Triangulating Stapling Technique: An Alternative Approach to Colorectal Anastomosis

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The triangulating stapling technique was employed to perform colorectal anastomosis in 259 patients. In 220 patients, the anastomosis was performed between the colon and nonperitonealized rectum. This anastomotic technique is safe and reliable and is an effective alternative to a circular stapling device, with minimal morbidity. The incidence of leak rate is comparable to anastomoses created by a circular stapling device. The main advantage seems to be the very low incidence of anastomotic stenosis. [Key words: Low anterior anastomosis; Triangulating stapled anastomosis; Anastomotic leak; Stenosis; Surgical technique; Gastrointestinal anastomosis]


In recent years, use of the anastomotic end-to-end stapler (EEA®, U.S. Surgical Corp., Norwalk, CT) has become quite popular among surgeons performing low rectal anastomosis. EEA® stapler use has expanded the scope of low anterior resection, creating a reliable anastomosis at a lower level, when compared with the hand-sewn anastomosis.1-5 As an alternative to use of the EEA® stapler and the hand-sewn technique, a triangulating stapling technique can be utilized effectively with minimal morbidity. The present study describes the triangulating technique in performing a colorectal anastomosis.

MATERIALS AND METHODS

The triangulating technique was employed in performing low anterior resection in 259 patients. One hundred forty-two patients (55 percent) were women. One hundred sixty-six patients (66 percent) were between the ages of 60 and 70 years, and 77 patients were over the age of 70. One hundred sixty-eight patients had malignant neoplasm of the rectum. In 73 patients, the surgery was performed for diverticular disease, extending to the proximal rectum (peritoneal reflection). Ten patients underwent low anterior resection for rectal prolapse and three patients for large villous adenoma. In 85 percent of the patients, the anastomosis was performed in the nonperitonealized rectum. The anastomotic level was between 5 and 8 cm in 153 patients (59 percent). In 49 patients, the anastomotic level was between 8 and 10 cm, and the anastomotic level was below 5 cm in 18 patients (7 percent). The peritonealized rectum was used to create the anastomosis in 39 patients (15 percent). The anastomotic site was between 10 and 14 cm in this group of patients.

TECHNIQUE

Prior to surgery, the patients had a complete lower gastrointestinal workup. Preoperative preparation consisted of mechanical bowel cleansing, oral antibiotics, and perioperative, intravenous broad-spectrum antibiotics. The operation was performed under general anesthesia in the modified lithotomy position, using a slight Trendelenburg tilt. A Foley catheter was inserted into the bladder.

A lower midline incision was made to enter the peritoneal cavity. The left colon was mobilized up to the splenic flexure. High ligation of the inferior mesenteric vessel was achieved. The rectum was mobilized adequately. After resection of the diseased colon, the proximal and distal ends of the bowel were prepared for anastomosis. The antimesenteric border of the proximal colon was fishmouthed if found to be of a smaller caliber than the rectum. A series of long bowel Allis clamps were applied closely to approximate the posterior walls of the colon and rectum. The posterior stapled line was always made longer to facilitate easier triangulation. The TA® 55 (U.S. Surgical Corp., Norwalk, CT) stapler was used to staple the approximated bowel ends in an inverted fashion (Fig. 1). It is important to verify that the ends of the

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posterior stapled line are included in the creation of the two anterior stapled lines to ensure overlapping (Fig. 2). The anterior bowel ends were approximated using closely applied Allis clamps and were stapled in an everting fashion using the TA® 30 (U.S. Surgical Corp., Norwalk, CT) stapling device (Figs. 3 and 4). Both the anterior staple lines should overlap in the middle (Fig. 5). Staples of 3.5 mm were used for all colorectal anastomoses.

The anastomosis was tested for an air leak by insufflation of air through the rectum using the proctoscope. Anastomotic air leaks were found in six patients and were sealed successfully with hand suturing. None of the group of patients required diverting colostomy. Closed drainage of the pelvis was routinely undertaken in anastomoses involving the nonperitonealized rectum.

Patients were started on a clear liquid diet after the return of bowel function, and they gradually advanced to a regular diet.

RESULTS

Over a period of eight years from 1981 to 1989, 259 patients underwent colorectal anastomosis using the triangulating stapling technique. The follow-up period ranged from 6 to 90 months (average of 48 months). The average hospital stay was about seven days. Twelve patients developed urinary tract infections, most likely from indwelling Foley catheters, and needed antibiotic treatment. Four patients developed postoperative pneumonitis re-