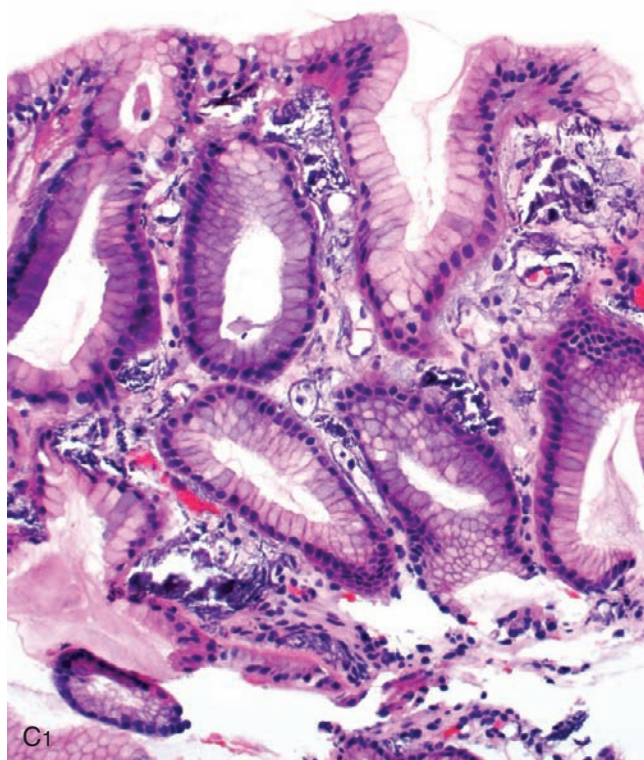
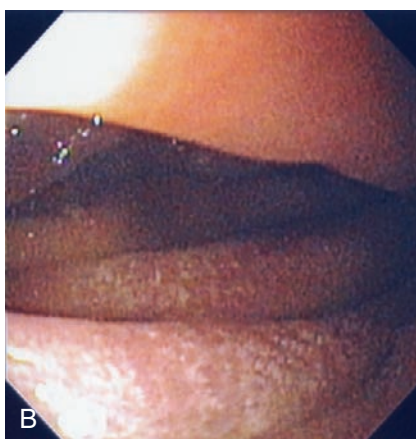
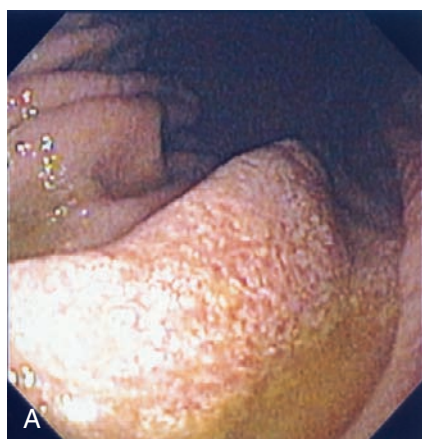


FIGURE 3.204 CALCINOSIS

A, B, The gastric folds have a whitish thickened appearance in this patient with renal failure on dialysis. **C1, C2,** Benign gastric mucosa with mild edema, inflammation, and multifocal areas of amorphous calcifications present in vascular and extravascular spaces.

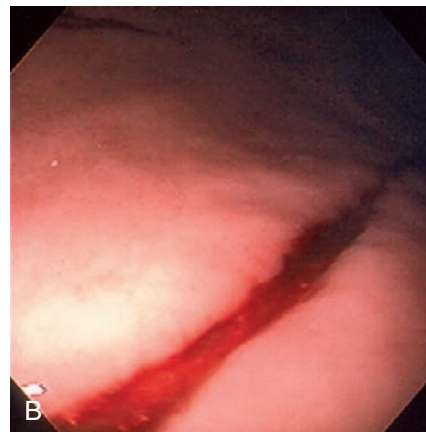
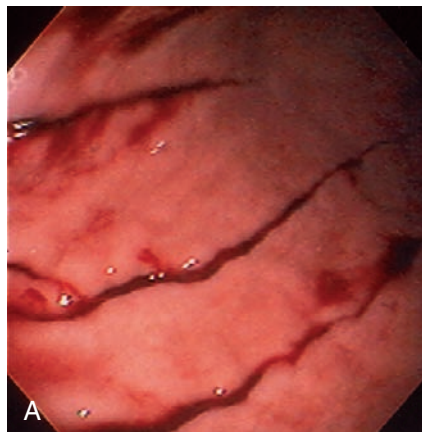


FIGURE 3.205 BAROTRAUMA

A, Multiple linear lesions throughout the gastric body. **B,** Close-up shows a linear tear and fresh bleeding.

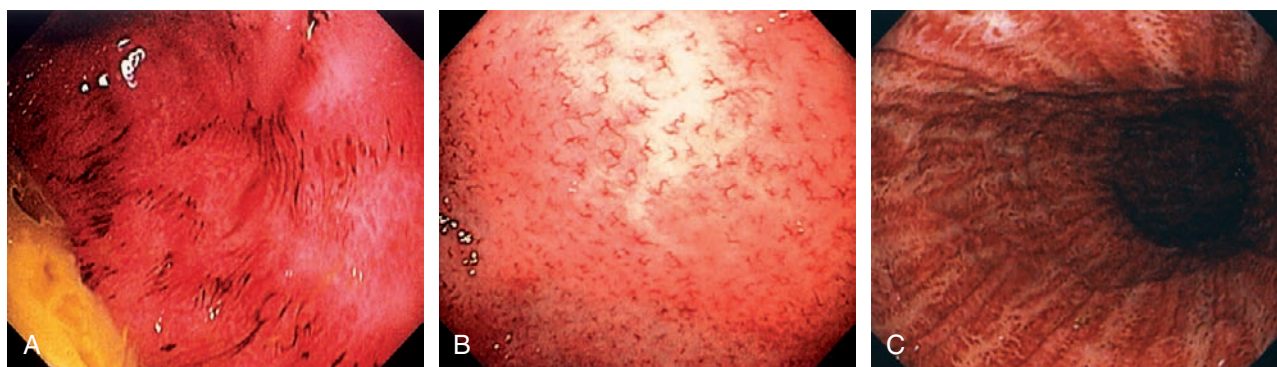


FIGURE 3.206 NONSPECIFIC ABNORMALITIES

A, Diffuse erythema, subepithelial hemorrhage, and fresh heme. **B**, Multiple red linear lesions. Biopsy in both cases disclosed no specific cause. Such findings are often attributed to “gastritis.” **C**, Diffuse hemorrhage of the gastric mucosa of unclear cause.

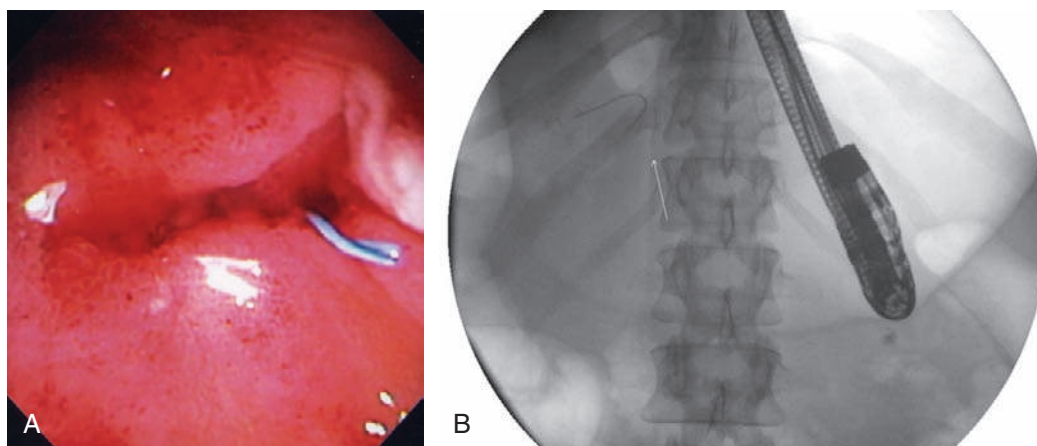


FIGURE 3.207 PRIOR EMBOLIZATION COIL

A, In the gastric antrum, a blue structure is emanating from an indentation. **B**, This is a prior coil from embolization of an artery in the setting of a bleeding pseudocyst.

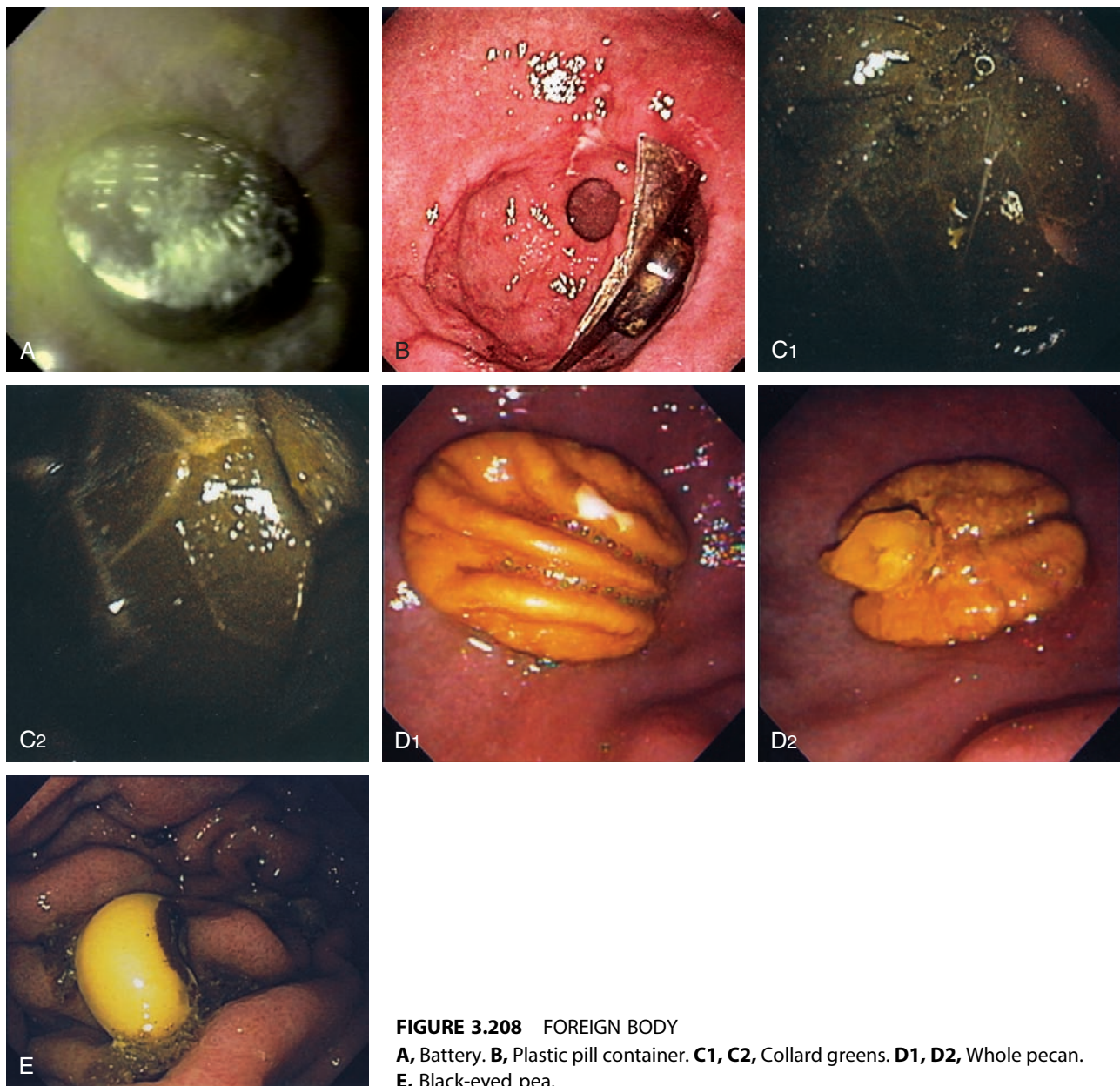


FIGURE 3.208 FOREIGN BODY

A, Battery. **B**, Plastic pill container. **C1**, **C2**, Collard greens. **D1**, **D2**, Whole pecan. **E**, Black-eyed pea.

Duodenum and Small Bowel

INTRODUCTION

Routine endoscopy is primarily limited to examination of the duodenal bulb and second portion of the duodenum, with an occasional glimpse of the third portion. With the availability of small-bowel enteroscopes and more recently of capsule technology, the entire small bowel can be visualized. The duodenal bulb appears as a small, round cavity with a finely granular appearance. At the superior duodenal angle, which marks the junction of the first and second portions, Kerckring's valves, or the circular folds, become visible. In contrast with the bulb, the mucosa assumes a more granular and frequently whitish appearance. The ampulla occasionally may be identified on the medial wall, especially when prominent. The intimacy of the pancreas and biliary system to the duodenum may be reflected by endoscopic lesions resulting from diseases of pancreaticobiliary tree.

Duodenal disease is generally limited to the bulb, where inflammatory disorders, erosions, and ulcers are found. Neoplasms typically reside in the distal duodenum, jejunum, or ileum, and thus remain endoscopically

hidden with routine endoscopy. If required, examination of the distal duodenum can be accomplished with a pediatric colonoscope or dedicated enteroscope. The anterior–posterior relationships in the duodenal bulb are important to understand, particularly when characterizing ulcer disease in the setting of gastrointestinal hemorrhage. The terminal ileum can be evaluated at the time of colonoscopy in most cases. In some situations, intubation of the terminal ileum should be routine; for example, when evaluating for Crohn’s disease or when finding fresh blood in the cecum in a patient with gastrointestinal bleeding. The identification of small-bowel lesions by capsule endoscopy may now be amenable to endoscopic therapy with the double-balloon endoscope.



A



B

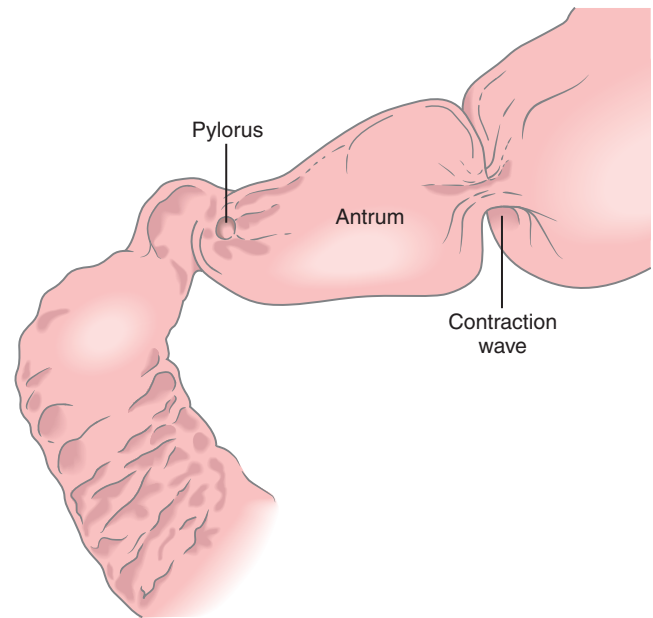


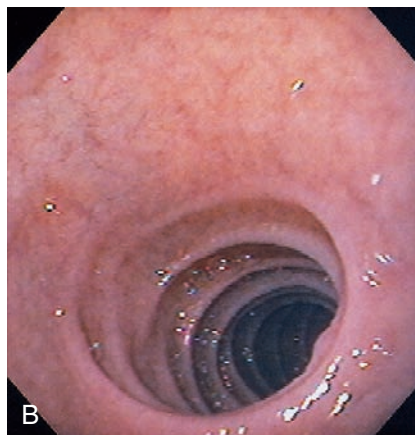
FIGURE 4.1 NORMAL DUODENUM

A, Upper gastrointestinal barium series demonstrates a normal-appearing duodenal bulb, with barium in the second duodenum (C sweep) and distal duodenum. The pylorus is seen en face.

B, The distal duodenum and proximal jejunum have a characteristic feathery appearance. The distal duodenum and proximal jejunum are seen coursing behind the antrum.



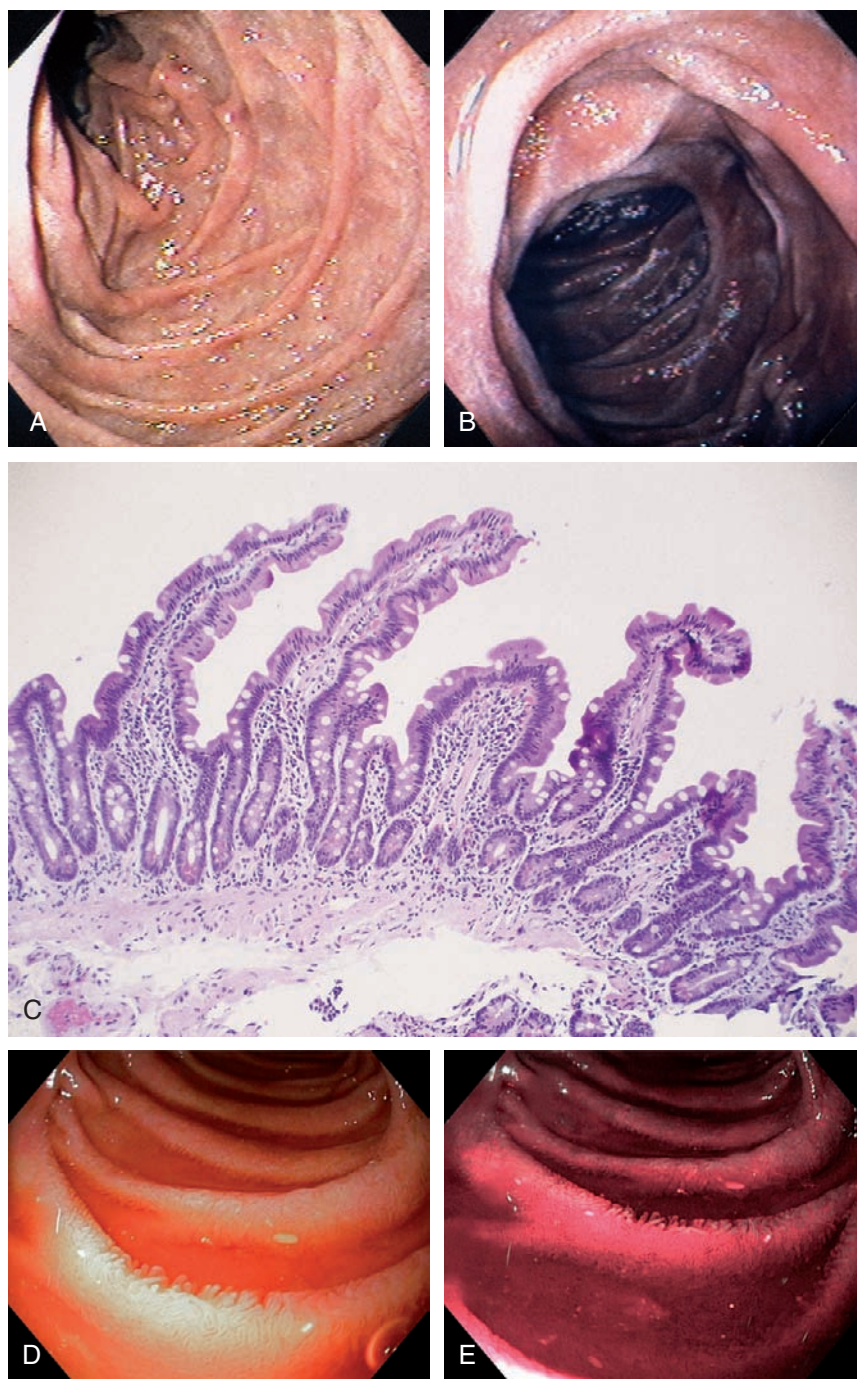
A



B

FIGURE 4.2 NORMAL DUODENAL BULB

A, The mucosa is not smooth but has a subtle textured appearance. The superior duodenal angle marks the junction between the distal duodenal bulb and the second duodenum. Vascularity can usually be appreciated. **B**, The vascular pattern is more pronounced. No real angle exists between the bulb and the second portion of the duodenum in this patient. The circular folds of the second duodenum are shown.

**FIGURE 4.3** SECOND DUODENUM

A, The second duodenum is characterized by circular folds termed *valvulae conniventes* or *Kerckring's valves*. The mucosa has a granular appearance. The junction of the second and third duodenum (inferior duodenal angle) is in the distance. **B**, The mucosa may have a frosted white appearance. **C**, The duodenal mucosa is characterized by slender villi composed of goblet cells. Appearance as shown by magnification endoscopy (**D**) and narrow band (**E**) imaging.

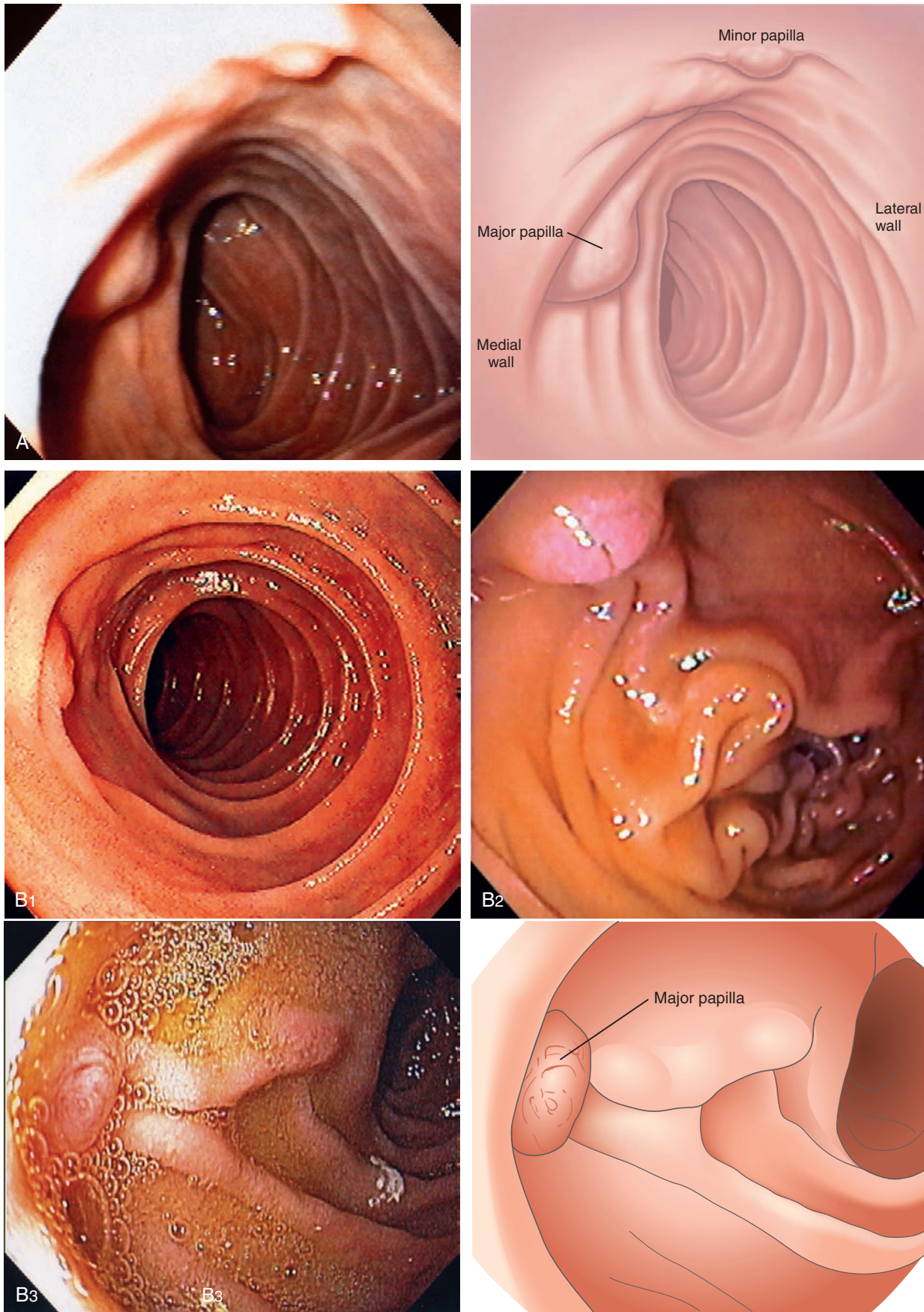
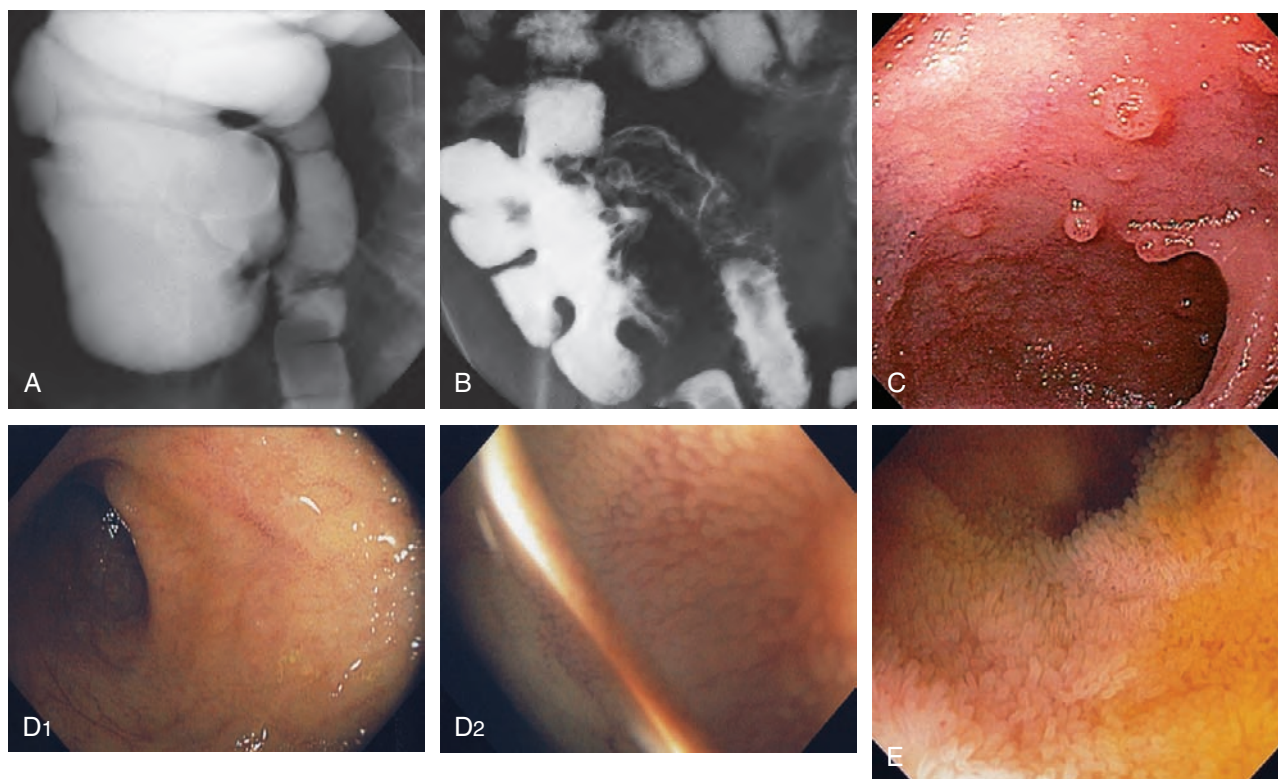


FIGURE 4.4 MAJOR AND MINOR PAPILLAE

A, The major papilla is seen on the medial wall of the mid-second duodenum; the minor papilla is shown proximally and in a superior position. **B1**, Small, polypoid-like lesion on the medial wall in the mid-second duodenum. **B2**, The papilla can be seen in a more en face view. The ampullary orifice is visible, and just distal is the longitudinal fold. **B3**, The major papilla is small and well seen with the forward viewing endoscope. (Drawing) Folds lead to the papilla.

**FIGURE 4.5** JEJUNUM

The jejunum is characterized by thinner but more frequent circular folds than in the duodenum, and the mucosa is smoother.

**FIGURE 4.6** TERMINAL ILEUM

A, Reflux of barium on enema examination. **B**, Small-bowel follow-through. Barium also outlines the cecum. **C**, The mucosa has a finely granular appearance, and lymphoid follicles are present. **D1**, The mucosa has a fine, granular appearance. As visualized underwater, the villi can now be appreciated (**D2**). **E**, Prominent villi are noted in this patient.

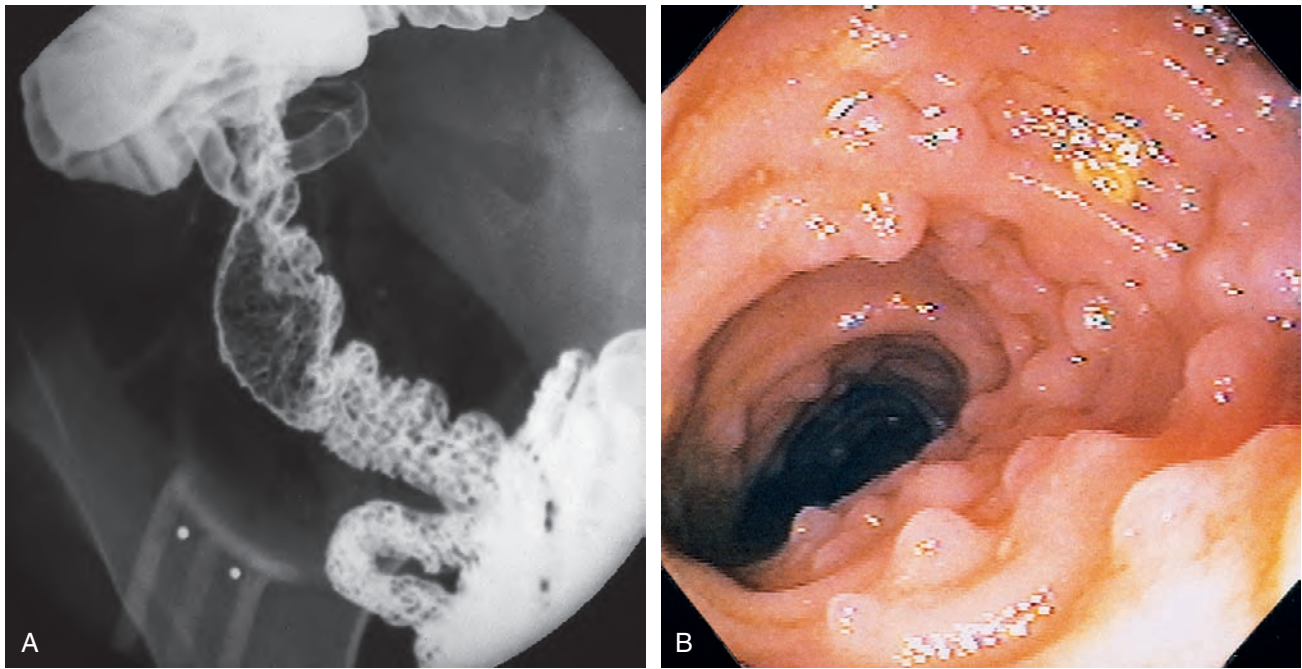


FIGURE 4.7 LYMPHOID HYPERPLASIA

A, Marked nodularity of the terminal ileum, as shown by reflux of barium during barium enema examination. **B**, Multiple well-circumscribed nodules. Lymphoid hyperplasia in the distal terminal ileum is a normal finding, frequent in younger persons.

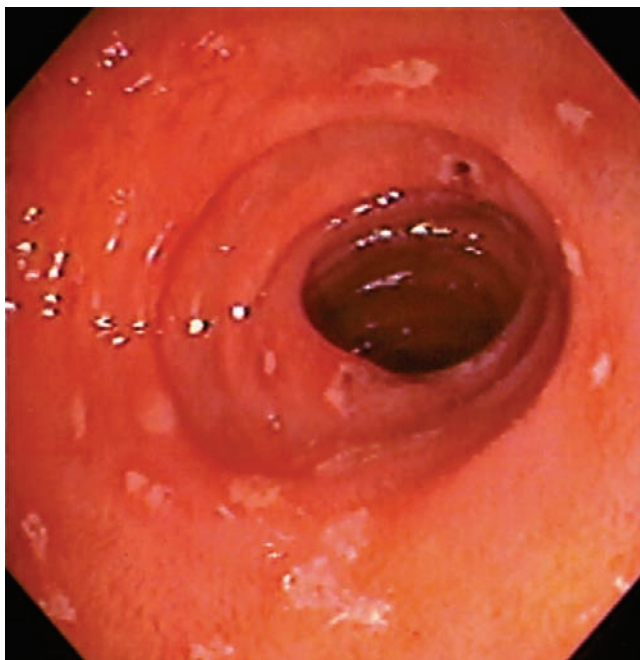


FIGURE 4.8 EROSIVE DUODENITIS

Multiple erosions in the duodenal bulb.

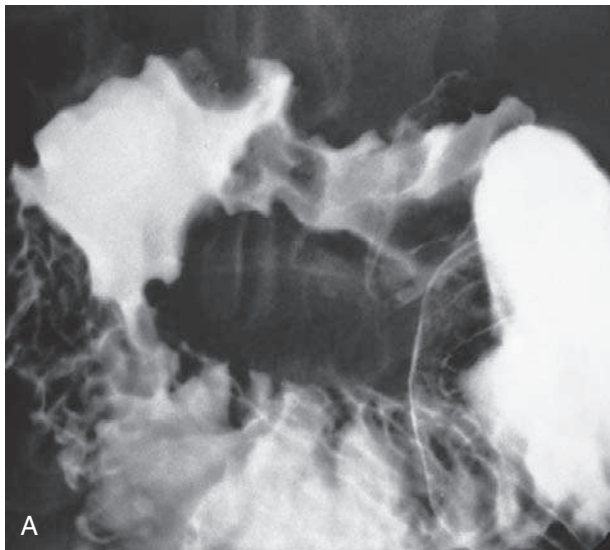


FIGURE 4.9 EROSIVE DUODENITIS

A, Marked nodularity of duodenal bulb. **B**, Severe edema, subepithelial hemorrhage, and multiple erosions. A portion of an active crater is present.

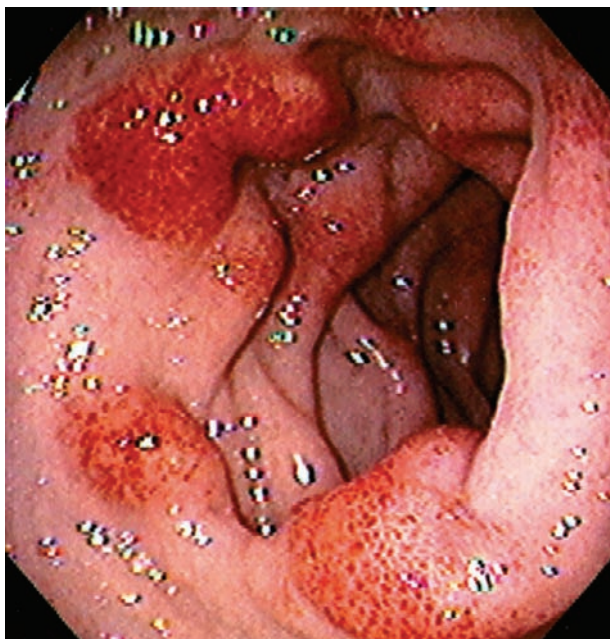
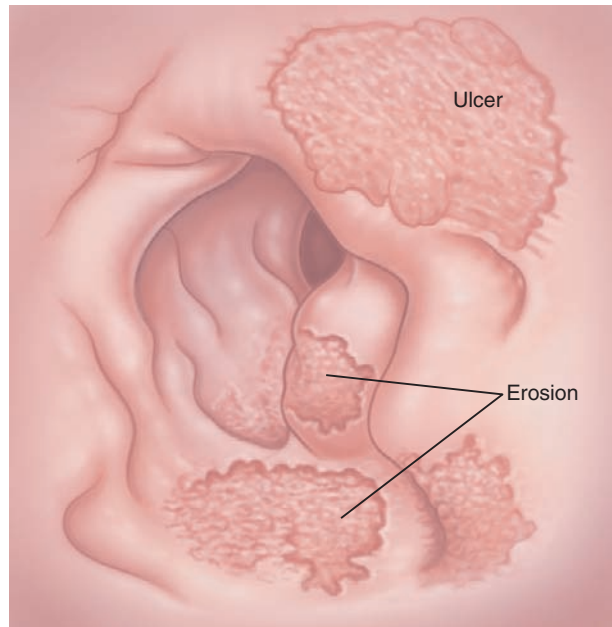
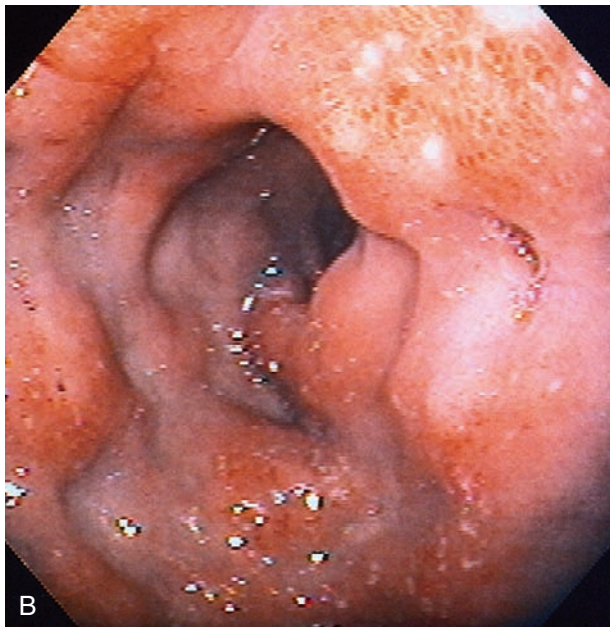


FIGURE 4.10 HEMORRHAGIC DUODENITIS

Patchy subepithelial hemorrhage in the distal duodenal bulb.

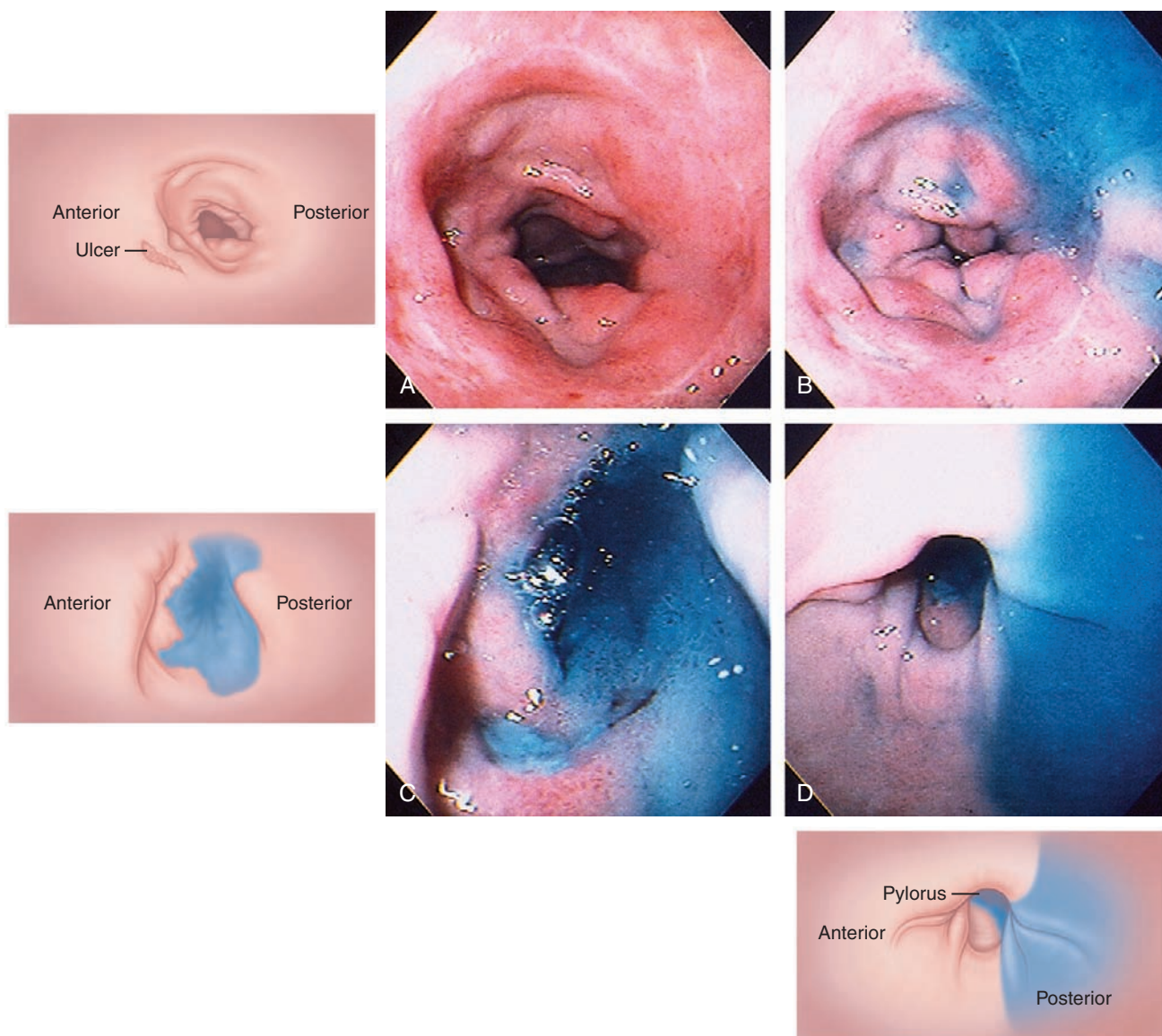


FIGURE 4.11 DUODENAL ULCER

A duodenal ulcer is shown anteroinferiorly (**A**). Methylene blue has been placed in the bulb with the patient still in the left lateral decubitus position (**B**). If the patient is moved to the supine position, fluid collects posteriorly, confirming the position in the bulb (**C**). The posterior portion of the antrum is demarcated by methylene blue (**D**).

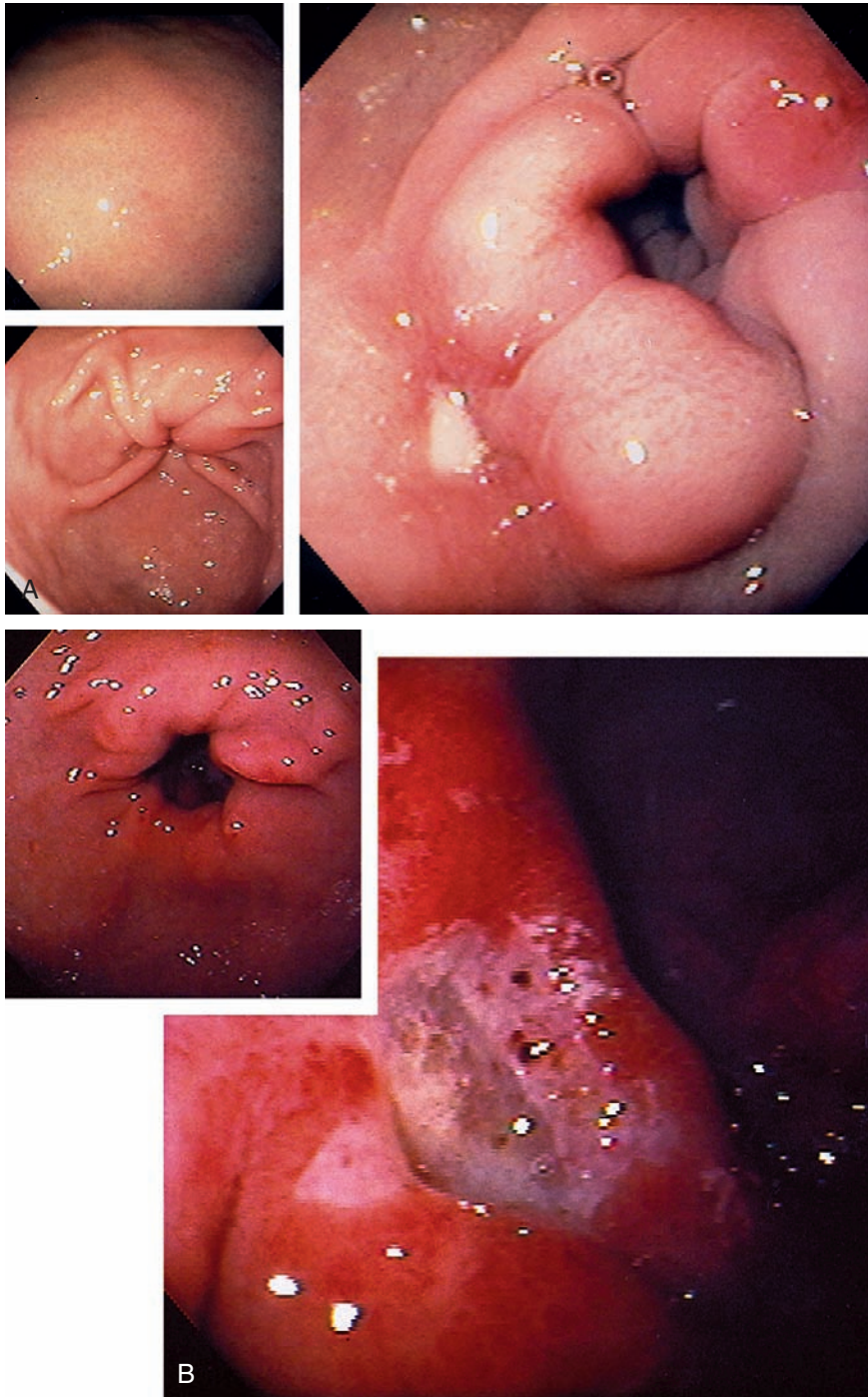


FIGURE 4.12 DUODENAL ULCER

A, Anterior clean-based duodenal ulcer. The duodenal folds are markedly edematous at the superior duodenal angle. A speckled pattern is on the gastric body, suggesting gastritis (*inset, top*). The antrum appears normal endoscopically (*inset, bottom*). *Helicobacter pylori* chronic active gastritis was histologically identified in both the body and the antral mucosa. **B**, Deep anterior ulcer with multiple black spots in the ulcer base, suggesting recent bleeding. The ulcer margins are edematous and hemorrhagic. The antrum and peripyloric area show mild erythema and subepithelial hemorrhage, especially around the pylorus, suggesting gastritis (*inset*). *H. pylori* chronic active gastritis was found on antral biopsy.

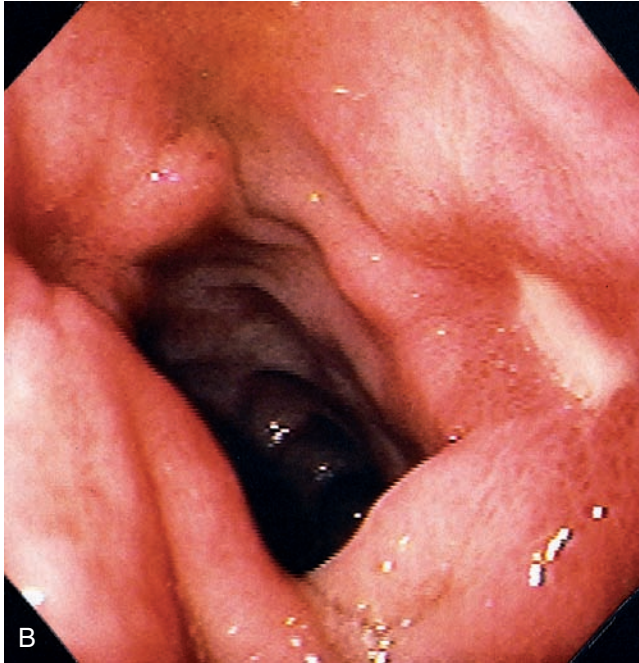
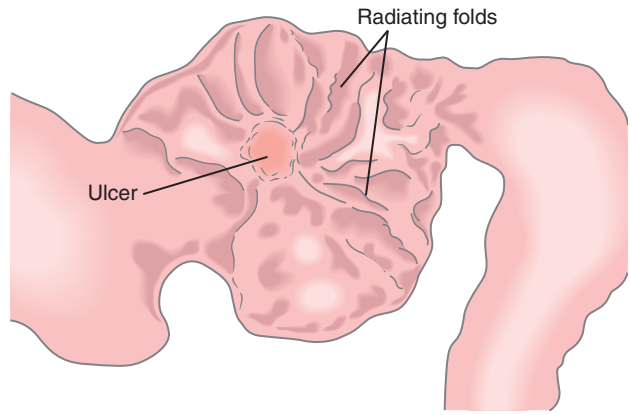
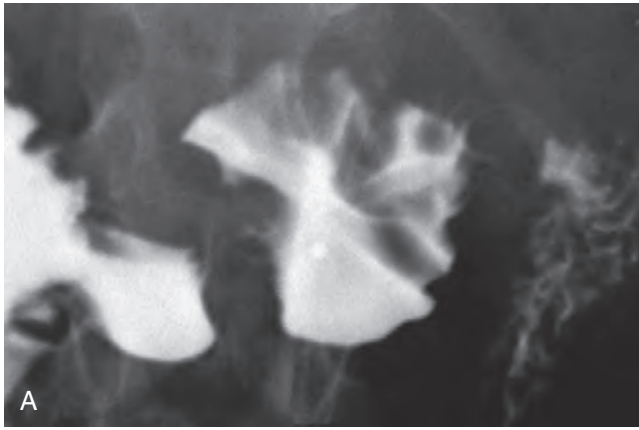


FIGURE 4.13 DUODENAL ULCER

A, A persistent collection of barium with radiating folds in the duodenal bulb, highly suggestive of an ulcer. **B**, Posterior duodenal ulcer with a clean base. There is marked edema of the bulb, with folds radiating from the ulcer. Subepithelial hemorrhage is surrounding the ulcer, as well as in the remainder of the bulb. A small ulcerative lesion is also shown anteriorly.



FIGURE 4.14 DUODENAL ULCER

Well-circumscribed ulcer with yellow exudate resembling a fried egg.



FIGURE 4.15 DUODENAL ULCER

Large duodenal ulcer with surrounding edema projecting into the duodenal bulb. The second duodenum is normal.



FIGURE 4.16 DUODENAL ULCER
Small, clean-based ulcer surrounded by prominent folds and diffuse subepithelial hemorrhage.

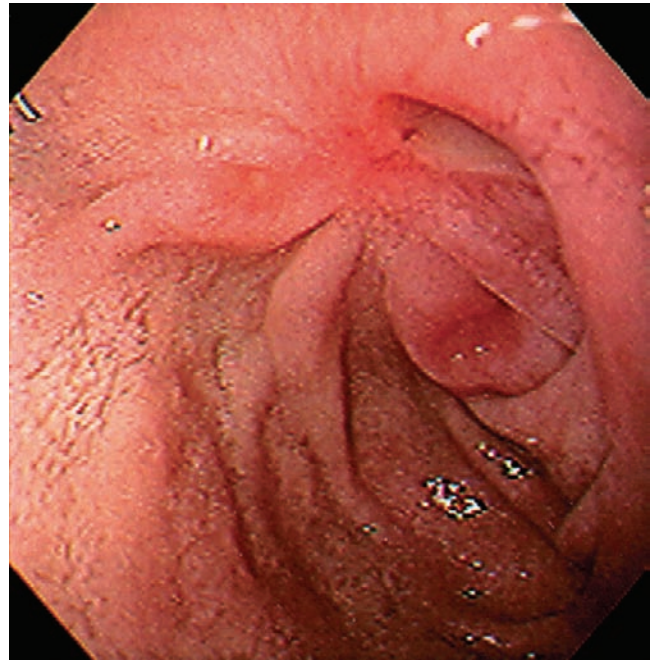


FIGURE 4.17 DUODENAL ULCER WITH SCARRING
Duodenal ulcer with several lesions and marked retraction resulting from prior disease.

