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Technique of colonic stenting

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ABSTRACT

Colonic stents have been used for more than 20 years for preoperative and palliative relief of malignant colonic obstruction. Self-expandable metal stent (SEMS) placement is more technically challenging than luminal stent placement in other locations. SEMS placement is performed most commonly with fluoroscopic guidance using through-the-scope devices. Accessories used for performing pancreaticobiliary procedures facilitate colonic SEMS placement.

1. Introduction

The first description of endoscopic placement of a prosthesis for colorectal disease was by Dohmoto et al. [1] for palliation of rectal cancer using a rigid Celestin tube. Subsequently, Spinelli et al. [2] first reported endoscopic placement of a self-expandable metal stent (SEMS) for treatment of malignant rectal obstruction in 1992. Since then, there have been numerous publications on the use of SEMS for management of malignant colonic obstruction [3]. In this review, the techniques for colonic SEMS placement have been covered.

2. Technology

There are a variety of SEMS specifically designed for colonic use (Figure 1). SEMS are constrained on delivery catheters, most of which pass through a therapeutic channel endoscope (through-the-scope [TTS]). The degree of shortening during deployment varies. All commercially available SEMS for colonic use sold in the United States are uncovered [4]. Many SEMS are available outside the United States, some of which have a covering to reduce tumor ingrowth, though with higher migration rates [5-7]. The ideal stent diameter is unknown but most colonic SEMS have diameters in the midbody that are between 20 and 30 mm after deployment. Although it is believed that SEMS of the same diameter have similar patency rates, this is not known conclusively [5,8]. Placement of SEMS in the rectum and distal sigmoid using non-TTS stents is analogous to esophageal stent placement. TTS stent placement is necessary for treating more proximal obstruction and is analogous to the techniques used for biliary and duodenal stent placement.

3. Patient selection

Some patients are referred for colonic stent placement based upon symptoms or endoscopic interpretation of an obstruction or both. At the time of stent placement, however, if a therapeutic adult colonoscope or upper endoscope can be passed easily across the lesion then stent placement may not be necessary and may be associated with a high rate of migration.

4. Patient preparation

Adequate endoscopic visualization is essential to allow optimal stent placement. Complete bowel preparation is usually not necessary in patients with complete colonic obstruction, as stool is evacuated below the obstruction. Enema preparations are usually adequate. Likewise, in distal sigmoid and rectal obstruction, stool can easily be evacuated with an enema preparation. A standard colonoscopy preparation is administered in patients with subtotal obstruction located more proximally.

Obtaining a preprocedural radiographic retrograde contrast study (barium or water-soluble contrast) is not necessary, though it allows determination of the anatomy and length of stricture and precludes need for passage of the endoscope proximal to the lesion. However, fluoroscopy is used during the procedure to obviate the need for advancing the endoscope across the lesion.

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Fig. 1. Various self-expandable metal colonic stents.

Although the patient is usually placed in the left lateral decubitus position, the supine position is often preferable for optimal interpretation of fluoroscopic images.

5. Techniques of insertion

Endoscopic colonic stent placement is more challenging than in other areas of the gastrointestinal tract because of the complex colonic anatomy. Additionally, many tumors are located at angulations and flexures making them impossible to see en face endoscopically. Endoscopists are often unfamiliar with the fluoroscopic images of the colon compared with other areas of the gastrointestinal tract. Additionally, patients with acute colonic obstruction are often acutely ill and cannot be adequately prepared. The potential for perforation and spillage of fecal contents poses additional challenges and risks to safe and successful SEMS placement. Technical success rates for SEMS placement, particularly in the setting of complete obstruction are not nearly as high as other locations such as esophageal SEMS placement. It is important to realize that technical difficulties between patients vary widely. For example, rectal SEMS placement in a stable outpatient in the setting of subtotal rectal obstruction is easy compared with a patient who develops complete acute colonic obstruction owing to a lesion, located at the splenic flexure and with impending perforation.

The steps involved with TTS colonic SEMS placement are shown in Figure 2. The endoscope is passed to the site of the obstruction (Figure 2A). The stricture can be outlined using fluoroscopic contrast injection. Contrast material can be injected directly through the working channel of the endoscope to define the stricture. However, in complete obstruction, this may not generate enough pressure to outline the stricture. Use of endoscopic retrograde cholangiopancreatography (ERCP) catheters is often needed. I prefer to use a biliary stone retrieval balloon. The balloon is inflated to maximal diameter (usually 15 mm) and advanced against the lesion. Contrast material is then injected under pressure to outline the lesion. The additional benefit of a balloon is that is can be used to "roll" around corners when inflated, which allows angles of approach to the lesion to be changed. Another trick when the lesion cannot be seen en face is to use a rotatable sphincterotome. The sphincterotome can be bowed in the direction of the lumen. The stricture is traversed with a guidewire (Figure 2A and B). Fluoroscopic marking of the tumor is not necessary, as the stent is deployed under direct endoscopic visualization. In addition, fluoroscopy is almost always used. The predeployed stent is passed through the channel of the endoscope and positioned across the lesion (Figure 2B). The stent is then deployed by withdrawing the constraining sheath or unraveling string (depending on the device) (Figure 2C and D). TTS SEMS deploy from the proximal (oral) position to the distal (anal) one (Figure 2C). A chosen SEMS should be of suitable length to bridge the stricture and extend at least 2 cm on each side of the lesion, once the stent is deployed (Figure 2D). One must also account for the degree of shortening that occurs during deployment and stent movement away from the endoscopist as the sheath is withdrawn. After deployment, proper positioning is demonstrated by a waist seen radiographically. Balloon dilation may provide more rapid