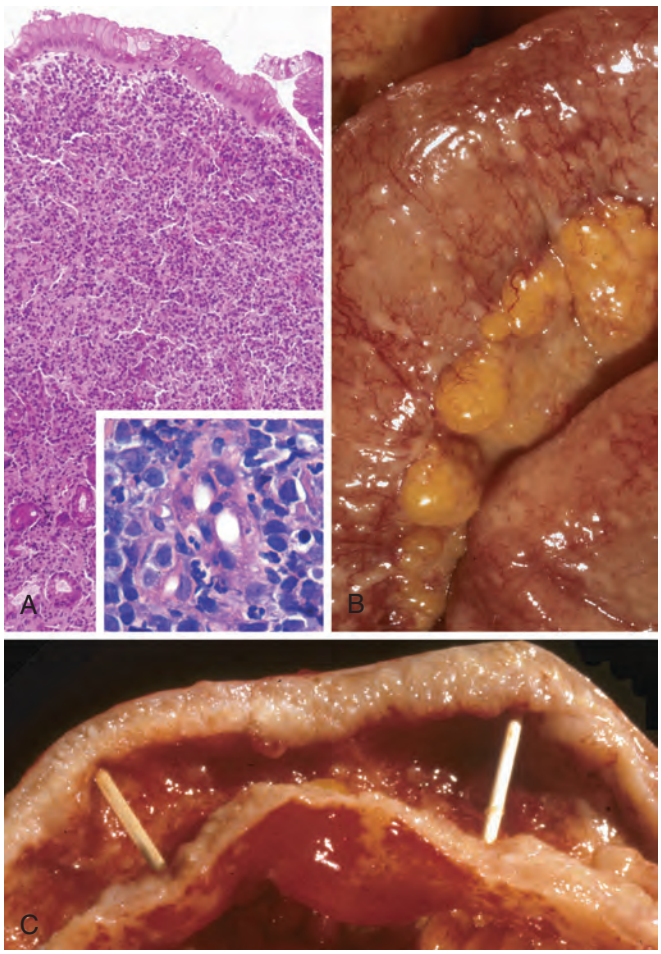

Figure 17-19 Lymphoma. **A,** Gastric MALT lymphoma replacing much of the gastric epithelium. Inset shows lymphoepithelial lesions with neoplastic lymphocytes surrounding and infiltrating gastric glands. **B,** Disseminated lymphoma within the small intestine with numerous small serosal nodules. **C,** Large B-cell lymphoma infiltrating the small intestinal wall and producing diffuse thickening.

commonly involved sites. Gastric carcinoid tumors may be associated with endocrine cell hyperplasia, autoimmune chronic atrophic gastritis, MEN-I, and Zollinger-Ellison syndrome. In addition to autoimmune chronic atrophic gastritis, as already discussed, gastric endocrine cell hyperplasia has been linked to proton pump inhibitor therapy, but the risk of progression to a neuroendocrine neoplasm in this circumstance is extremely low.

MORPHOLOGY

Grossly, carcinoids are intramural or submucosal masses that create small polypoid lesions (Fig. 17-20*A*). In the stomach they typically arise within oxyntic mucosa. At all GI sites, the overlying mucosa may be intact or ulcerated, and in the intestines the tumors may invade deeply to involve the mesentery. Carcinoids tend to be yellow or tan in color and are very firm as a consequence of an intense desmoplastic reaction, which may cause kinking and obstruction of the bowel. Histologically, carcinoids are composed of islands, trabeculae, strands, glands, or sheets of uniform cells with scant, pink granular cytoplasm and a round to oval stippled nucleus (Fig. 17-20). In most tumors there is minimal pleomorphism, but anaplasia, mitotic activity, and necrosis may be present in rare cases. Immunohistochemical stains are typically positive for endocrine granule markers, such as synaptophysin and chromogranin A.

Clinical Features. The peak incidence of carcinoid tumors is in the sixth decade, but they may appear at any age. Symptoms are determined by the hormones produced. For example, *tumors that produce gastrin may cause Zollinger-Ellison syndrome, while ileal tumors may cause carcinoid syndrome,* which is characterized by cutaneous flushing, sweating, bronchospasm, colicky abdominal pain, diarrhea, and right-sided cardiac valvular fibrosis. Carcinoid syndrome occurs in fewer than 10% of patients and is caused by vasoactive substances secreted by the tumor into the systemic circulation. When tumors are confined to the

Table 17-6 Features of Gastrointestinal Carcinoid Tumors

Feature	Esophagus	Stomach	Proximal Duodenum	Jejunum and Ileum	Appendix	Colorectum
Fraction of GI carcinoids	<1%	<10%	<10%	>40%	<25%	<25%
Mean patient age (yr)	Rare	55	50	65	All ages	60
Location	Distal	Body and fundus	Proximal third, peri-ampullary	Throughout	Tip	Rectum > cecum
Size	Limited data	1-2 cm, multiple; >2 cm, solitary	0.5-2 cm	<3.5 cm	0.2-1 cm	>5 cm (cecum); <1 cm (rectum)
Secretory product(s)	Limited data	Histamine, somatostatin, serotonin	Gastrin, somatostatin, cholecystokinin	Serotonin, substance P, polypeptide YY	Serotonin, polypeptide YY	Serotonin, polypeptide YY
Symptoms	Dysphagia, weight loss, reflux	Gastritis, ulcer, incidental	Peptic ulcer, biliary obstruction, abdominal pain	Asymptomatic, obstruction, metastatic disease	Asymptomatic, incidental	Abdominal pain, weight loss, incidental
Behavior	Limited data	Variable	Variable	Aggressive	Benign	Variable
Disease associations	None	Atrophic gastritis, MEN-I	Zollinger-Ellison syndrome, NF-1, sporadic	None	None	None

MEN-I, Multiple endocrine neoplasia type I; NF-1, neurofibromatosis type I.