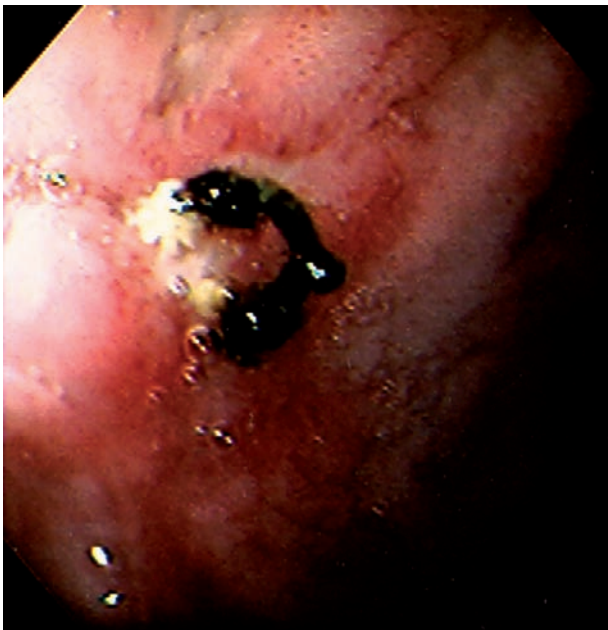


FIGURE 4.18 ANTERIOR SUTURE WITH SMALL ULCER
Suture at the site of a prior oversew of duodenal ulcer hemorrhage. Small ulceration is seen at the base of the suture material.

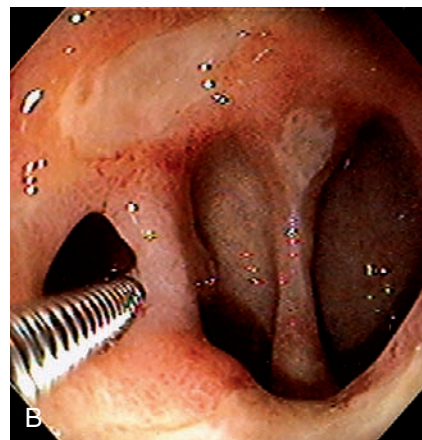
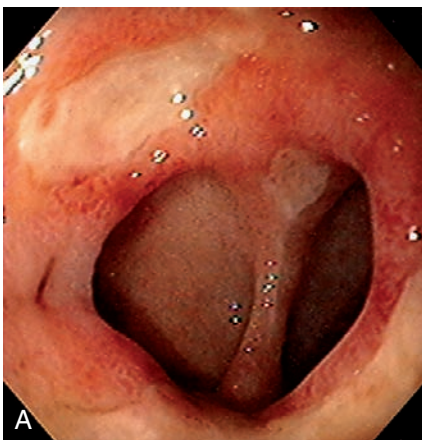


FIGURE 4.19 DUODENAL ULCER WITH DEFORMITY
A, Markedly abnormal duodenal bulb with active ulceration and pseudodiverticula.
B, Forceps were placed in the slitlike opening demonstrating a mucosal bridge.

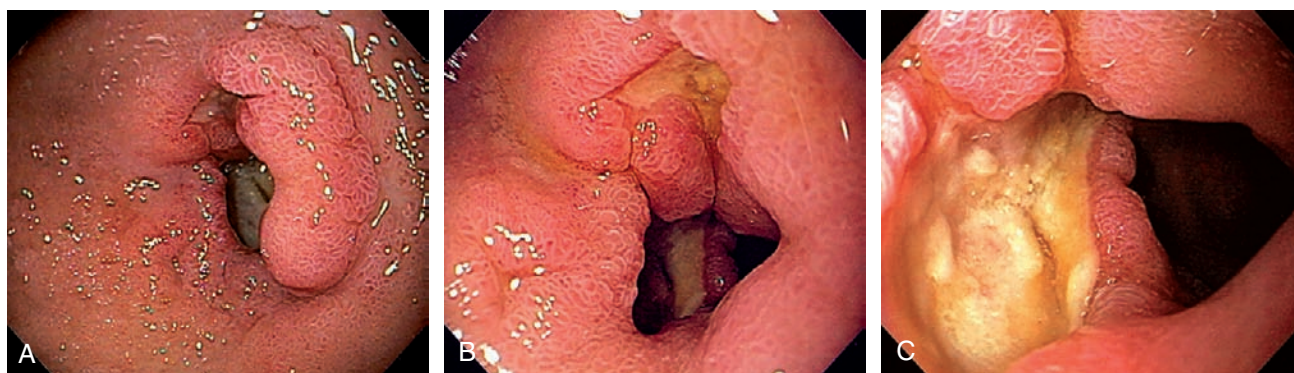


FIGURE 4.20 MALIGNANT DUODENAL ULCER

A, Edematous fold posteriorly at the junction of the first and second duodenum. There is mild narrowing and associated ulceration anteriorly. **B**, The ulceration is surrounded by edematous duodenal tissue. **C**, The depth of the lesion is evident. Biopsy results proved adenocarcinoma, and this patient had a hilar mass (cholangiocarcinoma).



Differential Diagnosis

Duodenal Ulcer (Figure 4.20)

Benign duodenal ulcer
 Extrinsic neoplasm (cholangiocarcinoma, pancreatic carcinoma)
 Periduodenal inflammatory process (e.g., pancreatitis)

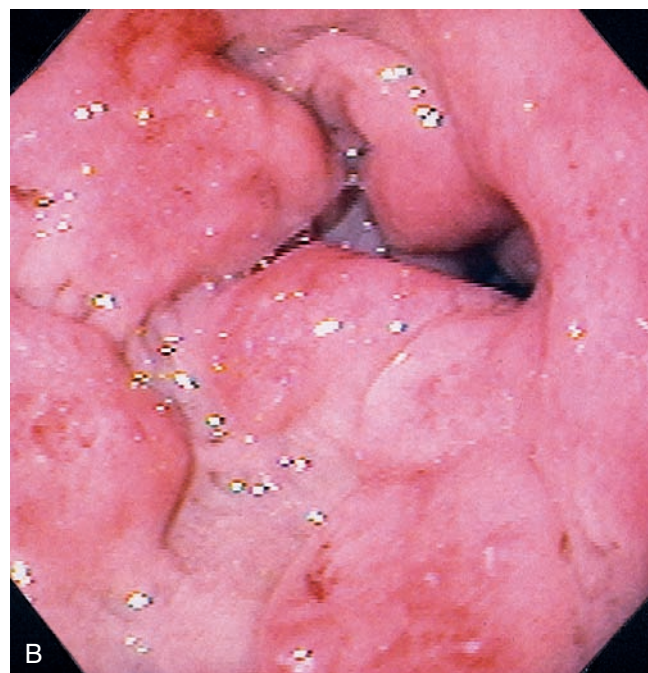
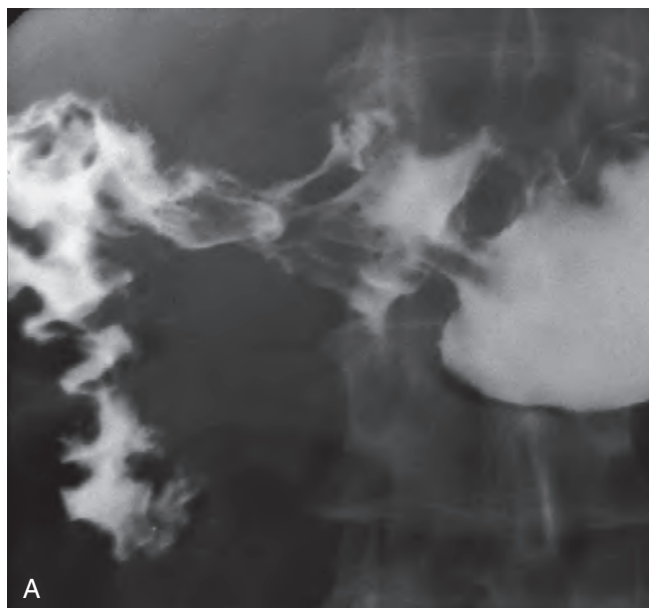


FIGURE 4.21 DUODENAL DEFORMITY MIMICKING ULCER

A, Collection of barium in the duodenal bulb with radiating folds, suggestive of an active ulcer crater. There is marked edema of the folds in the second duodenum, suggesting duodenitis. **B**, The collection of barium represents an old healed ulceration. The duodenal bulb is markedly distorted, with multiple erosions and edema. In a patient with prior ulcer disease, healed craters, and secondary pseudodiverticula, active ulcer craters may be difficult to distinguish radiographically from inactive healed disease.

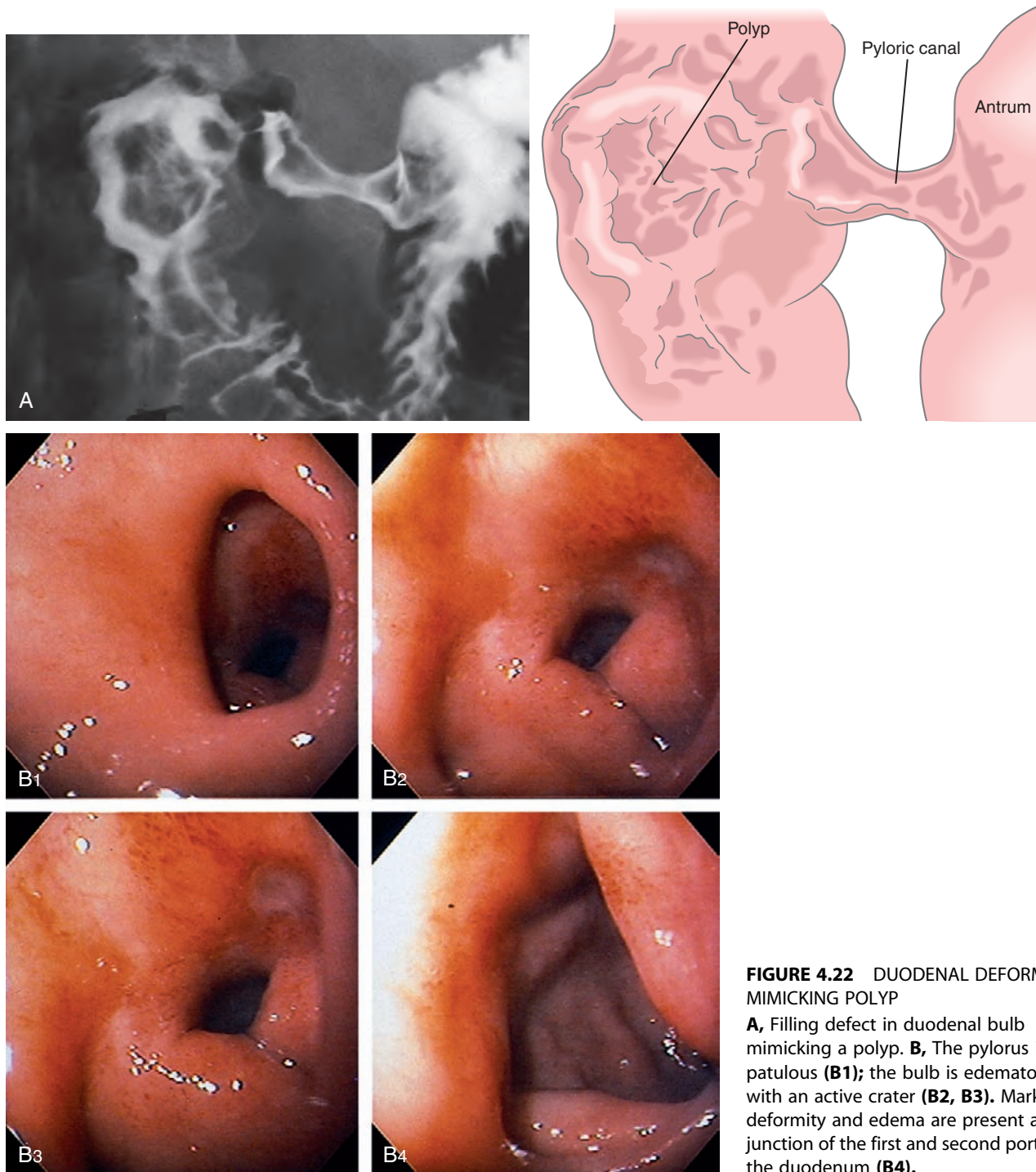


FIGURE 4.22 DUODENAL DEFORMITY MIMICKING POLYP
A, Filling defect in duodenal bulb mimicking a polyp. **B**, The pylorus is patulous (**B1**); the bulb is edematous, with an active crater (**B2, B3**). Marked deformity and edema are present at the junction of the first and second portion of the duodenum (**B4**).

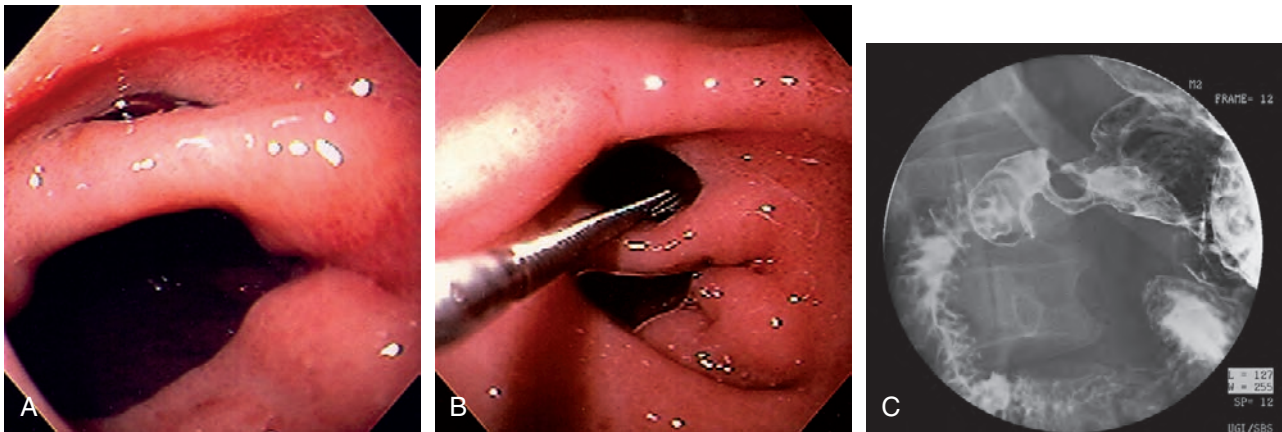


FIGURE 4.23 DOUBLE PYLORUS

A, Two openings at the pylorus separated by a mucosal bridge. **B**, The anterior opening is now more apparent when cannulated with a stiff wire. **C**, Upper gastrointestinal (UGI) series shows the two pathways to the duodenal bulb.

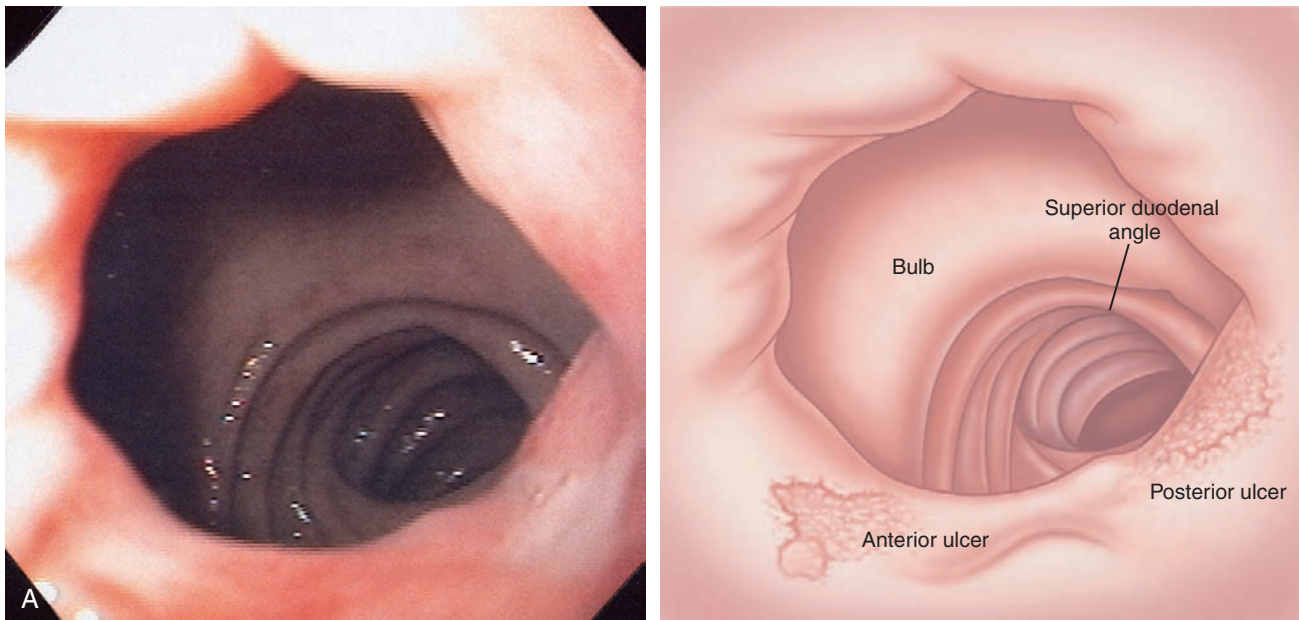


FIGURE 4.24 PYLORIC CHANNEL ULCER

A, The pylorus is seen with a clean-based ulcer posteriorly and a smaller ulcer anteriorly. There is associated subepithelial hemorrhage in the channel. A normal-appearing duodenal bulb and superior duodenal angle are seen in the distance.

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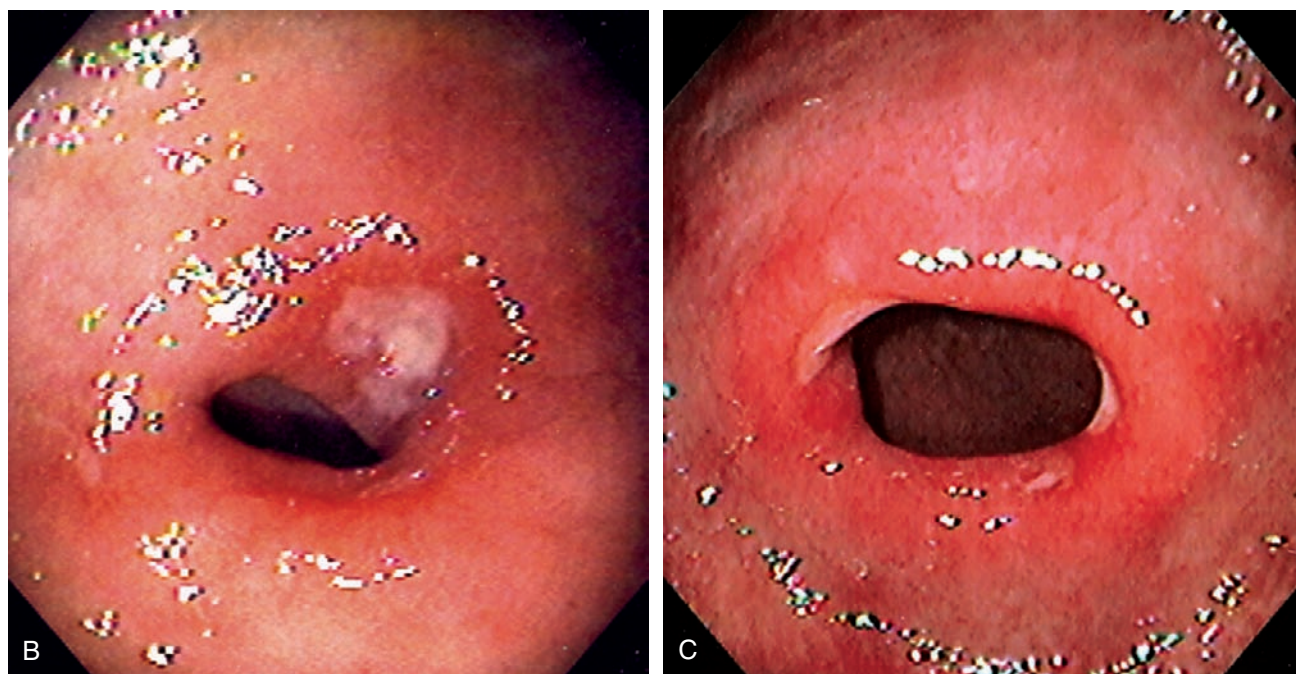


FIGURE 4.24 PYLORIC CHANNEL ULCER

B, Mild narrowing of the pylorus with erythema and shallow posterior ulcer. **C**, Patulous pylorus with shallow ulcer both anteriorly and posteriorly.

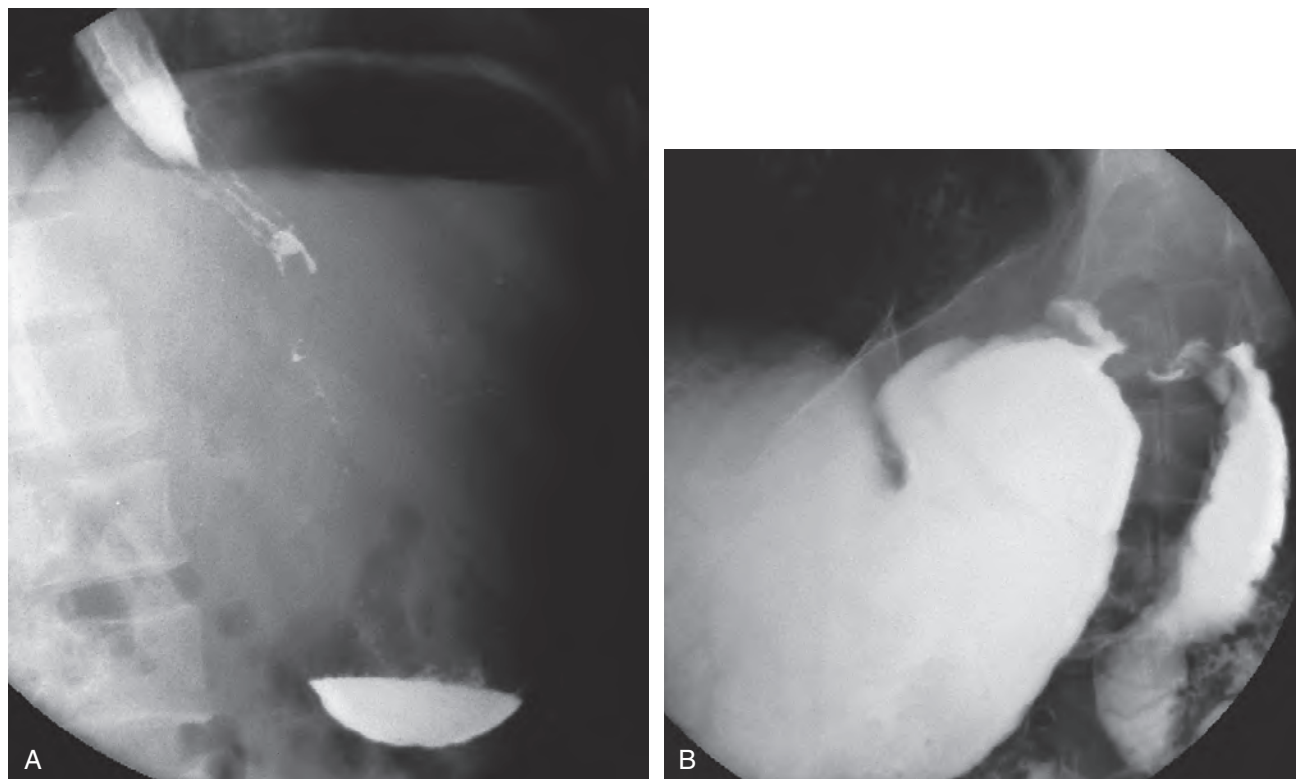


FIGURE 4.25 DUODENAL ULCER CAUSING GASTRIC OUTLET OBSTRUCTION

A, Markedly dilated, fluid-filled stomach, with barium seen in the distal esophagus and puddling in the gastric body. The gastric air bubble is pronounced. A succussion splash was present on physical examination. **B**, Deformity of the peripyloric area and bulb.

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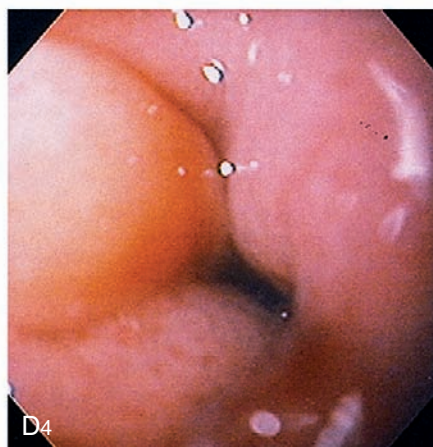
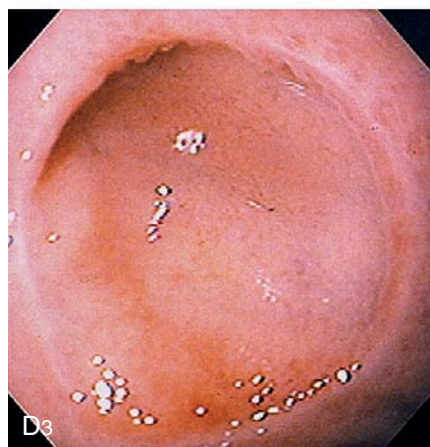
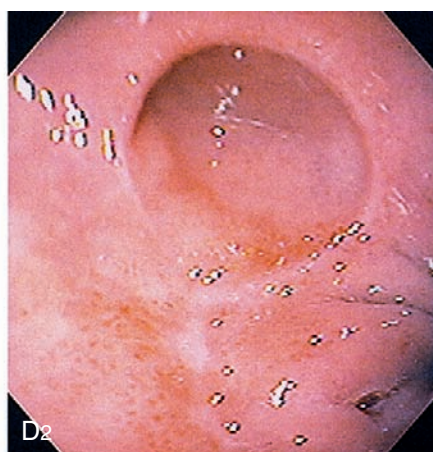
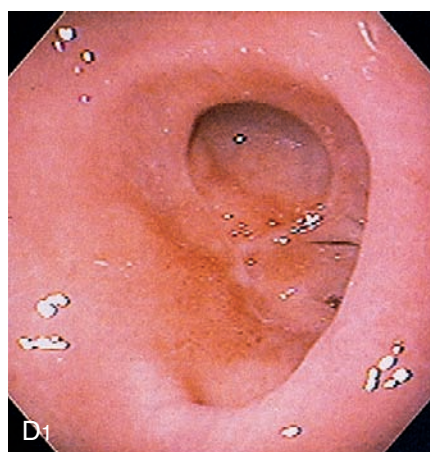
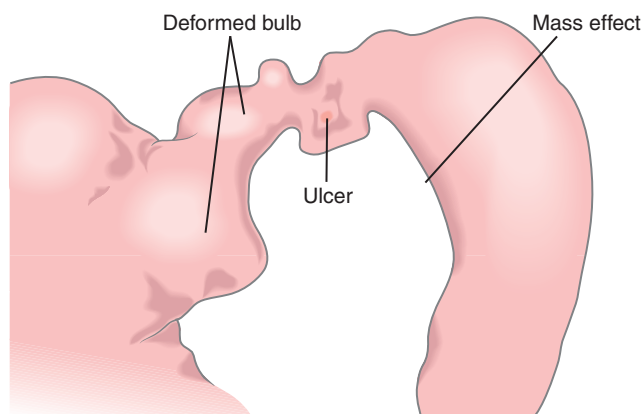
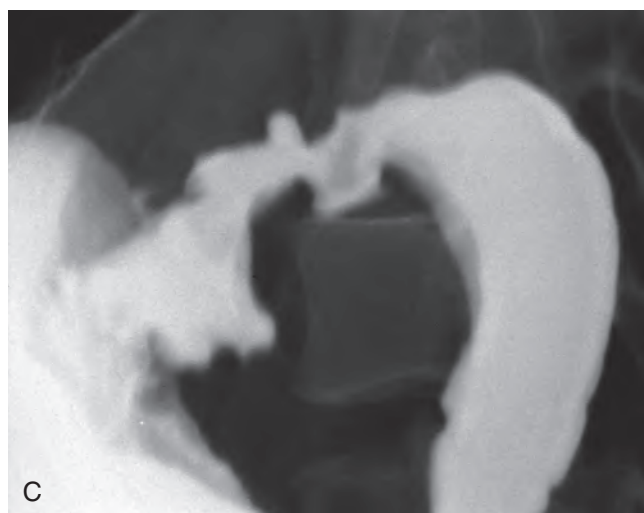


FIGURE 4.25 DUODENAL ULCER CAUSING GASTRIC OUTLET OBSTRUCTION

C, Deformity of bulb with active ulcer and edema, causing a mass effect on the proximal second duodenum.

D, The pylorus is absent. A large pseudodiverticulum is shown anteriorly (**D1-D3**). Edema and narrowing are present with further advancement of the endoscope (**D4**).

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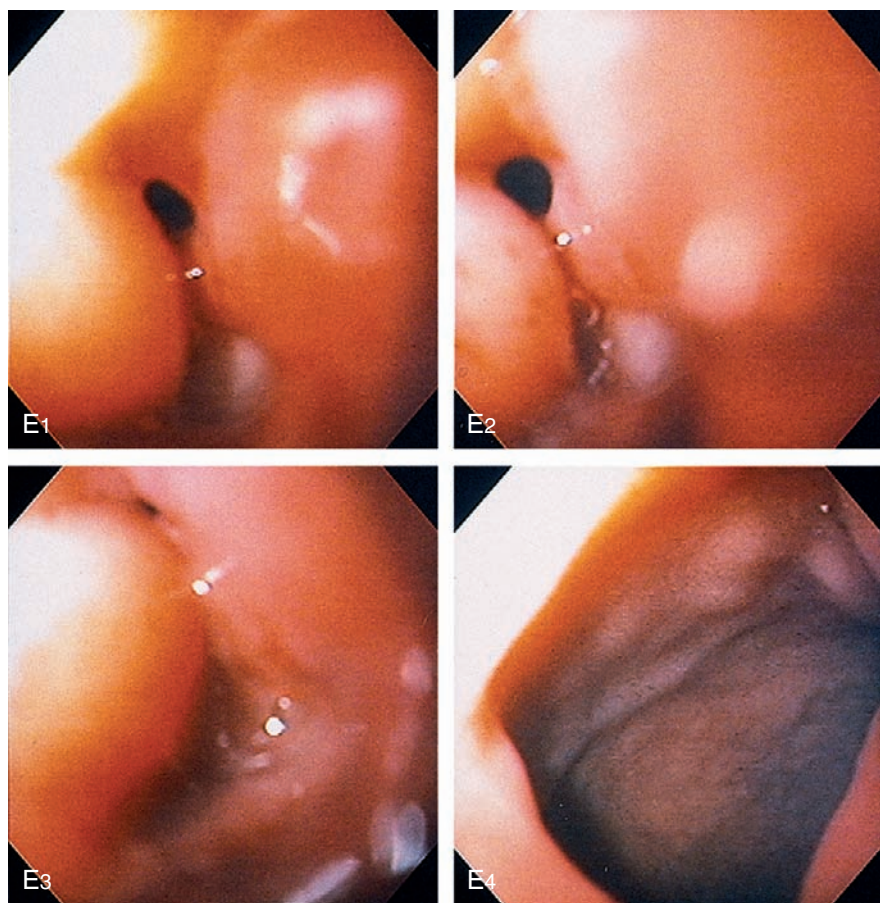


FIGURE 4.25 DUODENAL ULCER CAUSING GASTRIC OUTLET OBSTRUCTION **E**, An ulcer is seen posteriorly (**E1-E3**). The circumferential process ends abruptly at the superior duodenal angle (**E4**).



FIGURE 4.26 ULCER IN DESCENDING DUODENUM
Large hemicircumferential bile-stained ulcer in the mid-second duodenum. The lesion was caused by nonsteroidal antiinflammatory drug use.

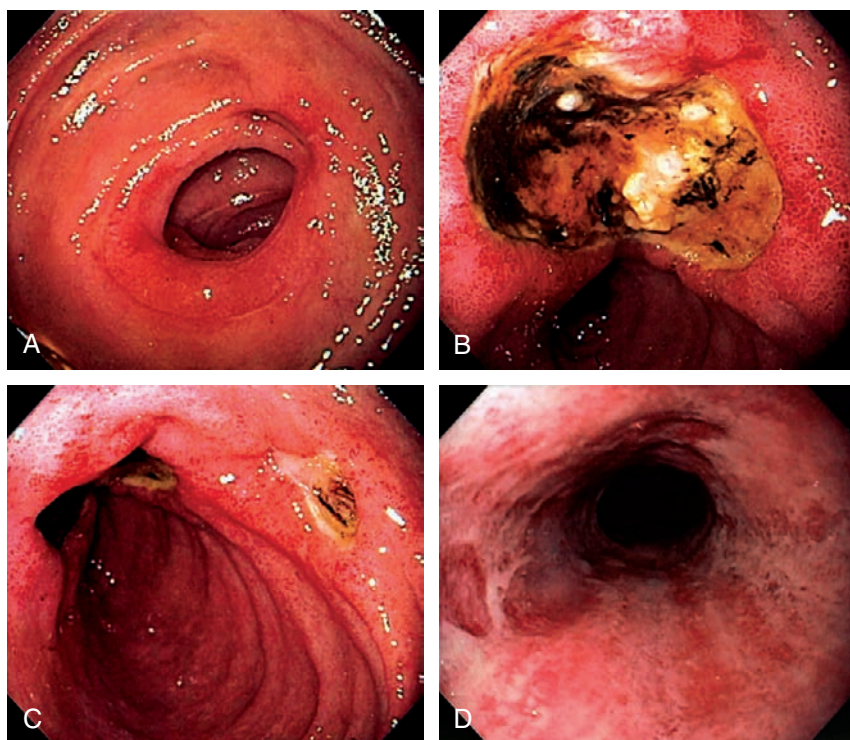


FIGURE 4.27 ZOLLINGER-ELLISON SYNDROME

A, Edema and erythema at the junction of first and second duodenum associated with a small posterior ulcer. **B**, Giant ulcer in the second duodenum. **C**, Multiple ulcers in the mid-second duodenum. **D**, This patient also had severe erosive esophagitis. The association of esophagitis with ulcers in the second duodenum should raise suspicion for Zollinger-Ellison syndrome.

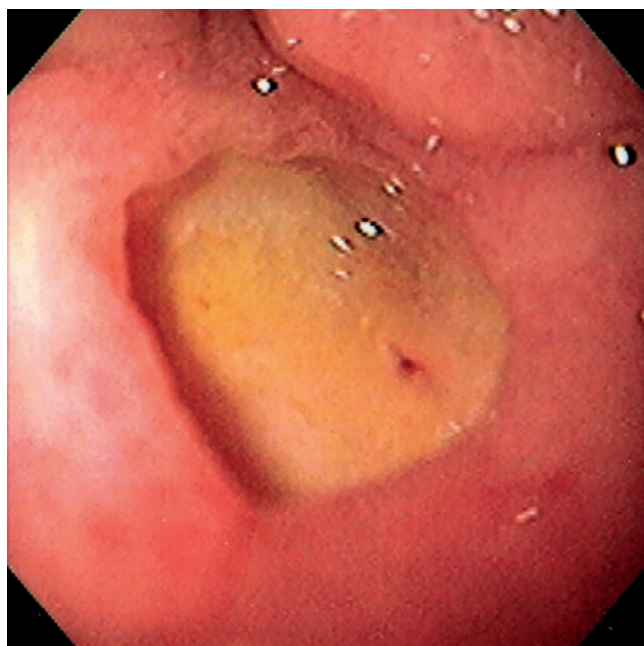


FIGURE 4.28 DUODENAL ULCER WITH FLAT RED SPOT
Large ulcer with flat red spot.

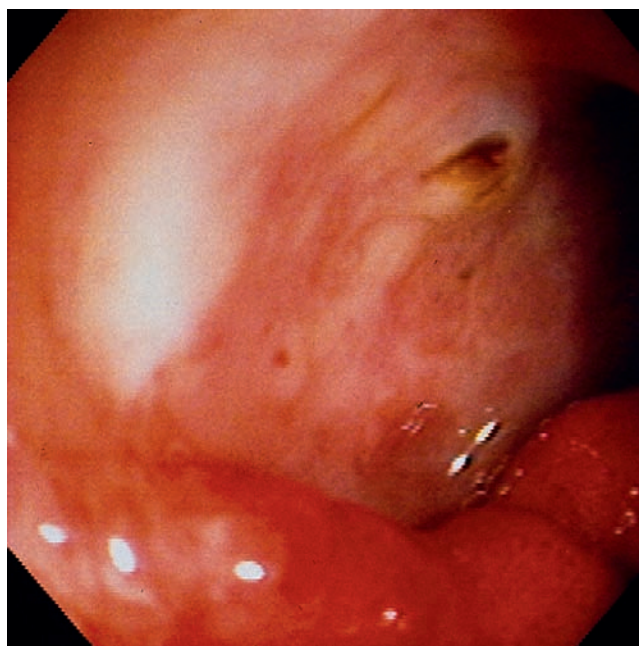


FIGURE 4.29 GIANT DUODENAL ULCER WITH RAISED SPOT
Note the depth of the lesion with the surrounding ulcer rim. A raised black spot in the center of the ulcer indicates the point of bleeding.

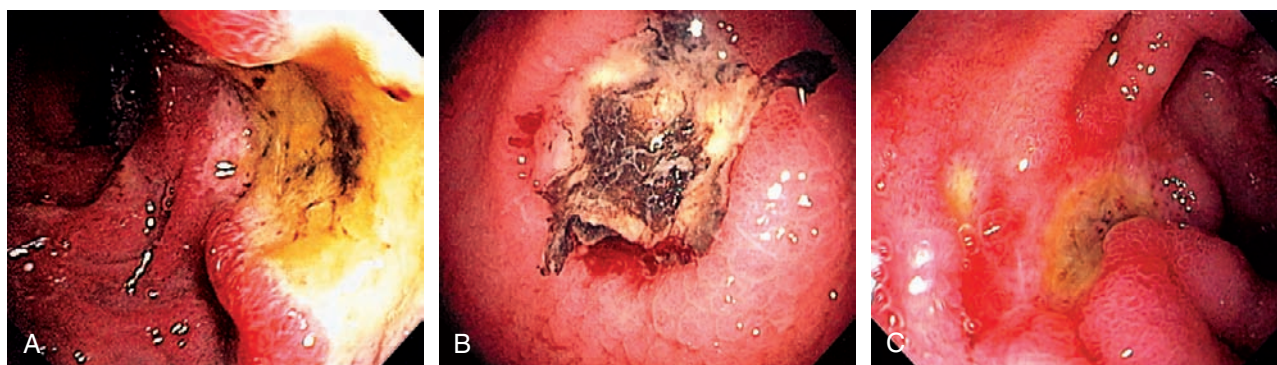


FIGURE 4.30 DUODENAL ULCER WITH BLACK BASE

A, Large posterior ulcer with heaped-up margins and adherent heme. **B**, Well-circumscribed posterior ulcer partially covered by old blood. **C**, Anterior duodenal ulcer with black base. Note the nearby small, clean-based ulcer.

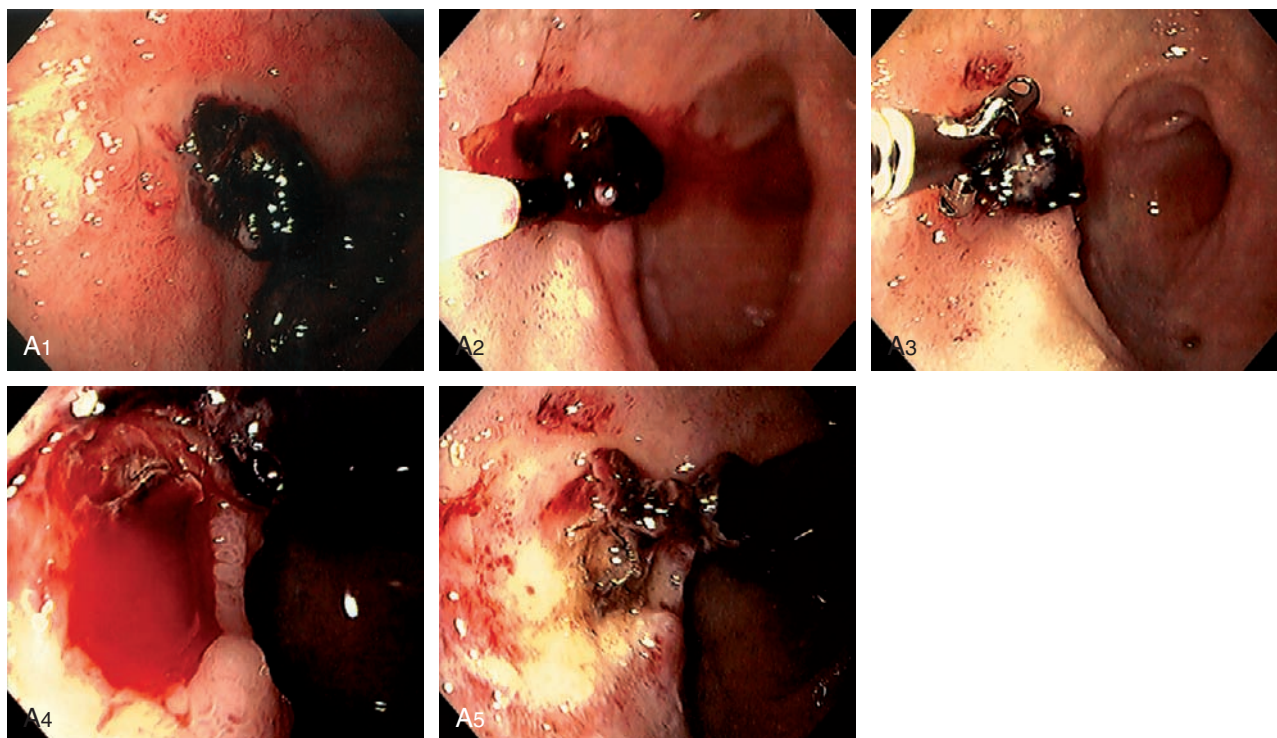


FIGURE 4.31 DUODENAL ULCER WITH CLOT

A1, Anterior ulcer with protruding adherent clot. **A2**, Epinephrine is injected into the base of the clot with bleeding precipitated. **A3**, The clot is removed with biopsy forceps. Note the ischemic appearance of the duodenum resulting from the epinephrine injection. **A4**, Oozing was seen from fleshy material at the base of the clot representing a visible vessel. **A5**, Thermal therapy was applied to the bleeding area, resulting in black eschar with depth and hemostasis achieved.

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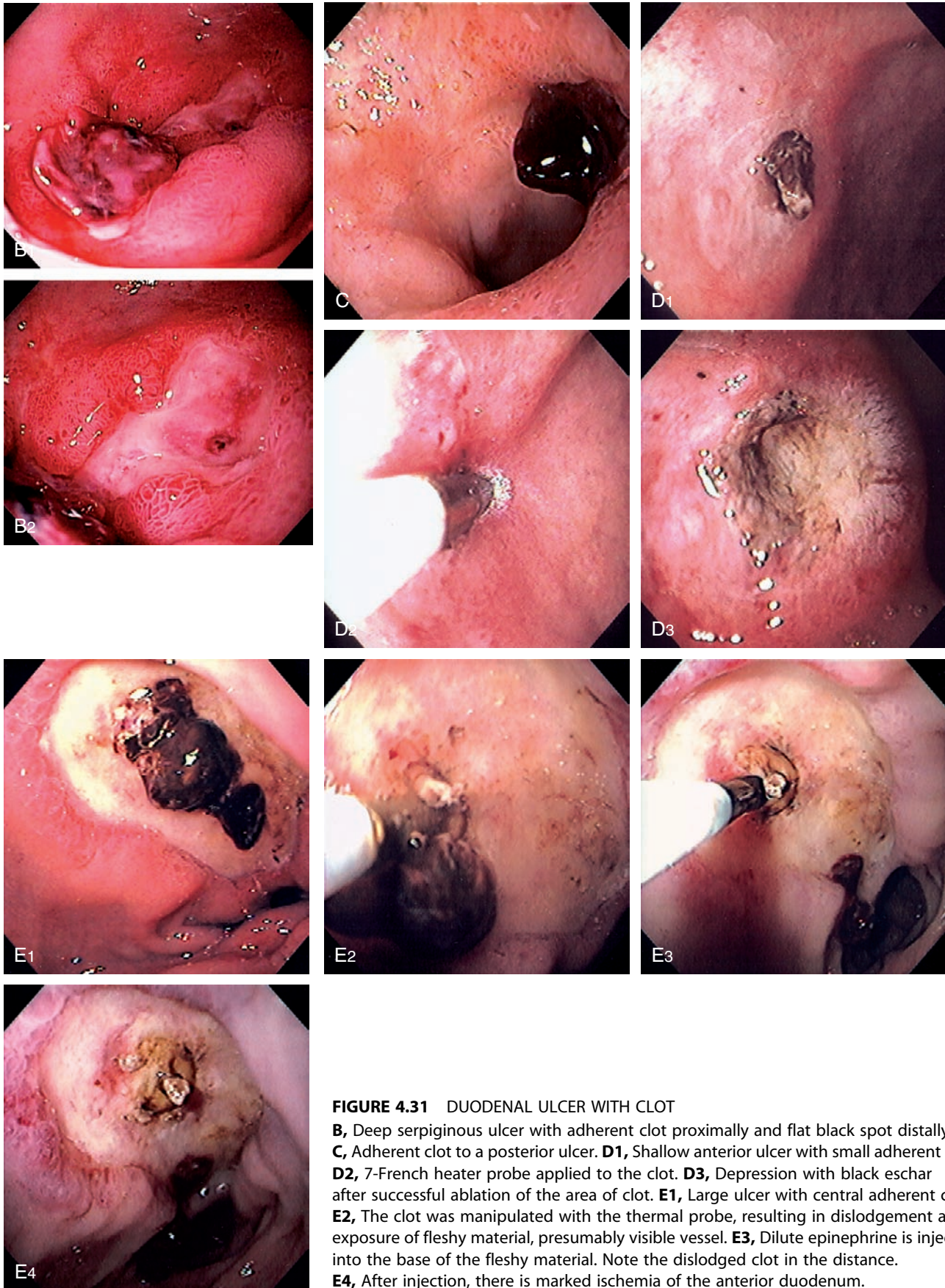


FIGURE 4.31 DUODENAL ULCER WITH CLOT

B, Deep serpiginous ulcer with adherent clot proximally and flat black spot distally. **C**, Adherent clot to a posterior ulcer. **D1**, Shallow anterior ulcer with small adherent clot. **D2**, 7-French heater probe applied to the clot. **D3**, Depression with black eschar after successful ablation of the area of clot. **E1**, Large ulcer with central adherent clot. **E2**, The clot was manipulated with the thermal probe, resulting in dislodgement and exposure of fleshy material, presumably visible vessel. **E3**, Dilute epinephrine is injected into the base of the fleshy material. Note the dislodged clot in the distance. **E4**, After injection, there is marked ischemia of the anterior duodenum.

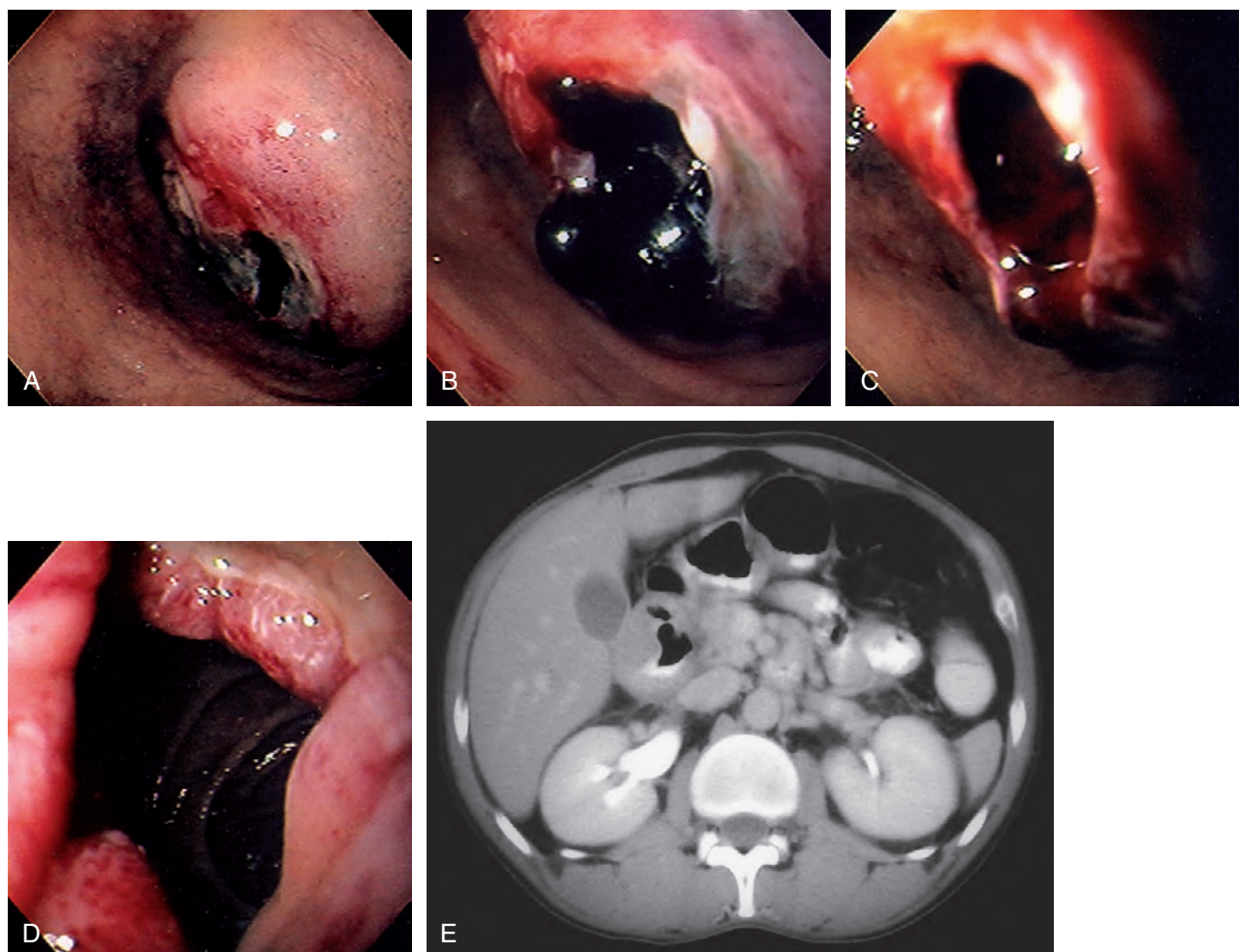


FIGURE 4.32 MASS-LIKE DUODENAL ULCER WITH CLOT

A, Mass effect in the posterior duodenum with central ulceration. **B**, Close-up of the ulcerated area demonstrates an opening covered with clot. **C**, With clot removed, a cavity is evident. **D**, More distally, circumferential ulcer is seen with normal duodenum in the distance. **E**, Marked circumferential thickening of the duodenum resembling a mass lesion. Air is seen in the lumen and in the thickened wall. Surgery confirmed a benign duodenal ulcer.

