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Endoscopic and Imaging Procedures

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INTRODUCTION

Since Mikulicz first used a prototype esophagoscope to visualize the lumen of the esophagus in 1880, physicians have been attempting to peer into every portion of the gastrointestinal (GI) tract in order to understand disease and to restore their patients to health. This goal has become more achievable than ever as a result of the wide variety of invasive and noninvasive endoscopic and imaging procedures that are currently available. This chapter reviews the various endoscopic and radiographic procedures currently in use, including their indications and basic information regarding their performance.

GASTROINTESTINAL ENDOSCOPY

GI endoscopy is the primary modality for directly visualizing the GI tract and for obtaining tissue samples to establish definitive diagnoses. In addition, a wide variety of therapeutic maneuvers can be performed endoscopically to deal with a host of disease processes, such as hemostasis for bleeding ulcers or varices, resection or ablation of neoplastic tissue, dilation or stenting of strictures, and removal of bile duct stones.

Over the years, endoscopes have evolved from early rigid types with limited capabilities to more sophisticated flexible instruments with advanced imaging capabilities, specialized features for therapeutic maneuvers, and various designs to enable examination of specific areas of the GI tract and biliopancreatic systems. Endoscopes come in varying lengths and in diameters ranging from 3.1 mm to 15 mm (Fig. 34-1). They consist of a control handle, an insertion tube, and a connector section that attaches to the light source and image processing unit. The control handle comprises dials that deflect the scope tip in all directions as well as buttons for suction, air or water insufflation, and image capture. The control handle also includes the entry port to the "working channel," which runs down the length of the insertion tube, through which a wide array of accessories such as biopsy forceps, snares, and balloon dilators can be passed. The tip of the insertion tube houses a charge-coupled device for color image generation, a light guide illumination system, and an objective lens, which may be oriented for forward viewing, side viewing, or oblique viewing, depending on the type of endoscope.

Technologic advances continue to improve the quality of endoscopic imaging. These include the introduction of high-definition instruments, magnification endoscopy (from a baseline of 30× or 35× up to 150×), and enhanced imaging technologies such as narrow band imaging (NBI) and multiband imaging.

GI endoscopy can be performed in dedicated endoscopy suites or at a patient's bedside in emergency situations. After positioning the patient appropriately and providing sedation, if necessary, the endoscopist passes the lubricated endoscope through the intended orifice and advances it manually. The angulations of the GI lumen are navigated by deflecting the endoscope tip and by applying torque to the instrument shaft (i.e., rotating the shaft along the long axis of the instrument). Endoscopy is generally safe, with complications that include bleeding (0.3% to 1% after colonoscopic polypectomy), perforation (0.05% in general, but 0.1% to 0.5% after polypectomy), and sedation-associated hypotension and hypoxia (1% to 5%). Death related to endoscopic procedures is exceedingly rare (0% to 0.01%).

Esophagogastroduodenoscopy

Esophagogastroduodenoscopy (EGD), often referred to as *upper endoscopy*, is performed with a *gastroscope* and allows the

FIGURE 34-1 Endoscopes used for endoscopy of the upper gastrointestinal tract. Endoscopes of varying sizes are available for use in different situations. The uppermost endoscope (6-mm diameter) can be used for unsedated endoscopy. The middle endoscope (9-mm diameter) is used for standard diagnostic endoscopy. The lowermost endoscope (12-mm diameter) is used for therapeutic endoscopy, such as the placement of enteral stents. (Courtesy Brian C. Jacobson, Boston, Mass.)