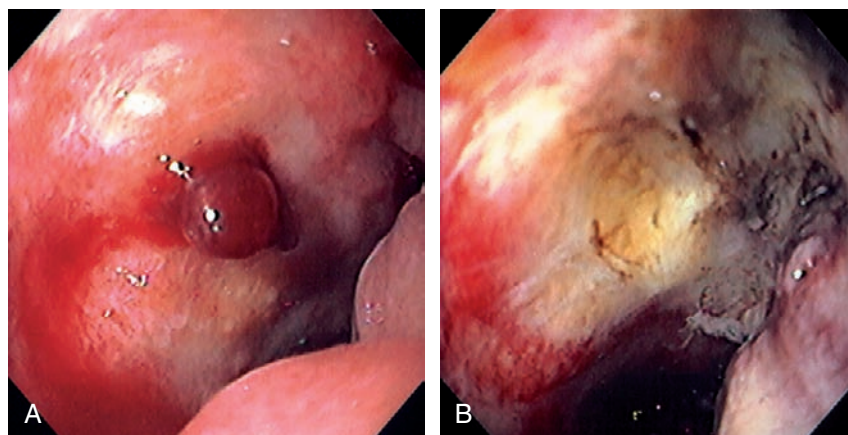


FIGURE 4.33 MALIGNANT DUODENAL ULCER WITH BLEEDING VISIBLE VESSEL

A, Large ulcer in the anterior wall of the duodenal bulb. Note the mass effect in the duodenum and the lack of well-defined edges to the ulcer. There is a central fresh blood clot with active oozing from underneath. **B**, Thermal therapy was applied to the area, resulting in eschar and depression. Subsequent biopsy results showed adenocarcinoma.

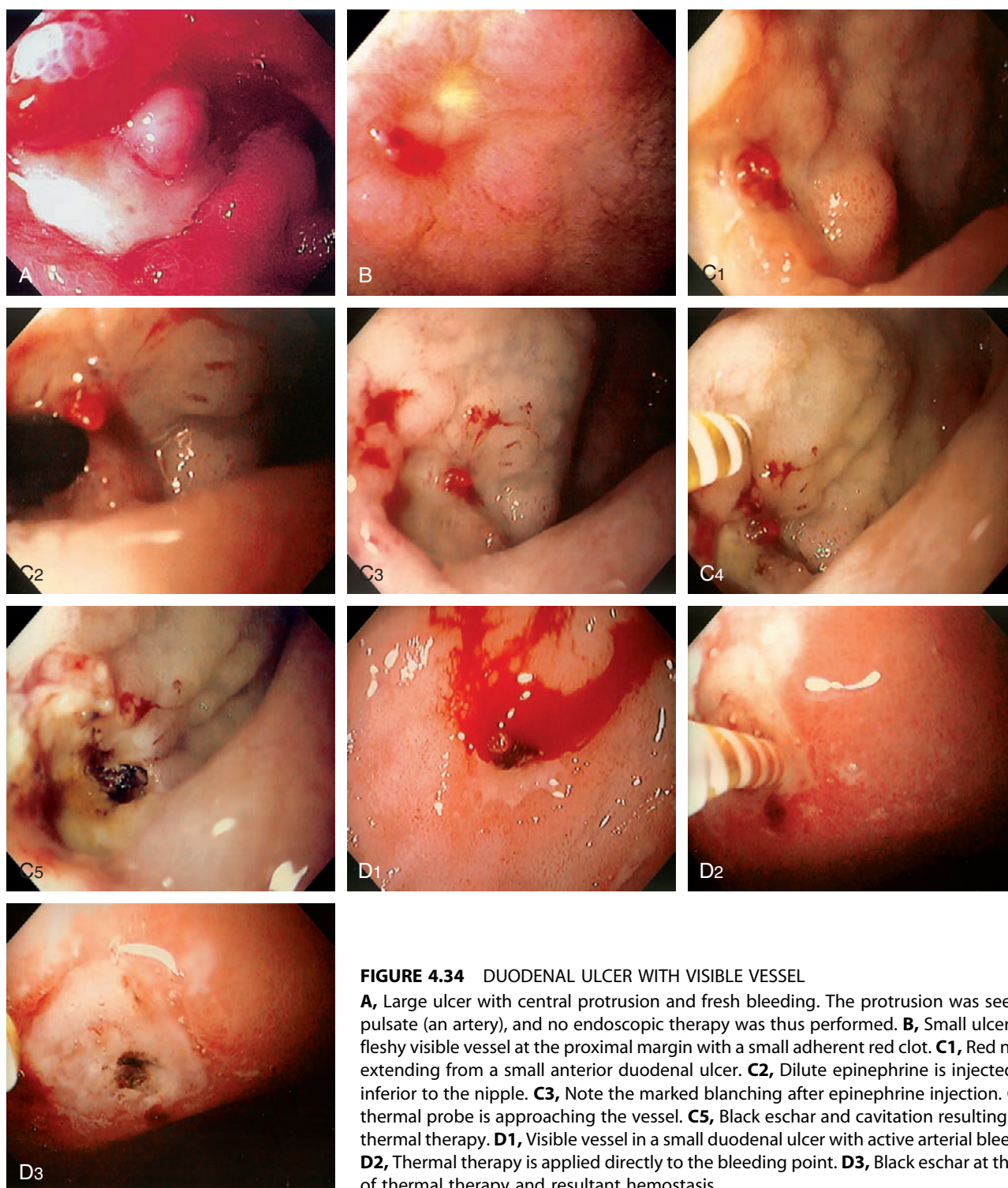


FIGURE 4.34 DUODENAL ULCER WITH VISIBLE VESSEL

A, Large ulcer with central protrusion and fresh bleeding. The protrusion was seen to pulsate (an artery), and no endoscopic therapy was thus performed. **B**, Small ulcer with fleshy visible vessel at the proximal margin with a small adherent red clot. **C1**, Red nipple extending from a small anterior duodenal ulcer. **C2**, Dilute epinephrine is injected just inferior to the nipple. **C3**, Note the marked blanching after epinephrine injection. **C4**, A thermal probe is approaching the vessel. **C5**, Black eschar and cavitation resulting from thermal therapy. **D1**, Visible vessel in a small duodenal ulcer with active arterial bleeding. **D2**, Thermal therapy is applied directly to the bleeding point. **D3**, Black eschar at the site of thermal therapy and resultant hemostasis.

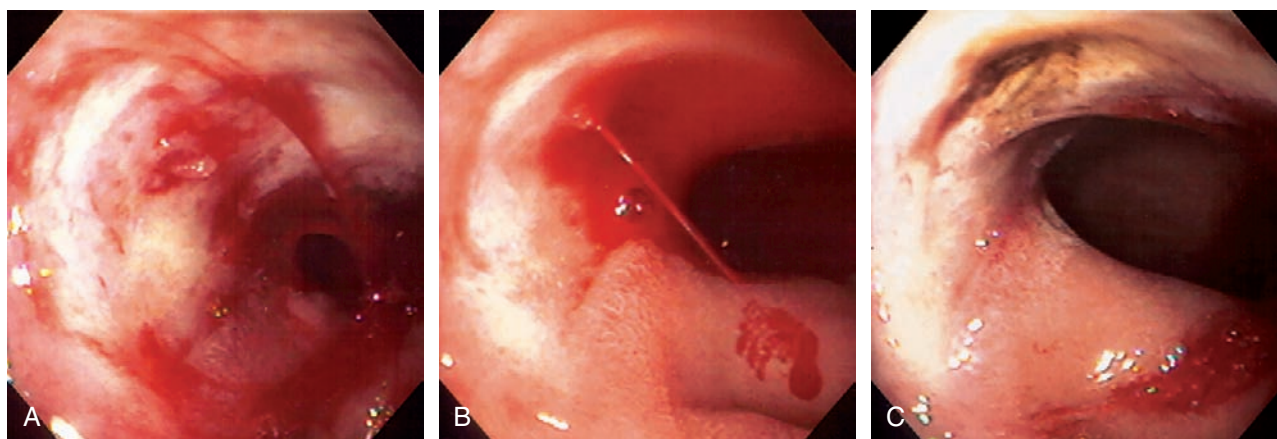


FIGURE 4.35 DUODENAL ULCER WITH VISIBLE VESSEL AND ARTERIAL BLEEDING

A, Large anterior duodenal ulcer with fleshy nonbleeding visible vessel. **B**, With observation, active arterial bleeding began. **C**, Appearance of the ulcer after thermal therapy.

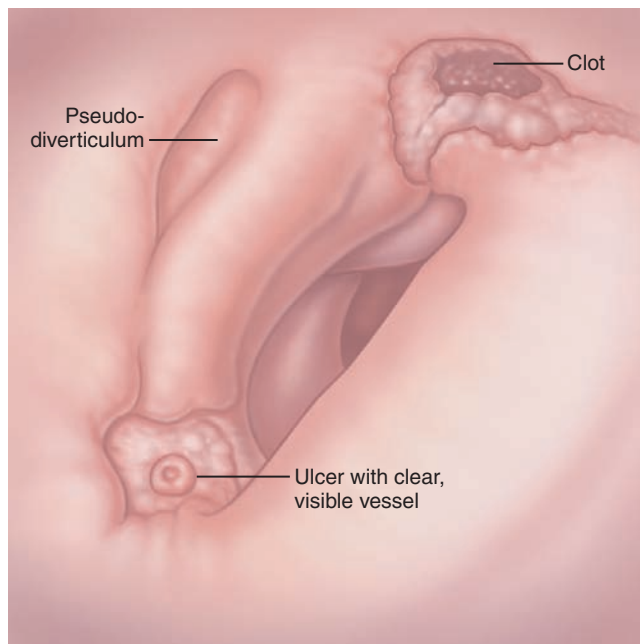
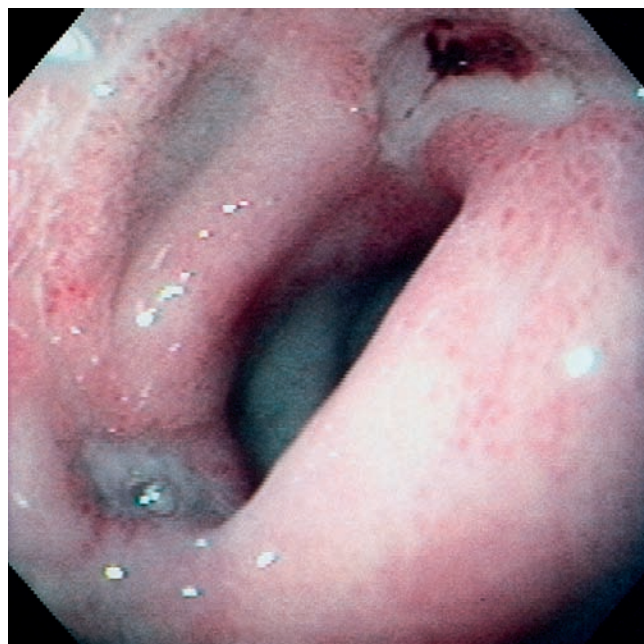


FIGURE 4.36 DUODENAL ULCERS WITH MULTIPLE STIGMATA

Two ulcers in the bulb with associated pseudodiverticulum. The anteroinferior ulcer has a white nipple-like projection, whereas the superior ulcer has a large, flat black area.

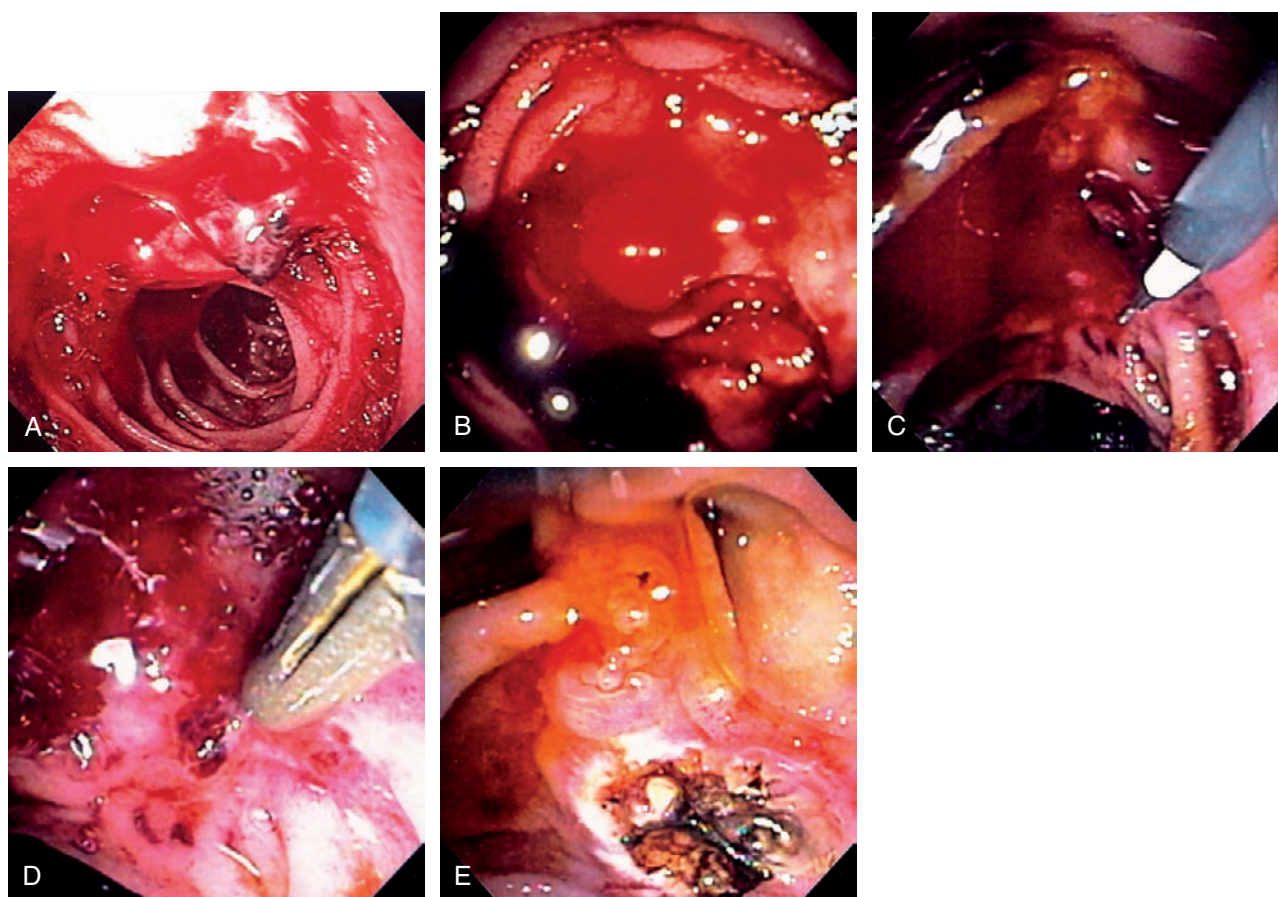


FIGURE 4.37 BLEEDING ULCER IN SECOND DUODENUM

A, Fresh blood and active bleeding from a clot in the second duodenum. Because of the position, a forward viewing endoscope could not adequately visualize the area for endoscopic therapy. **B**, Bleeding area as seen with side viewing duodenoscope. An en face view was now possible. **C**, With vigorous washing, a focal area of bleeding was seen and dilute epinephrine injected with a sclerotherapy needle. **D**, After epinephrine therapy, a fleshy vessel was identified. The 10-French thermal probe is in position. Multiple pulses were applied, resulting in hemostasis and a black eschar. **E**, Note bile flowing from the major papilla just superior to the lesion.



FIGURE 4.38 DUODENAL ULCER PERFORATION

Large duodenal ulcer with apparent opening. Surgery confirmed a perforated anterior ulcer.

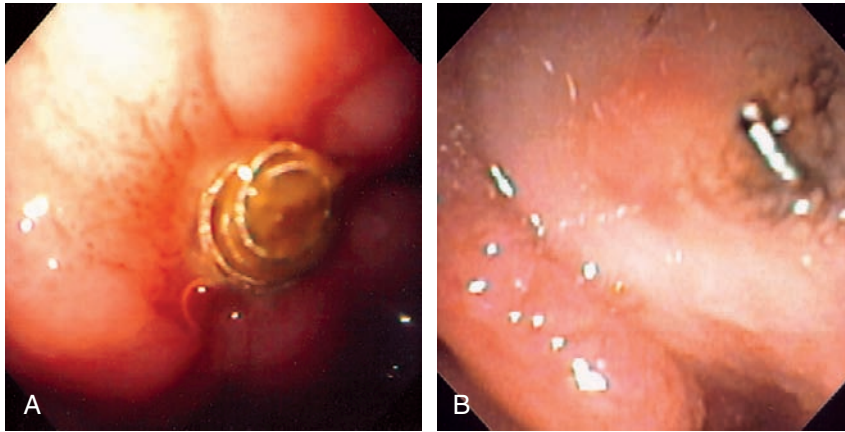


FIGURE 4.39 COILS IN DUODENAL WALL FROM PRIOR EMBOLIZATION
A, B, Round coils at site of prior bleeding ulcer.

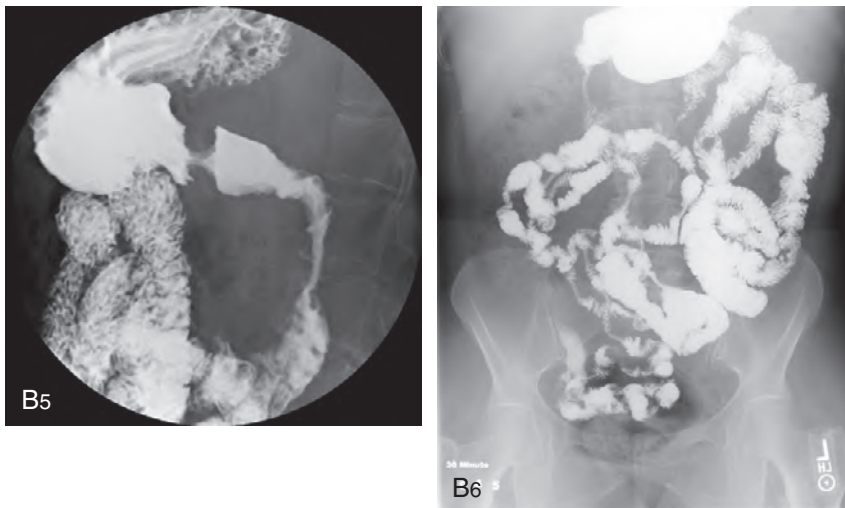
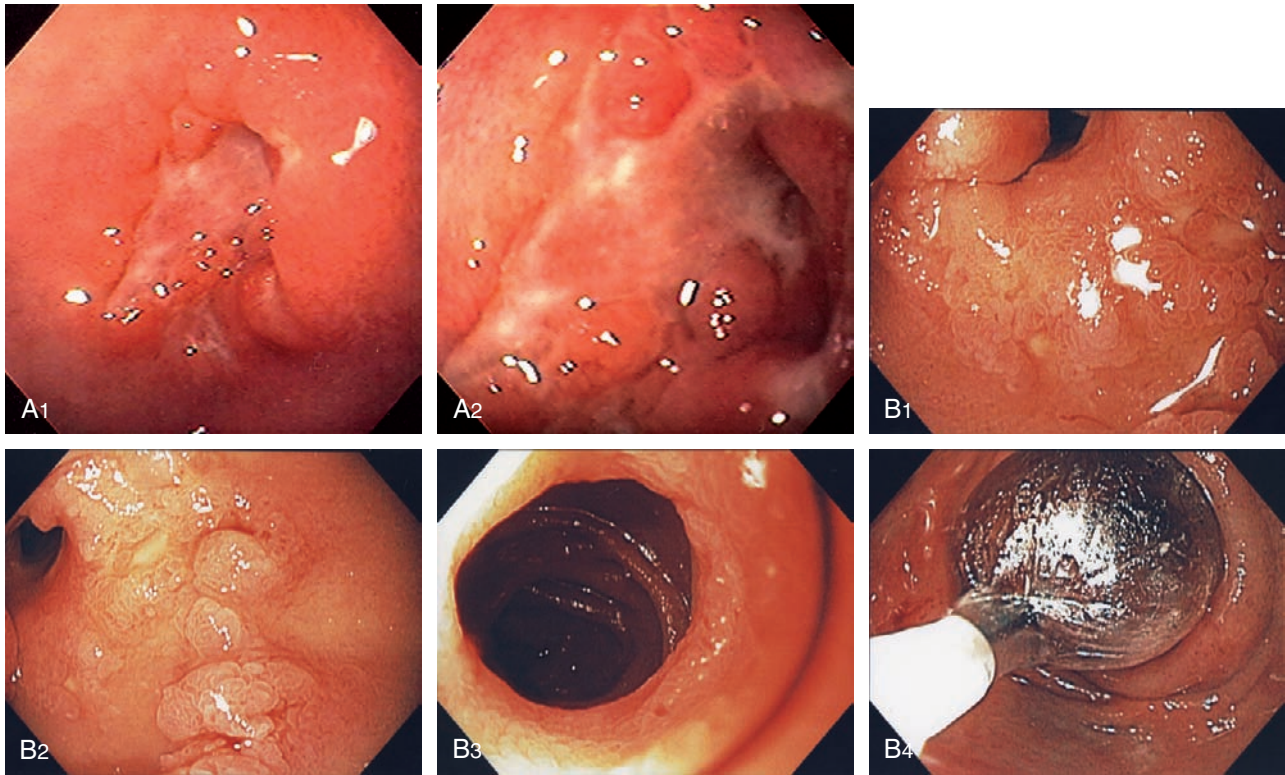


FIGURE 4.40 CROHN'S DISEASE
A1, Irregular ulceration at the junction of first and second duodenum. **A2,** Close-up shows the serpiginous nature of the ulcer.
B1, B2, Serpiginous ulceration with nodularity in the third duodenum with some narrowing. **B3,** More distally, a stricture is shown. **B4,** Balloon dilatation of the stricture. **B5, B6,** UGI series with a small-bowel follow-through shows multiple strictures and distal ileal disease confirming the diagnosis of Crohn's disease.



Differential Diagnosis

Crohn's Disease (Figure 4.40)

Infection

Cytomegalovirus

Nonsteroidal antiinflammatory drug injury



FIGURE 4.41 JEJUNAL CROHN'S DISEASE

Ulcerated stricture in the proximal jejunum found by push enteroscopy. (Courtesy F. Perez-Roldan, MD, and Dr. P. Gonzalez-Carro, MD, Alcazar de San Juan, Spain.)

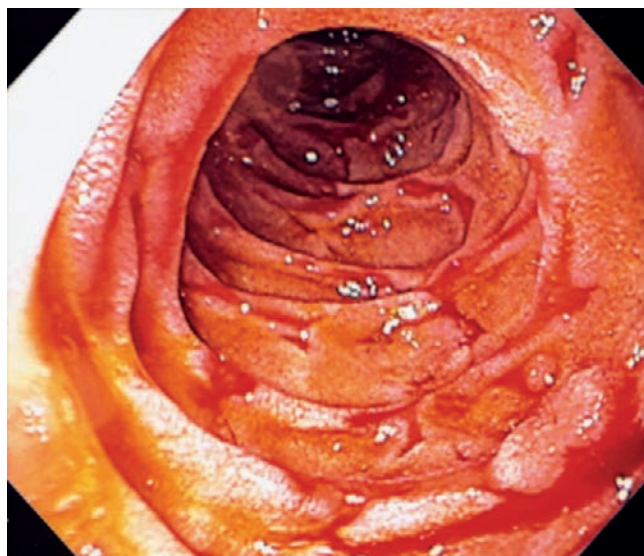


FIGURE 4.42 ISCHEMIA

Serpiginous ulceration throughout the second duodenum.

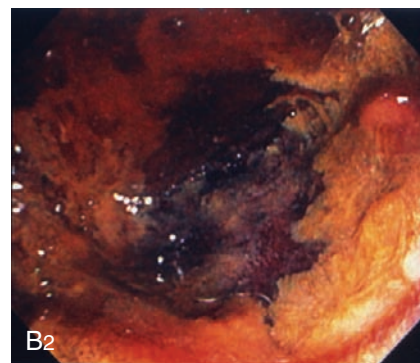
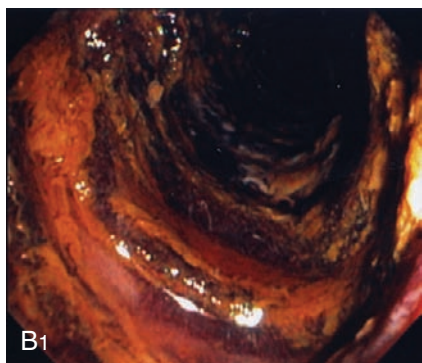
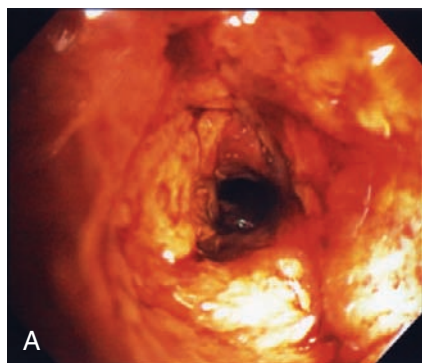


FIGURE 4.43 INFARCTION

A, Thick exudate covers the duodenum. **B1, B2**, When the exudate is débrided, the underlying mucosa is black and necrotic.

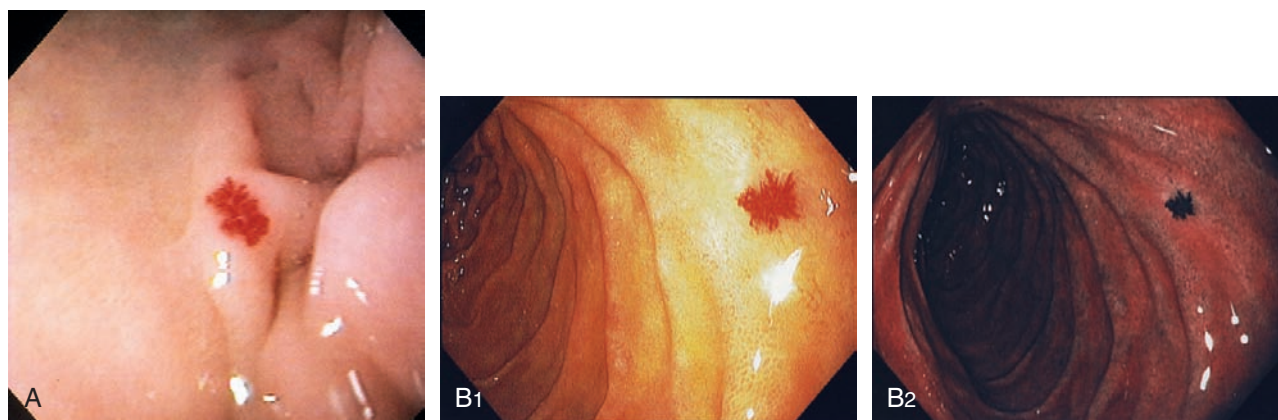


FIGURE 4.44 VASCULAR ECTASIA

A, Air has been withdrawn from the duodenal bulb to bring the ectasia closer, documenting the lack of depth and the characteristic frondlike appearance. **B1**, Solitary ectasia in the second duodenum. **B2**, The ectasia is well delineated on narrow band imaging.

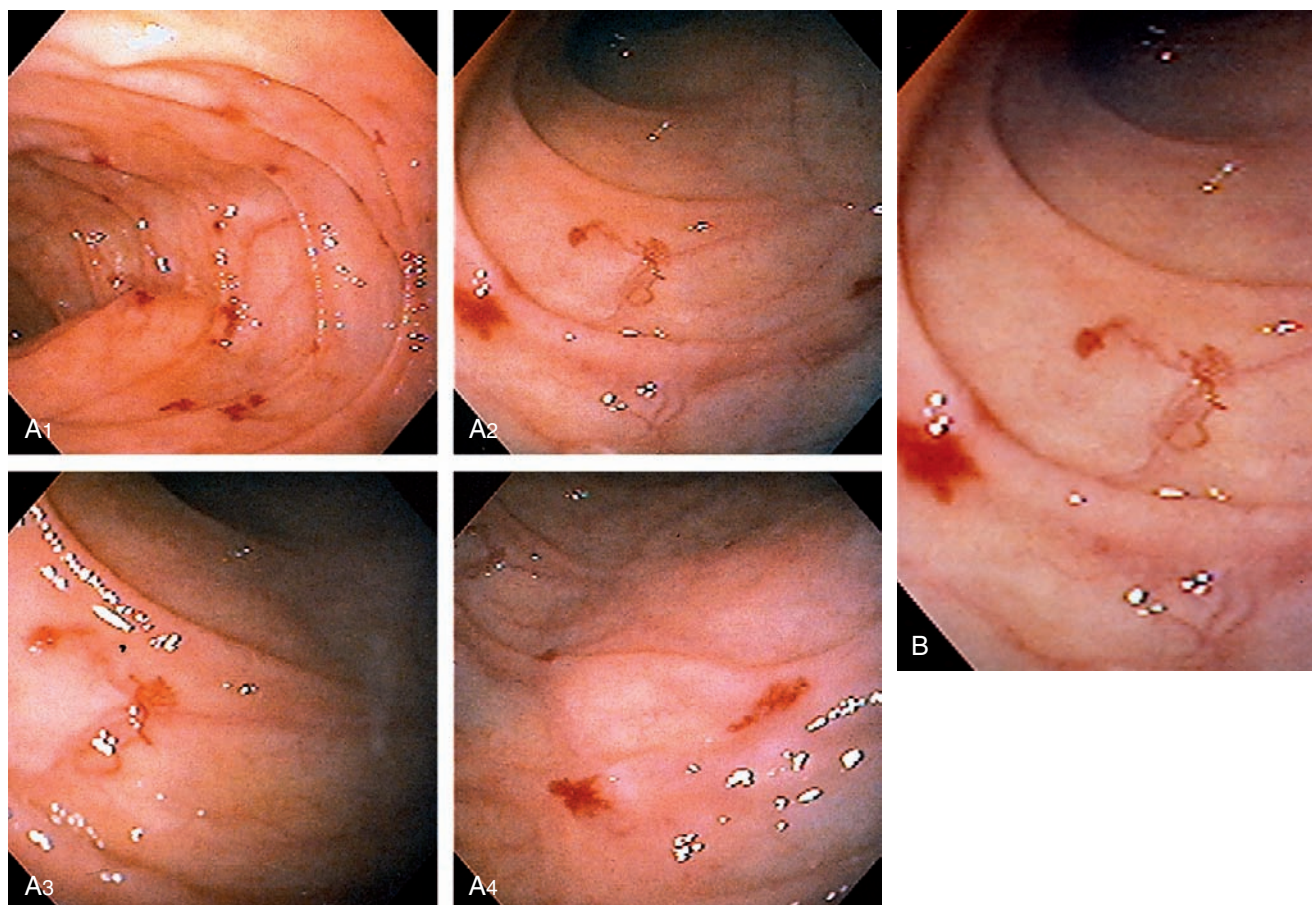


FIGURE 4.45 MULTIPLE VASCULAR ECTASIAS

A, Multiple ectasias in the second duodenum. Ectasias were not seen in the stomach or colon. **B**, Close-up view demonstrates the variable appearance of two ectasias.

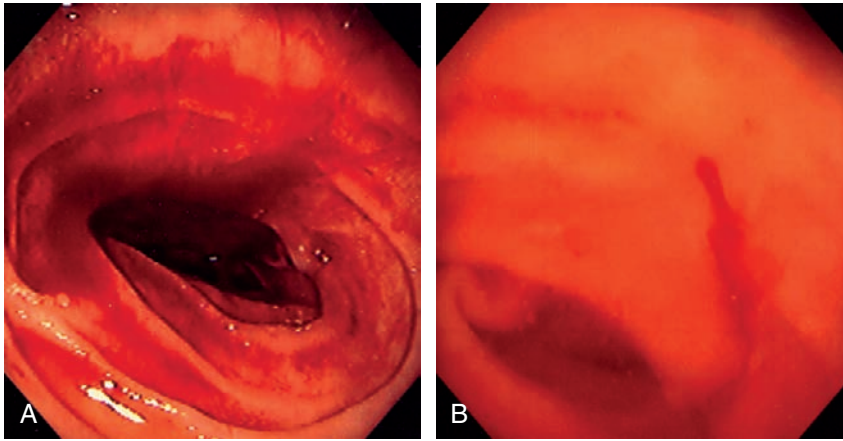


FIGURE 4.46 BLEEDING ECTASIA UNDERWATER

A, A large amount of fresh blood in the mid-second duodenum without a pinpoint site. **B**, With infusion of water, blood was now seen to stream from a pinpoint site.

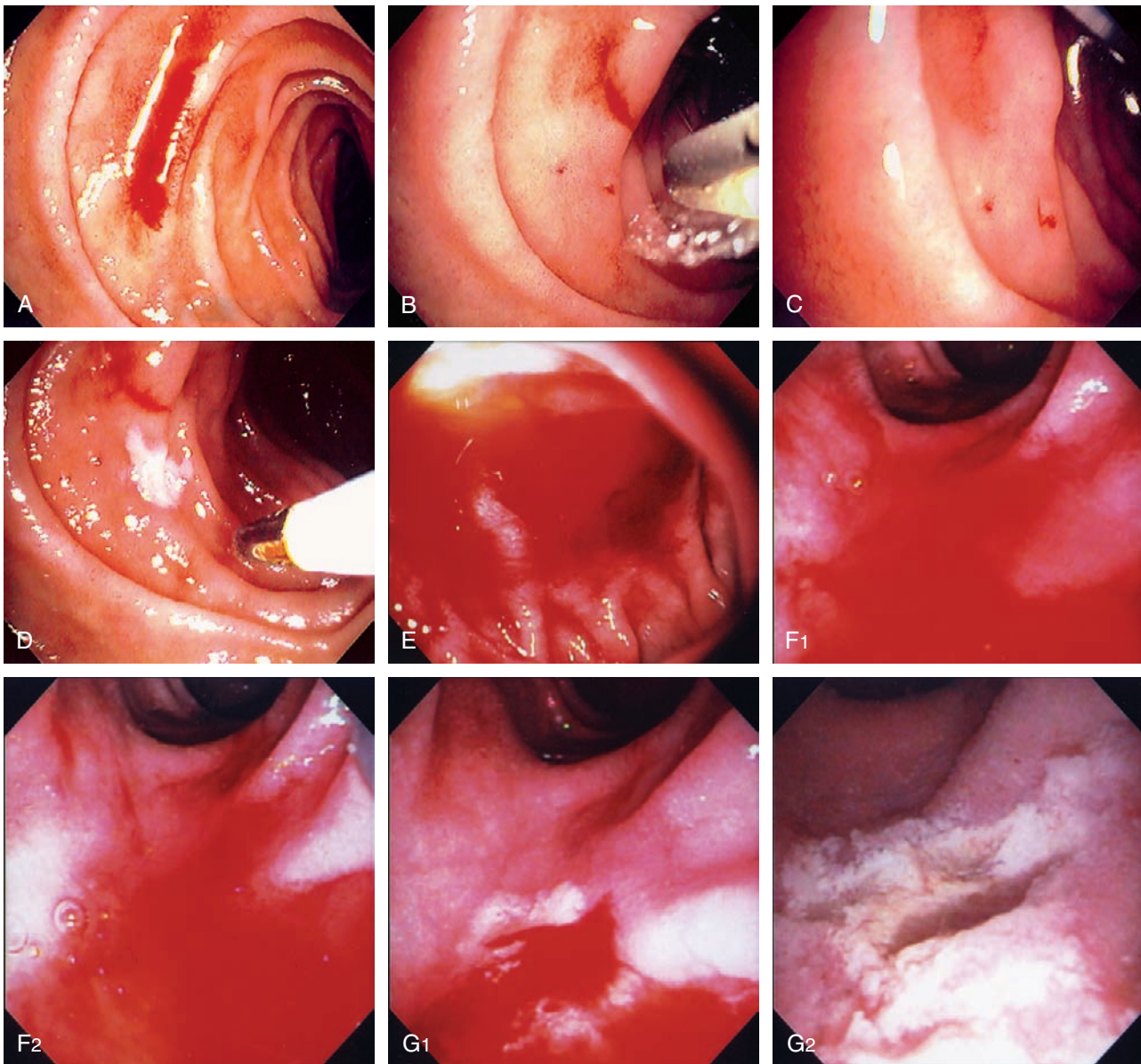


FIGURE 4.47 BLEEDING ECTASIA

A, A fresh stream of blood is shown. **B**, The heater probe water jet is applied to the bleeding area exposing a bleeding site. **C**, With observation, blood is seen to stream from a pinpoint ectasia. **D**, The 7-French heater probe is applied to the area, resulting in a white eschar and hemostasis. **E**, Fresh blood coating the proximal second duodenum with the forward viewing endoscope. No specific bleeding site is seen. **F1**, **F2**, Using the duodenoscope and with washing, an area of persistent oozing is seen. The area is vigorously washed identifying a pinpoint area whereby the heater probe is used to coagulate the lesion, resulting in exudate, white eschar, and hemostasis (**G1**, **G2**).

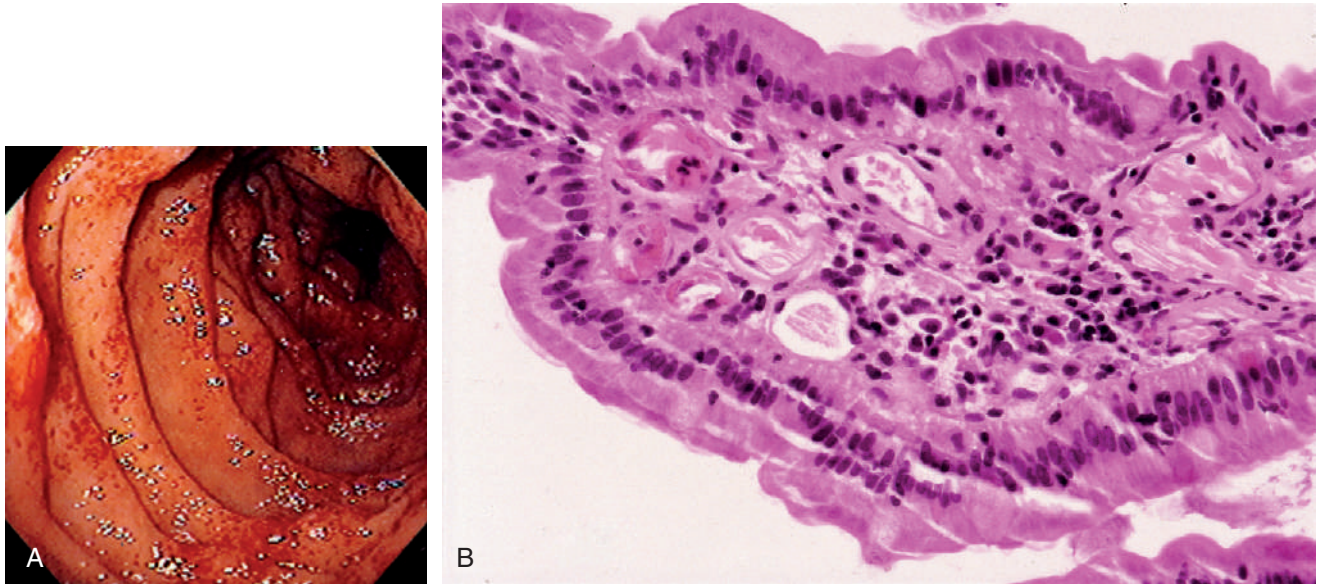


FIGURE 4.48 PORTAL HYPERTENSIVE DUODENOPATHY

A, Diffuse petechial lesions in the second duodenum. This patient also had esophageal varices. **B**, Multiple dilated capillaries in the submucosa.

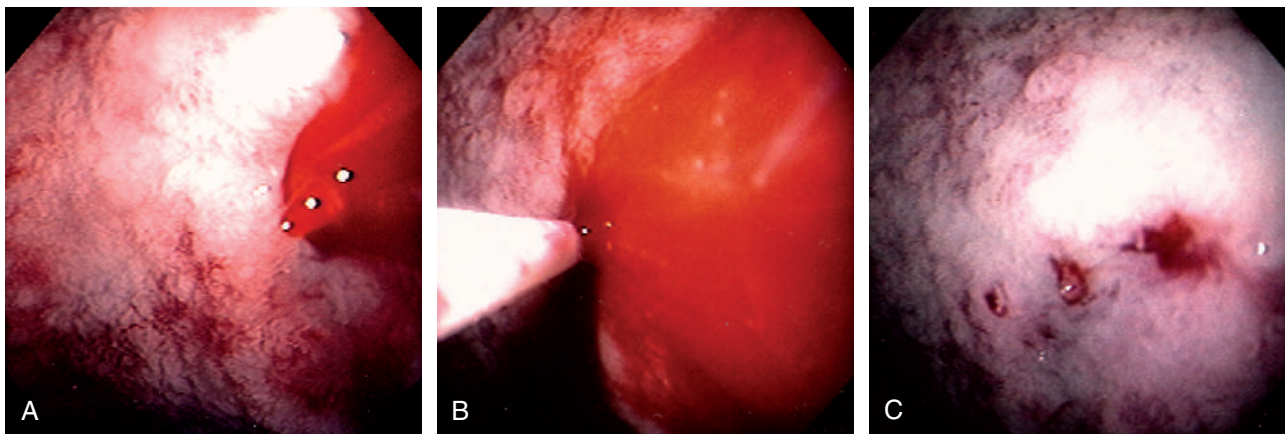


FIGURE 4.49 DIEULAFOY LESION

A, Active stream of blood jetting from the posterior duodenal bulb. **B**, Large volume of dilute epinephrine was injected into the bleeding site. **C**, After injection, the mucosa has a whitish appearance from ischemia. A pinpoint area representing the bleeding site is apparent.

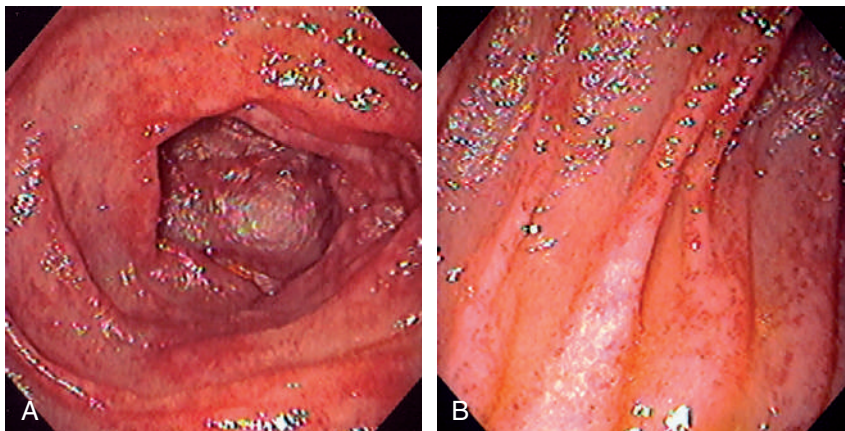


FIGURE 4.50 RADIATION ENTERITIS
Multiple small ectasias throughout the duodenum after radiation therapy (**A**, **B**).

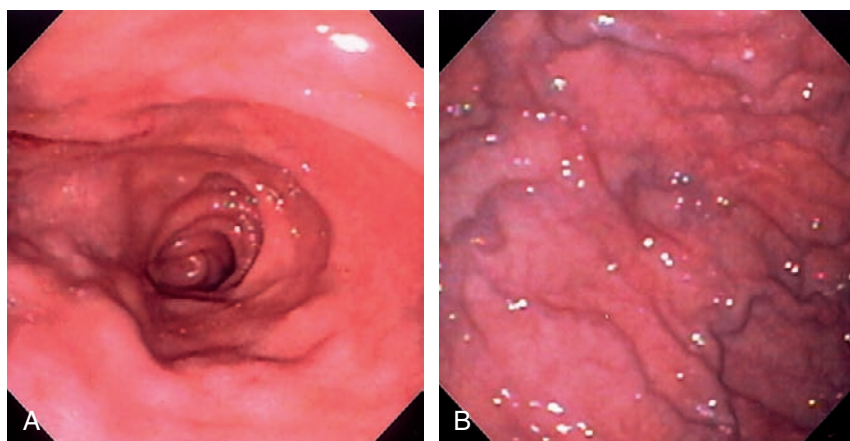


FIGURE 4.51 DUODENAL VARICES
A, Small submucosal veins. **B**, Gastric varices were also present. This patient had splenic vein thrombosis.

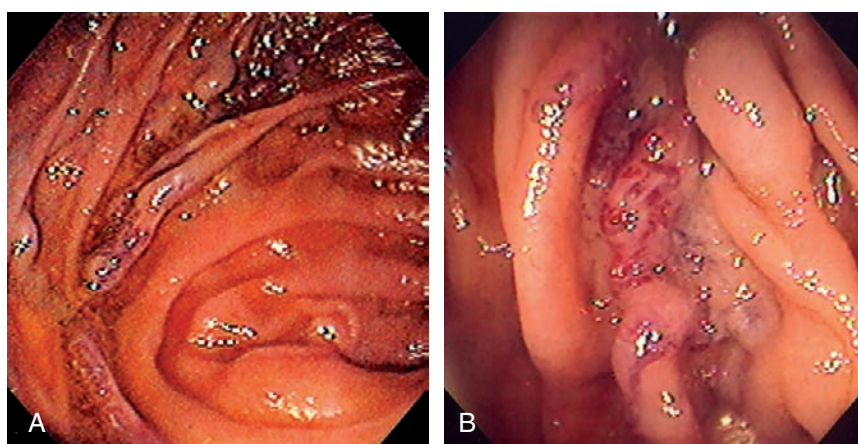


FIGURE 4.52 ANASTOMOTIC VARICES
A, Variceal trunk near the site of a small-bowel anastomosis. **B**, Close-up of the area shows subepithelial varices.

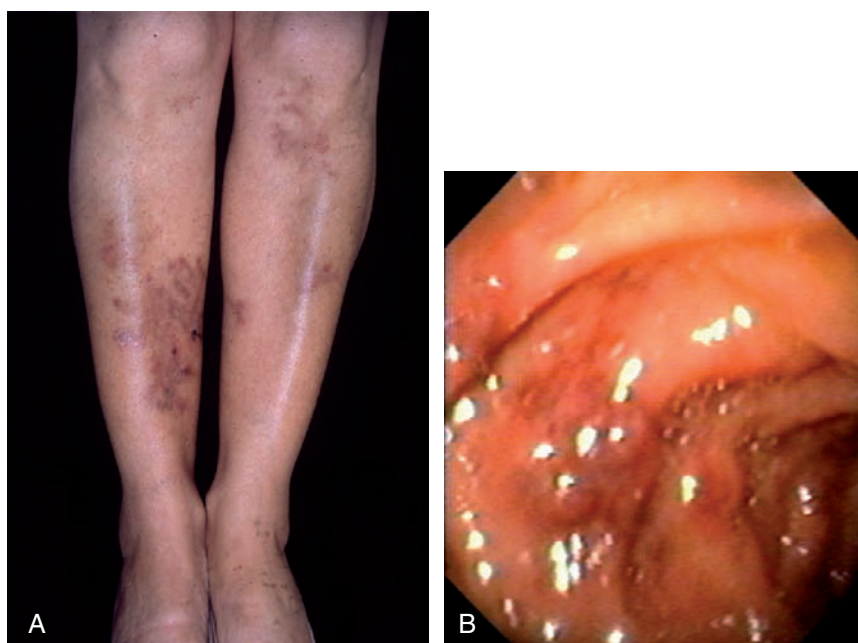


FIGURE 4.53 POLYARTERITIS NODOSA
A, Typical skin lesion on the lower extremities. **B**, Submucosal purpuric lesion of the duodenum. (**A** courtesy P. Redondo, MD, Pamplona, Spain.)

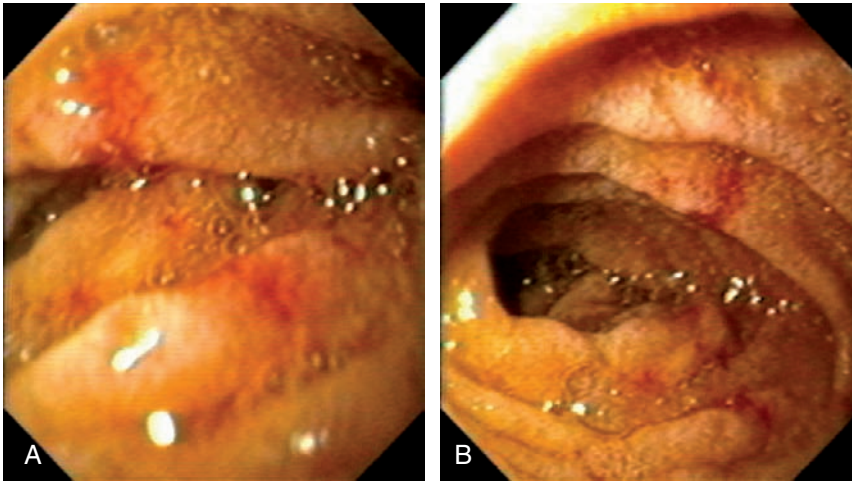


FIGURE 4.54 HENOCH-SCHÖNLEIN PURPURA

A, B, Focal petechial lesions in the second duodenum. The surrounding mucosa is normal.



FIGURE 4.55 THROMBOTIC THROMBOCYTOPENIC PURPURA
Multiple well-circumscribed erosions in the second duodenum.



FIGURE 4.56 INFLAMMATORY POLYP

Two small, raised, polypoid lesions in the anterior duodenal bulb. Biopsy findings demonstrated acute and chronic inflammation without evidence of neoplasia. The appearance is not pathognomonic for any specific type of polypoid lesion.

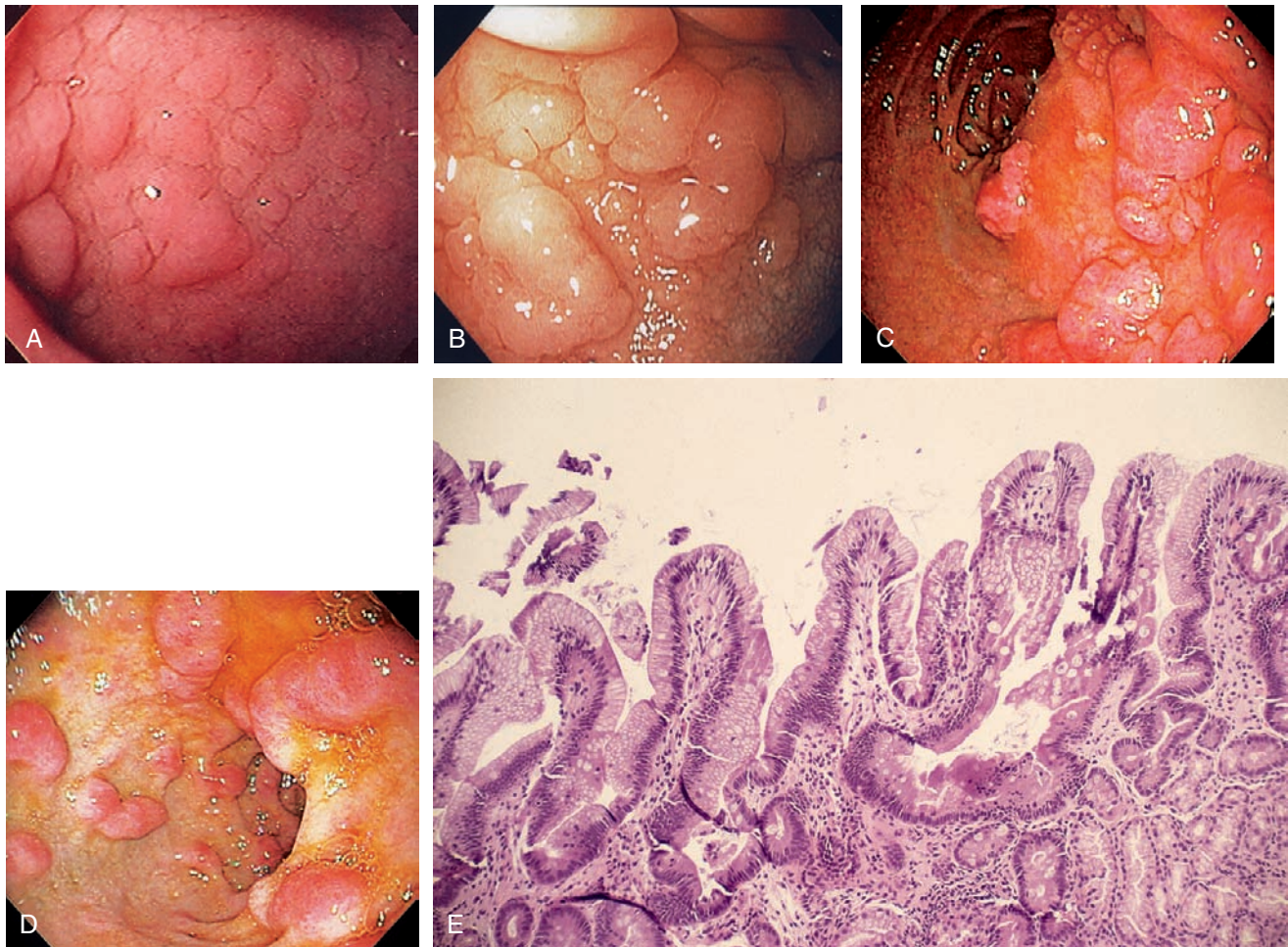


FIGURE 4.57 GASTRIC METAPLASIA

A, Multiple small nodules on the anterior wall of the duodenal bulb that have a typical appearance for gastric metaplasia. **B**, Larger lesions seen in association with the more typical smaller lesions. **C**, Larger polypoid lesions. **D**, Linear polypoid lesions. **E**, Gastric-type mucosa with foveolar epithelium. Gastric metaplasia may be seen in the duodenal bulb, associated with polyps.

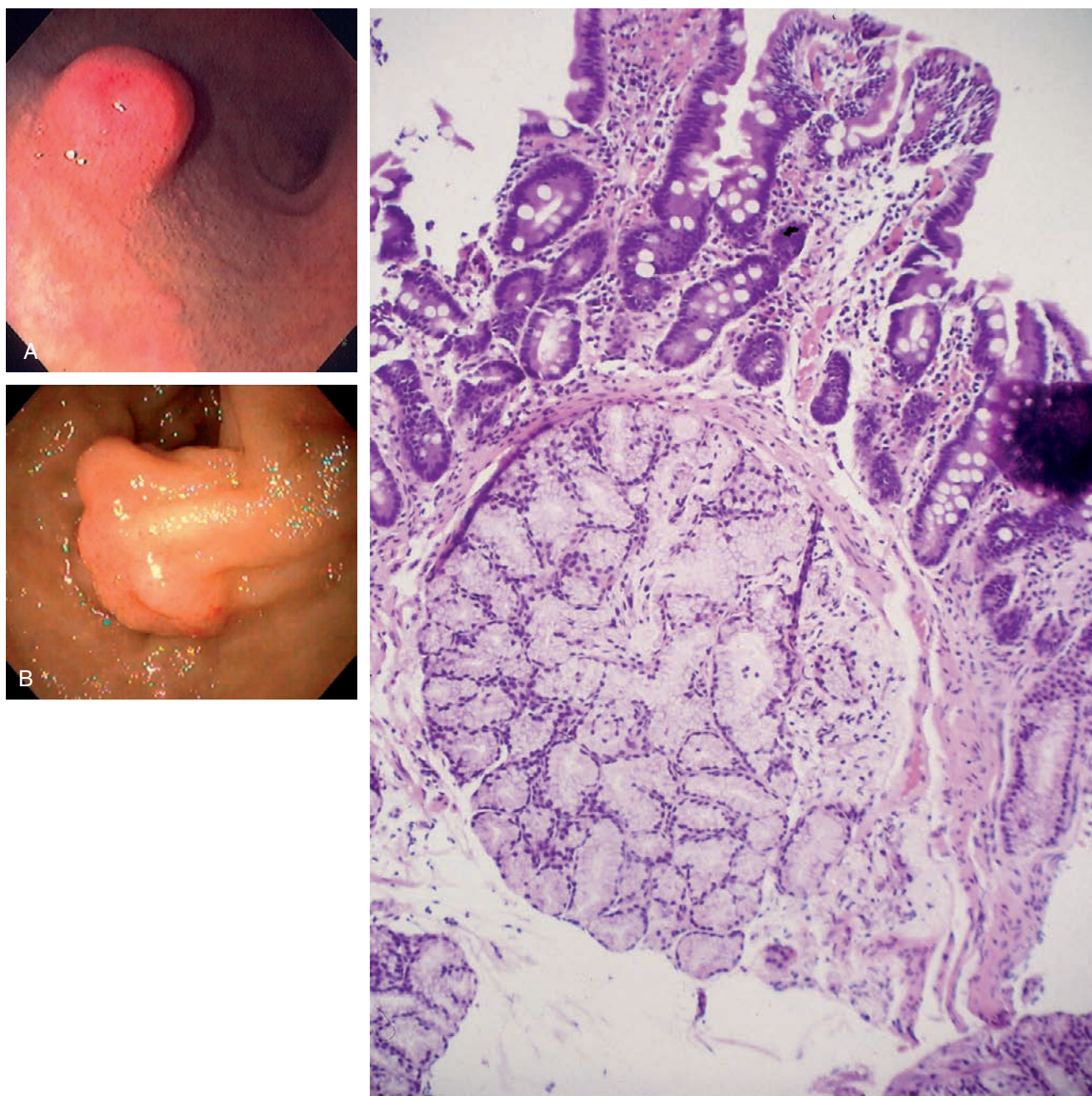


FIGURE 4.58 BRUNNER'S GLAND HYPERPLASIA

A, Small polypoid lesion in the duodenal bulb. **B**, Giant Brunner gland polyp. **C**, Normal-appearing duodenal tissue with submucosal Brunner's glands.

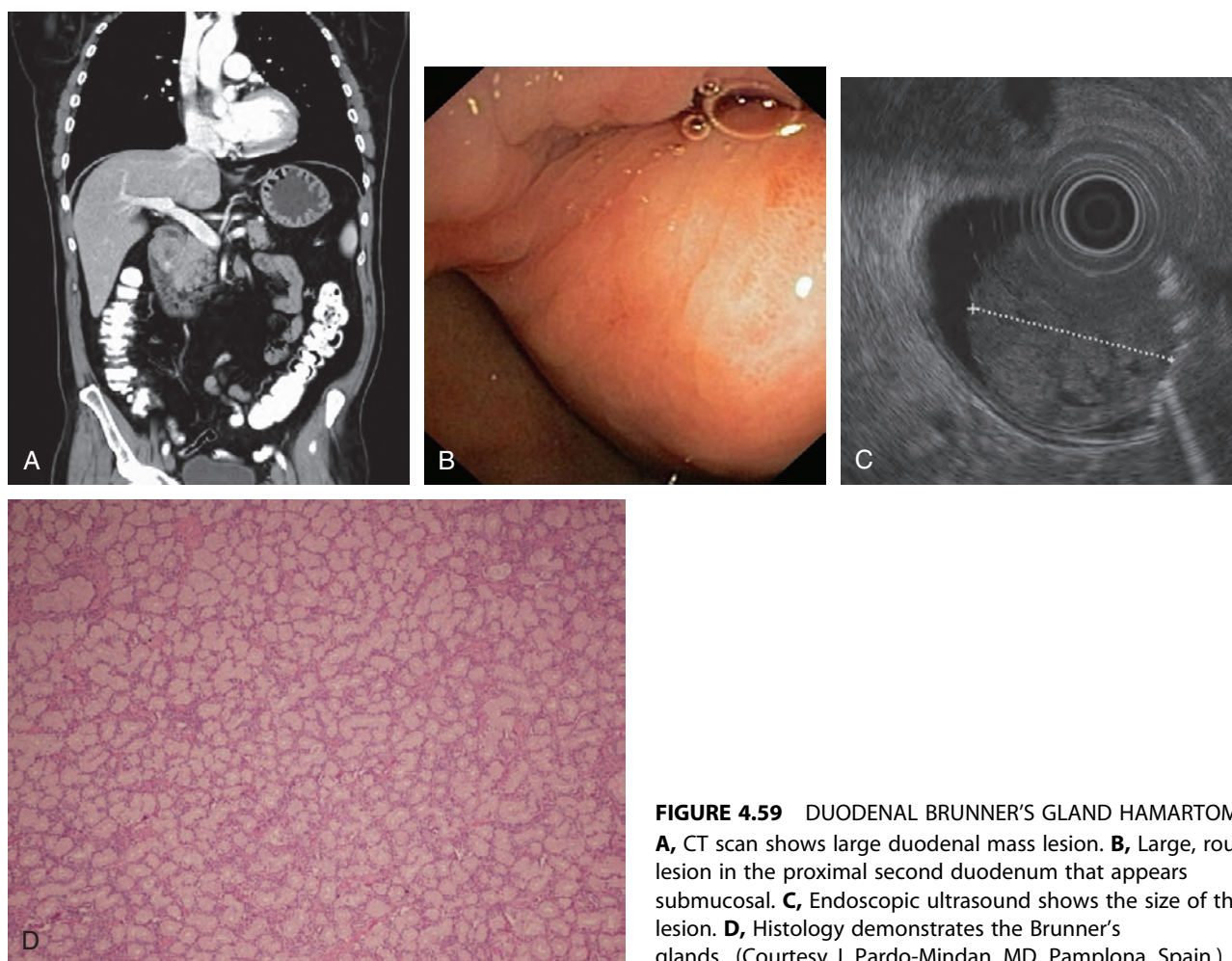


FIGURE 4.59 DUODENAL BRUNNER'S GLAND HAMARTOMA **A**, CT scan shows large duodenal mass lesion. **B**, Large, round lesion in the proximal second duodenum that appears submucosal. **C**, Endoscopic ultrasound shows the size of the lesion. **D**, Histology demonstrates the Brunner's glands. (Courtesy J. Pardo-Mindan, MD, Pamplona, Spain.)



Differential Diagnosis

Duodenal Brunner's Gland Hamartoma (Figure 4.59)

Gastrointestinal stromal tumor
Extrinsic lesion

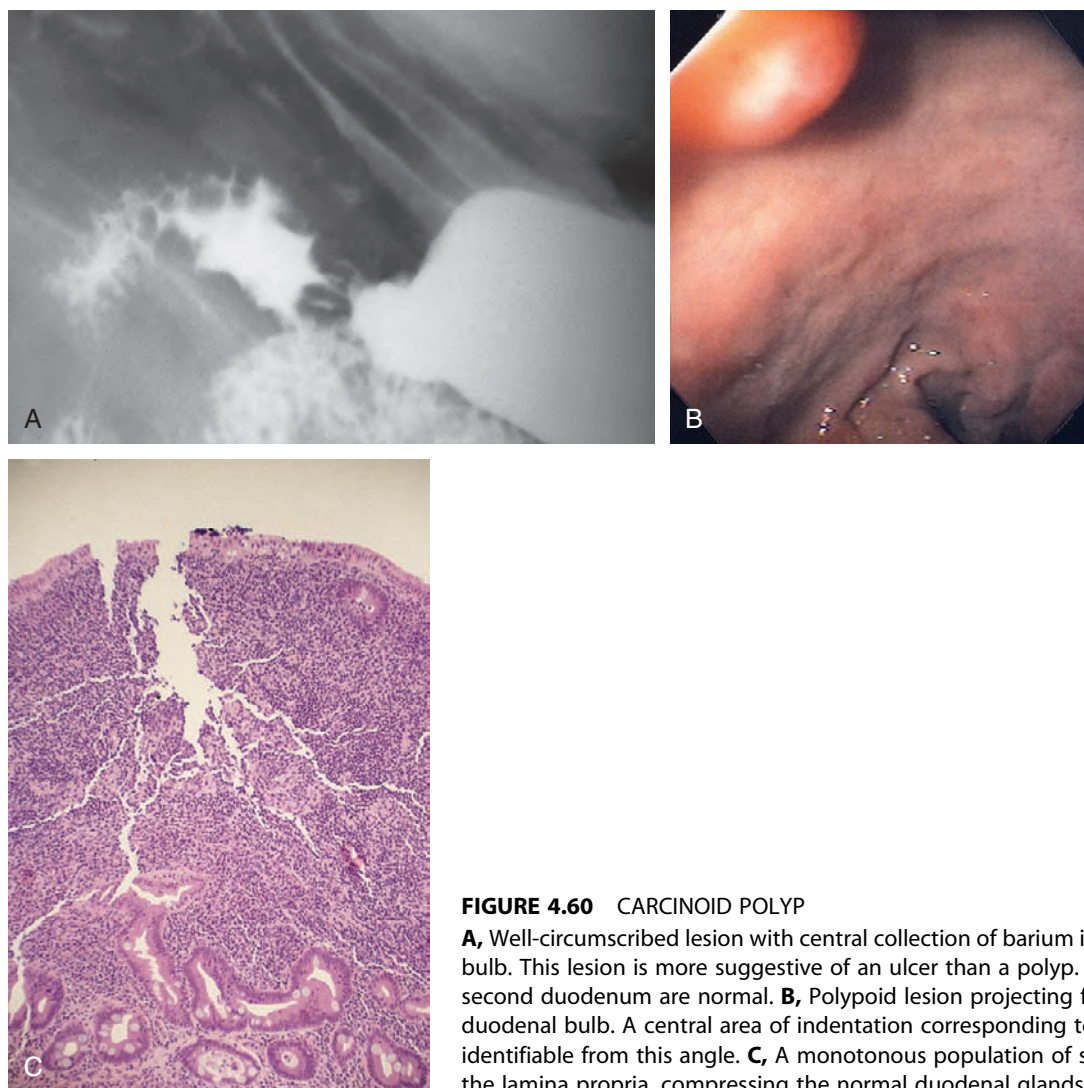


FIGURE 4.60 CARCINOID POLYP

A, Well-circumscribed lesion with central collection of barium in the proximal duodenal bulb. This lesion is more suggestive of an ulcer than a polyp. The duodenal bulb and second duodenum are normal. **B**, Polypoid lesion projecting from the anterosuperior duodenal bulb. A central area of indentation corresponding to the radiograph is not identifiable from this angle. **C**, A monotonous population of small, round cells fills the lamina propria, compressing the normal duodenal glands.

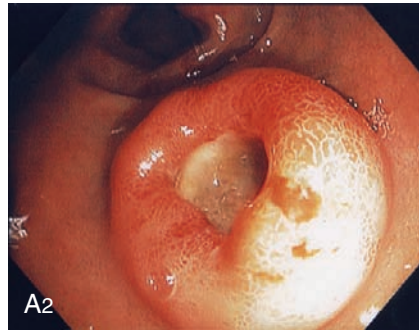
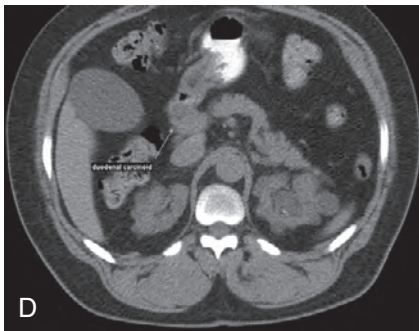
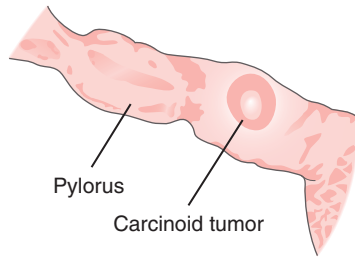
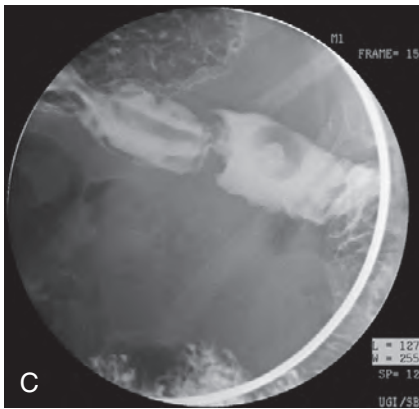
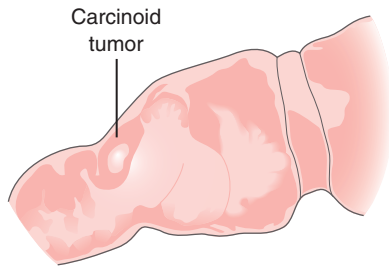
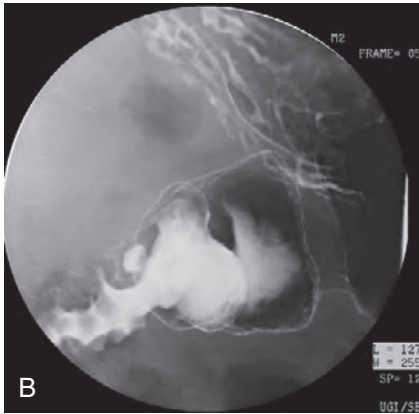


FIGURE 4.61 CARCINOID TUMOR
A1, A2, Round, donut-shaped lesion with central ulceration in the duodenal bulb typical for a neuroendocrine tumor. **B, C**, UGI series shows a defect in the duodenal bulb with persistent barium in the ulcer crater resembling the donut appearance (*right*). **D**, CT also shows the large filling defect represented by the hypodense lesion in the duodenum.



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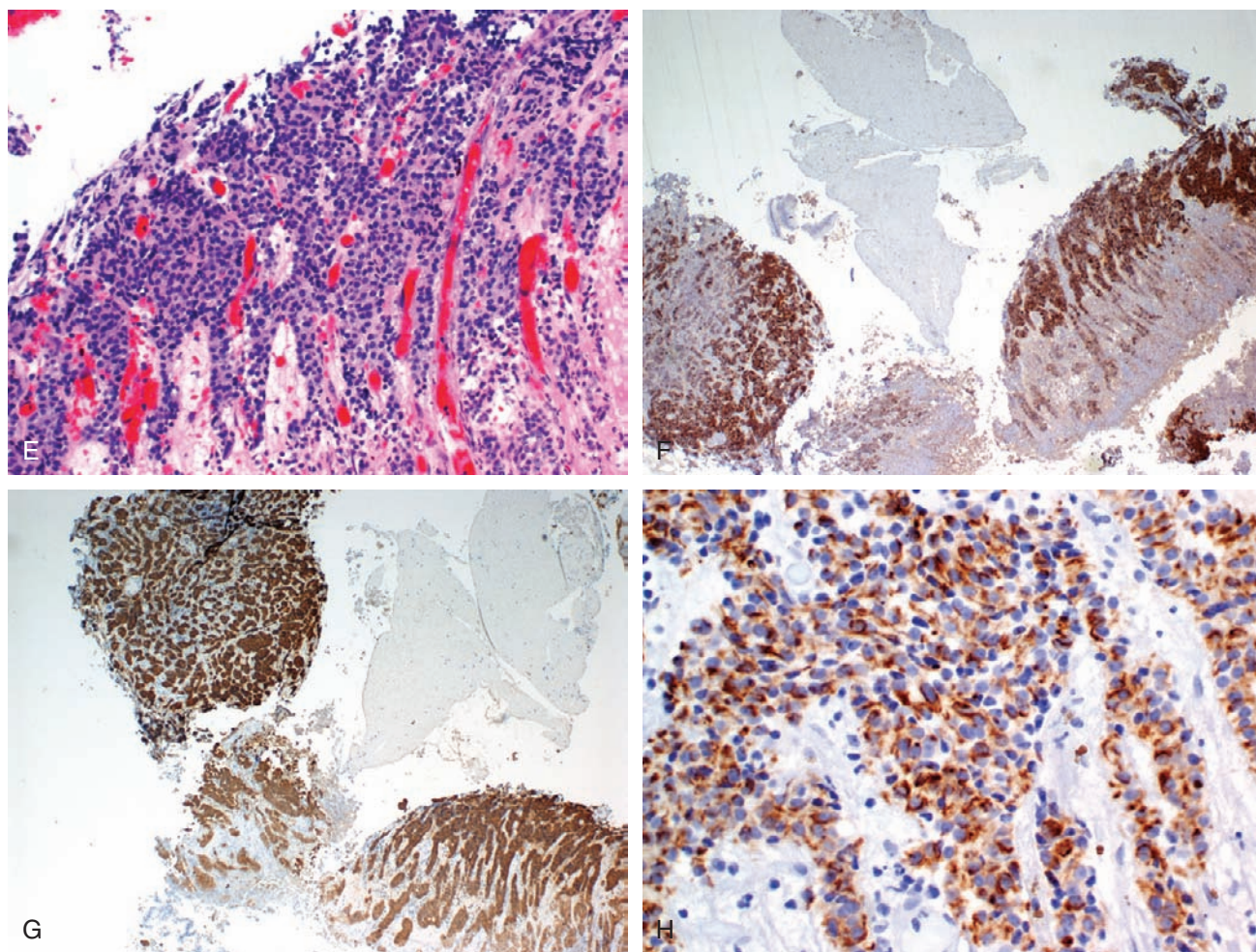


FIGURE 4.61 CARCINOID TUMOR

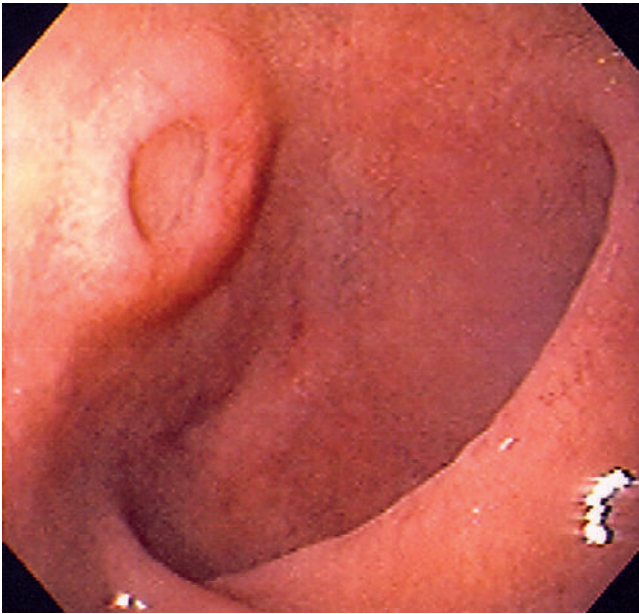
E, Carcinoid features are seen on routine hematoxylin and eosin staining. The neuroendocrine origin of the lesion is demonstrated by confirmational staining with chromogranin (**F**), synaptophysin (**G**), and keratin (**H**).



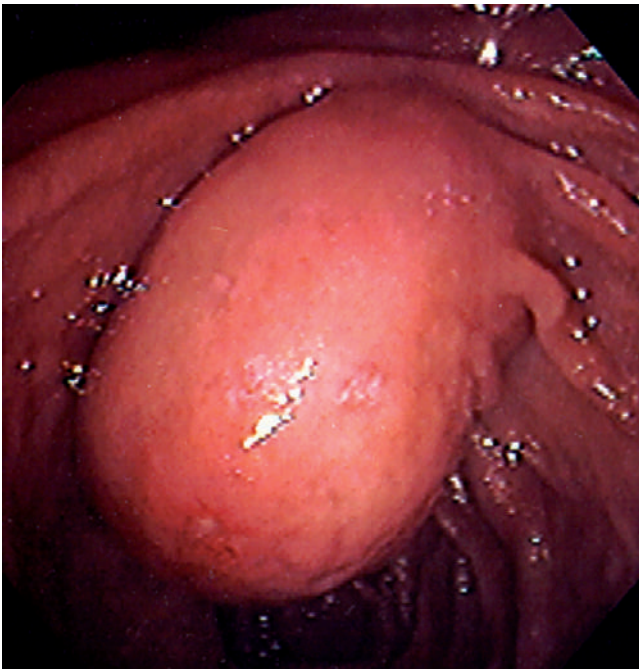
Differential Diagnosis

Carcinoid Tumor (Figure 4.61)

Metastatic tumor
Adenocarcinoma
Primary duodenal lymphoma

**FIGURE 4.62** PANCREATIC REST

Well-circumscribed, donut-like lesion in the anterior duodenal bulb. This lesion resembles that seen in the stomach (see [Figure 3.179](#)).

**FIGURE 4.63** DUPLICATION CYST

Large polypoid mass occupying the normal location of the ampulla. A small ulcer is on the inferior portion of the lesion.



Differential Diagnosis

Duplication Cyst ([Figure 4.63](#))

Primary ampullary adenocarcinoma
Other ampullary neoplasm
Impacted bile duct stone

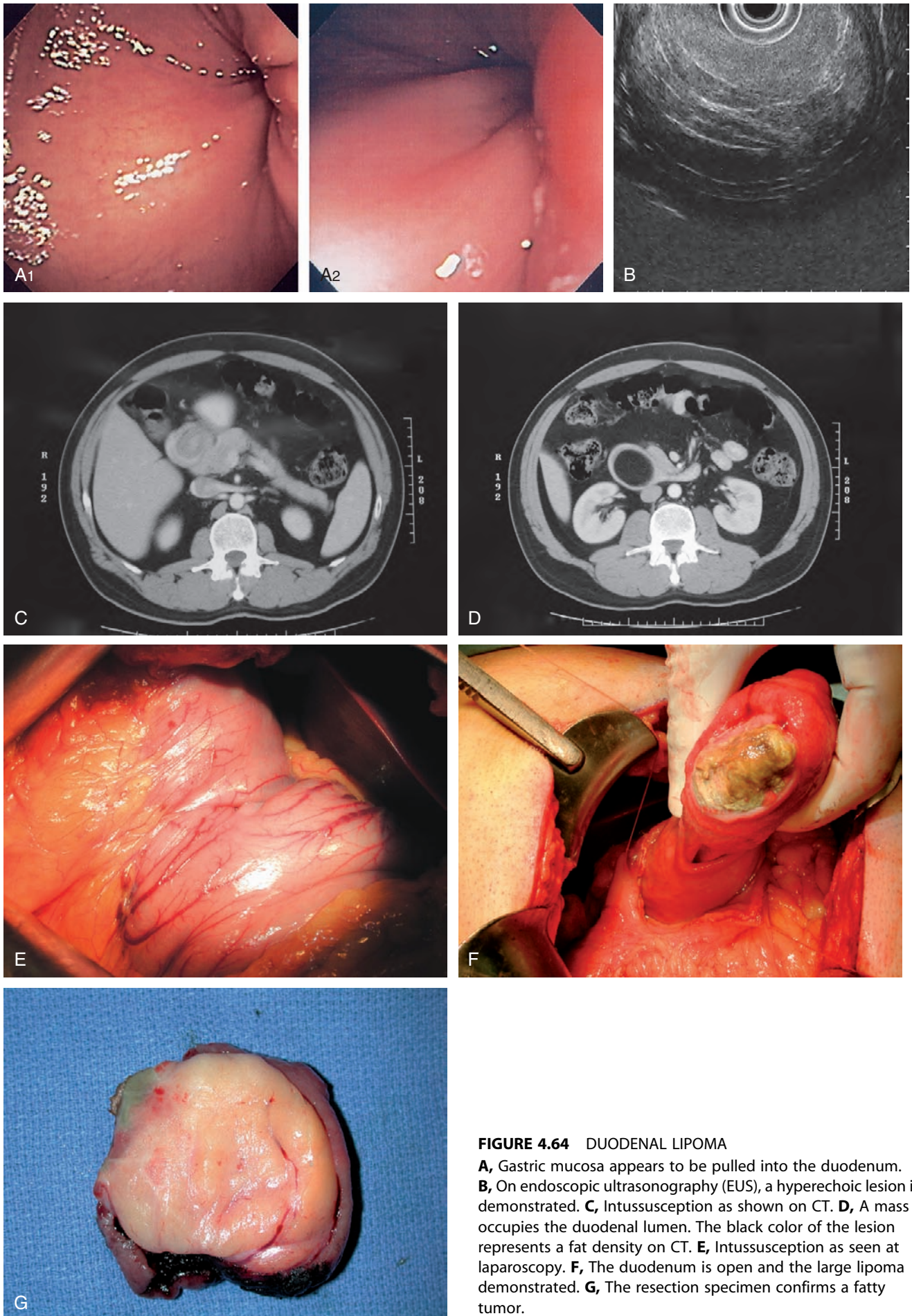


FIGURE 4.64 DUODENAL LIPOMA

A, Gastric mucosa appears to be pulled into the duodenum. **B**, On endoscopic ultrasonography (EUS), a hyperechoic lesion is demonstrated. **C**, Intussusception as shown on CT. **D**, A mass occupies the duodenal lumen. The black color of the lesion represents a fat density on CT. **E**, Intussusception as seen at laparoscopy. **F**, The duodenum is open and the large lipoma demonstrated. **G**, The resection specimen confirms a fatty tumor.

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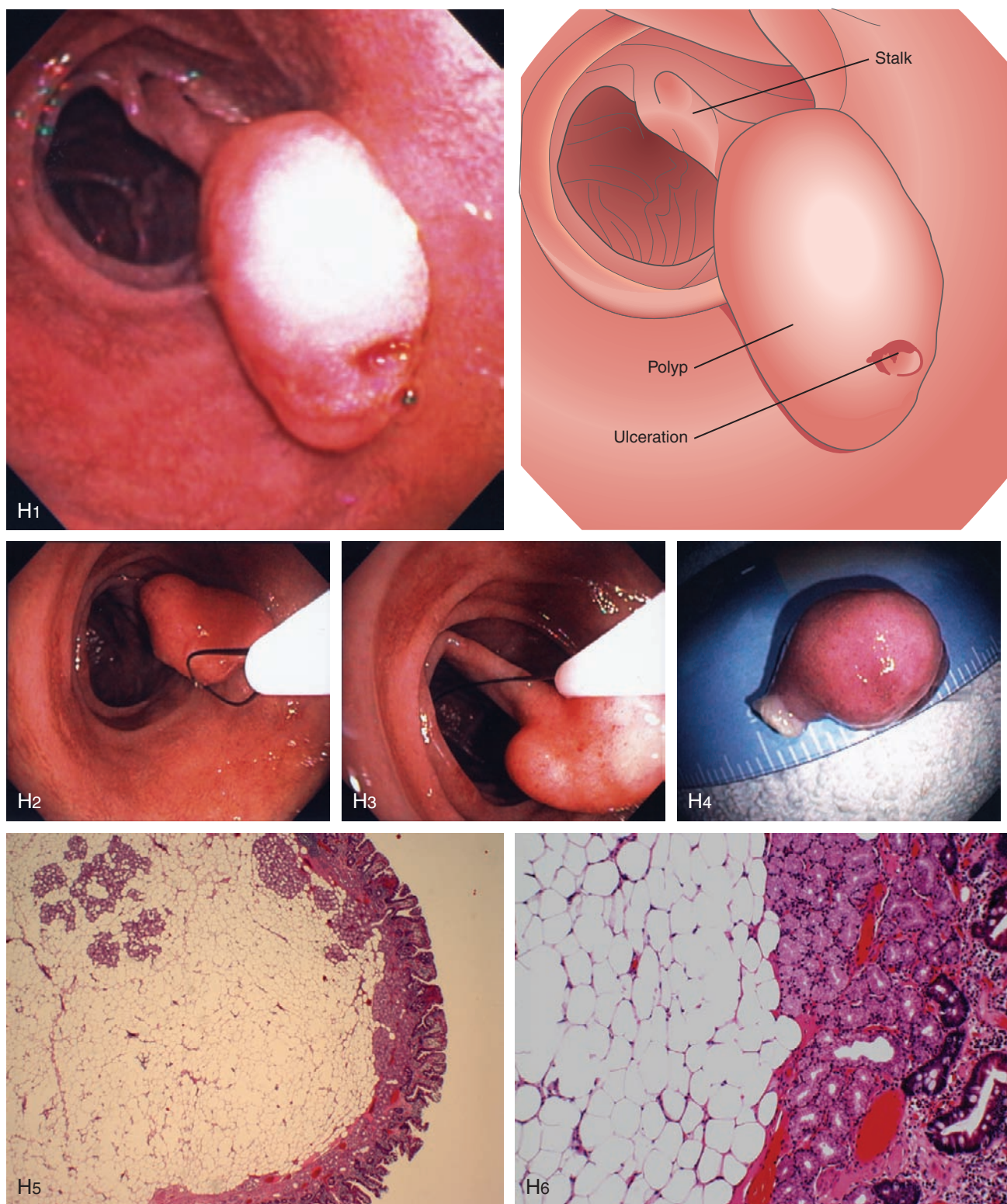


FIGURE 4.64 DUODENAL LIPOMA

H1, Polyp in duodenal bulb with a long stalk and with central ulceration. **H2, H3**, The polyp is snared and resected, and measured to be 1 cm (**H4**). **H5, H6**, Small-bowel mucosa with underlying well-circumscribed fibroadipose tissue mass.

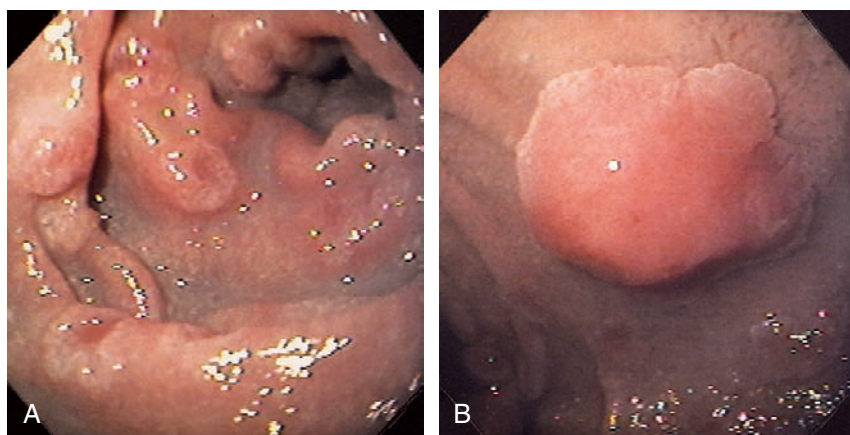


FIGURE 4.65 FAMILIAL ADENOMATOUS POLYPOSIS

A, Multiple sessile to slightly raised lesions with central discoloration in the second duodenum. **B**, Large mushroom-shaped polyp on the lateral wall of the second duodenum. Biopsy results demonstrated adenoma. The patient had previously undergone total colectomy for familial adenomatous polyposis coli syndrome.

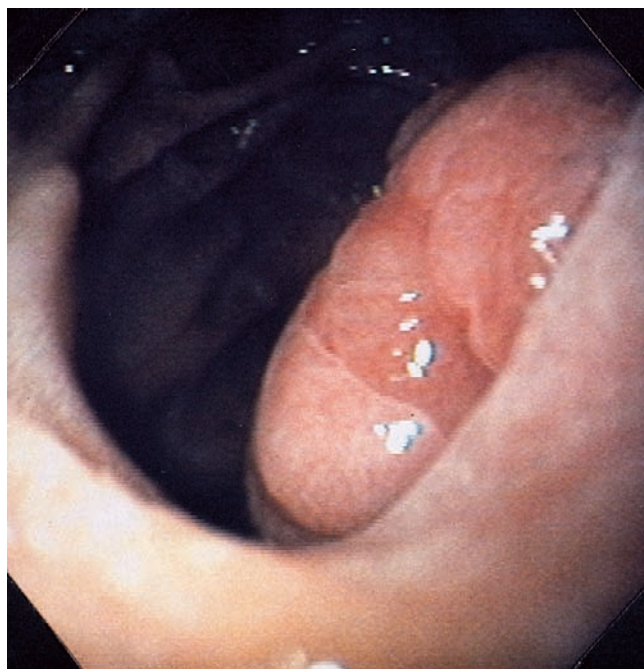


FIGURE 4.66 ADENOMA

Large adenomatous polyp at the superior duodenal angle posteriorly. The polypoid lesion is somewhat nodular and has a superficial texture suggestive of adenoma.

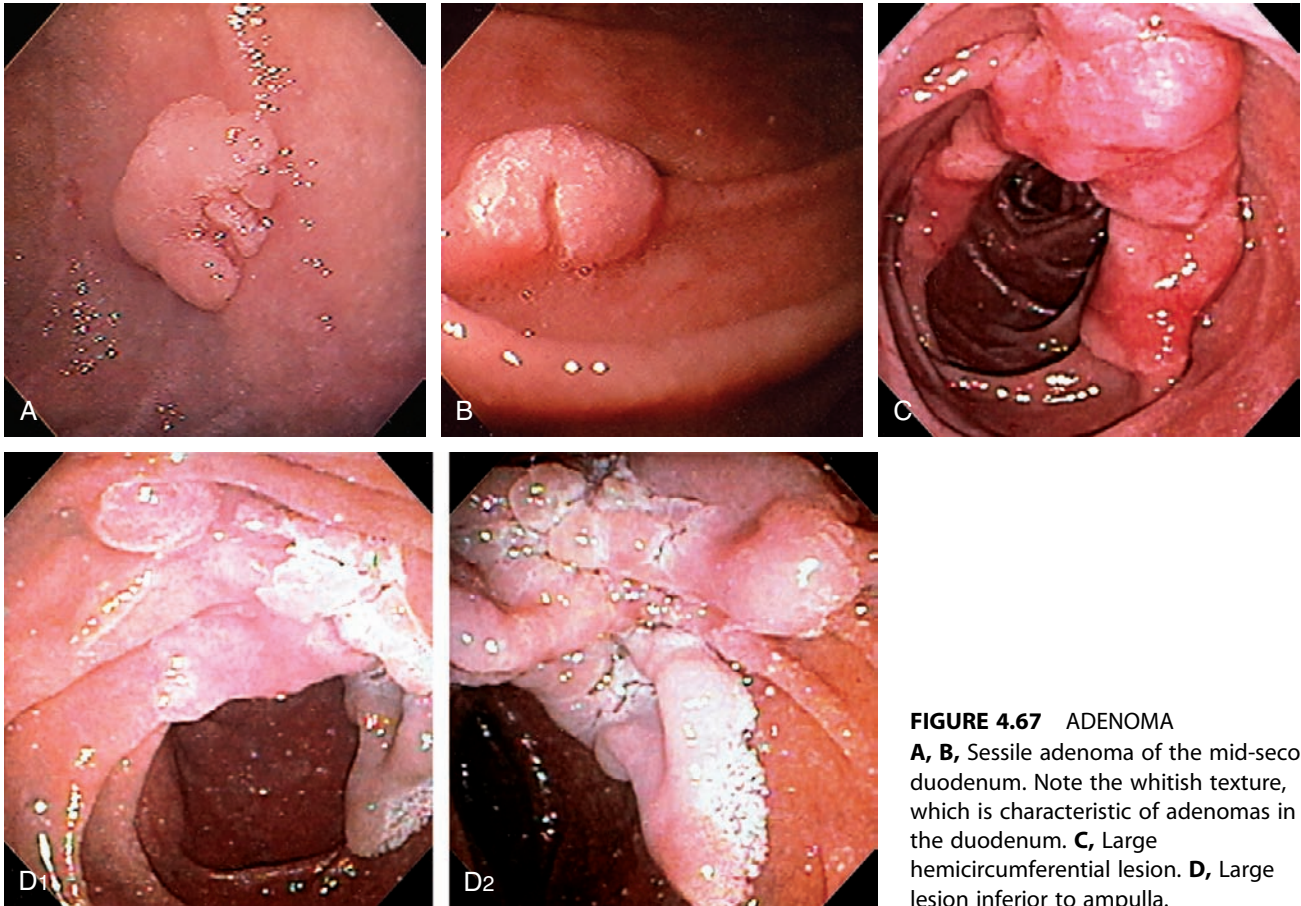


FIGURE 4.67 ADENOMA
A, B, Sessile adenoma of the mid-second duodenum. Note the whitish texture, which is characteristic of adenomas in the duodenum. **C**, Large hemircumferential lesion. **D**, Large lesion inferior to ampulla.



FIGURE 4.68 ADENOMA
A, Well-circumscribed adenoma at the junction of first and second duodenum. **B**, Appearance with narrow band imaging. **C**, Endoscopic resection of lesion.

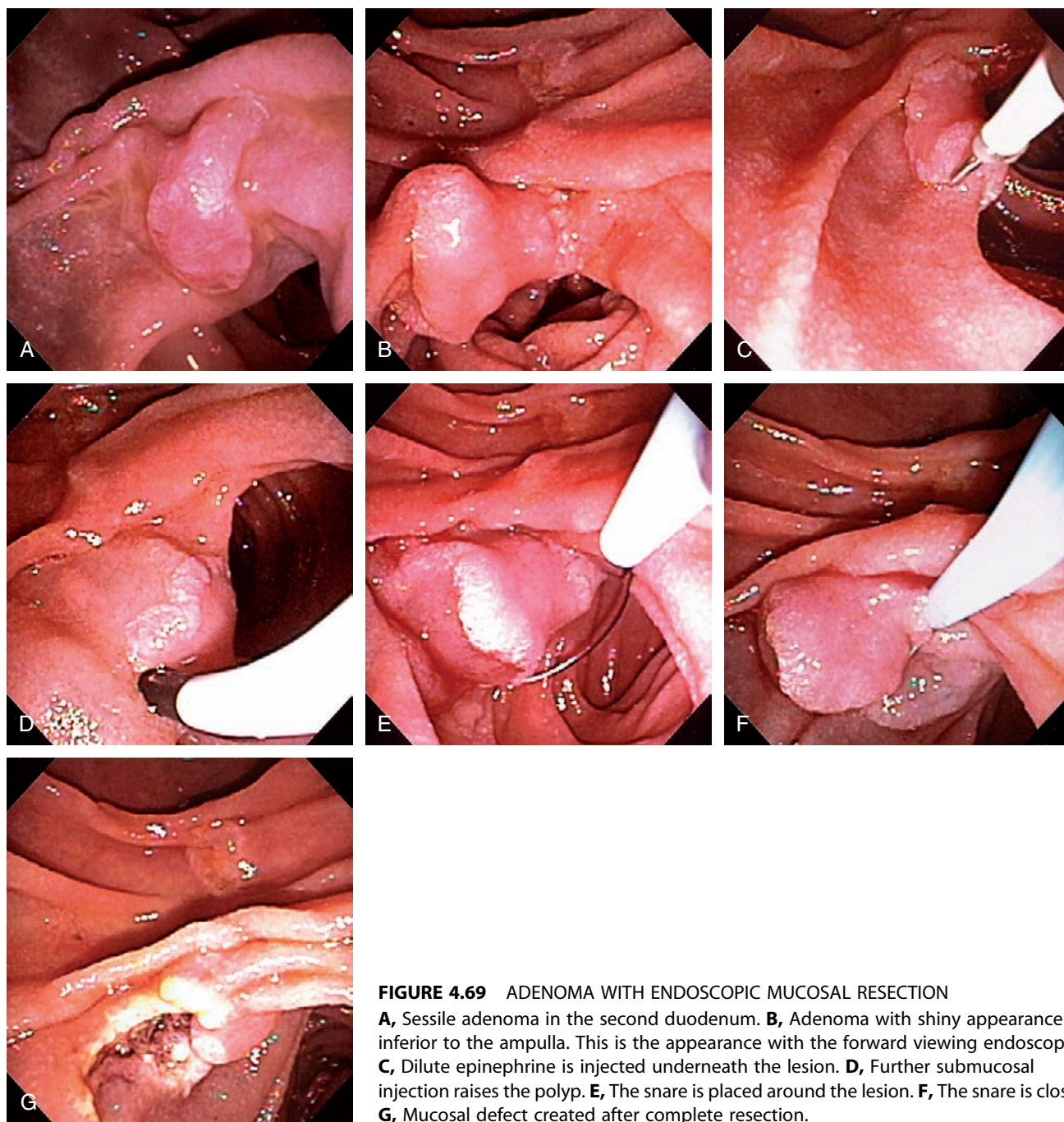


FIGURE 4.69 ADENOMA WITH ENDOSCOPIC MUCOSAL RESECTION

A, Sessile adenoma in the second duodenum. **B**, Adenoma with shiny appearance inferior to the ampulla. This is the appearance with the forward viewing endoscope. **C**, Dilute epinephrine is injected underneath the lesion. **D**, Further submucosal injection raises the polyp. **E**, The snare is placed around the lesion. **F**, The snare is closed. **G**, Mucosal defect created after complete resection.

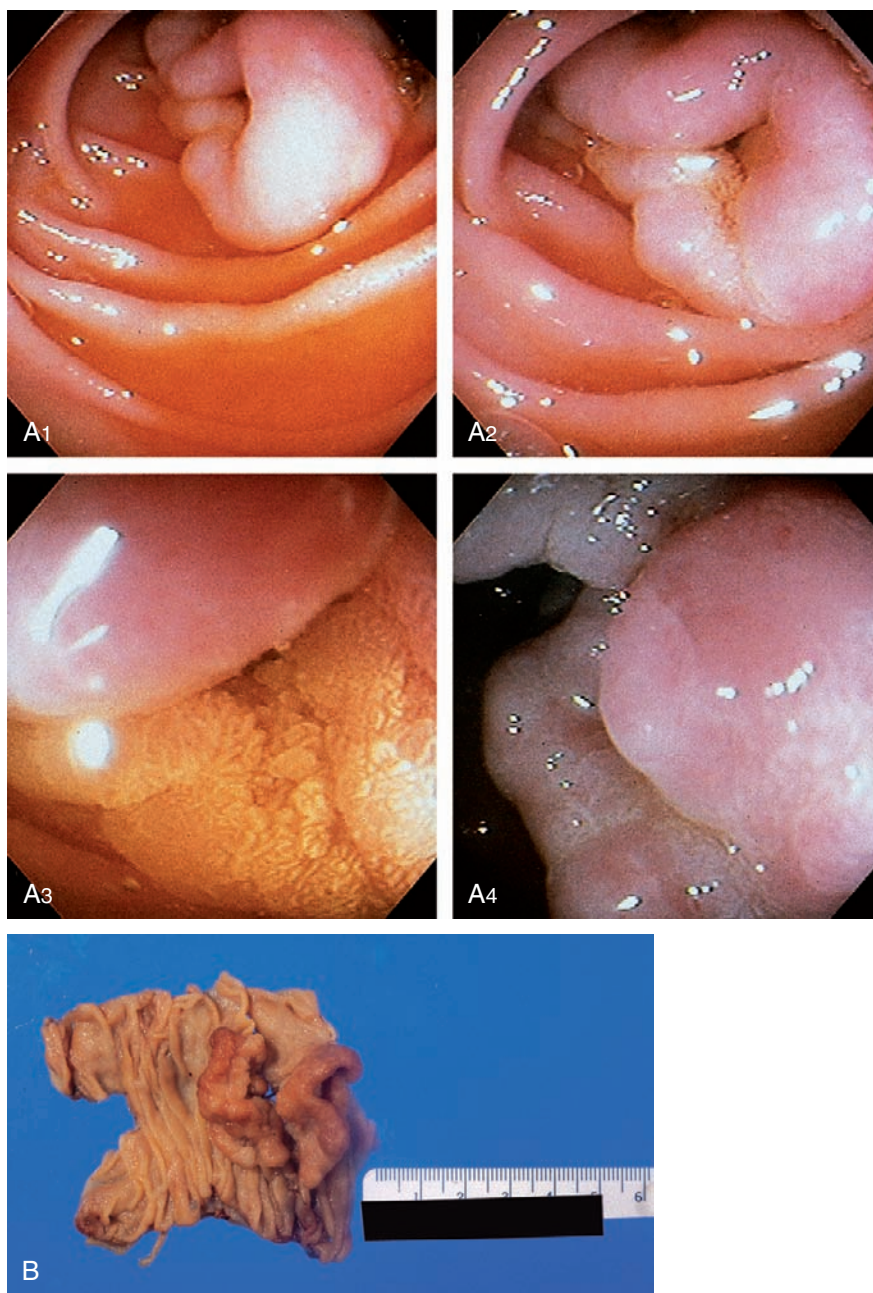


FIGURE 4.70 VILLOUS ADENOMA
A, The lesion appears to emanate from the distal duodenum (**A1**, **A2**). The center of the lesion is covered with bile and has a frondlike appearance, suggestive of adenomatous tissue (**A3**). The lesion appears to be on the lateral duodenum when the instrument is advanced, documenting the center of the lesion (**A4**). **B**, Surgical specimen has been partially everted, demonstrating the well-circumscribed nature of the lesion.

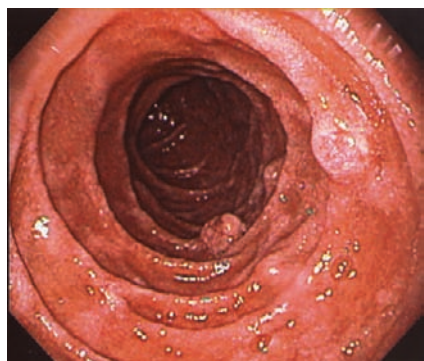


FIGURE 4.71 CARCINOID TUMORS ASSOCIATED WITH MULTIPLE ENDOCRINE NEOPLASIA TYPE 1 AND ZOLLINGER-ELLISON SYNDROME
 Multiple round nodular lesions in the second duodenum.

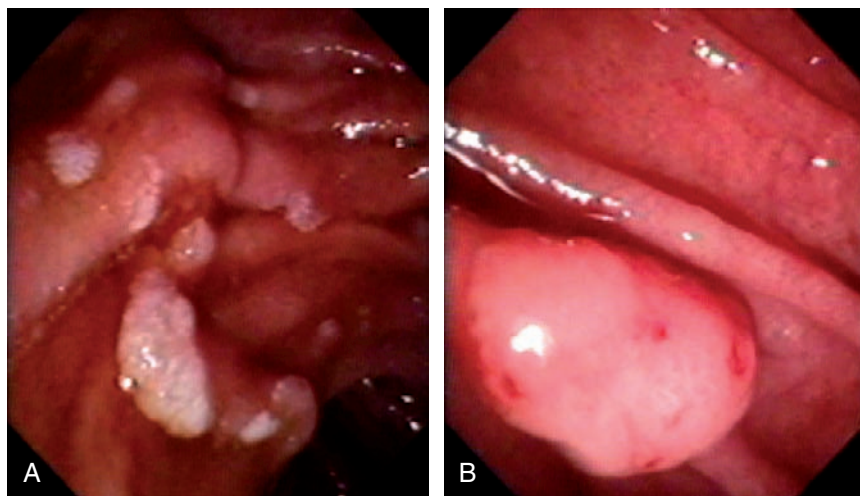


FIGURE 4.72 GARDNER'S SYNDROME
Multiple polyps in the periampullary area
(A) and mid- and second duodenum (B).

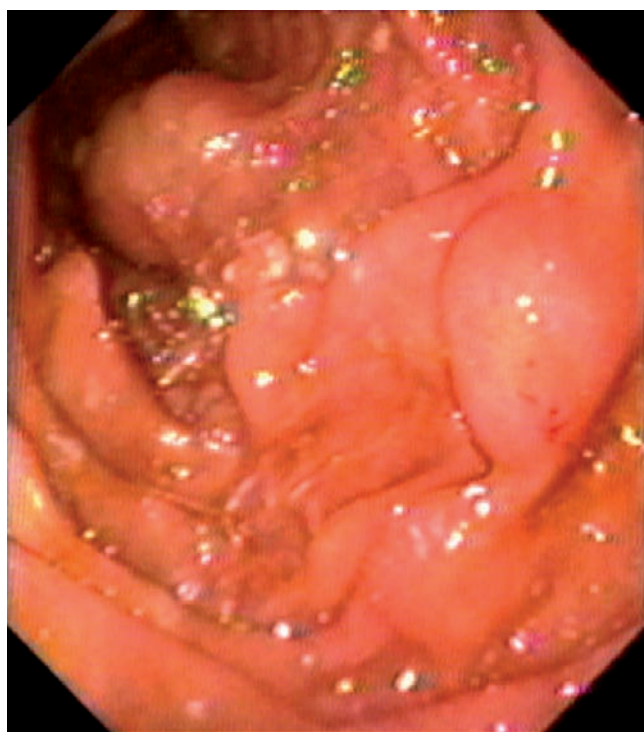


FIGURE 4.73 COWDEN'S SYNDROME
Large polypoid lesion in the second duodenum.

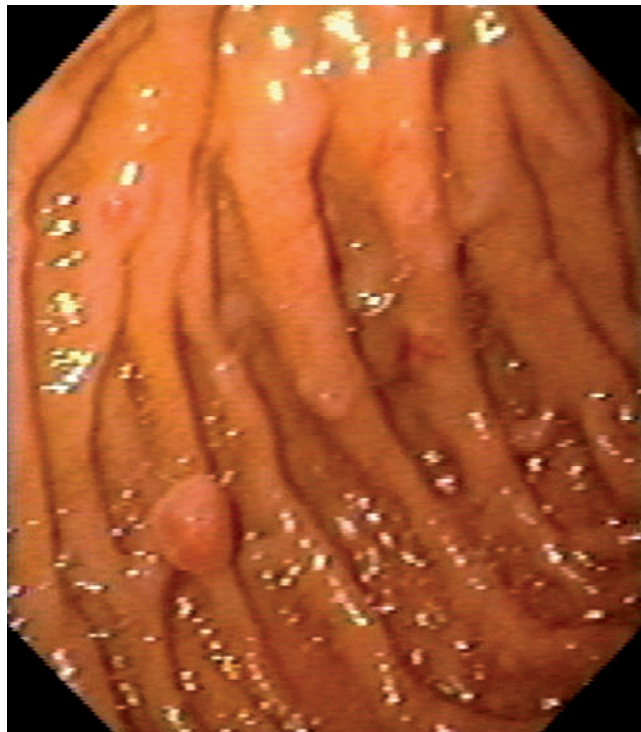


FIGURE 4.74 PEUTZ-JEGHERS POLYPS
Multiple small polyps in the second duodenum.

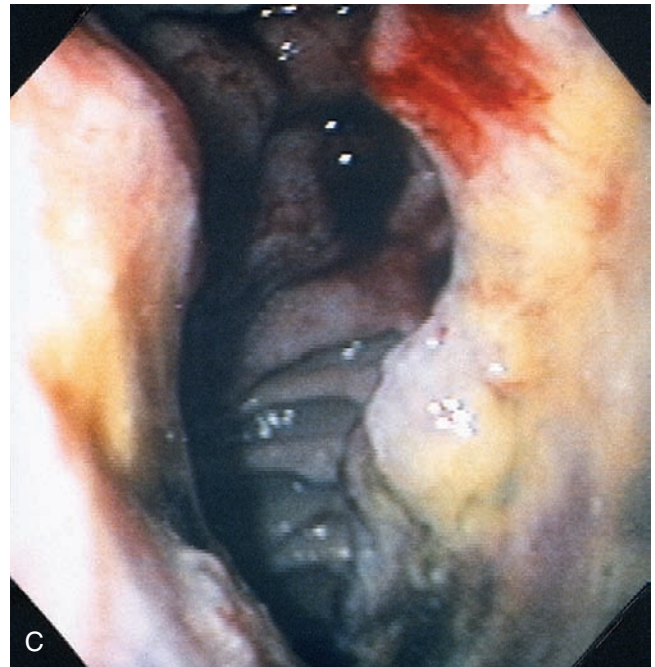
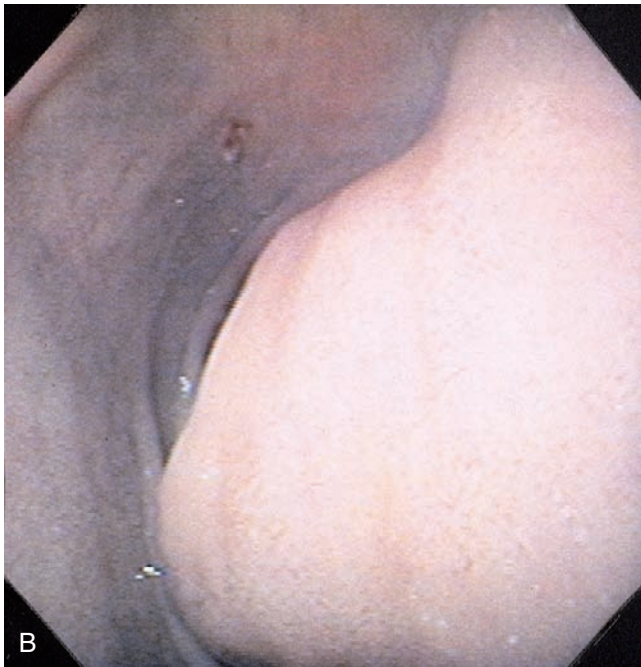
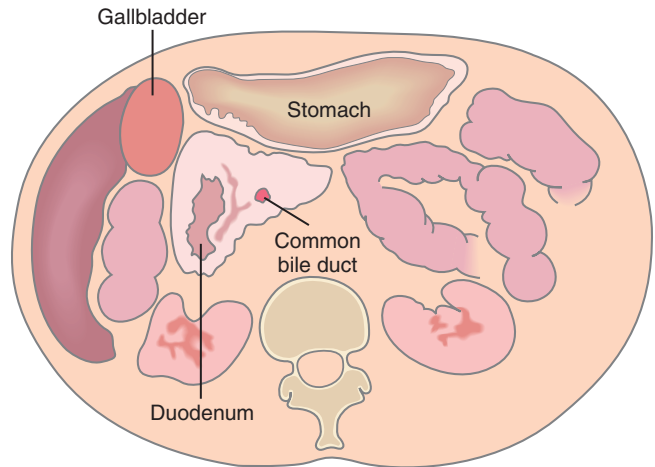
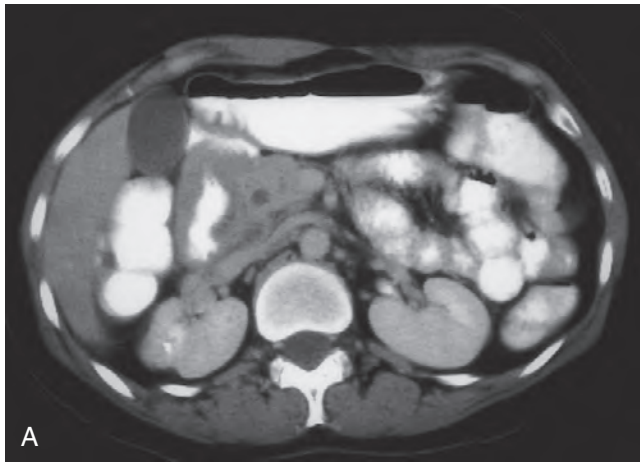


FIGURE 4.75 ADENOCARCINOMA

A, The duodenal sweep is dilated and markedly circumferentially thickened. The common bile duct is seen. This suggests a masslike lesion of the proximal second duodenum. **B**, Extrinsic compression in the distal duodenal bulb. The overlying mucosa appears normal. **C**, Hemicircumferential ulcerative lesion in the proximal second duodenum. The adenocarcinoma was believed to be of primary duodenal origin. Pancreatic carcinoma may present with duodenal abnormalities.

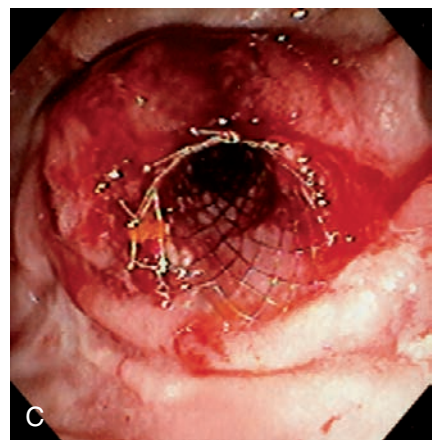
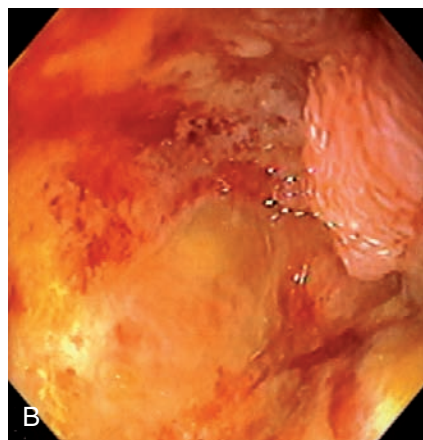
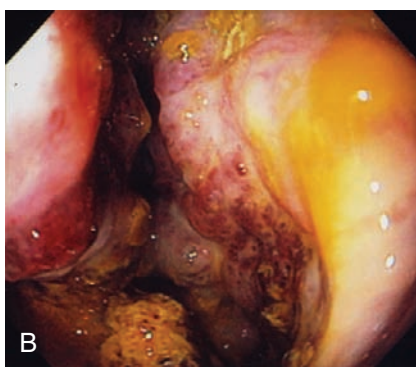
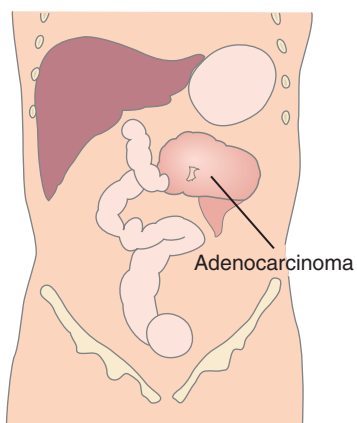
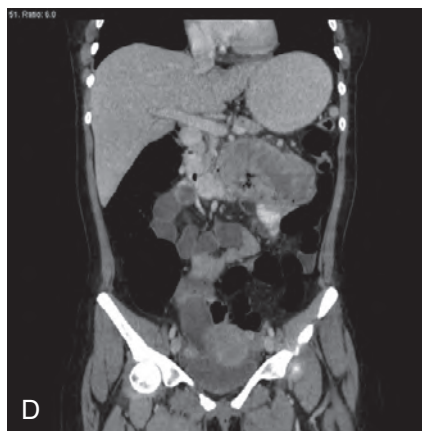
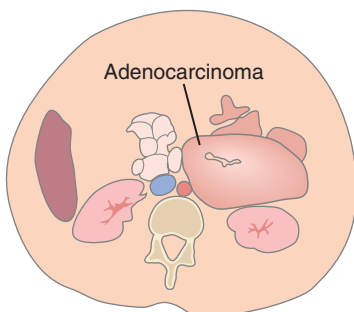


FIGURE 4.76 ADENOCARCINOMA

A, Narrowing of the junction of first and second duodenum with nodularity and a large central ulceration. **B**, There is circumferential ulceration with impending obstruction. **C**, Enteral stent was placed for palliation.

**FIGURE 4.77 ADENOCARCINOMA**

A, At the junction of the second and third duodenum, a glimpse of abnormal tissue is shown. **B**, A circumferential ulcerated mass lesion is identified with further advancement. **C**, **D**, CT images show the extensiveness of the mass.



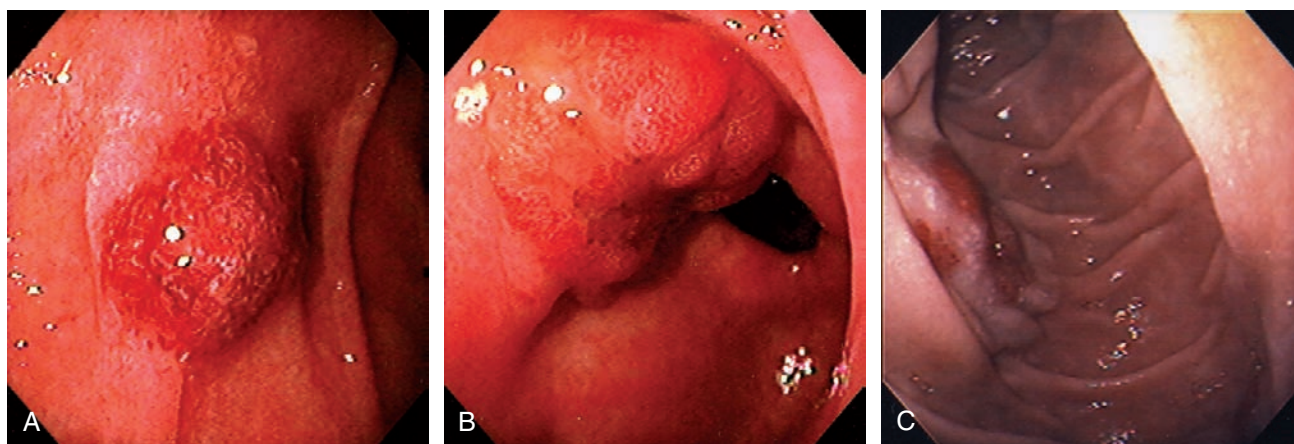


FIGURE 4.78 KAPOSI'S SARCOMA

A, Hemorrhagic polypoid lesion in the mid-second duodenum. **B**, A large lesion was also present near the pylorus. **C**, Well-circumscribed, raised, dark polypoid lesion in the second duodenum.

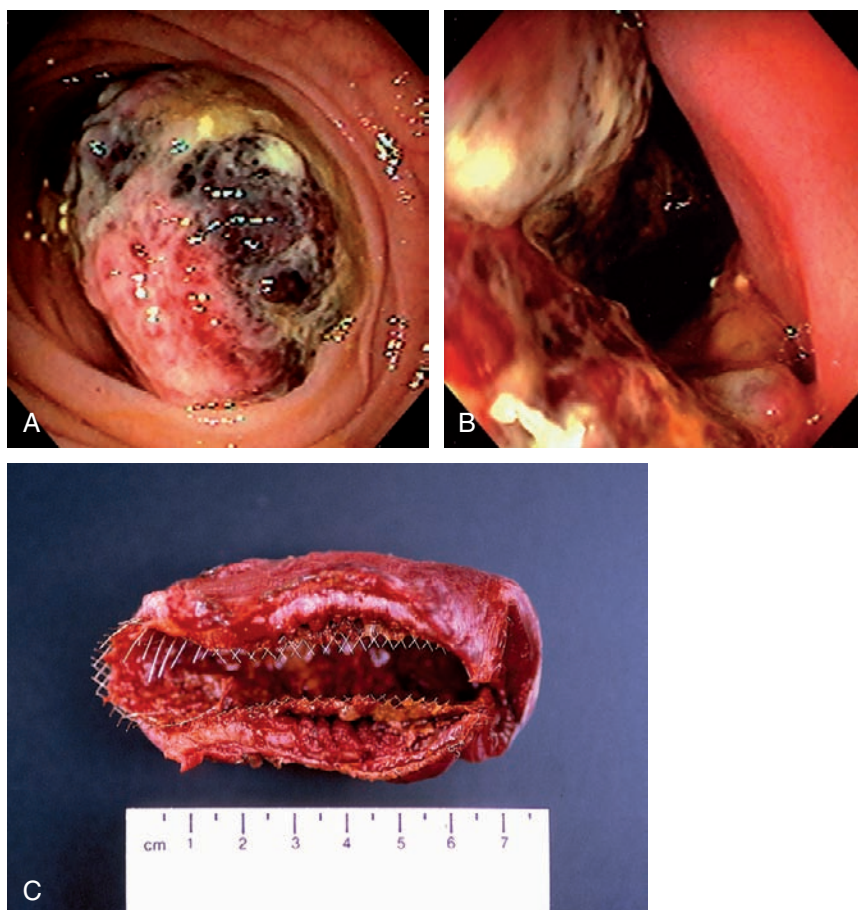


FIGURE 4.79 GASTROINTESTINAL STROMAL TUMOR

A, Large mass lesion occupying the lumen of the distal duodenum. **B**, Hemicircumferential nature of the tumor is apparent. **C**, The appearance of the stent and tumor in the surgical specimen.

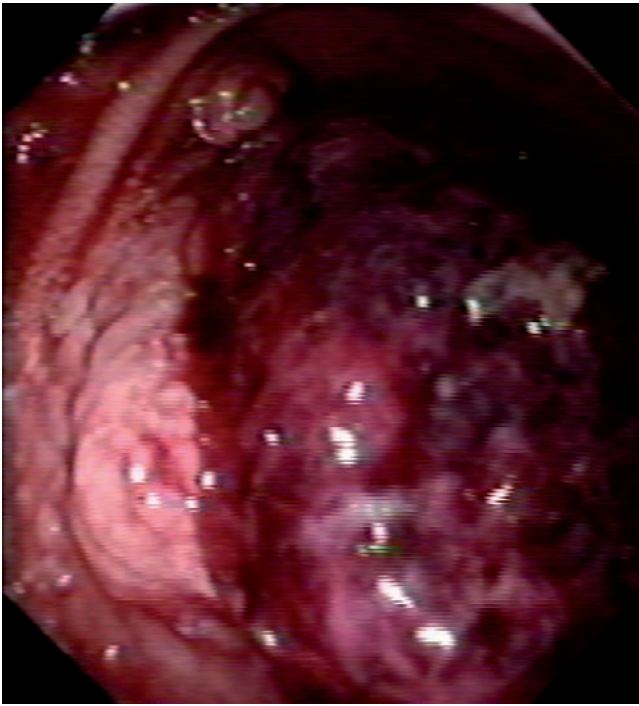


FIGURE 4.80 GASTROINTESTINAL STROMAL TUMOR
Large hemorrhagic mass lesion.

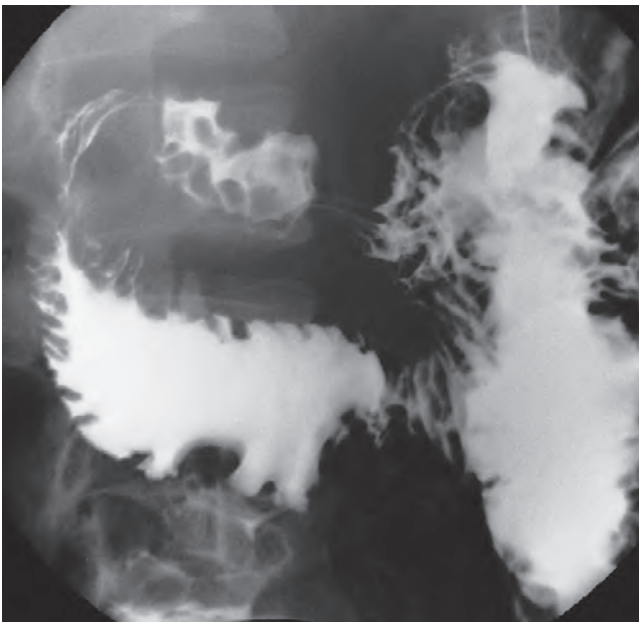
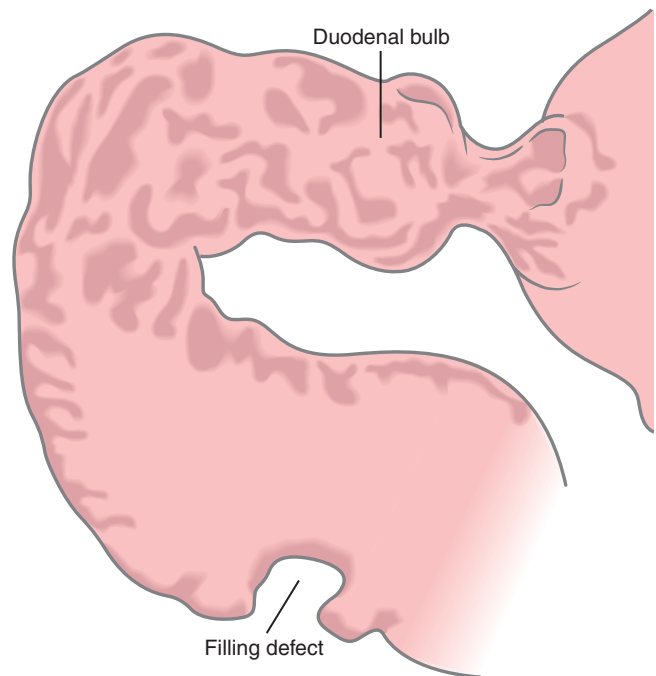


FIGURE 4.81 NON-HODGKIN'S LYMPHOMA
Nodularity of the duodenal bulb and filling defect in the proximal third duodenum.



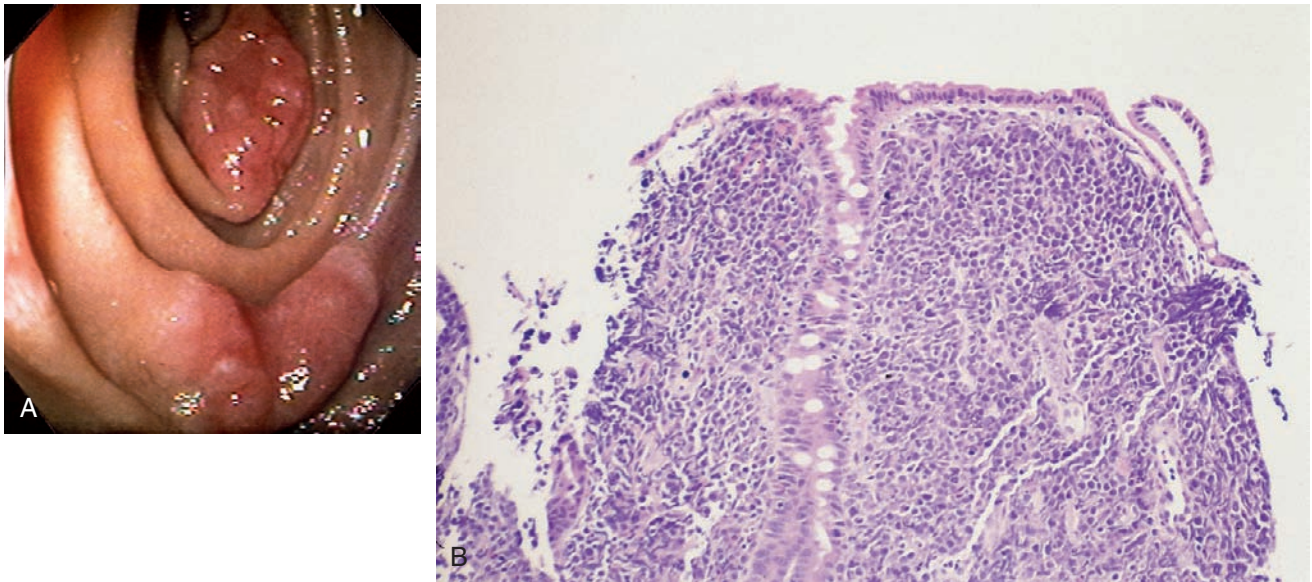


FIGURE 4.82 NON-HODGKIN'S LYMPHOMA

A, Fleshy mass lesions in the second duodenum. **B**, Malignant lymphoid cells distorting the duodenal glands.

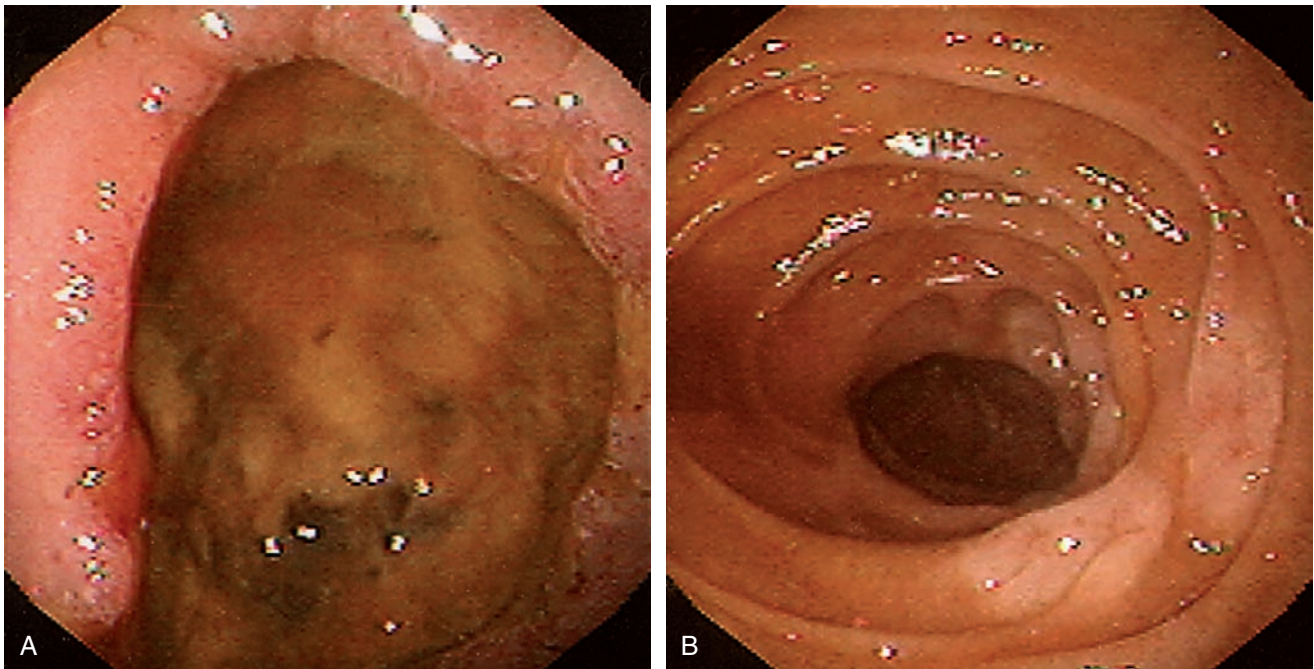


FIGURE 4.83 NON-HODGKIN'S LYMPHOMA

A, Large anterior wall duodenal ulcer. **B**, White plaquelike lesions in the second duodenum.



Differential Diagnosis

Non-Hodgkin's Lymphoma (Figure 4.83)

- Giant benign duodenal ulcer
- Adenocarcinoma
- Extrinsic lesion
- Neoplasm
- Infection

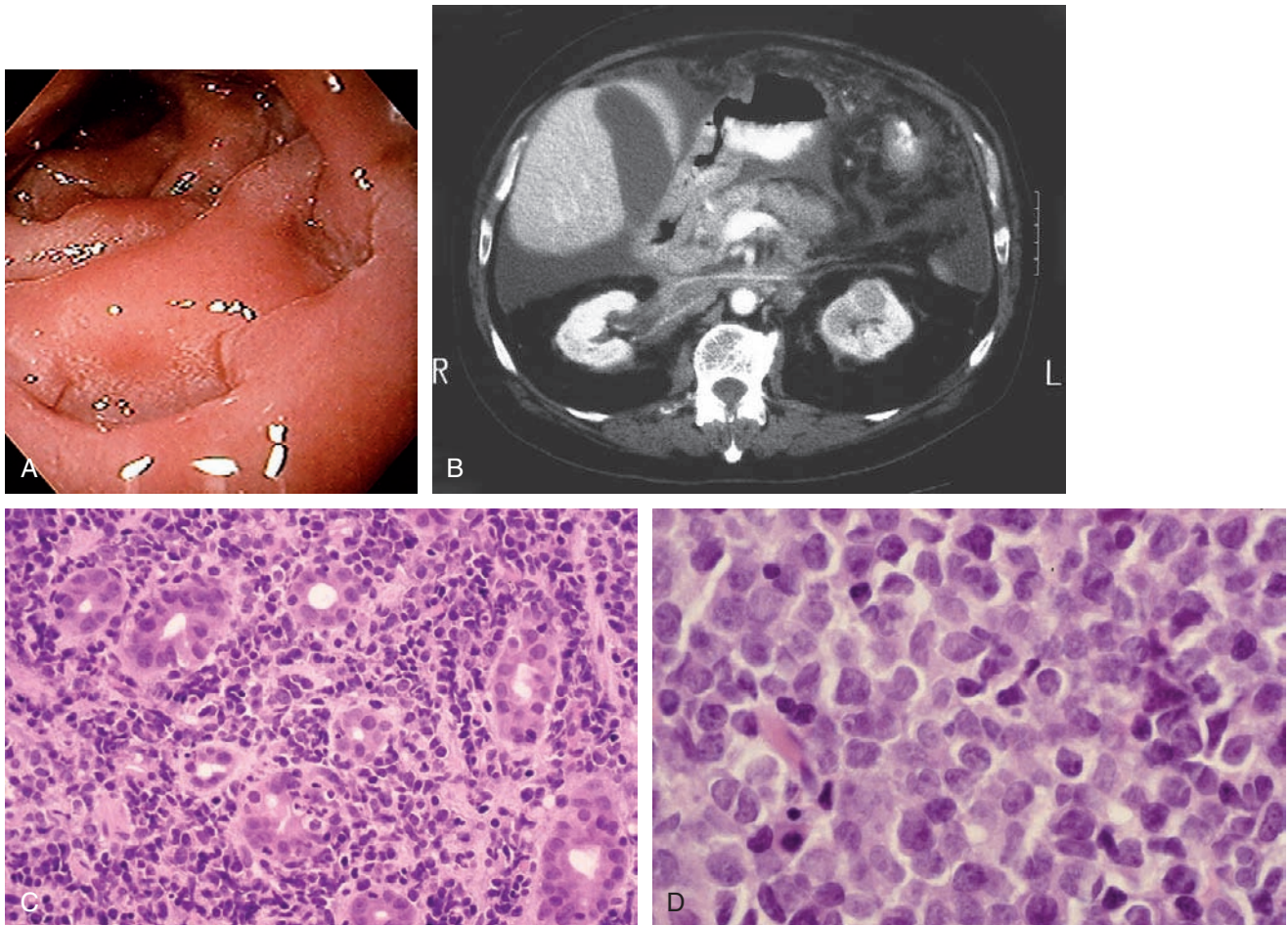


FIGURE 4.84 NON-HODGKIN'S LYMPHOMA

A, Smooth fold thickening throughout the second duodenum. **B**, The duodenum is markedly thickened. **C, D**, Diffuse large cell lymphoma.

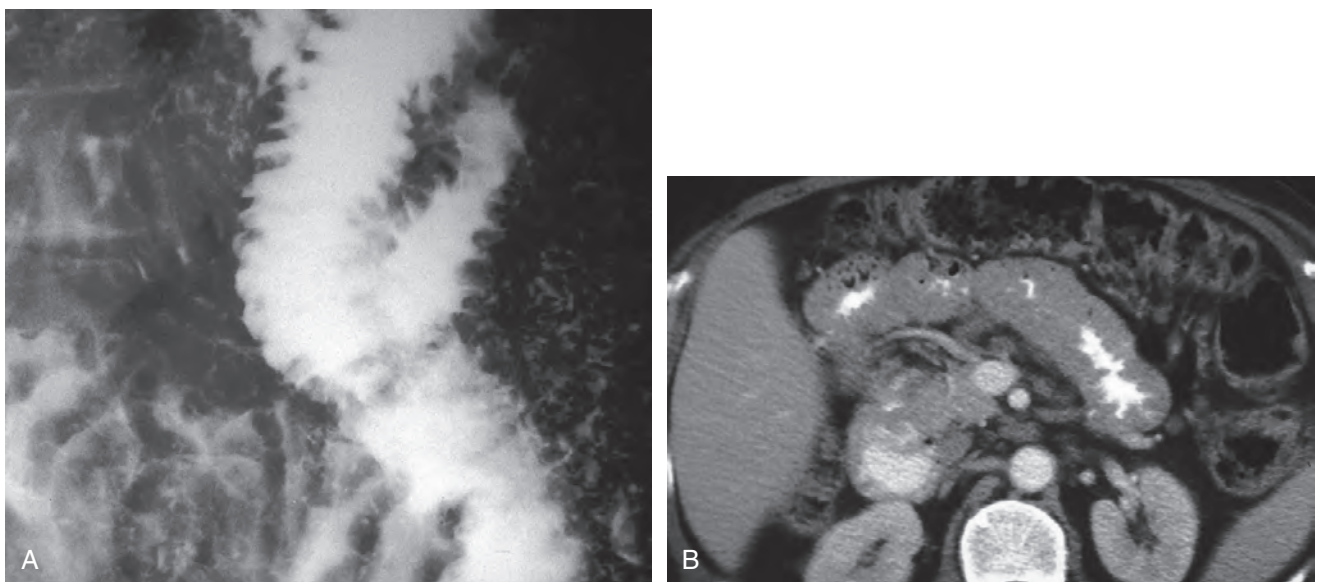


FIGURE 4.85 MANTLE CELL LYMPHOMA

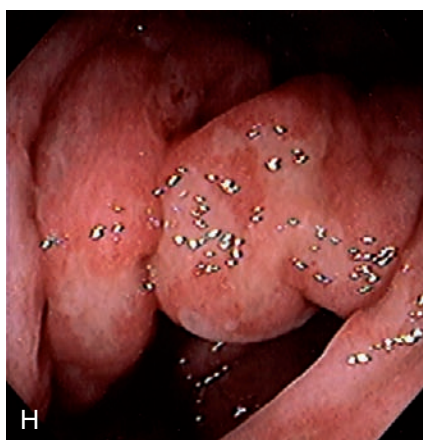
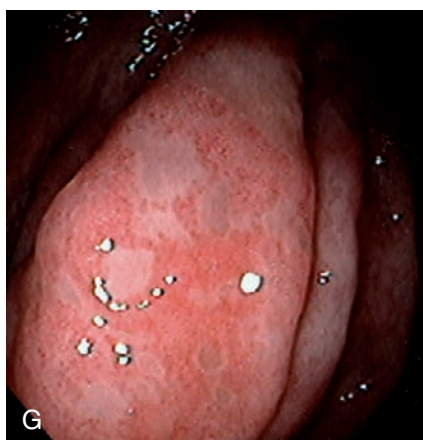
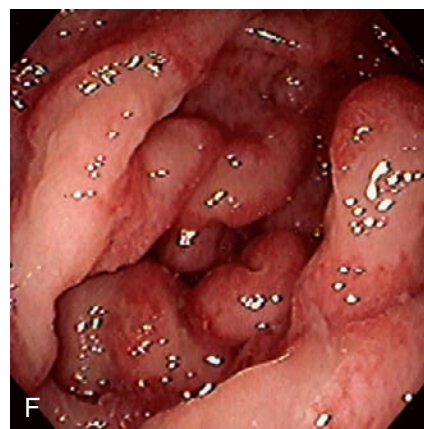
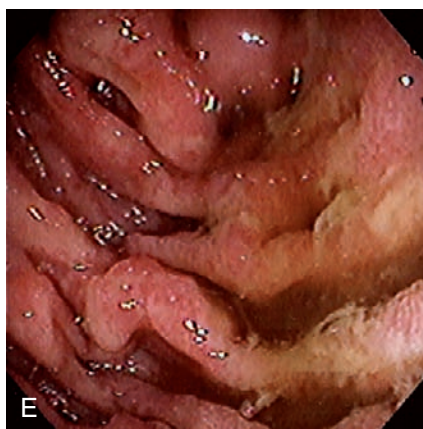
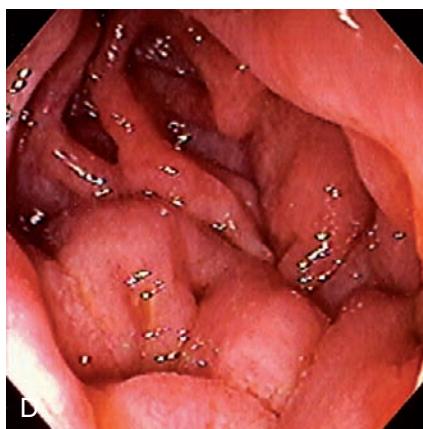
A, Small-bowel series shows diffuse mucosal thickening. **B**, Marked duodenal and proximal jejunal thickening.

Continued



FIGURE 4.85 MANTLE CELL LYMPHOMA

C, Diffuse small-bowel thickening and thickening of the colon. **D**, Fold thickening in the second duodenum, proximal jejunum (**E**), and ileum (**F**). There was also colonic involvement with loss of mucosal vascular pattern, patchy ulceration, and mucosal thickening (**G, H**).



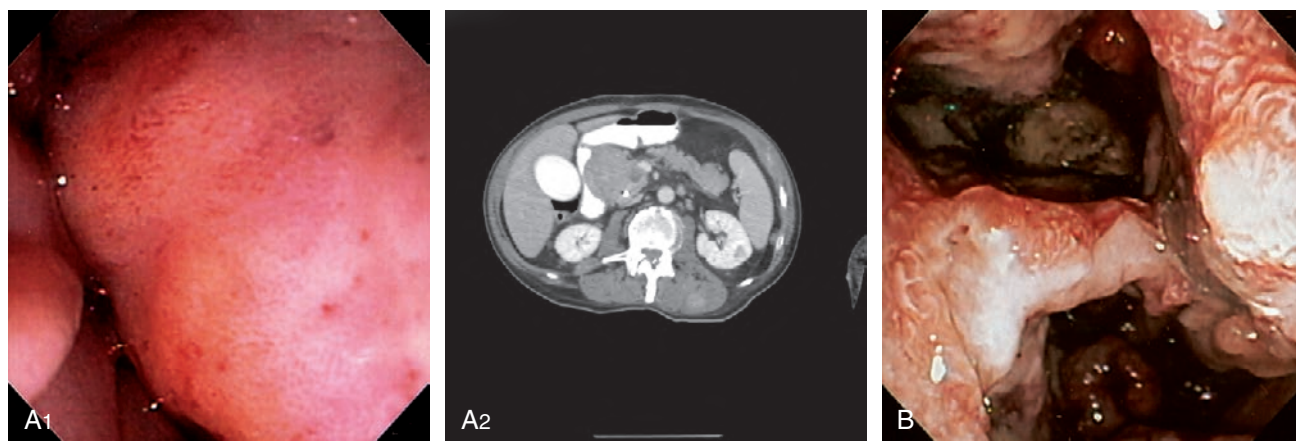


FIGURE 4.86 MELANOMA

A1, Large, masslike lesion impinging on the second duodenum. **A2**, Large mass in the peripancreatic area. **B**, Large, ulcerated, masslike lesion in the second duodenum. No normal mucosa is present.

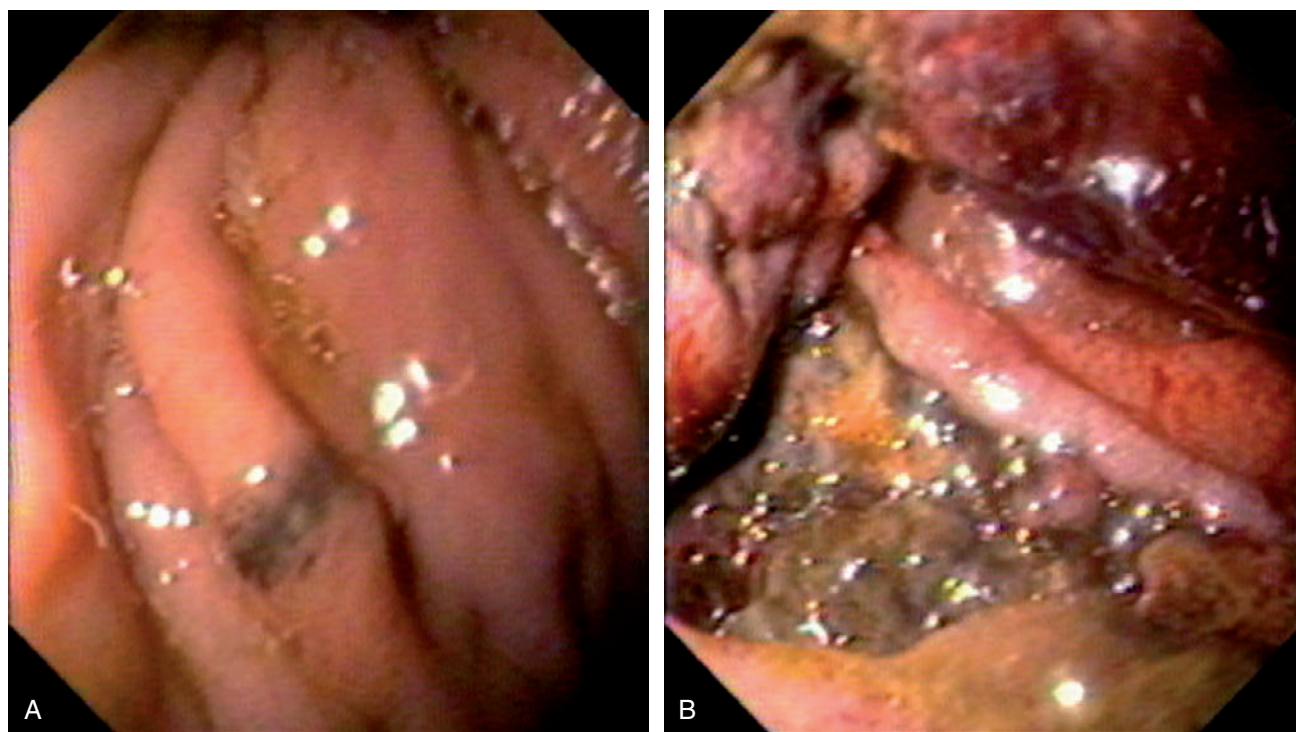


FIGURE 4.87 MELANOMA

A, Small dark lesion in the proximal second duodenum. **B**, Large darkly discolored lesion eroding into the second duodenum.



FIGURE 4.88 METASTATIC HYPERNEPHROMA
Submucosal mass with overlying erosions.

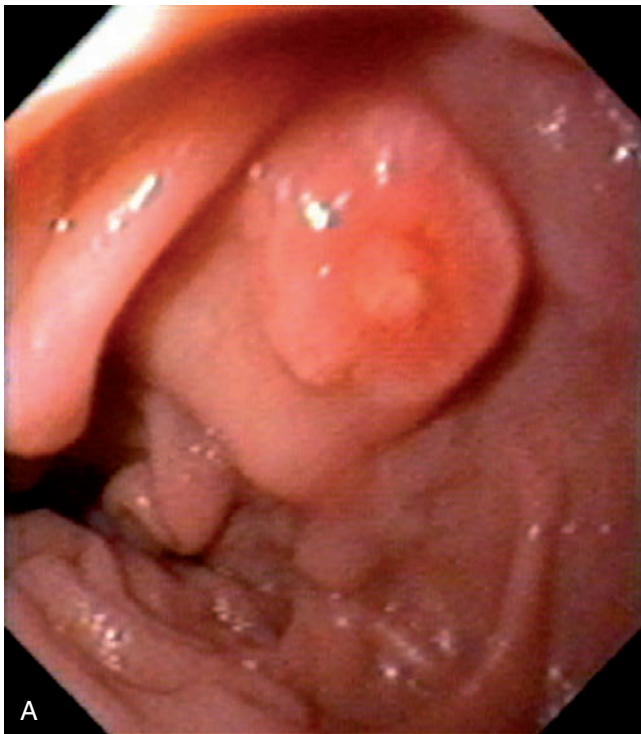


FIGURE 4.89 METASTATIC LUNG CANCER

Multiple lesions in the second duodenum. One lesion has a small ulceration (**A**), whereas the other lesion has a raised volcano appearance with a deep ulcer (**B**).



Differential Diagnosis

Inflammatory polyp
Adenomatous polyp
Metastatic neoplasm

Metastatic Lung Cancer ([Figure 4.89](#))

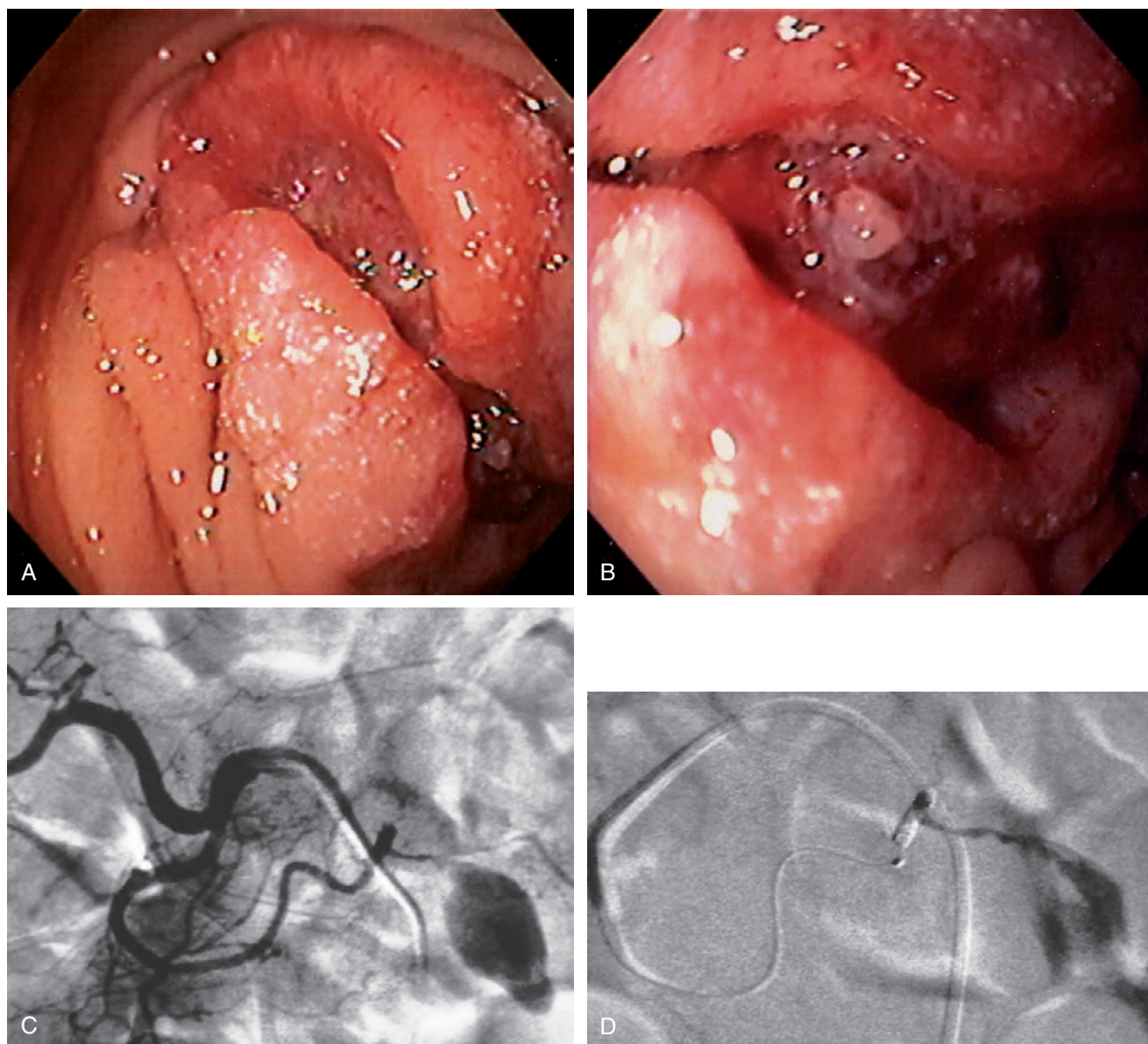


FIGURE 4.90 COLON CANCER INVOLVING DUODENUM

A, Well-circumscribed mass lesion in the second duodenum. **B**, A fleshy visible vessel was seen in the center of the lesion presumably at the site of recent bleeding. **C**, Angiography shows a large tumor blush. **D**, Post-embolization film demonstrates the placed coils and markedly reduced blood flow.



FIGURE 4.91 METASTATIC RECTAL CANCER
Submucosal lesion in the mid-second duodenum.

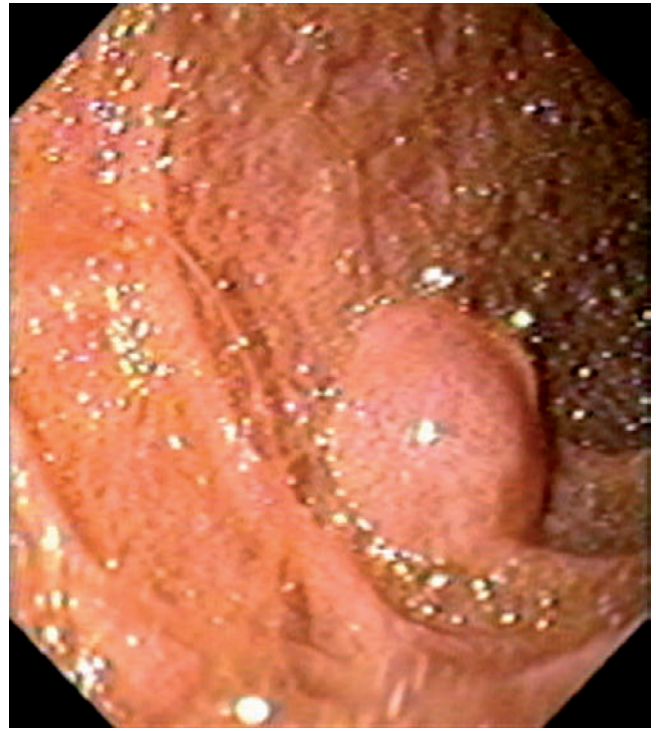


FIGURE 4.92 METASTATIC PSEUDOMYXOMA PERITONEI
Fleshy lesion in the mid-second duodenum.



FIGURE 4.93 CYTOMEGALOVIRUS ULCERATION
Marked edema and subepithelial hemorrhage in the duodenal bulb. A well-circumscribed, clean-based ulcer is present, with an ulcer also present in the distance.

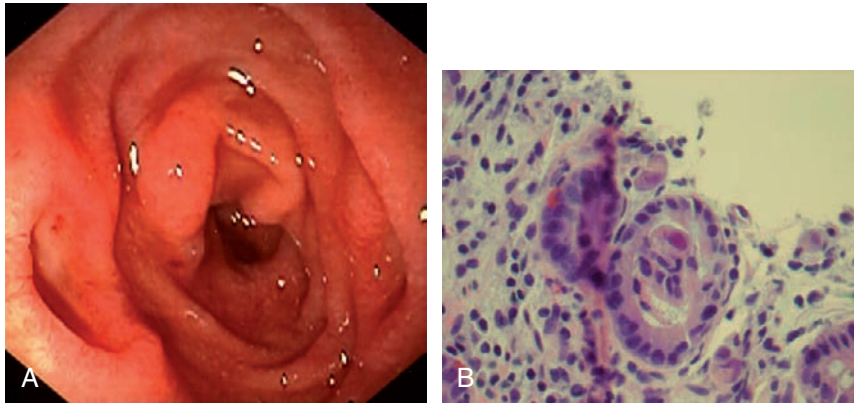


FIGURE 4.94 CYTOMEGALOVIRUS ULCER
A, Well-circumscribed ulcer with a punched-out appearance in the mid-second duodenum. Red spots are present in the ulcer base. This patient was status post-renal transplantation and had no clinical bleeding. **B**, Characteristic viral cytopathic effect in the epithelial cells.

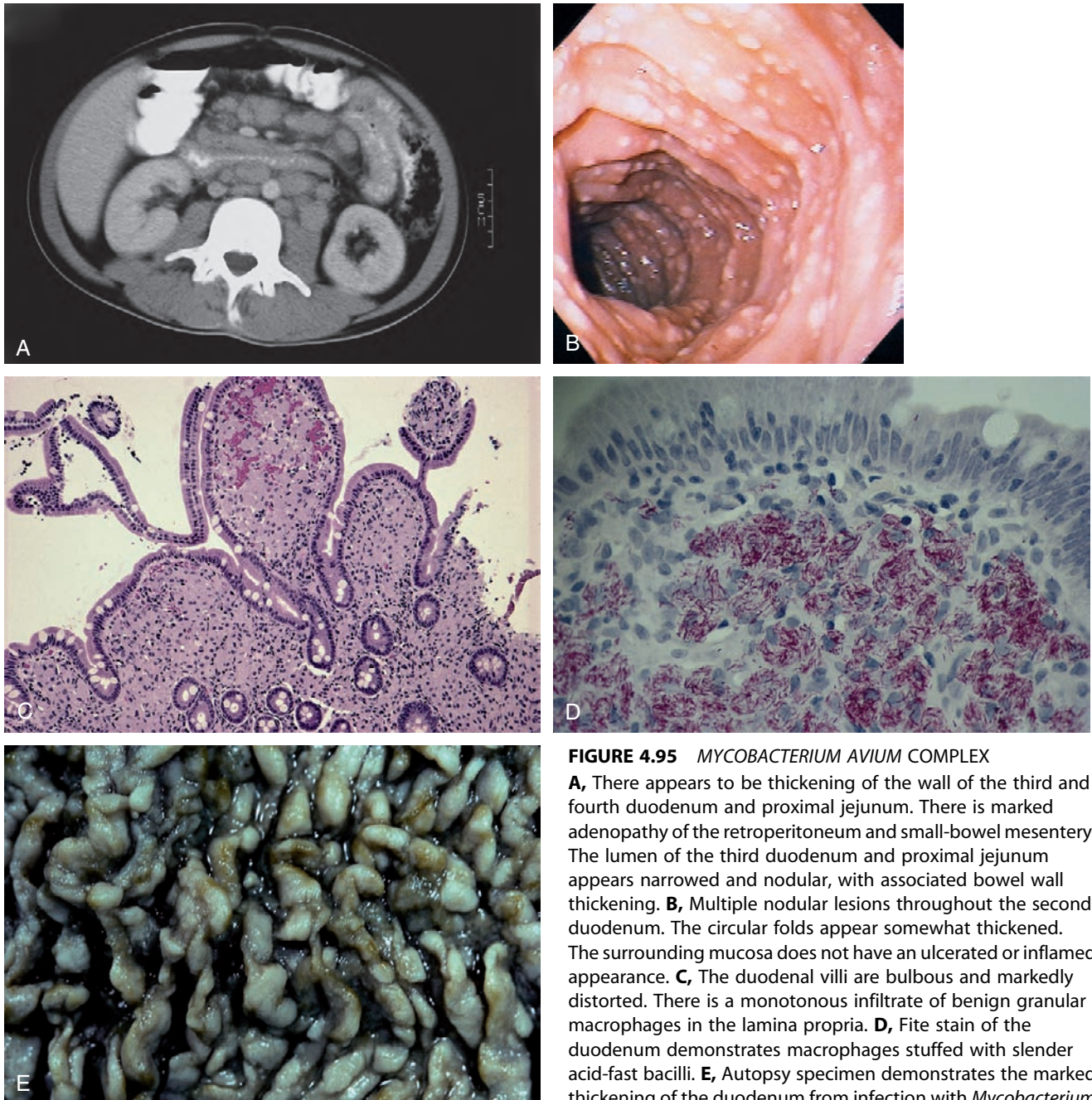


FIGURE 4.95 *MYCOBACTERIUM AVIUM* COMPLEX

A, There appears to be thickening of the wall of the third and fourth duodenum and proximal jejunum. There is marked adenopathy of the retroperitoneum and small-bowel mesentery. The lumen of the third duodenum and proximal jejunum appears narrowed and nodular, with associated bowel wall thickening. **B**, Multiple nodular lesions throughout the second duodenum. The circular folds appear somewhat thickened. The surrounding mucosa does not have an ulcerated or inflamed appearance. **C**, The duodenal villi are bulbous and markedly distorted. There is a monotonous infiltrate of benign granular macrophages in the lamina propria. **D**, Fite stain of the duodenum demonstrates macrophages stuffed with slender acid-fast bacilli. **E**, Autopsy specimen demonstrates the marked thickening of the duodenum from infection with *Mycobacterium avium* complex.

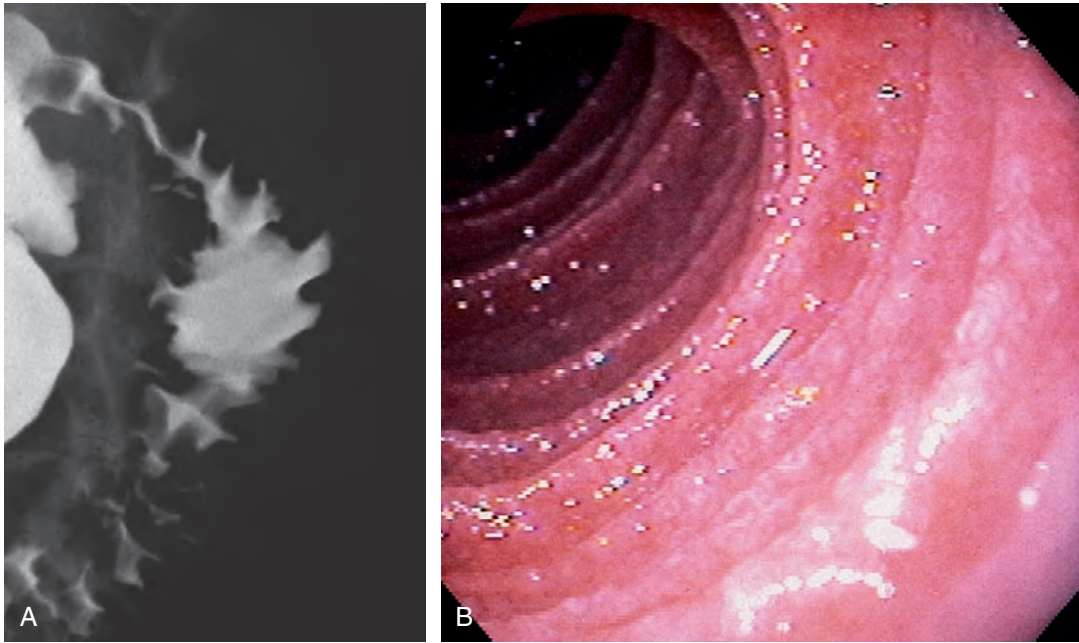


FIGURE 4.96 CRYPTOSPORIDIOSIS

A, Marked thickening of the duodenal folds. **B**, The mucosa has a very granular, whitish appearance, and the circular folds are thickened. Marked inflammation was present on biopsy.

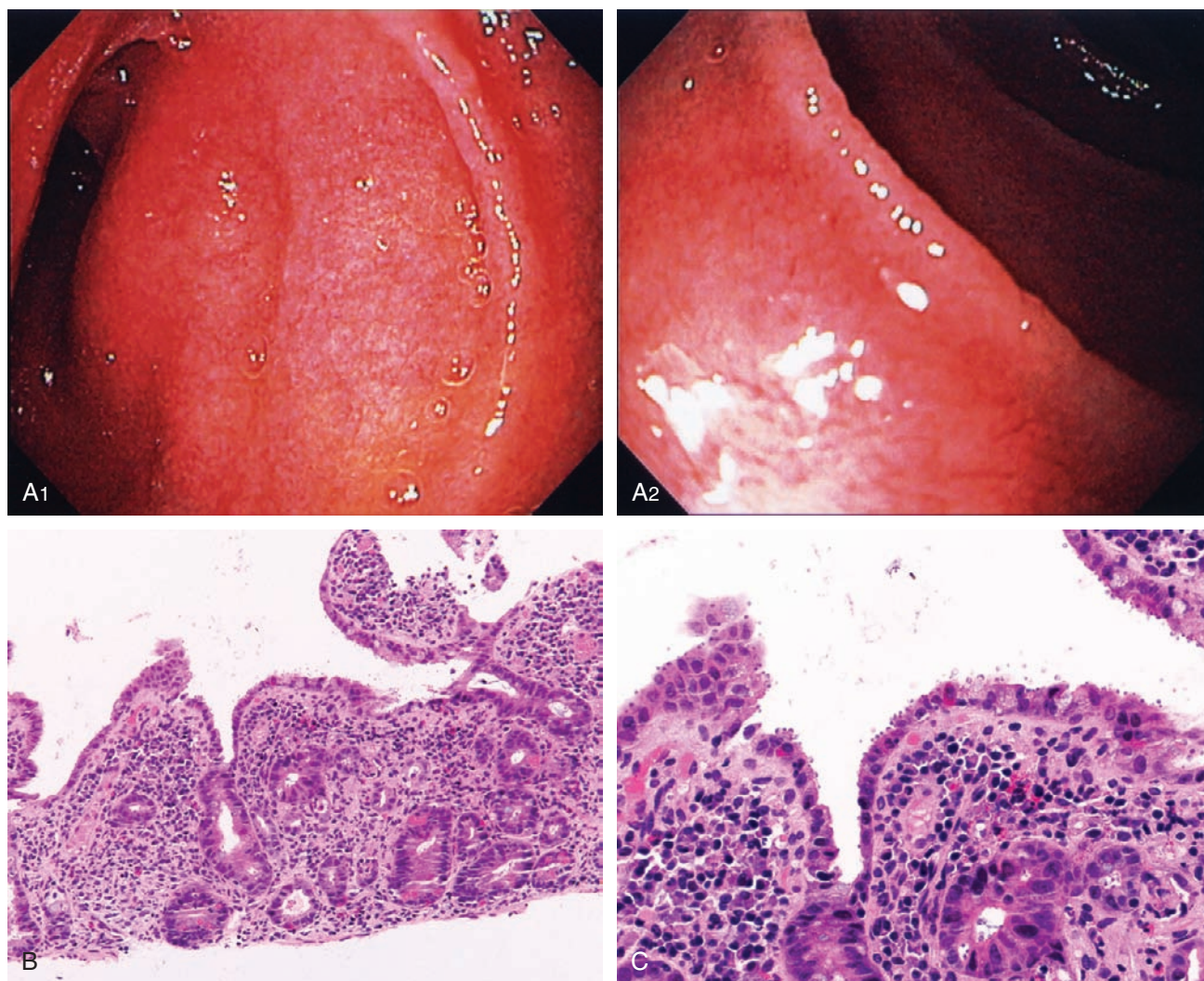


FIGURE 4.97 CRYPTOSPORIDIOSIS

A1, Diffuse erythema and granularity with some loss of the duodenal folds (**A2**). **B**, Histology shows mild blunting of the villi with a marked inflammatory process. **C**, Numerous small, round structures are seen on the surface epithelium representing the cryptosporidial organisms.

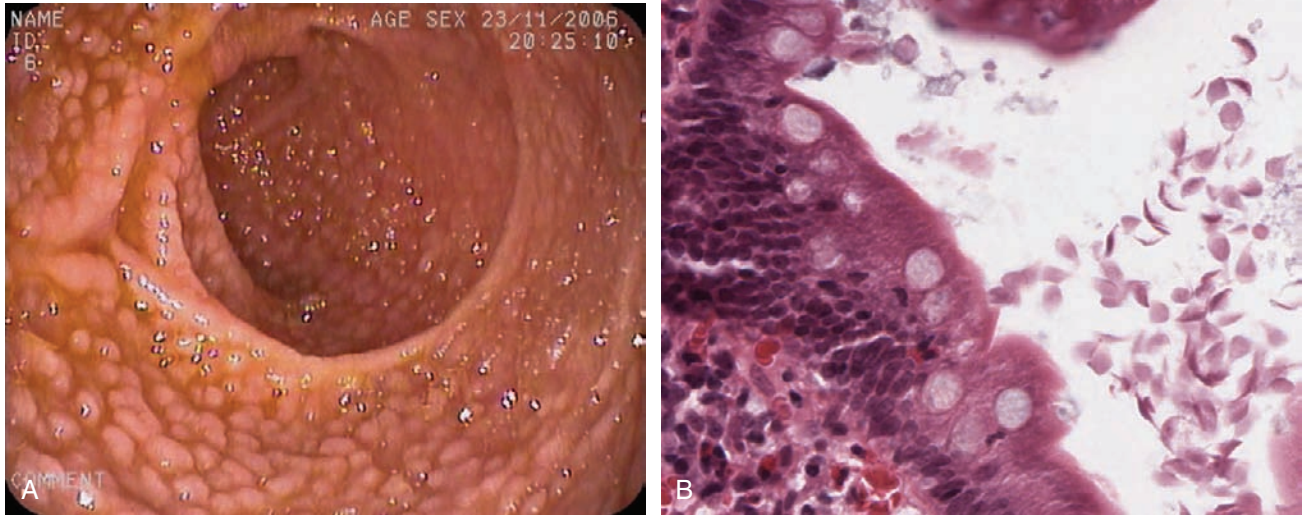


FIGURE 4.98 GIARDIASIS

A, Marked nodularity and loss of the normal mucosal pattern. **B**, Marked inflammation associated with numerous Giardia organisms represented by the crescent-like structures at the epithelial surface.

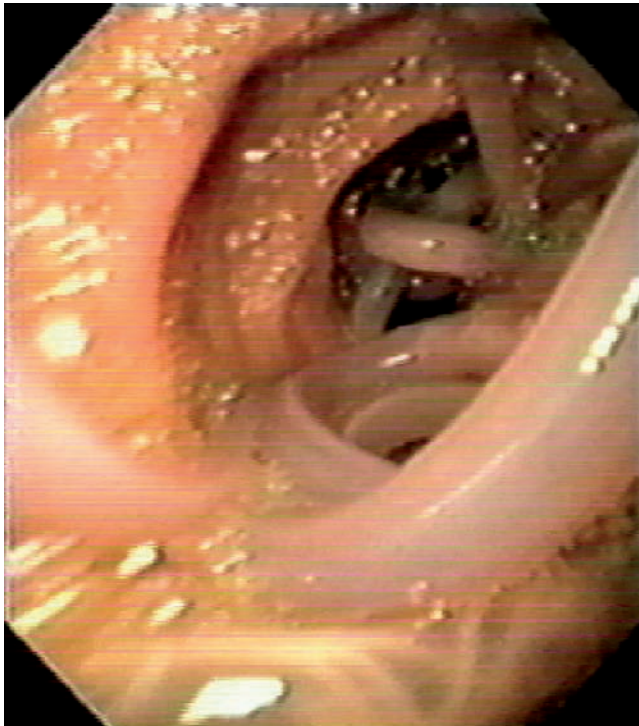


FIGURE 4.99 *ASCARIS LUMBRICOIDES*

Large worm filling the duodenum. (Courtesy F. Vida, MD, and A. Tomas, MD, Manresa, Spain.)

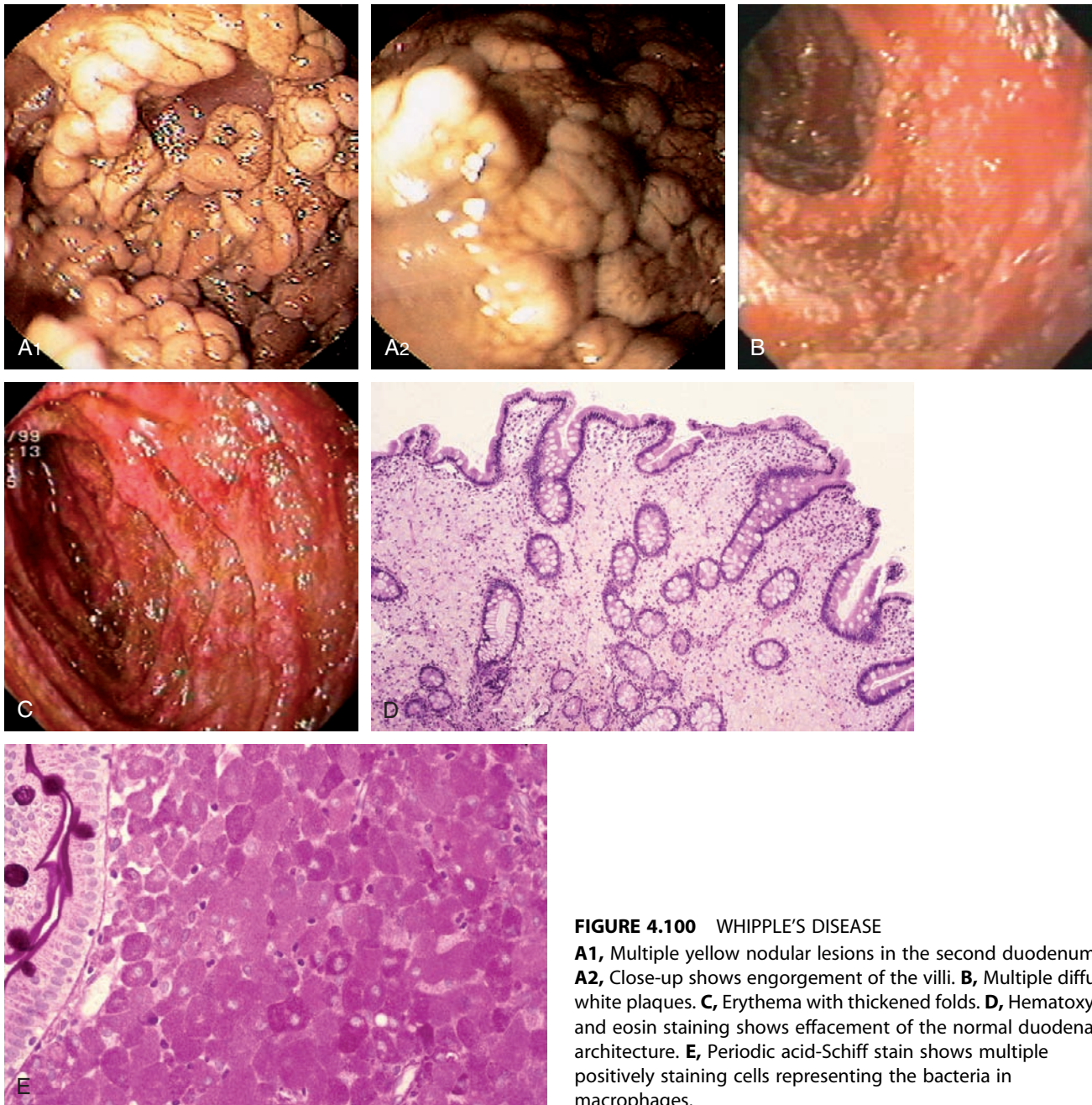


FIGURE 4.100 WHIPPLE'S DISEASE

A1, Multiple yellow nodular lesions in the second duodenum. **A2**, Close-up shows engorgement of the villi. **B**, Multiple diffuse white plaques. **C**, Erythema with thickened folds. **D**, Hematoxylin and eosin staining shows effacement of the normal duodenal architecture. **E**, Periodic acid-Schiff stain shows multiple positively staining cells representing the bacteria in macrophages.

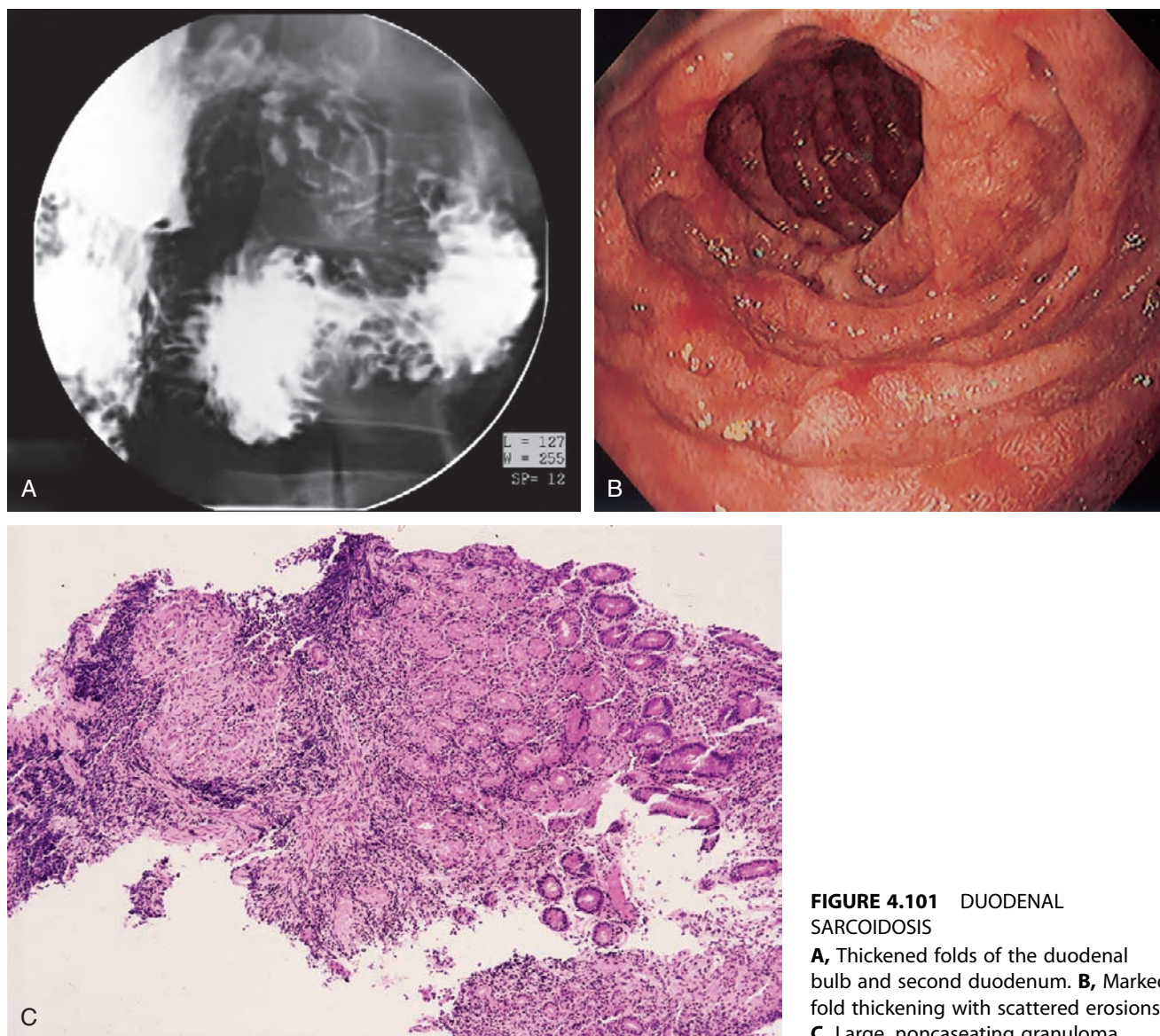


FIGURE 4.101 DUODENAL SARCOIDOSIS

A, Thickened folds of the duodenal bulb and second duodenum. **B**, Marked fold thickening with scattered erosions. **C**, Large, noncaseating granuloma.

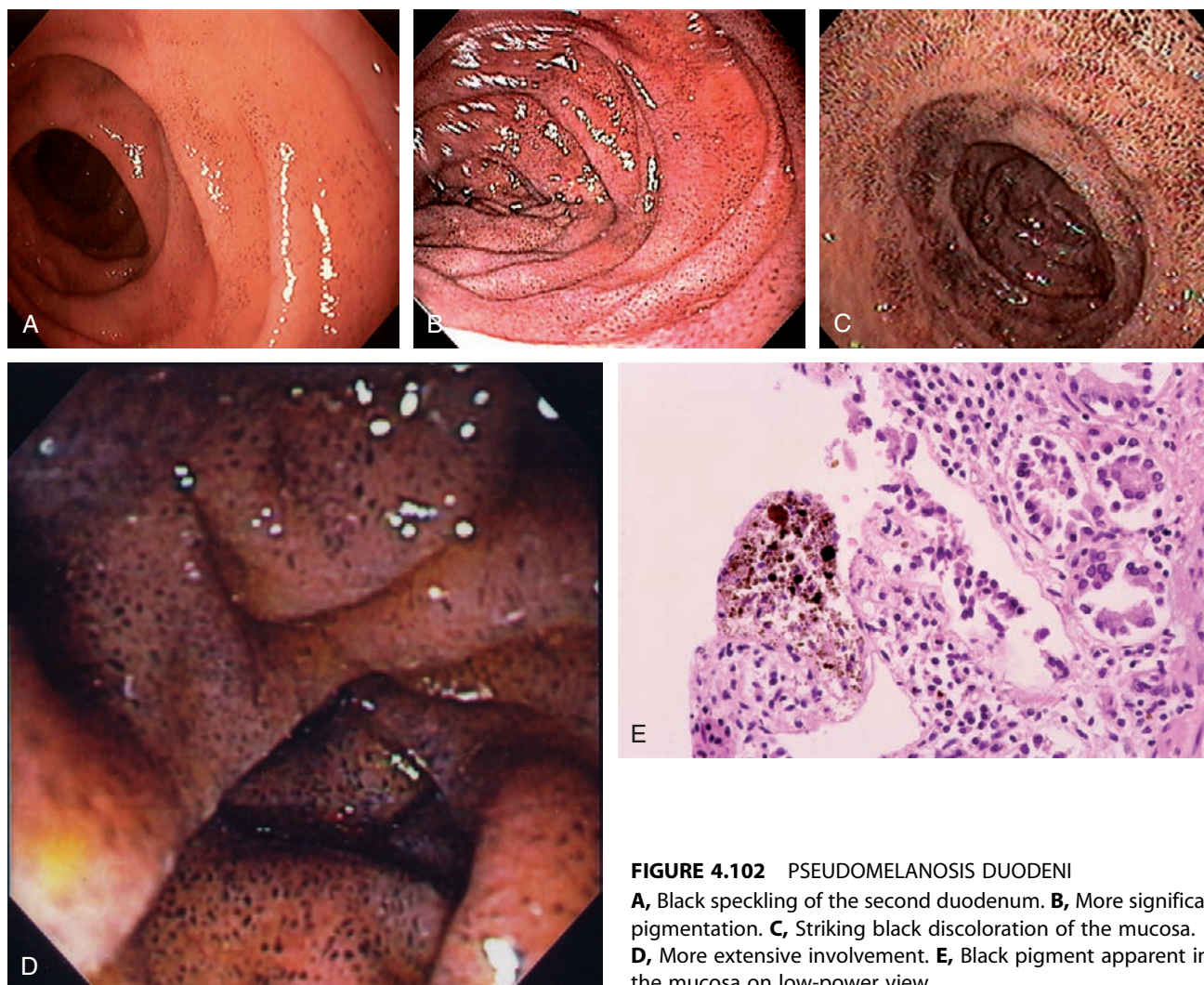


FIGURE 4.102 PSEUDOMELANOSIS DUODENI

A, Black speckling of the second duodenum. **B**, More significant pigmentation. **C**, Striking black discoloration of the mucosa. **D**, More extensive involvement. **E**, Black pigment apparent in the mucosa on low-power view.

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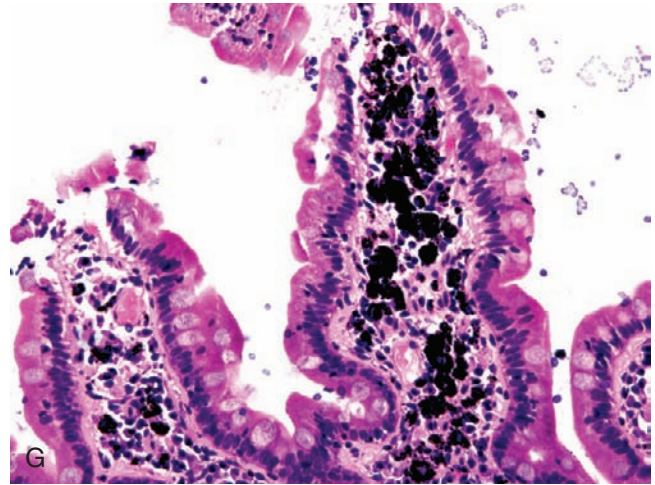
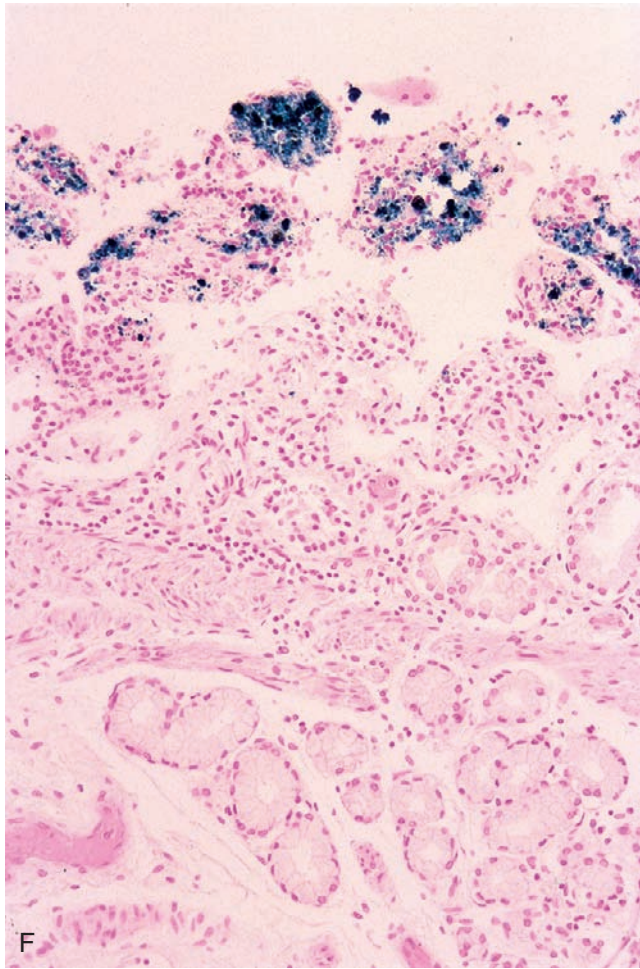
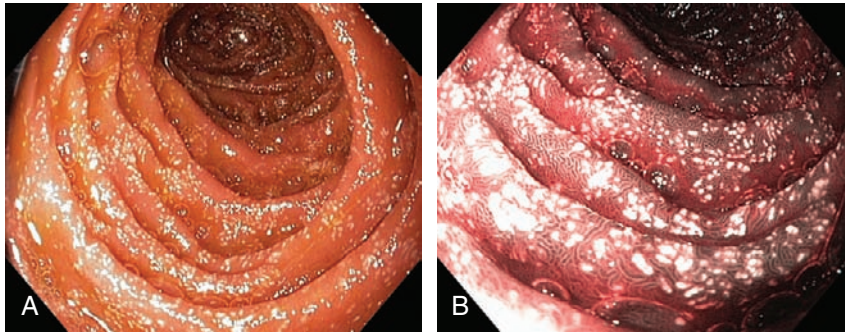
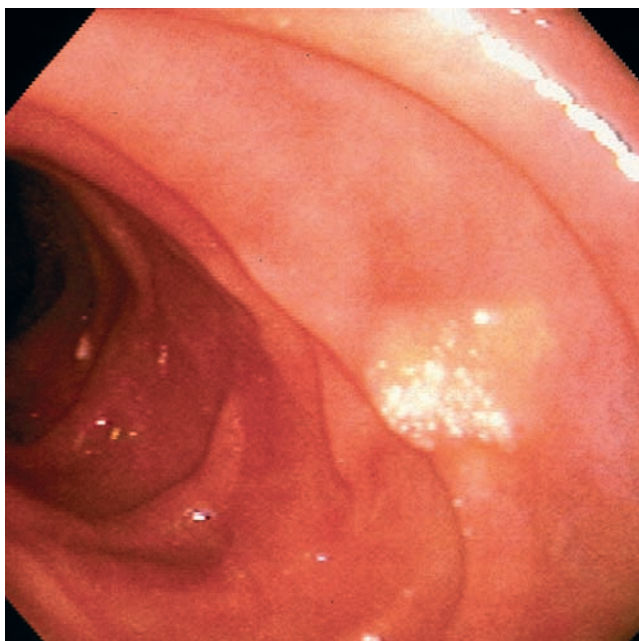
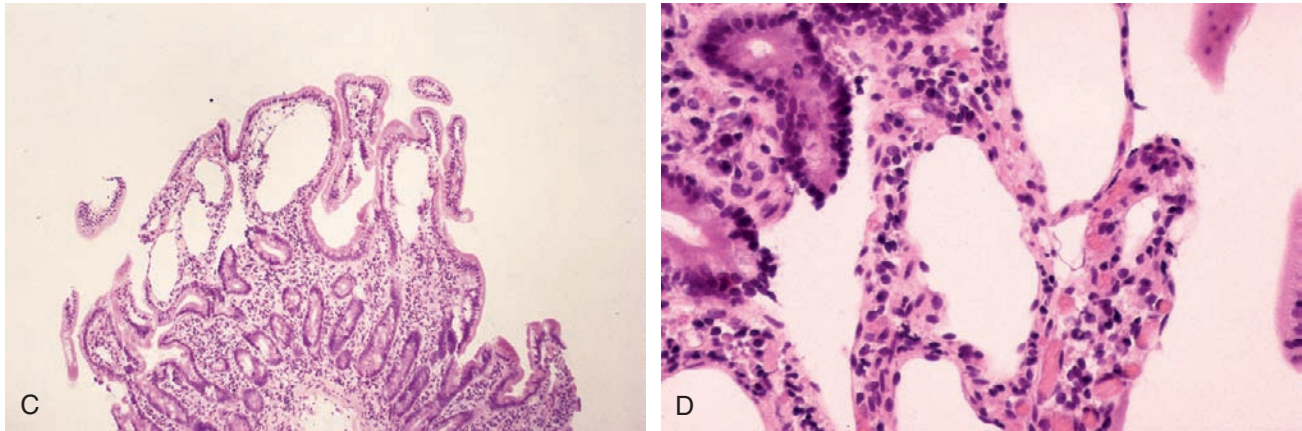


FIGURE 4.102 PSEUDOMELANOSIS DUODENI

F, Iron stain highlights the pigment. **G**, Black pigment seen in the duodenal submucosa on high-power image.

**FIGURE 4.103** LYMPHANGIECTASIA

Duodenal lymphangiectasia as shown on routine (A) and narrow band imaging (B). C, D, Lymphatic channels readily apparent at the mucosal surface.

**FIGURE 4.104** LIPID PLAQUE

Well-circumscribed yellow plaque with a white speckled surface. Biopsy results demonstrated a focal lipid collection. These lipid collections can be seen throughout the gastrointestinal tract.

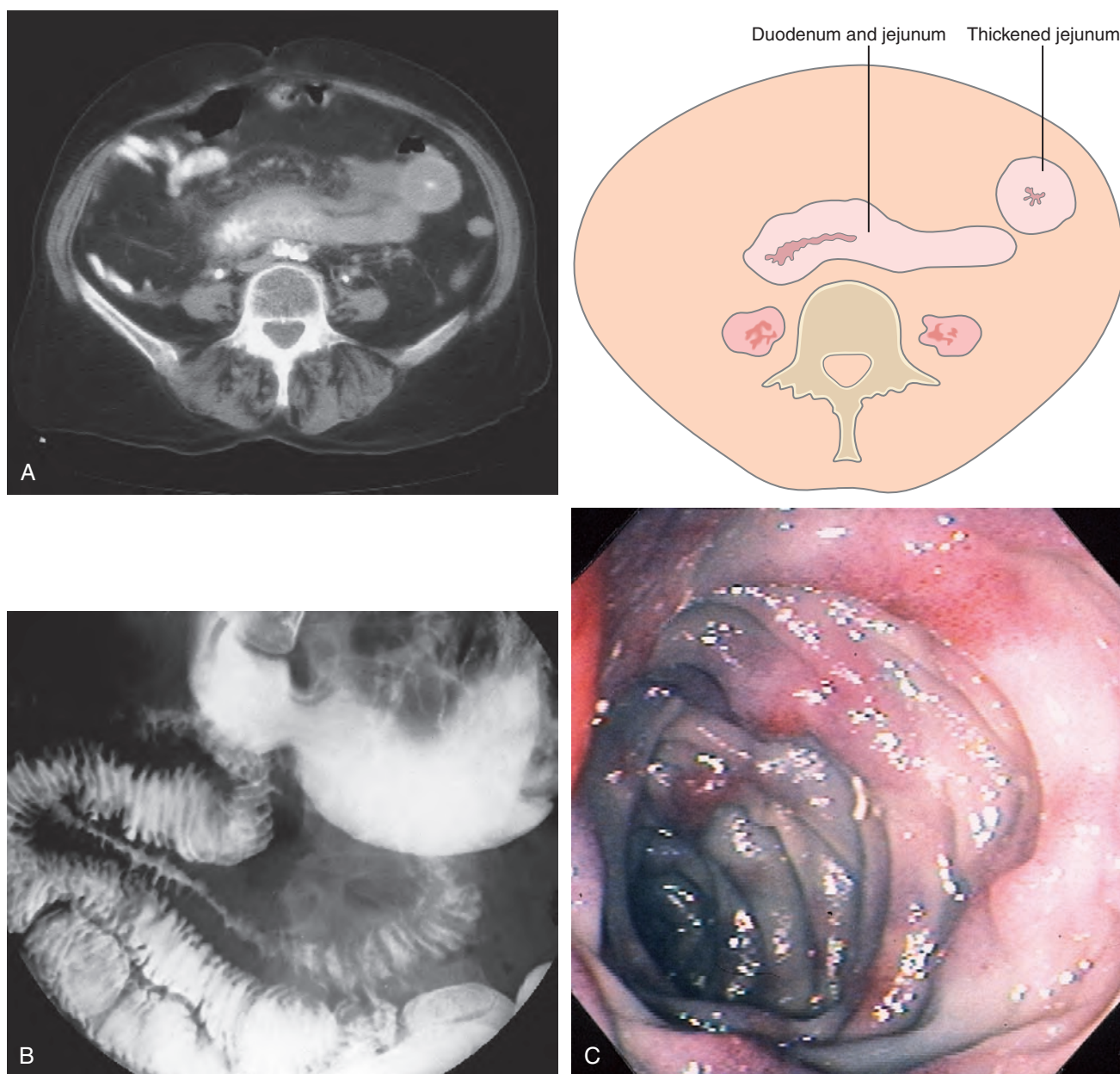
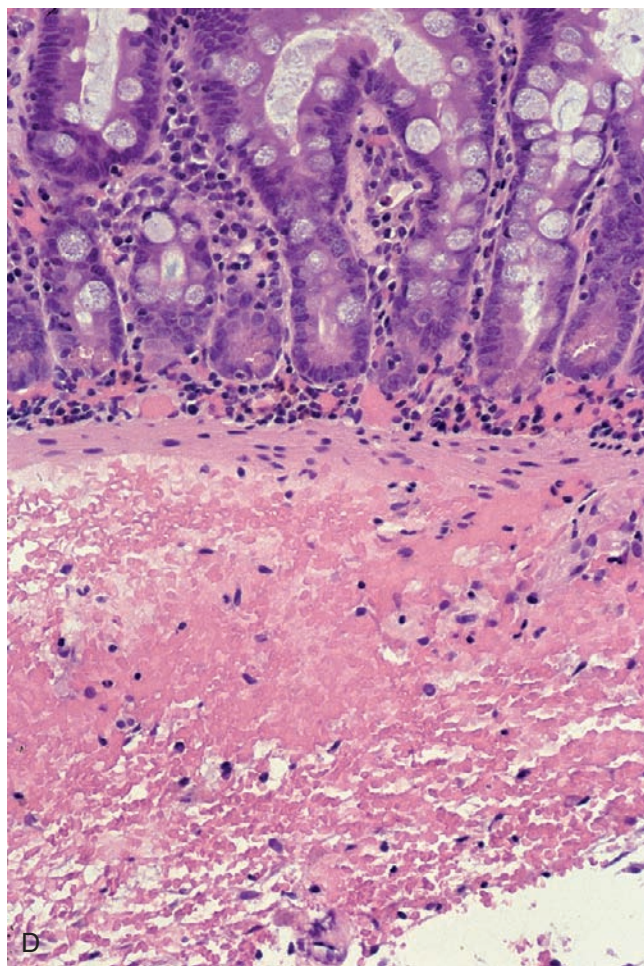


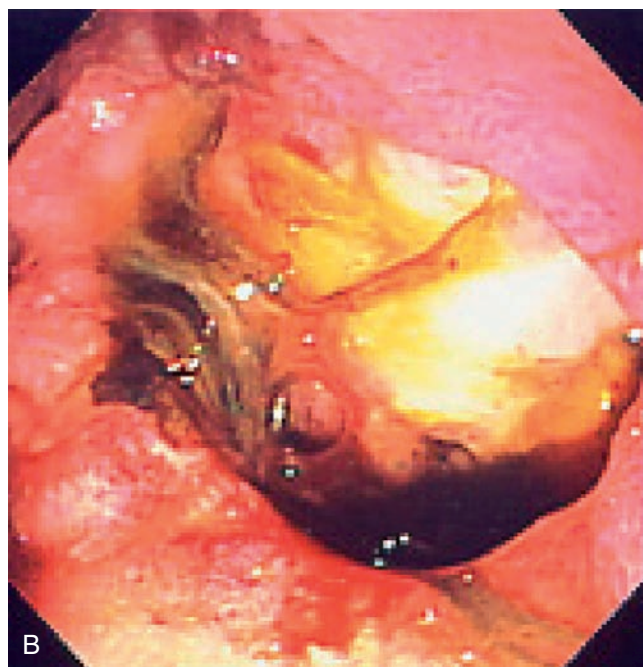
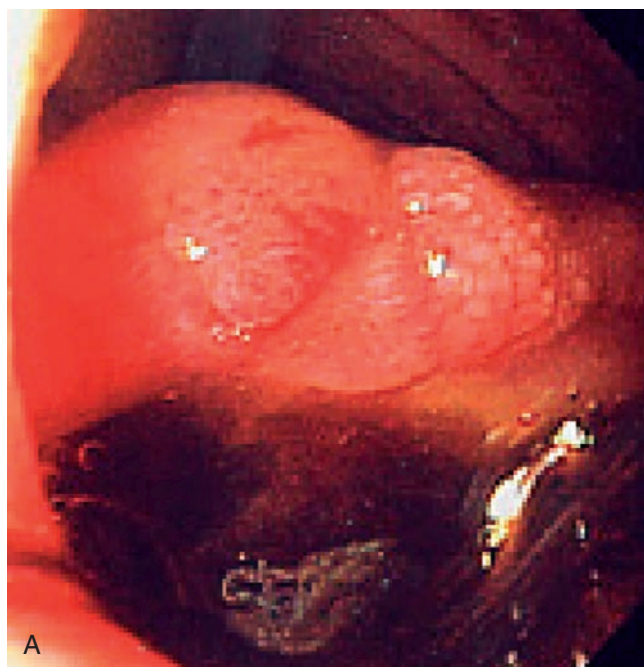
FIGURE 4.105 INTRAMURAL HEMORRHAGE

A, Marked edema of the second duodenum and proximal jejunum. The jejunum has a markedly thickened wall, with small collections of barium in the center representing the lumen. **B**, Marked spiculation and nodularity of the duodenum, with luminal narrowing in the second duodenum. There is separation between the duodenal loops in this area, resulting from wall thickening. **C**, Marked thickening and subepithelial hemorrhage throughout the distal second duodenum. In some areas where there is no subepithelial hemorrhage, the mucosa has a bluish hue.

Continued

**FIGURE 4.105** INTRAMURAL HEMORRHAGE

D, There is focal hemorrhage in the lamina propria, and blood diffusely infiltrates the fibroconnective tissue of the submucosa. Bleeding in the lamina propria appears endoscopically as bright red subepithelial hemorrhage. The bluish discoloration represents the deeper, submucosal areas of hemorrhage.

**FIGURE 4.106** AORTOENTERIC FISTULA

A, Large defect in the mid-second duodenum with central depression and overlying blood clot. **B**, With washing, a large defect is now visible.

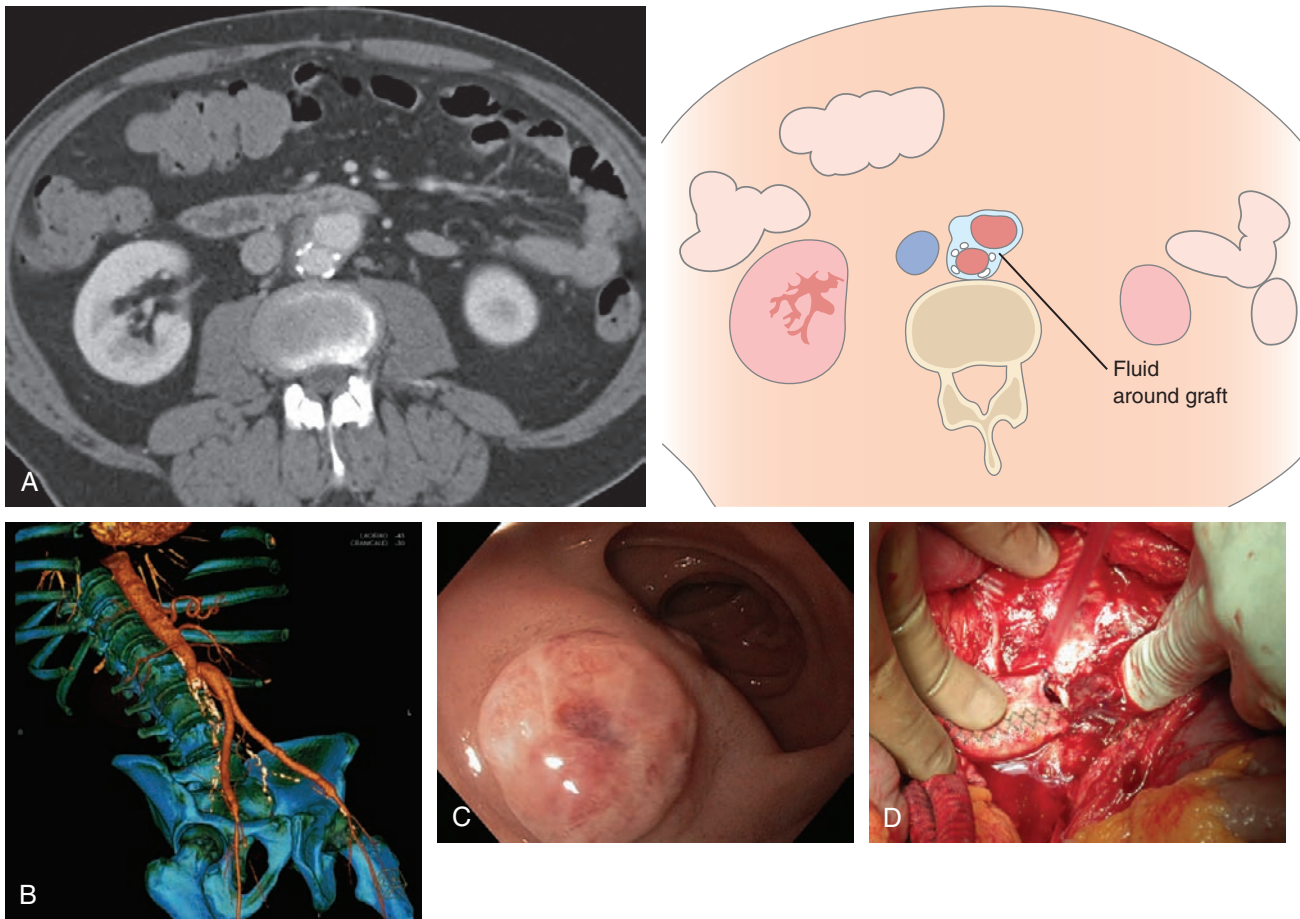


FIGURE 4.107 AORTOENTERIC FISTULA

A, Computed tomography (CT) shows fluid around the graft (*right*). **B**, CT with vascular image reconstruction shows the abnormality of the right iliac artery. **C**, Round, raised polypoid lesion in the duodenum. **D**, As seen at the time of surgery, the fistulous opening is obvious.

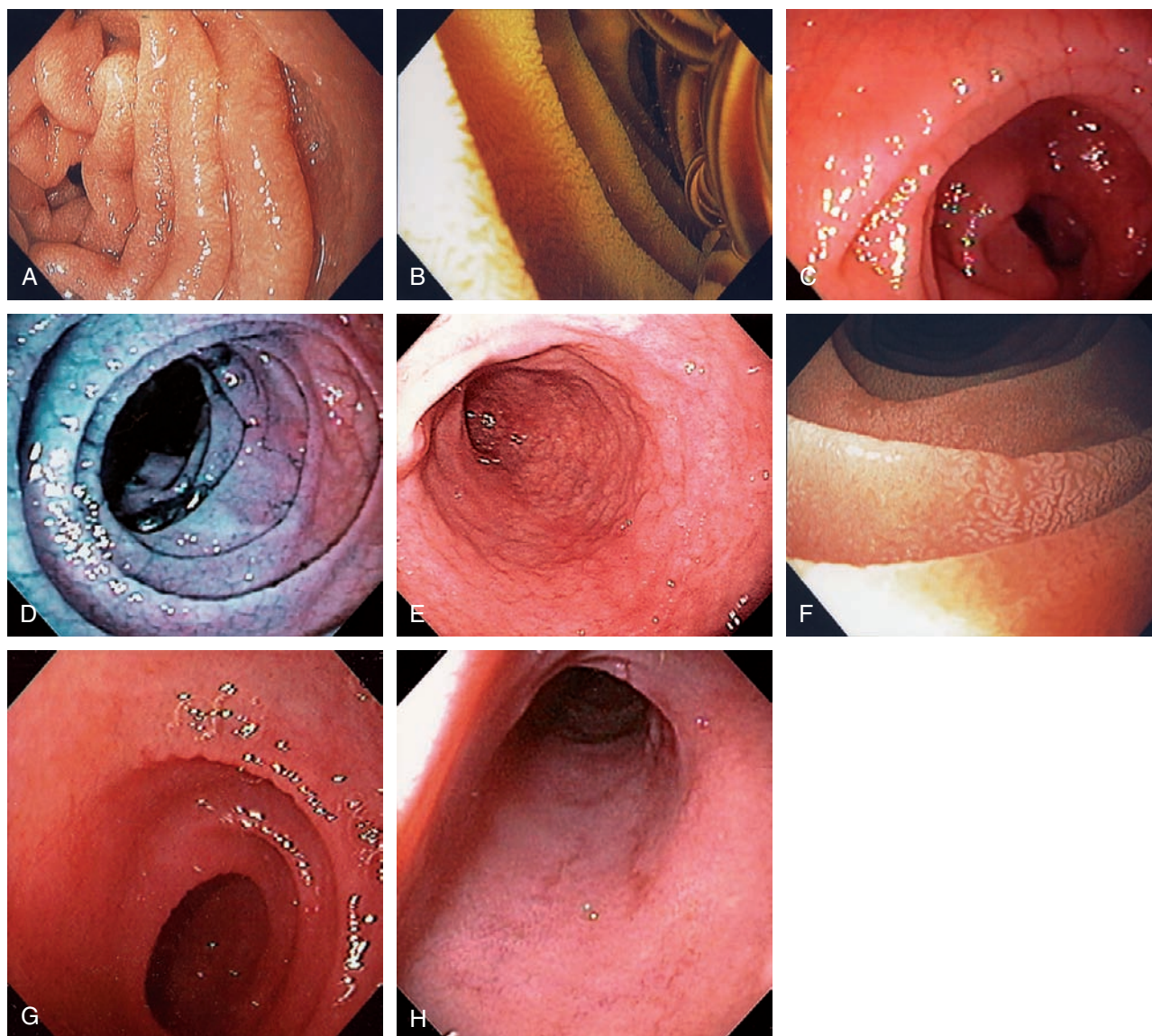


FIGURE 4.108 CELIAC SPRUE

A, The duodenal folds appear slightly thickened. **B**, When viewed underwater, minimal villi are appreciated. **C**, Fissuring and mild nodularity of the valvulae conniventes. **D**, The mucosal changes are highlighted with methylene blue. **E**, Nodularity of the mucosa with absent folds. **F**, Subtle loss of the villi with some areas of epithelial loss.

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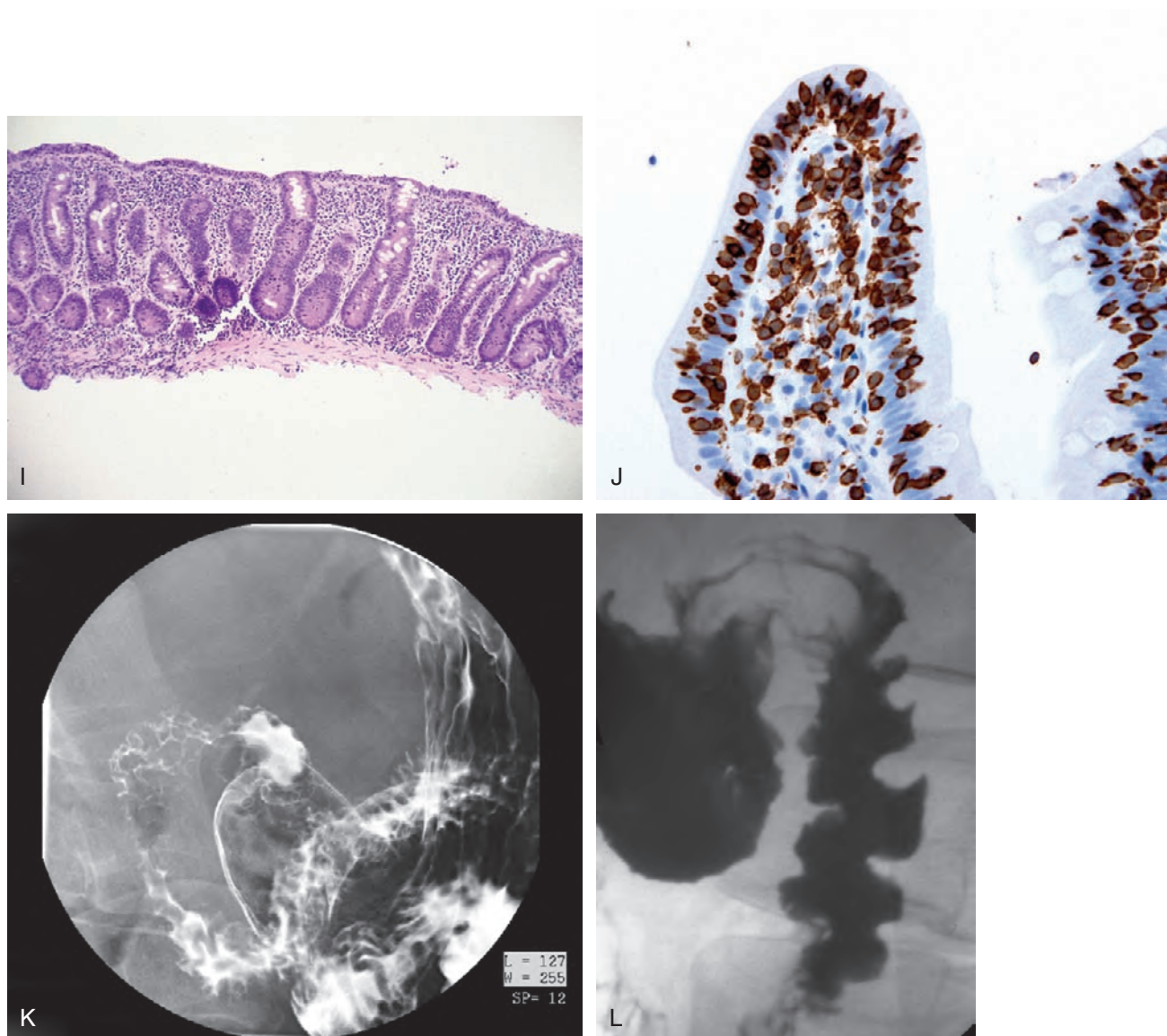


FIGURE 4.108 CELIAC SPRUE

G, Smooth mucosa with some ridging to the folds. **H**, Completely flat smooth mucosa. **I**, Villous atrophy with chronic inflammation in the lamina propria. **J**, Numerous CD3 positively staining cells in the submucosa. **K**, Marked nodularity of the duodenum can be seen on barium study. **L**, Dilated duodenum with thickened folds.

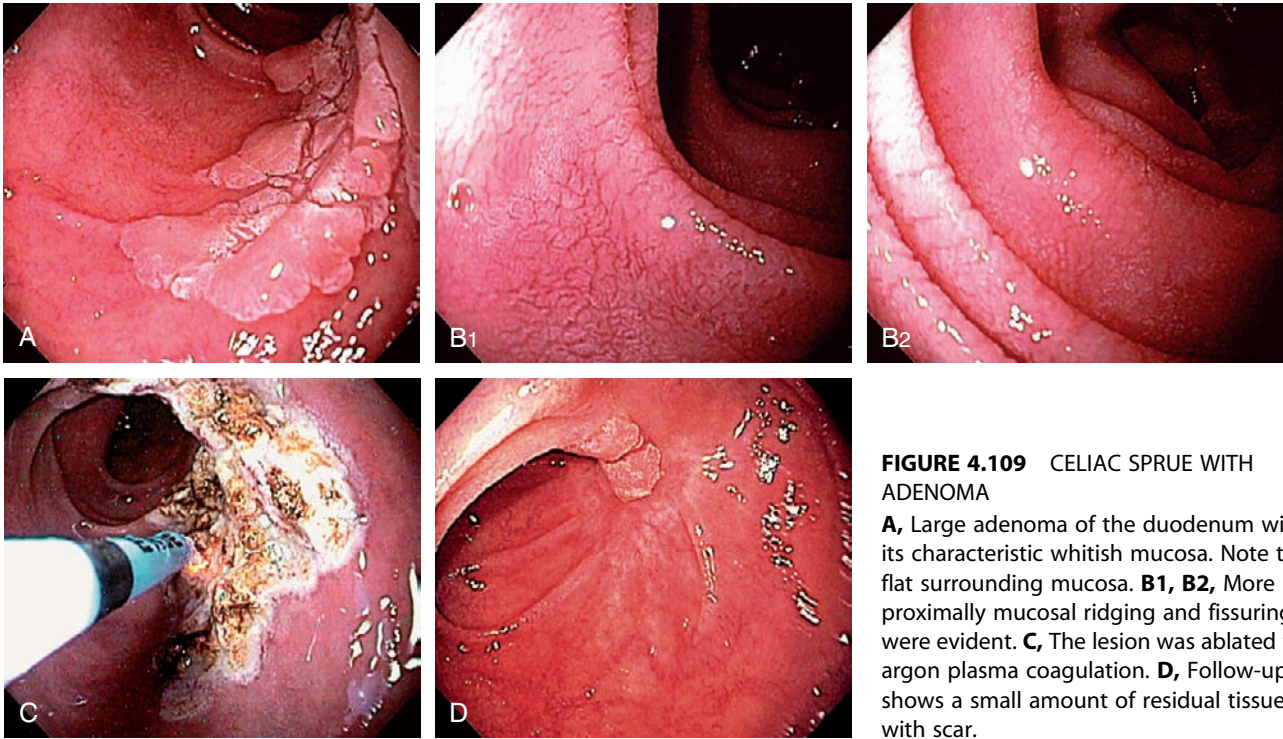


FIGURE 4.109 CELIAC SPRUE WITH ADENOMA

A, Large adenoma of the duodenum with its characteristic whitish mucosa. Note the flat surrounding mucosa. **B1, B2**, More proximally mucosal ridging and fissuring were evident. **C**, The lesion was ablated with argon plasma coagulation. **D**, Follow-up shows a small amount of residual tissue with scar.

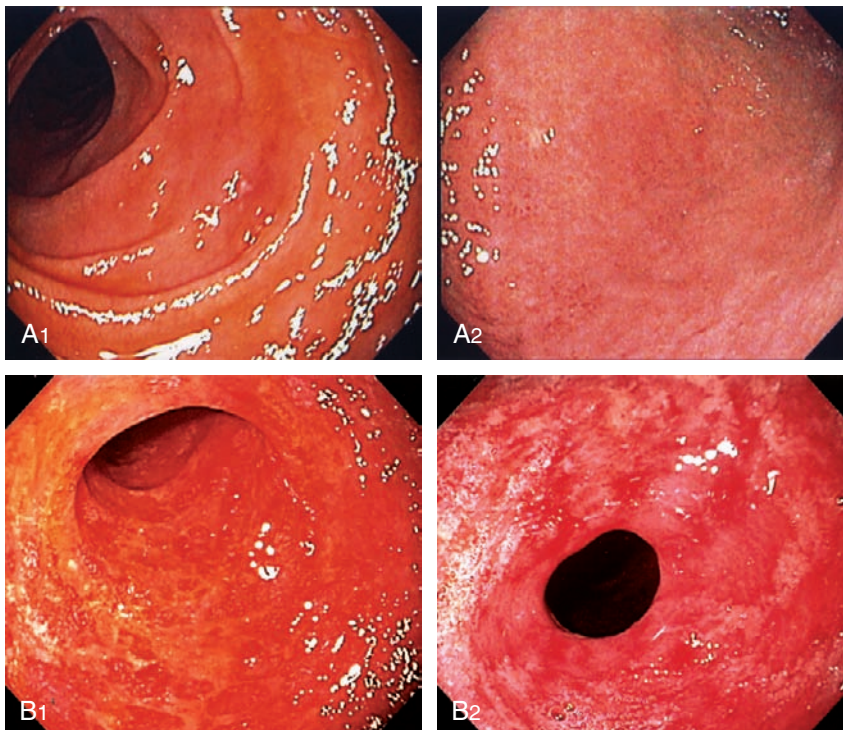


FIGURE 4.110 GRAFT-VERSUS-HOST DISEASE

A1, Patchy erythema of the second duodenum. **A2**, Mild changes were also present in the gastric antrum. **B1**, Diffuse hemorrhage and complete mucosal loss. Similar changes were present in the stomach (**B2**).

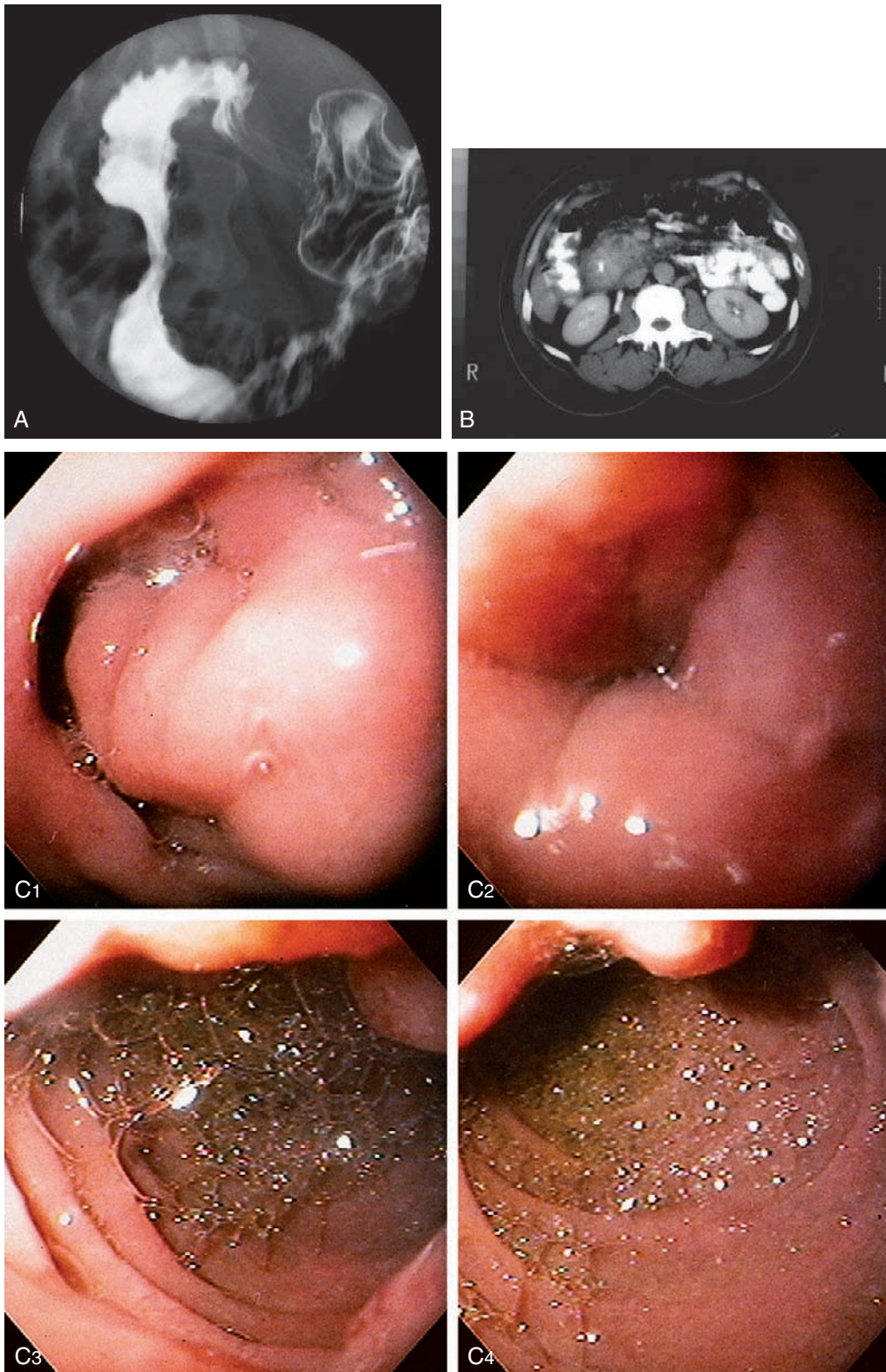


FIGURE 4.111 PANCREATITIS

A, Narrowing of the second duodenum. **B**, The wall of the second duodenum is markedly thickened. **C**, At the superior duodenal angle, the lumen is collapsed by edematous mucosa. There is no overlying mass lesion or ulceration (**C1**). The lumen is significantly narrowed at the superior duodenal angle (**C2**). In the second duodenum, bile is present; the masslike lesion can be seen anteriorly (**C3**). In the mid-second duodenum, the masslike lesion can be seen on the medial superior wall (**C4**).

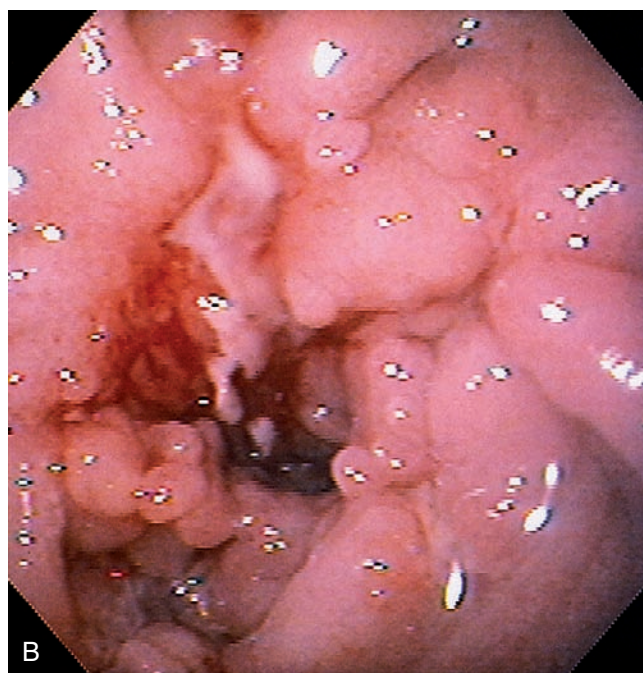
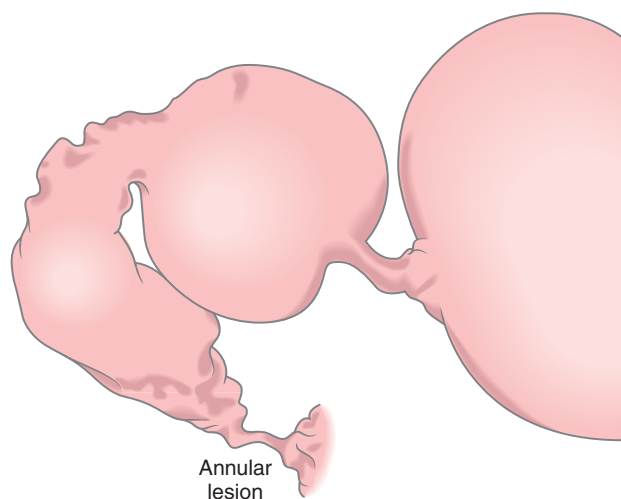
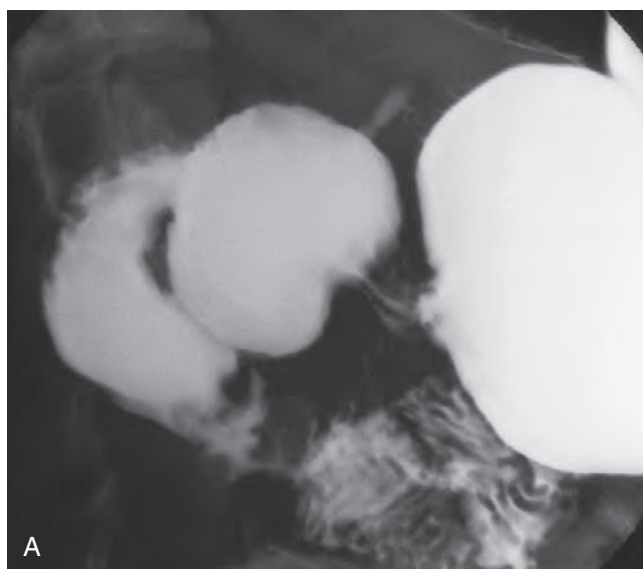


FIGURE 4.112 CHRONIC PANCREATITIS AND DUODENAL OBSTRUCTION

A, Irregular constricting lesion of the distal second duodenum compatible with a neoplasm. Barium is refluxing into the common bile duct. **B**, A circumferential ulcerated area at the junction of the first and second duodenum, suggestive of carcinoma. Surgical exploration revealed only chronic pancreatitis.



Differential Diagnosis

Chronic Pancreatitis and Duodenal Obstruction (Figure 4.112)

- Primary duodenal adenocarcinoma
- Pancreatic carcinoma
- Other extrinsic inflammatory or neoplastic process

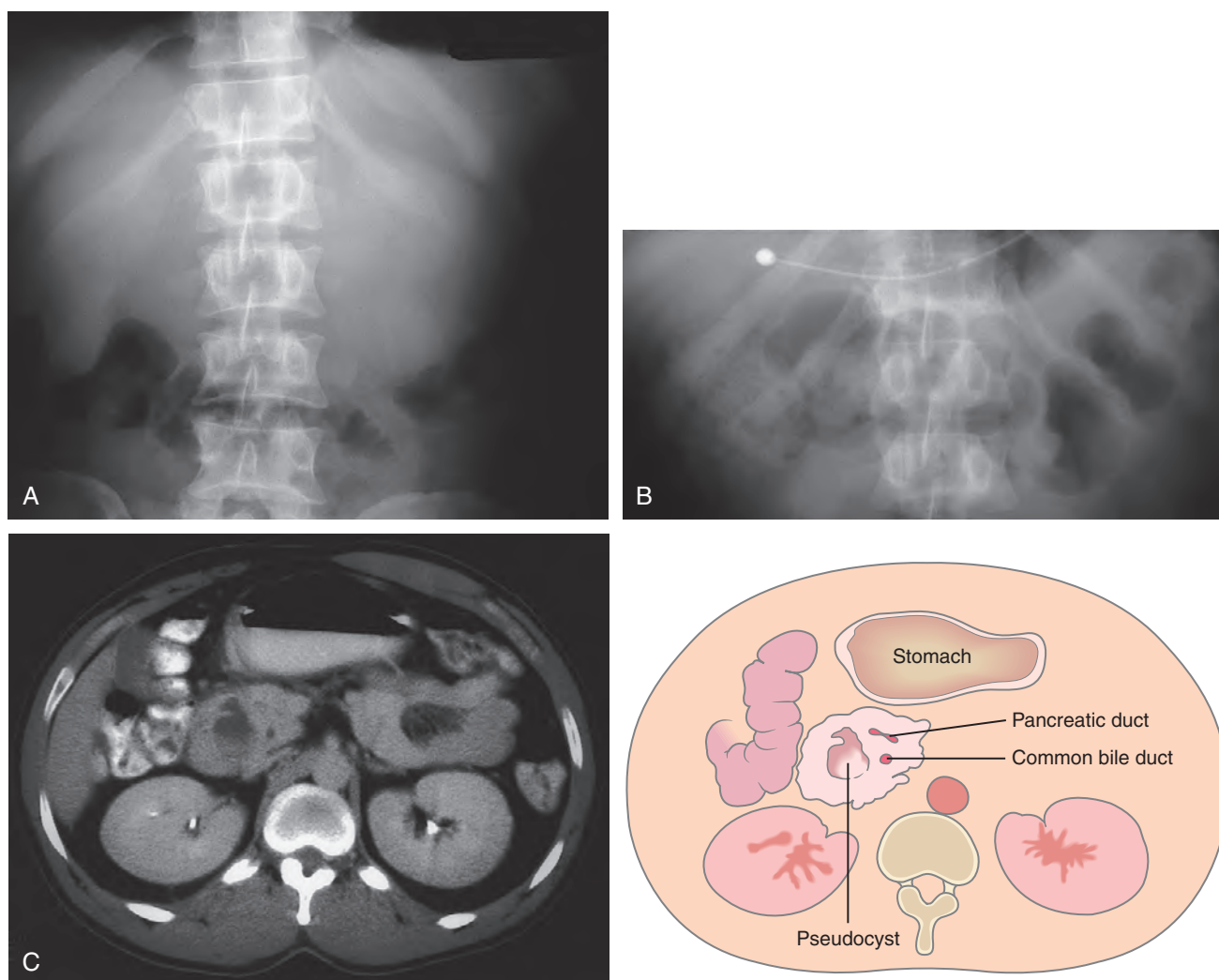


FIGURE 4.113 PANCREATIC PSEUDOCYST CAUSING DUODENAL OBSTRUCTION

A, Markedly dilated stomach displacing the transverse colon. **B**, After nasogastric suction, the transverse colon returns to its normal position. **C**, The stomach is dilated, with no contrast material seen in the second duodenum. The pancreatic head is enlarged, and a pseudocyst is present.

Continued



FIGURE 4.113 PANCREATIC PSEUDOCYST CAUSING DUODENAL OBSTRUCTION

D, The stomach is filled with fluid (**D1**); the duodenal bulb is inflamed, and a circumferential narrowing is present at the junction of the first and second duodenum (**D2-D4**). **E**, The endoscope is advanced through the area of narrowing (**E1-E3**), which represents edema finally entering the second duodenum (**E4**).

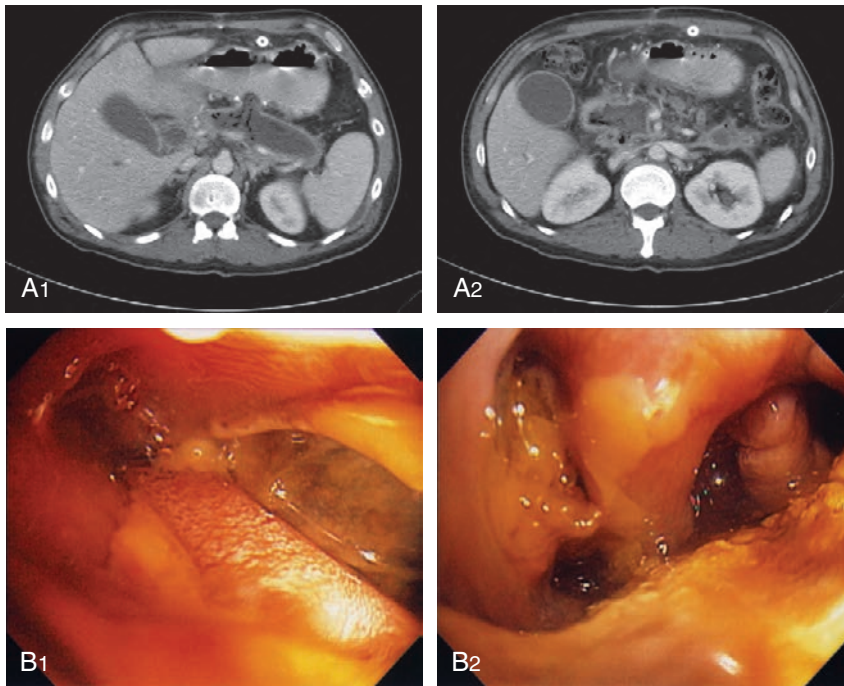


FIGURE 4.114 SPONTANEOUS PANCREATODUODENAL FISTULA CAUSED BY NECROTIZING PANCREATITIS

A1, A2, CT shows complete pancreatic necrosis with air in the pancreatic bed. **B1,** Ulceration and distortion in the proximal second duodenum. **B2,** On entering the necrotic area, an opening is seen into the cavity of pancreatic necrosis.

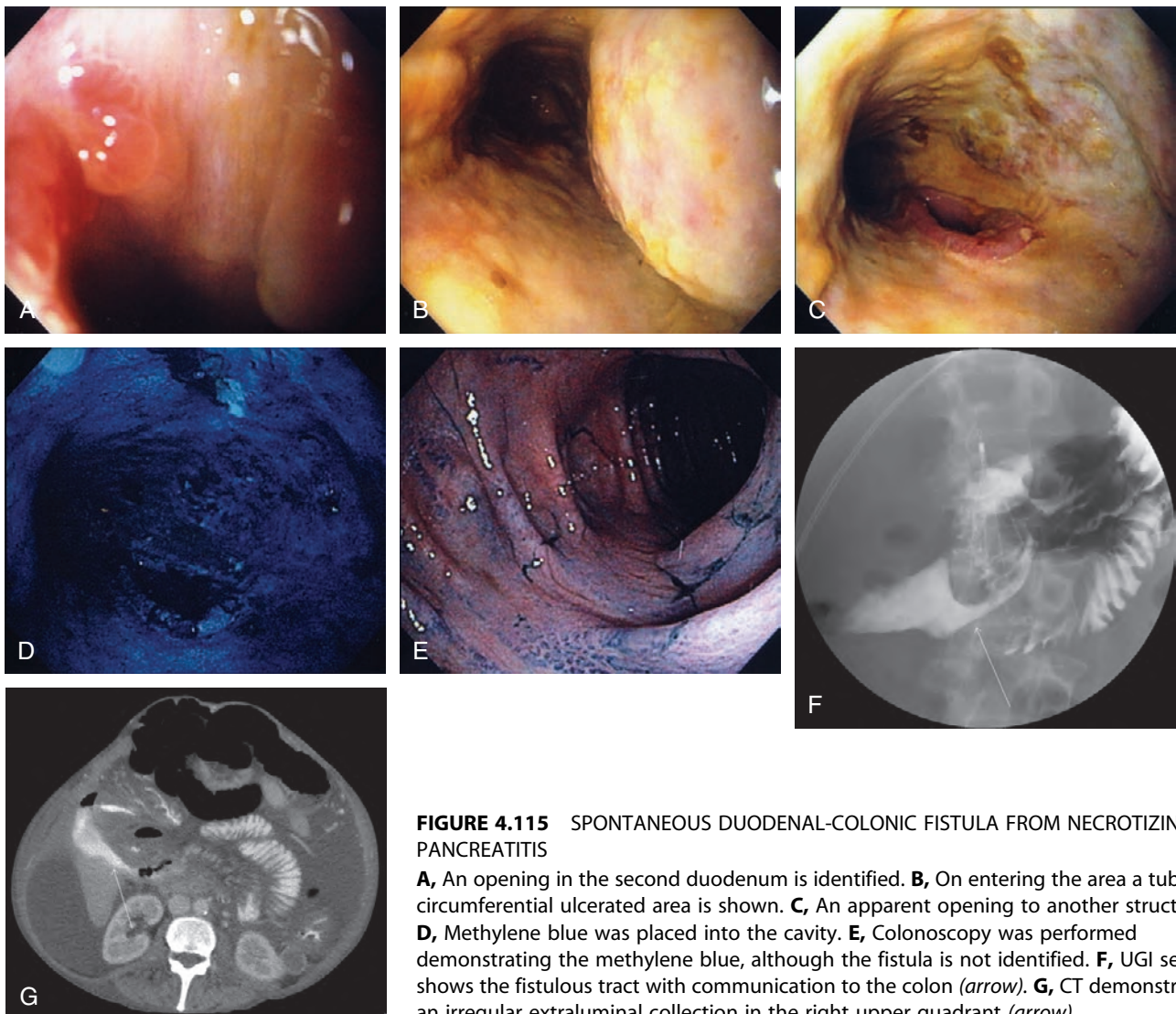


FIGURE 4.115 SPONTANEOUS DUODENAL-COLONIC FISTULA FROM NECROTIZING PANCREATITIS

A, An opening in the second duodenum is identified. **B,** On entering the area a tubular circumferential ulcerated area is shown. **C,** An apparent opening to another structure. **D,** Methylene blue was placed into the cavity. **E,** Colonoscopy was performed demonstrating the methylene blue, although the fistula is not identified. **F,** UGI series shows the fistulous tract with communication to the colon (*arrow*). **G,** CT demonstrates an irregular extraluminal collection in the right upper quadrant (*arrow*).

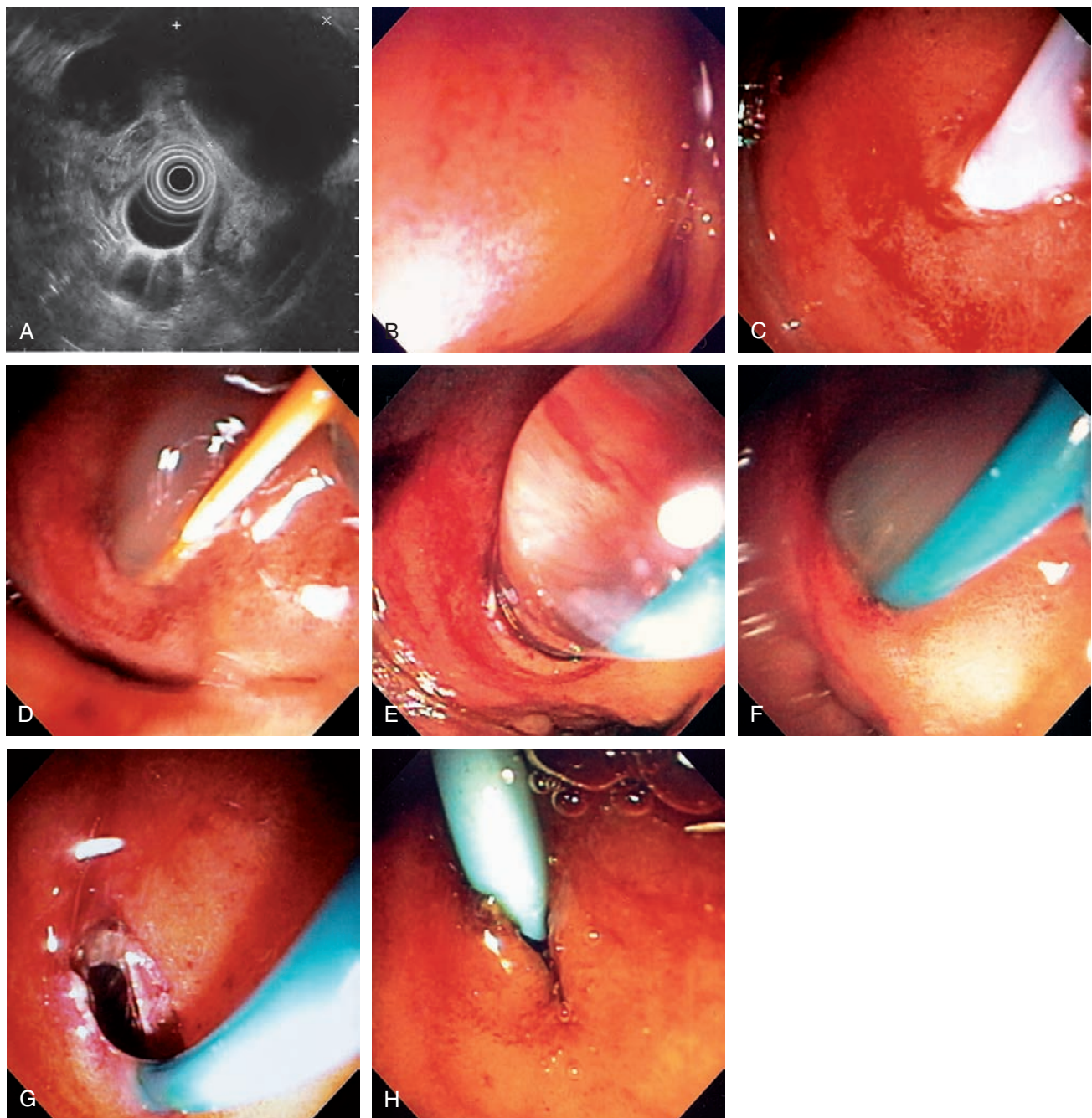


FIGURE 4.116 ENDOSCOPIC CYST DUODENOSTOMY

A, The cyst is large and free of internal echoes. No overlying vascular strictures are present. **B**, Large bulge is visible in the proximal duodenum. **C**, A needle is placed into the lesion. **D**, A guidewire exchange is performed with a large amount of cloudy material passing spontaneously through the puncture site. **E**, A balloon is inflated across the duodenal wall. **F, G**, Once deflated, a large defect is created and fluid again rapidly drains. **H**, A large double pigtail stent is placed into the cyst.

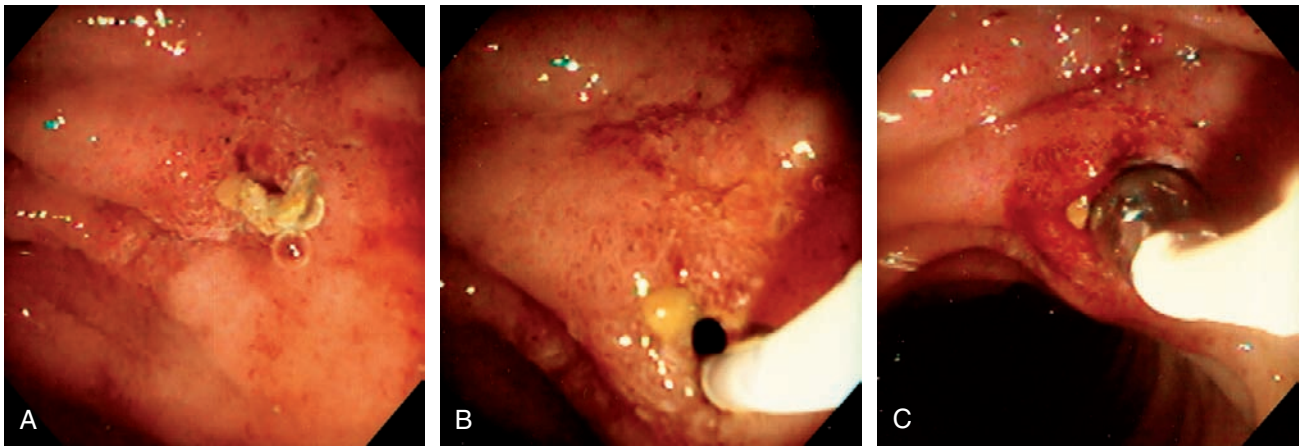


FIGURE 4.117 SPONTANEOUS FISTULA FROM PSEUDOCYST IN SECOND DUODENUM

A, Subtle mucosal defect in the second duodenum with overlying debris and subepithelial hemorrhage. **B**, The area was probed and a fistula to the cyst cavity identified. **C**, The fistulous tract is dilated.

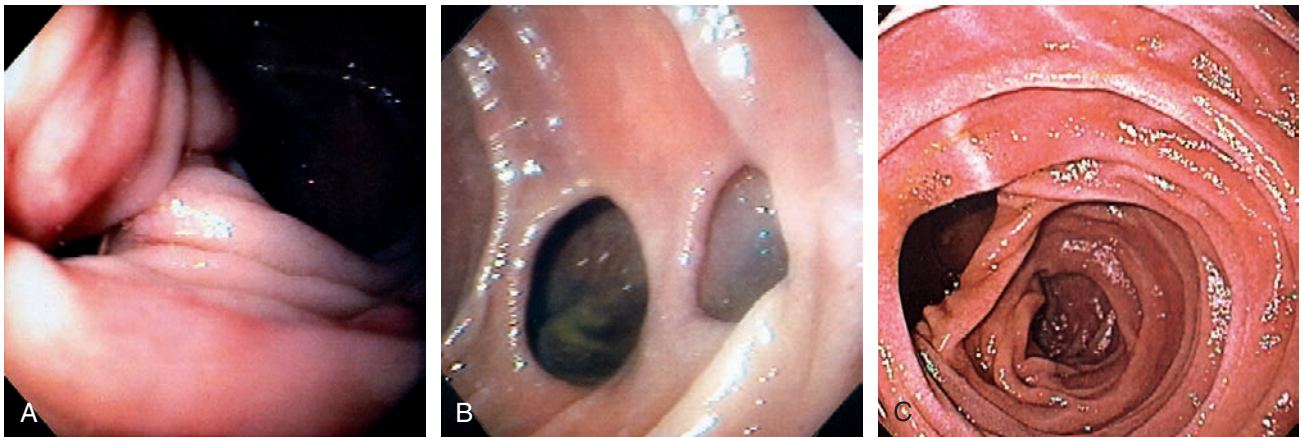


FIGURE 4.118 DUODENAL DIVERTICULUM

A, Large diverticulum on the medial wall of the mid-second duodenum. Diverticula in the second duodenum are most commonly seen around the papilla. **B**, Multiple diverticula on the lateral wall of the second duodenum. **C**, Large diverticulum on the medial wall of second duodenum. This is likely the location of the major papilla.

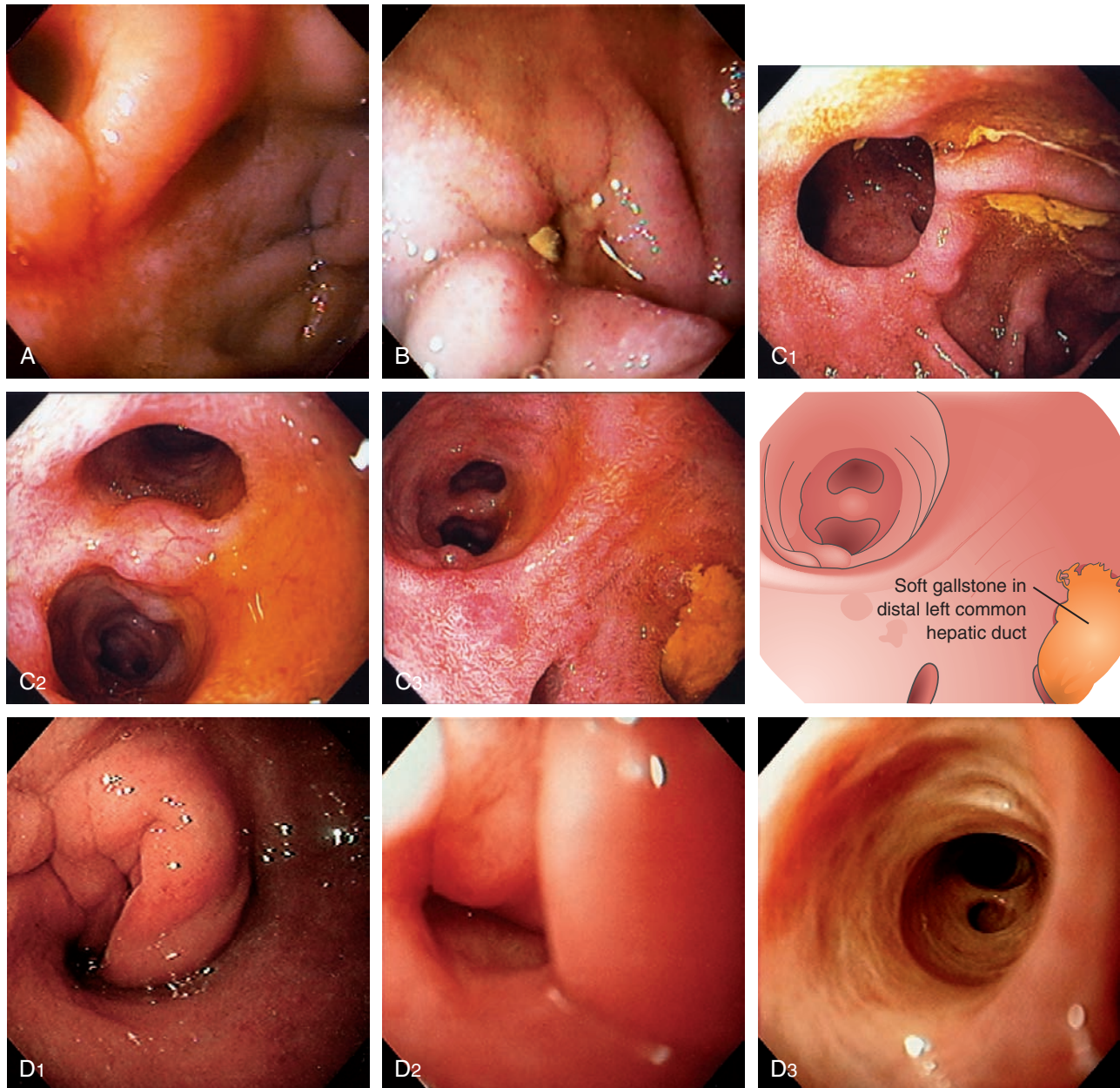


FIGURE 4.119 CHOLEDOCHODUODENOSTOMY

A, An opening can be seen in the anterior duodenal bulb, representing anastomosis of the distal common bile duct to the duodenum. Another small defect represents past erosion of a common bile duct stone into the duodenal wall. Anterior–posterior relationships in the duodenal bulb are important when defining ulcerative disease in the setting of gastrointestinal hemorrhage. The duodenum may be involved secondarily in the setting of disease of surrounding structures, most notably pancreatic disease with pancreatitis. **B**, Small defect anteriorly at the junction of first and second duodenum. A small gallstone is resting over the opening. **C1**, Opening in the proximal second duodenum represents the cholechooduodenal anastomosis. **C2**, On entering the anastomosis, the biliary tree and ducts are identified. **C3**, The common bile duct can be entered visualizing the hilum with junction of right and left common hepatic ducts. Note the presence of a soft gallstone in the distal left common hepatic duct. **D1**, Circumferential folds in the proximal duodenum. **D2**, The folds were gently entered, revealing an opening. **D3**, The endoscope was passed into the biliary system with radicals identified.

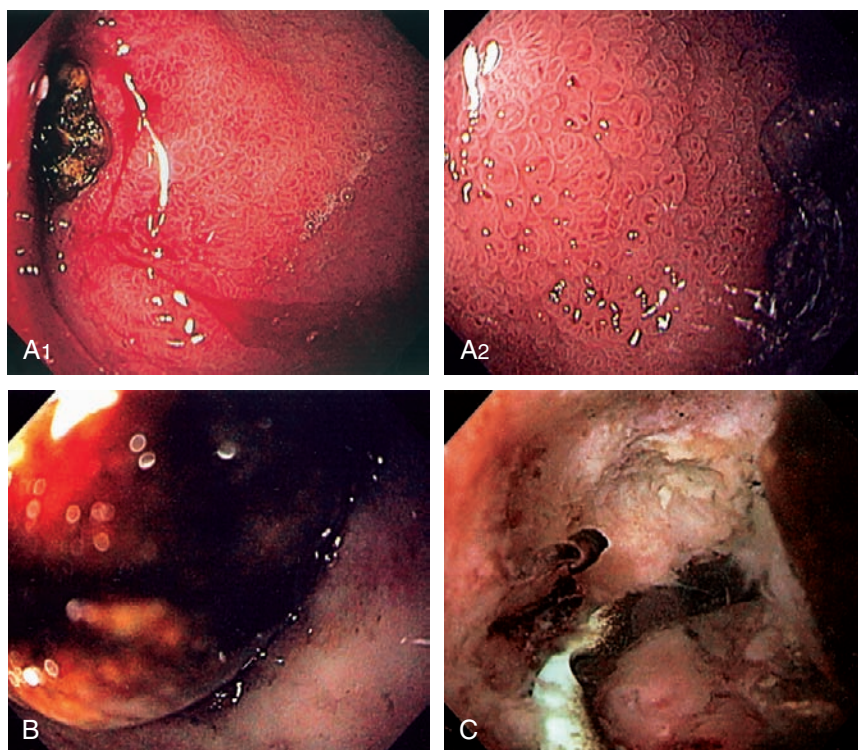


FIGURE 4.120 CHOLECYSTODUODENAL FISTULA

A1, Dark ulcer in the duodenal bulb with diffuse bulbar erythema. **A2**, Note the striking edema with accentuation of the duodenal mucosal pattern. **B**, Large gallstone at the entrance to the defect. **C**, Once you enter the defect, the gallbladder can be seen with a pigtail cholecystostomy tube.

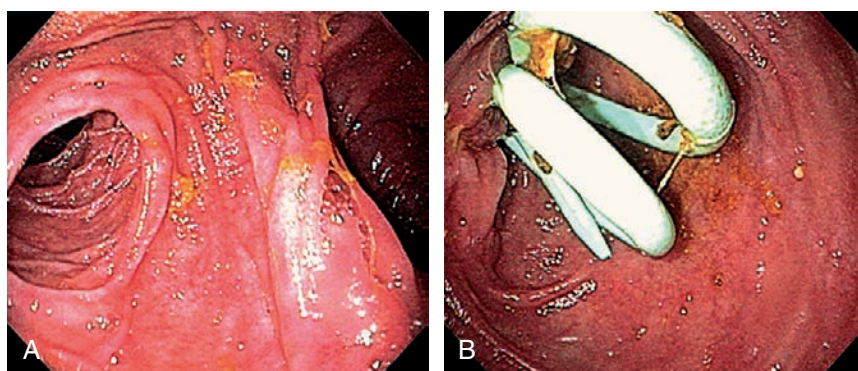


FIGURE 4.121 PYLORUS-PRESERVING WHIPPLE

A, With the endoscope in the pylorus, two limbs are identified. **B**, The superior limb is entered and bile duct stents are found.

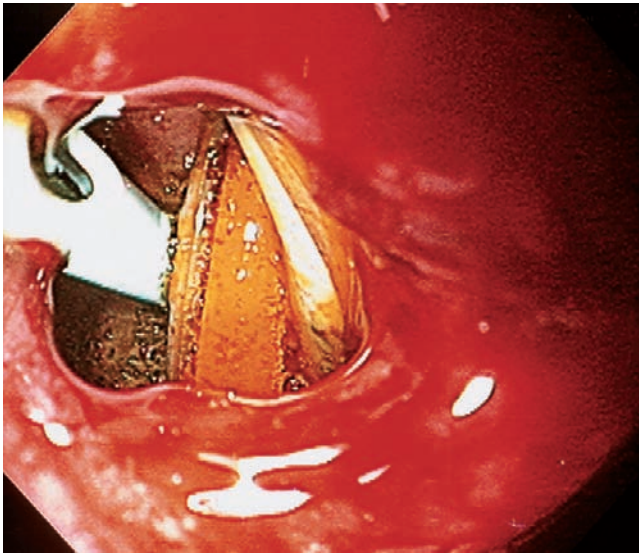


FIGURE 4.122 POSTSURGICAL DUODENAL PERFORATION

Large opening in the anterior wall of the duodenal bulb. A biliary tube is exiting the large defect. Other drains are in the opening. This patient recently had complicated biliary tract surgery.

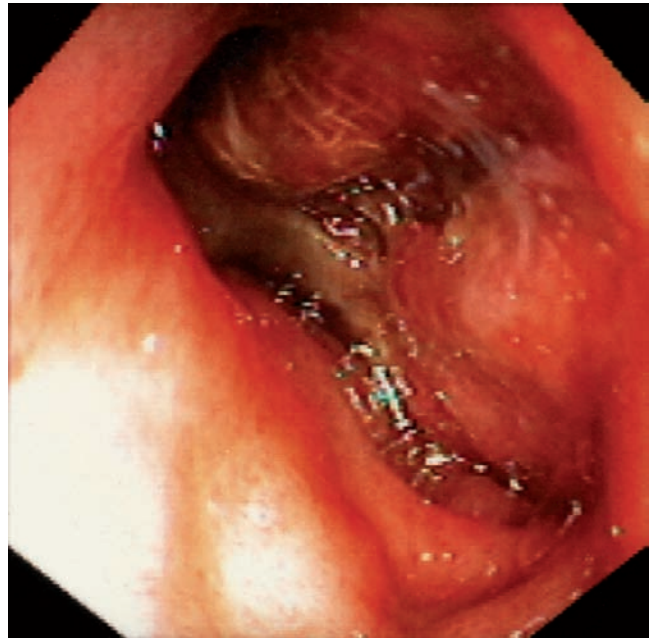


FIGURE 4.123 POSTSURGICAL DEFECT

Large defect in the duodenal wall with the presence of gauze. This patient recently had complicated abdominal surgery with packing of infected tissue.

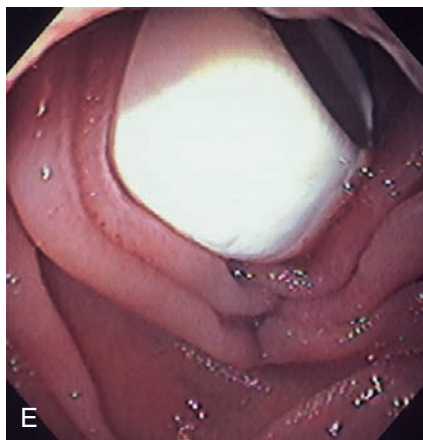
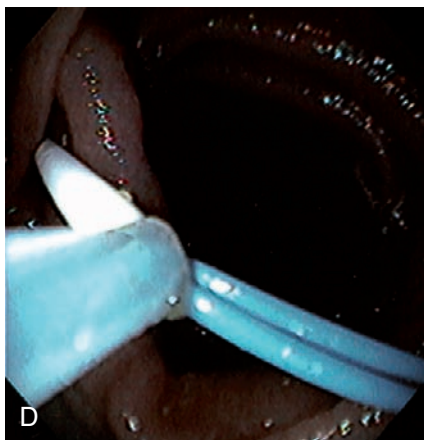
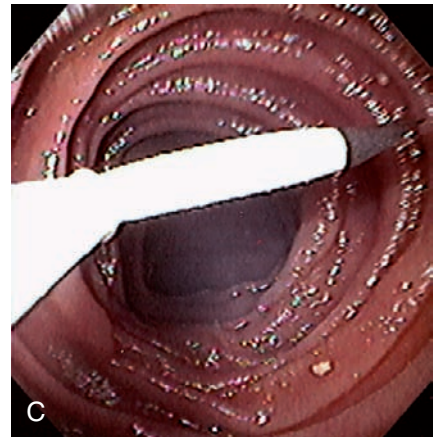
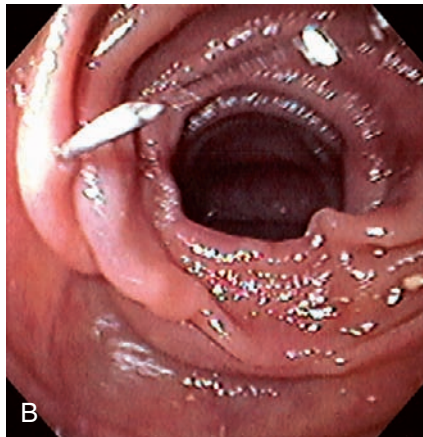
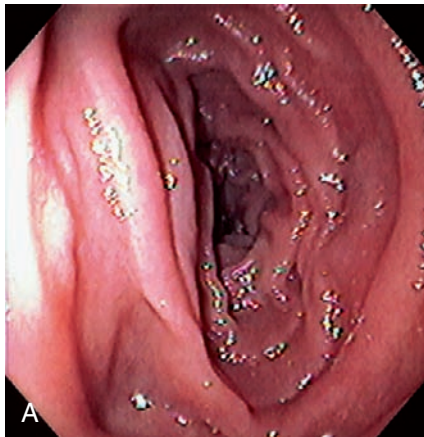


FIGURE 4.124 DIRECT PERCUTANEOUS ENDOSCOPIC JEJUNOSTOMY

A, A suitable site is identified in the jejunum by finger compression. **B**, A needle is placed into the jejunal lumen and then grasped with a snare (**C**). **D**, After removal of the needle, a wire is advanced and grasped with the snare. Then the percutaneous endoscopic gastrostomy (PEG) tube is placed over the wire, with the PEG bumper now secure in the jejunal wall (**E**).

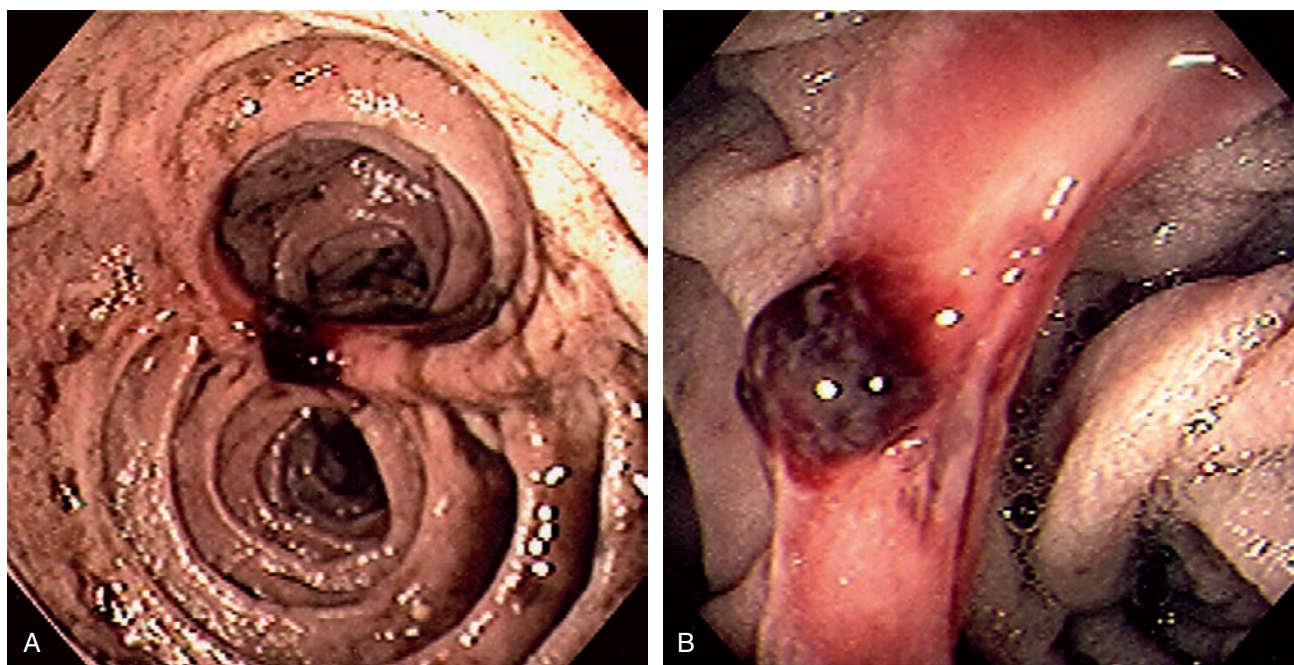


FIGURE 4.125 BLEEDING ULCER AT ROUX-EN-Y ANASTOMOSIS

A, Roux-en-Y anastomosis with fresh adherent blood clot. **B**, Ulceration at the anastomosis with clot.

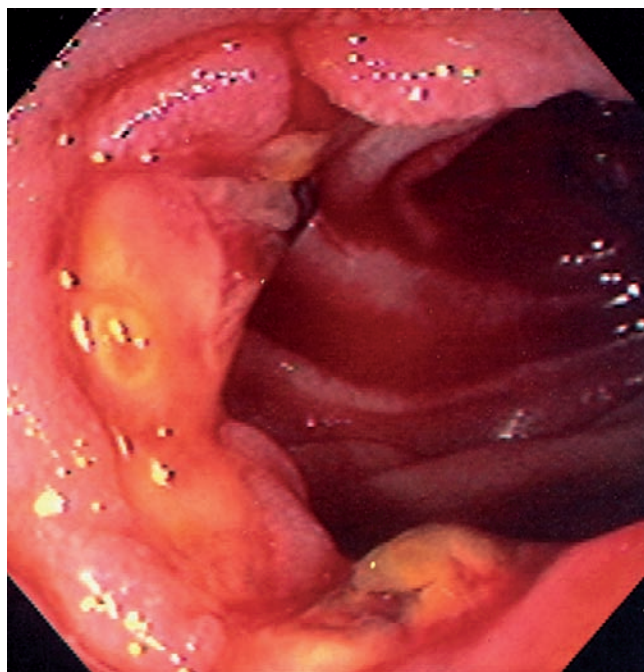


FIGURE 4.126 CHOLEDOCHOJEJUNOSTOMY

Ulceration at the site of a choledochojejunostomy in a patient recently status post-liver transplantation.

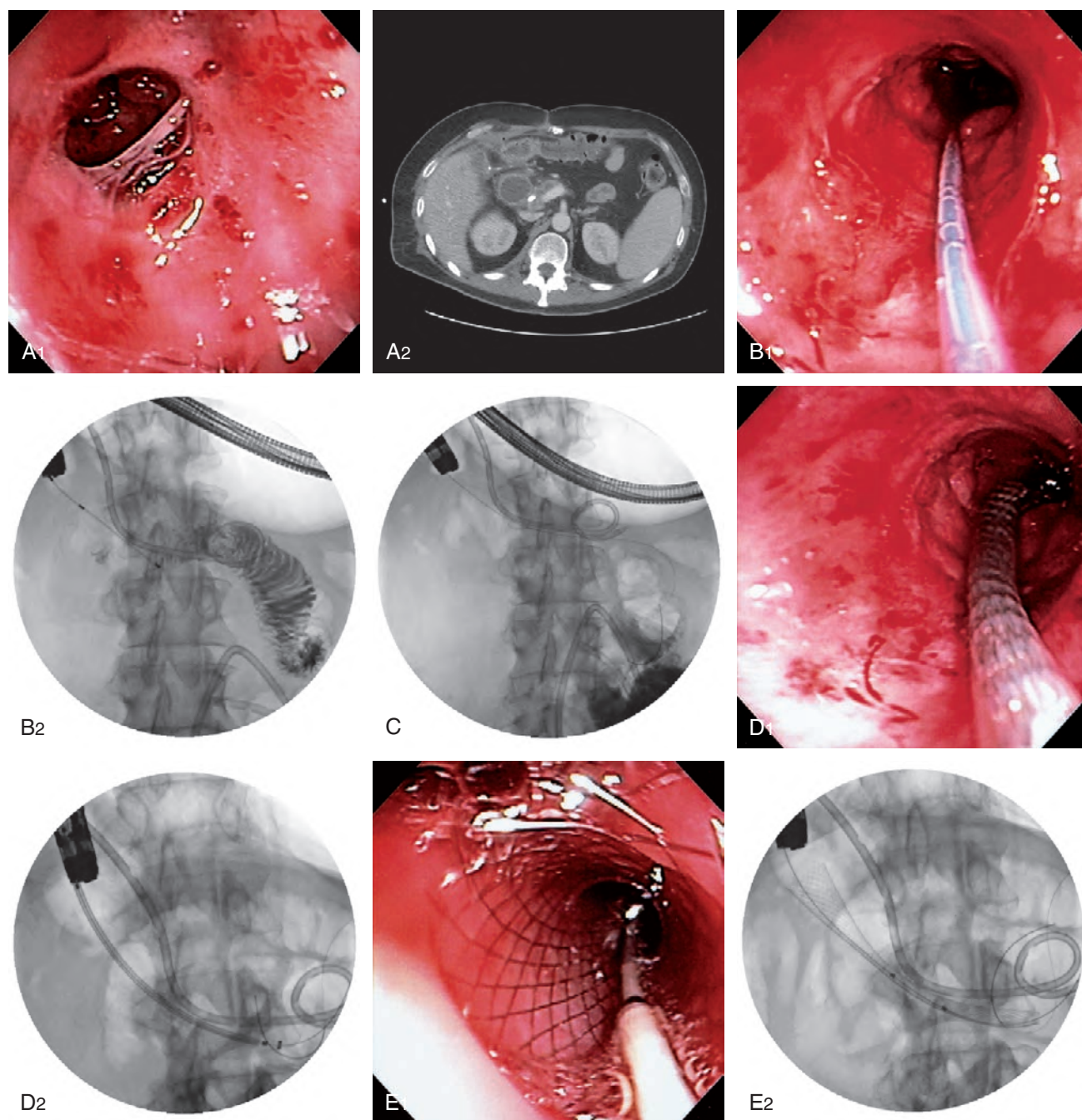


FIGURE 4.127 ENTERAL STENT PLACEMENT FOR MALIGNANT OBSTRUCTION

A1, Duodenal narrowing caused by tumor and prior radiation therapy. **A2**, The duodenum is markedly dilated. A biliary tube is present. **B1**, Under fluoroscopic guidance, a catheter is passed through the lesion and injection confirms adequate position in the duodenum. **B2**, The patient has a percutaneous biliary pigtail catheter in distal duodenum. **C**, A guidewire is passed to the distal duodenum. **D1**, **D2**, The metallic prosthesis is advanced over the wire. **E1**, **E2**, The stent has been deployed.

Continued



FIGURE 4.127 ENTERAL STENT PLACEMENT FOR MALIGNANT OBSTRUCTION

F, Barium study shows flow through the prosthesis.

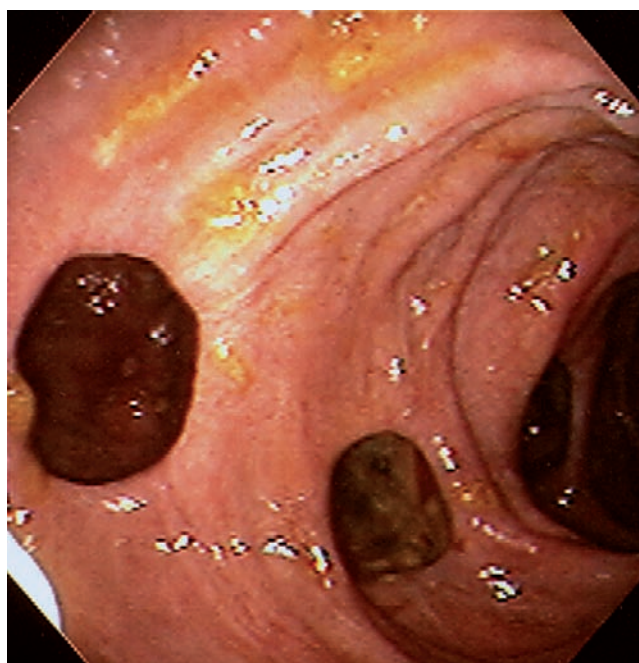


FIGURE 4.128 JEJUNAL DIVERTICULA

Multiple diverticula in the proximal jejunum.

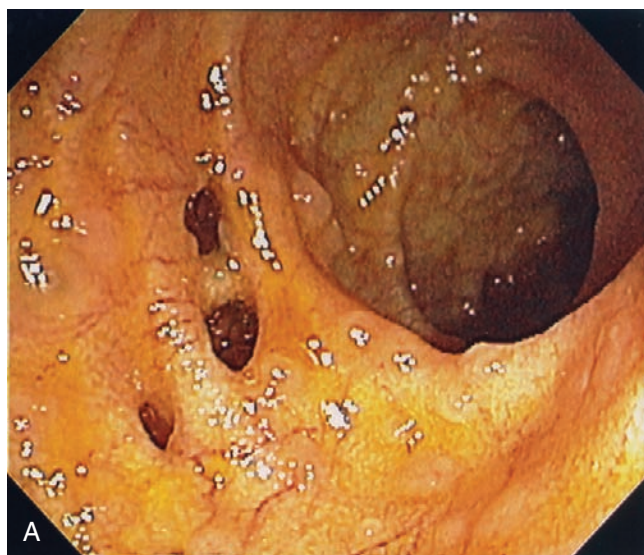


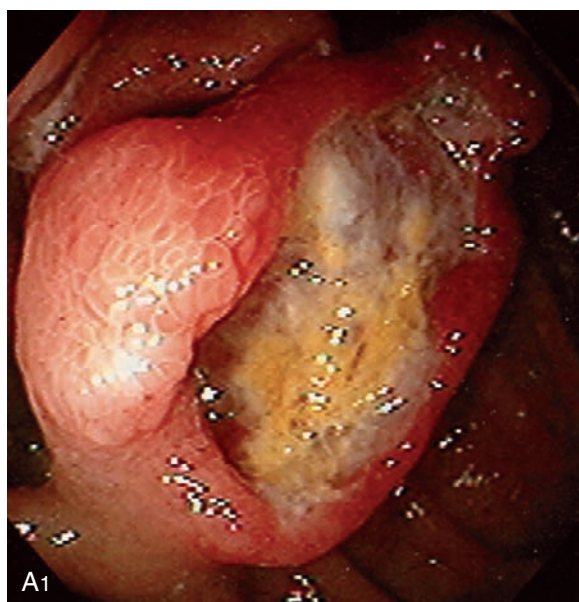
FIGURE 4.129 MULTIPLE ILEAL DIVERTICULA

A, Multiple diverticula in the distal ileum identified at colonoscopy. Note the presence of lymphoid follicles (**B**).

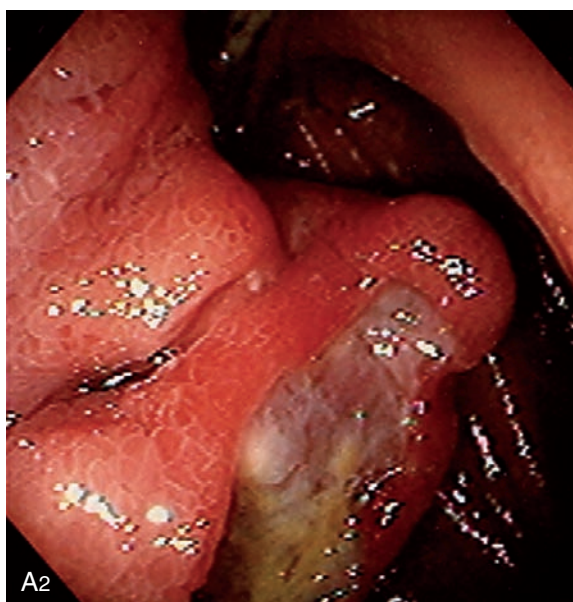




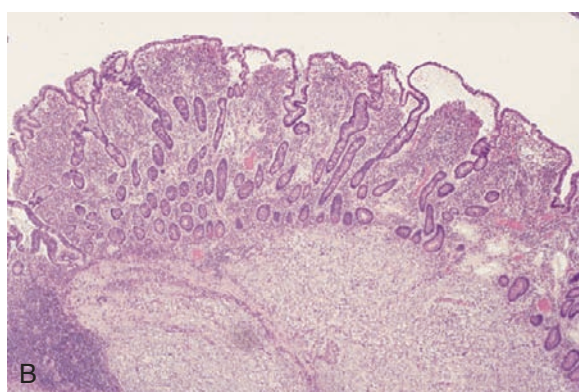
FIGURE 4.130 JEJUNAL GASTROINTESTINAL STROMAL TUMOR
Submucosal tumor with central ulceration.



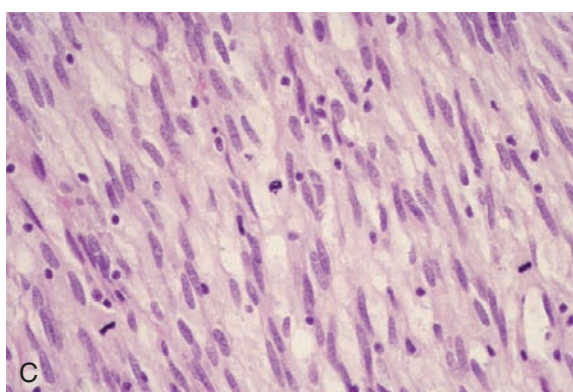
A1



A2



B



C

FIGURE 4.131 JEJUNAL GASTROINTESTINAL STROMAL TUMOR

A1, A2, Ulcerated lesion in the proximal jejunum with surrounding thickened folds. **B**, Low-power view shows effacement of the mucosa with infiltrating tumor. **C**, High-power view shows numerous mitoses, one feature of malignancy in gastrointestinal stromal tumors.



Differential Diagnosis

Jejunal Gastrointestinal Stromal Tumor (Figure 4.131)

Metastatic lesion

Primary small intestinal adenocarcinoma

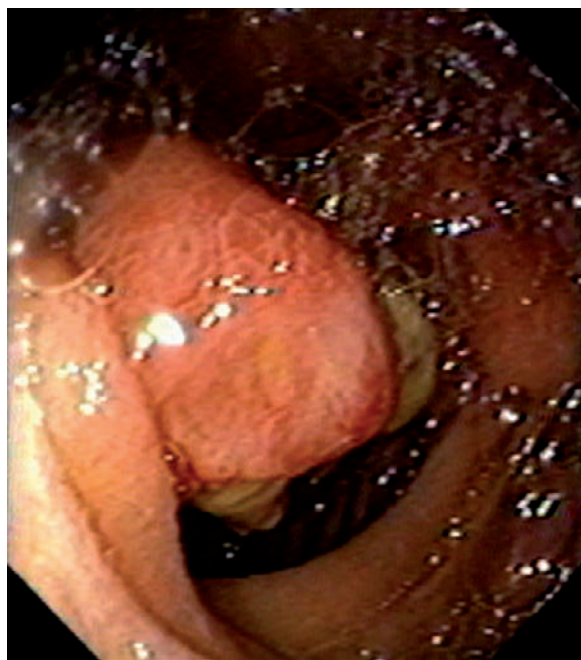
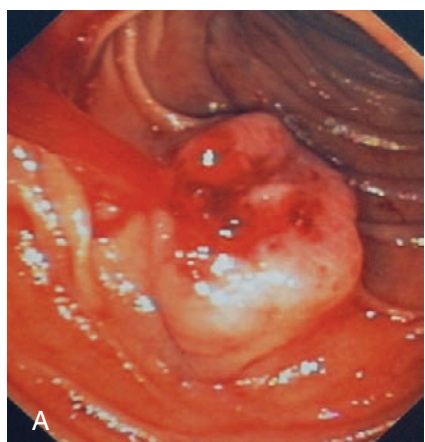
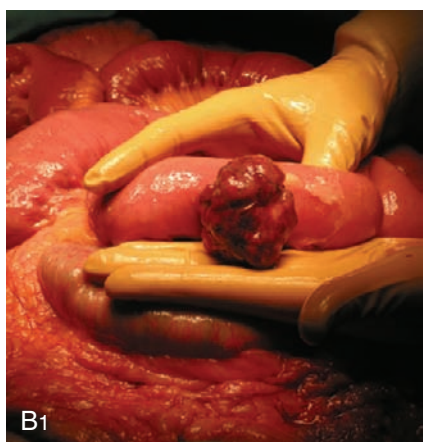


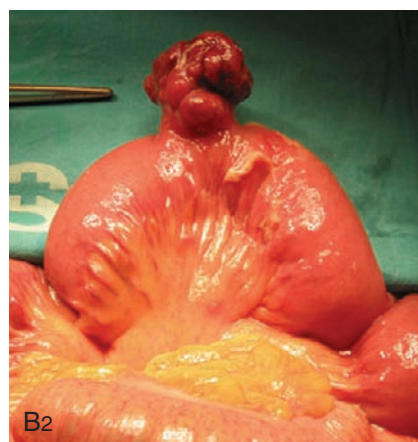
FIGURE 4.132 JEJUNAL GASTROINTESTINAL STROMAL TUMOR
Mass lesion with central ulceration in the proximal jejunum.



A



B1



B2

FIGURE 4.133 JEJUNAL GASTROINTESTINAL STROMAL TUMOR

A, Submucosal mass lesion with fresh bleeding. **B1, B2**, View at the time of surgery demonstrates the extraluminal component.

Continued

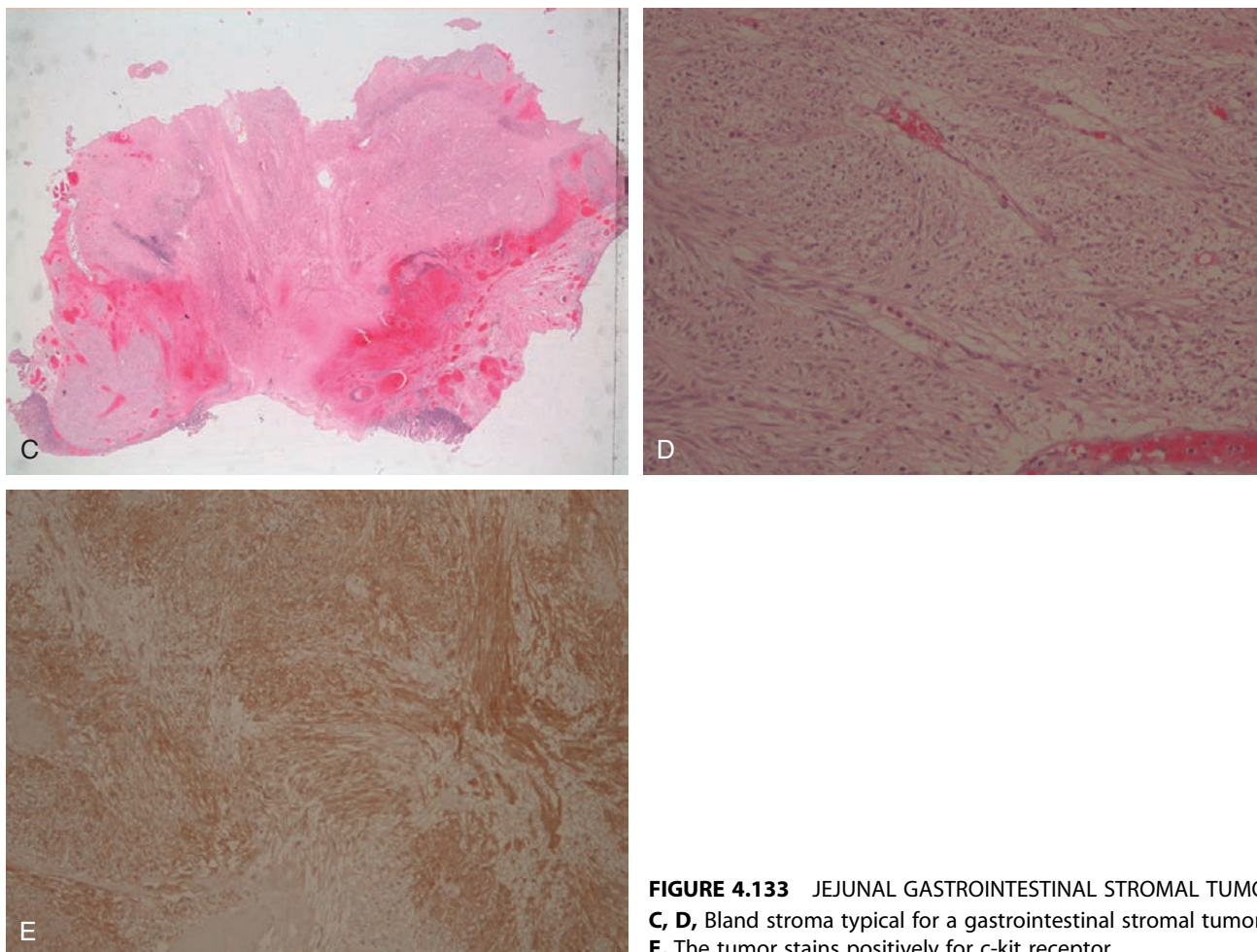


FIGURE 4.133 JEJUNAL GASTROINTESTINAL STROMAL TUMOR
C, D, Bland stroma typical for a gastrointestinal stromal tumor.
E, The tumor stains positively for c-kit receptor.

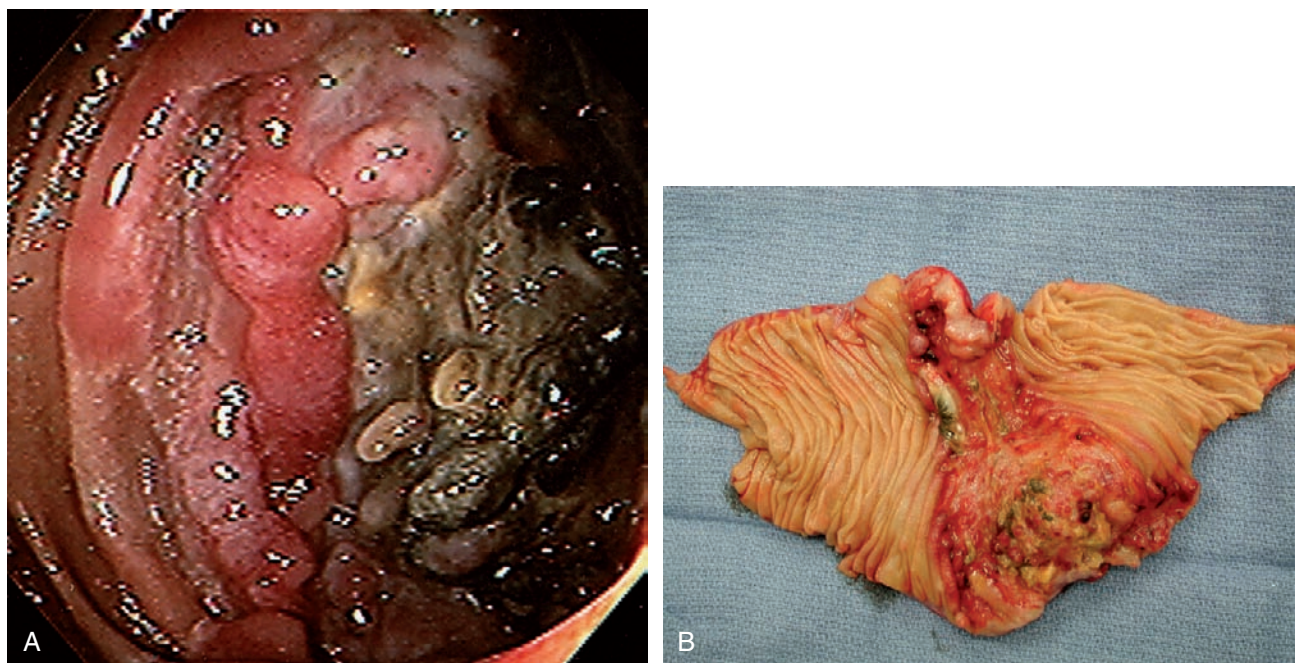


FIGURE 4.134 JEJUNAL LYMPHOMA

A, Ulcerated lesion with central necrosis. **B,** Circumferential nature of the lesion is apparent.

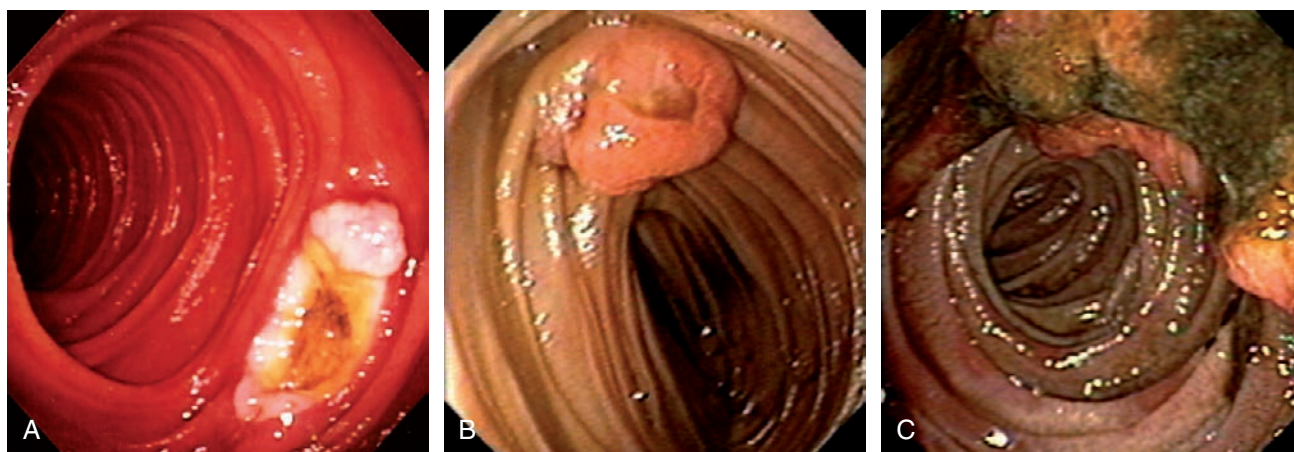


FIGURE 4.135 JEJUNAL METASTATIC LESIONS

A, Jejunal metastasis. Squamous cell metastasis from a head and neck cancer. **B**, Metastatic melanoma. Fleshy mass lesion in the jejunum. **C**, Metastatic lung cancer. Necrotic circumferential mass lesion.

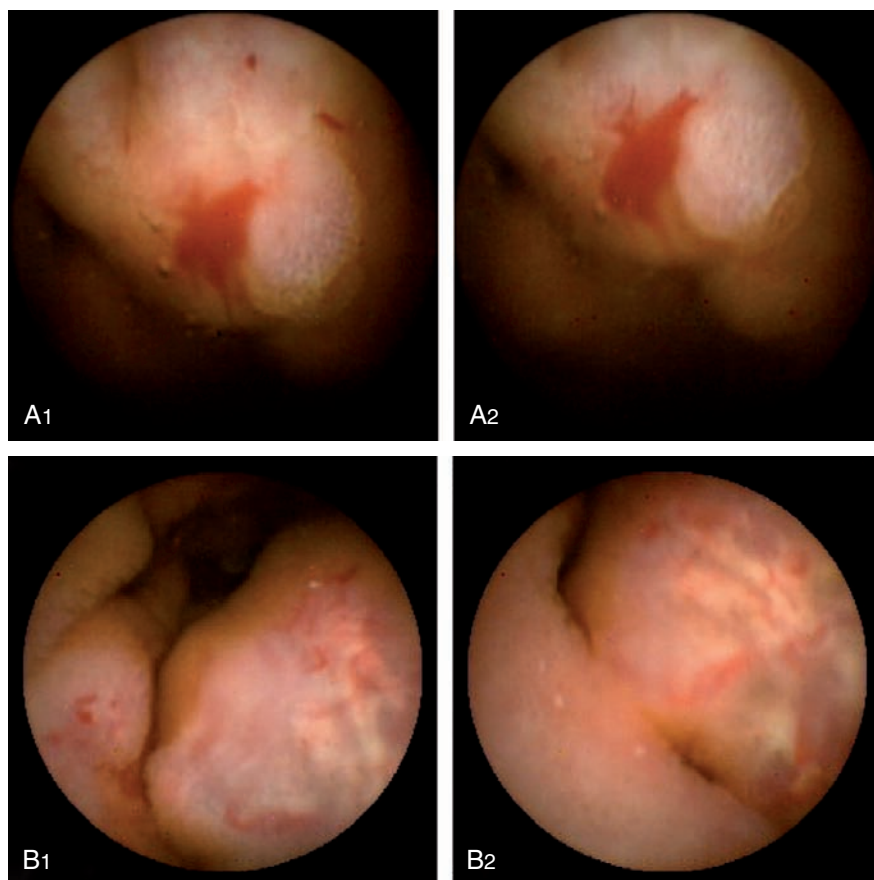


FIGURE 4.136 CAPSULE ENDOSCOPY

A, Large ectasia. **B**, Polypoid small-bowel neoplasm.

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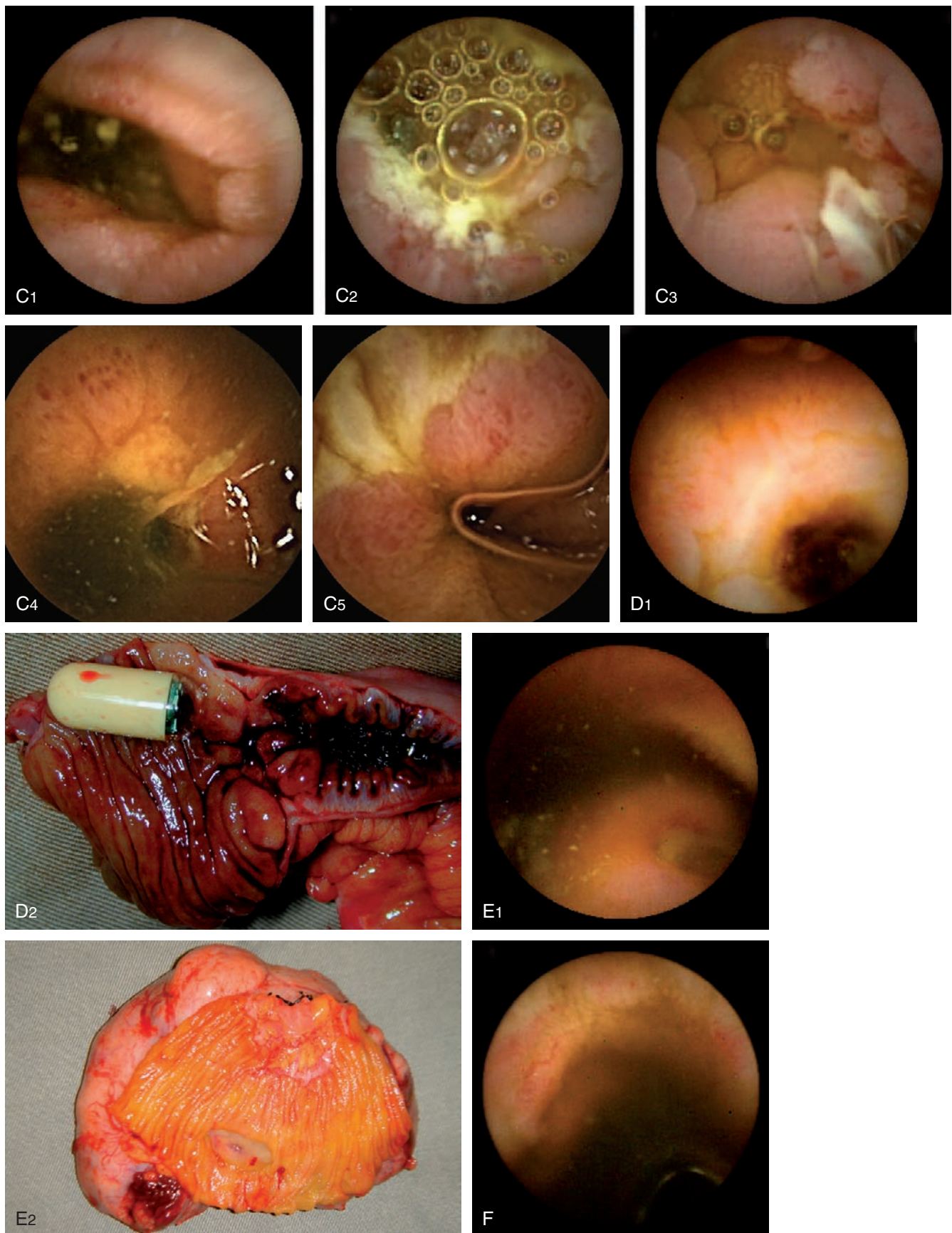


FIGURE 4.136 CAPSULE ENDOSCOPY

C, Crohn's disease. **D**, Crohn's disease with stricture. There is a stricture in the small bowel ultimately requiring surgery where the capsule was retained. **E**, Gastrointestinal stromal tumor. **F**, Radiation-induced ectasia.

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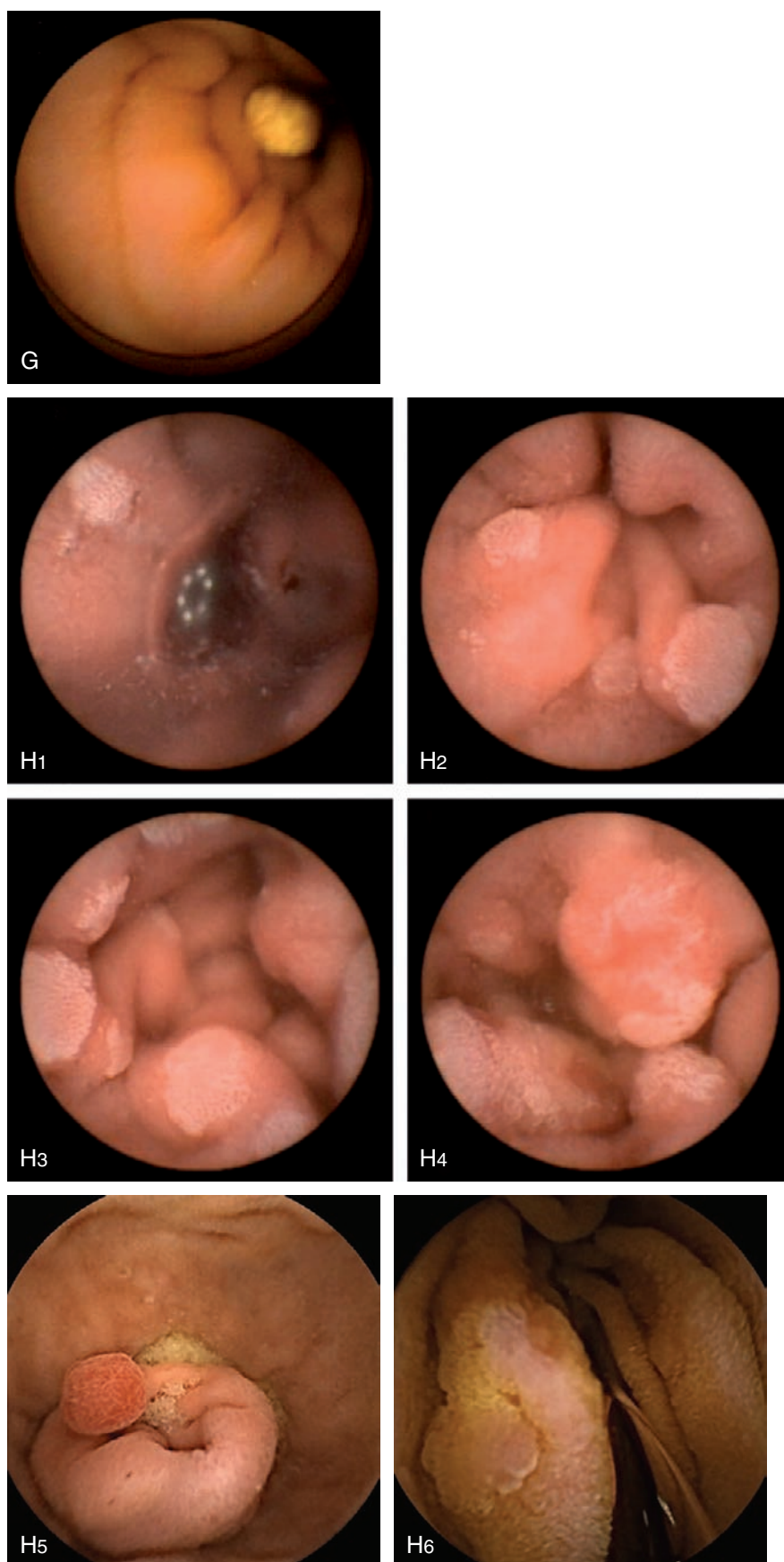


FIGURE 4.136 CAPSULE ENDOSCOPY

G, Lymphangiectasia. **H**, Familial adenomatous polyposis. Numerous adenomas are apparent in the small bowel. **H5**, Tubular adenoma in duodenum. **H6**, Tubular adenoma.

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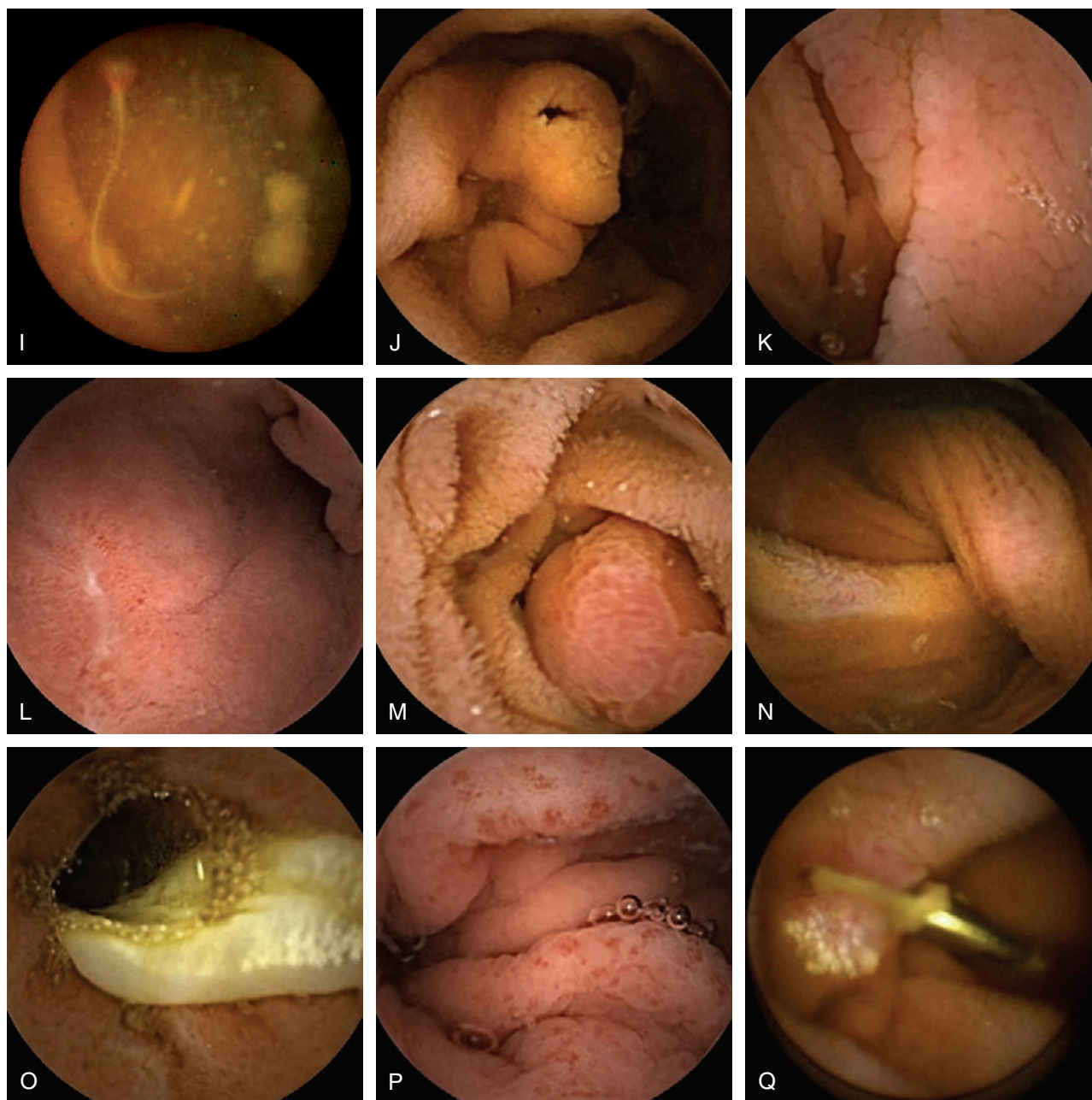


FIGURE 4.136 CAPSULE ENDOSCOPY

I, Ancylostoma worm in jejunum. **J**, Ampulla of Vater. **K**, Celiac disease. **L**, Duodenal ulcer. **M**, Duodenal Brunner's gland hamartoma. **N**, Peutz-Jeghers polyp with intussusception. **O**, Tapeworm. **P**, Portal hypertensive gastropathy. **Q**, Endoscopic clip at the site of prior vascular ectasia. (I courtesy O. Alarcón, MD, Tenerife, Spain.)



FIGURE 4.137 DOUBLE BALLOON ENTEROSCOPY

A, Fistula. **B1, B2**, Jejunal polyp histologically confirmed to be a hamartoma in the setting of Peutz-Jeghers syndrome. **B3**, Typical oropharyngeal lesions. **C**, Adenocarcinoma.

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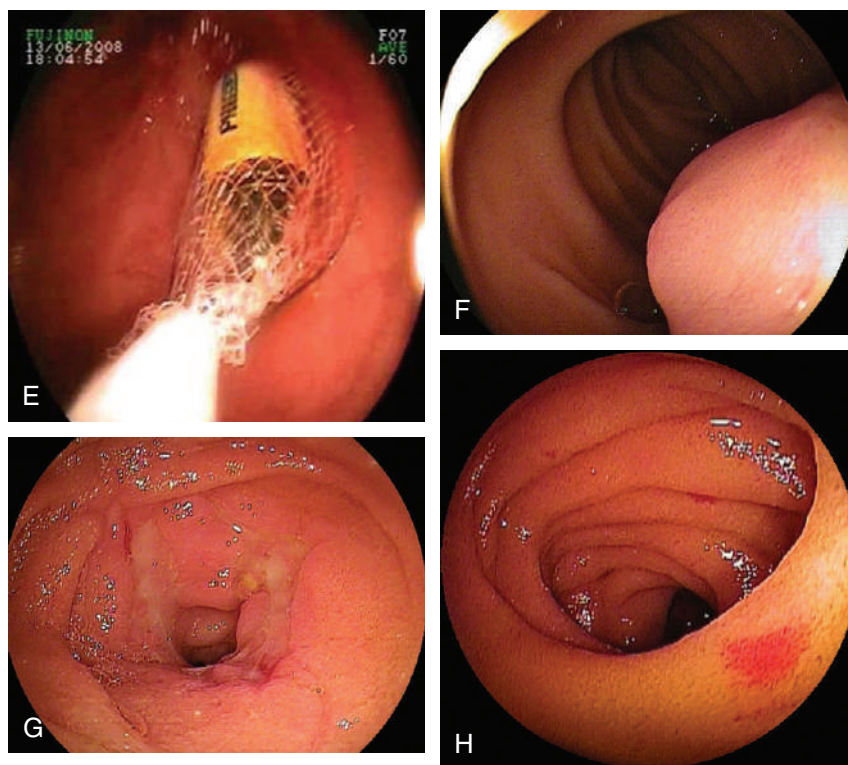


FIGURE 4.137 DOUBLE BALLOON ENTEROSCOPY

D1, Retained capsule above a stricture.

D2, The obstruction is caused by an adenocarcinoma. **E**, Removal of retained capsule. **F**, Gastrointestinal stromal tumor.

G, Circumferential ulceration from Crohn's disease. **H**, Solitary vascular ectasia.

(A courtesy E. Pérez-Cuadrado, MD.)