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Minimally Invasive Procedures on the Small Intestine

Minimally invasive small bowel and colorectal operations have gained widespread acceptance as large case series, randomized trials, and systematic reviews have indicated that the laparoscopic approach is feasible, safe, and beneficial. In experienced hands, these procedures can have low conversion rate, acceptable operative times, shorter hospital stays, and faster postoperative recoveries. A higher conversion rate may be seen in patients with prior laparotomy, obesity, enterocutaneous fistula, adhesions, large inflammatory masses, and an emergency operative indication. In general, the transition to a laparoscopic approach to intestinal surgery has not been as complete as it has been with, say, laparoscopic cholecystectomy; this probably is secondary to the increased complexity and technical difficulty of the intestinal procedures. It seems apparent, however, that the transition is ongoing, and the proportion of intestinal operations performed with minimally invasive technique likely will increase in the future.

OPERATIVE INDICATIONS

Laparoscopic operations upon the small intestine include enterectomy, adhesiolysis, Meckel's diverticulectomy, and stricturoplasty. For any of these procedures, the surgeon should be prepared to perform a minimally invasive small bowel resection if indicated. Laparoscopic adhesiolysis for acute bowel obstruction has been described by numerous authors; this procedure remains somewhat controversial, though. If the degree of abdominal distention does not prohibit the laparoscopic approach, then, in general, laparoscopic adhesiolysis can be performed. Other less common indications for laparoscopic small bowel surgery include intussusception (Fig. 11-1), gallstone ileus (Fig. 11-2), and foreign body removal (Fig. 11-3). A more controversial indication for minimally invasive small bowel surgery is laparoscopy for chronic abdominal pain. A randomized trial has demonstrated that only 27% of the patients undergoing laparoscopy for this indication had subsequent improvement.

Nearly 70% of patients with Crohn's disease will ultimately require surgery; a decision to operate should be considered with long-term medical management. Indications for surgery in patients with Crohn's disease typically include obstruction, fistula, perforation, or simply symptom intractability with inadequate response to medical management. Most often the distal

ileum is involved, which would require ileocolic resection of the grossly involved segment only. Intraoperatively, the surgeon may encounter a thickened mesentery, phlegmon, abscess or fistula; any of these can make the procedure more difficult. Nonetheless, these complicating factors are only relative contraindications for laparoscopic resection. Crohn's disease also may be associated with long and short intestinal strictures. Short strictures are best treated with stricturoplasty, and long strictures typically require segmental resection. Nearly 50% of patients will need reoperation within 10 to 15 years and therefore limited resection to only those margins grossly involved is warranted.

Meckel's diverticulum is a congenital abnormality which occurs if the connection between the yolk sac and the midgut (the omphalomesenteric duct) fails to obliterate during gestation. The estimated incidence is 2%; a diverticulum is usually found on the antimesenteric wall of the distal ileum, approximately 10 to 150 cm from the ileocecal valve. Its length and thickness may vary, and there may or may not be a separate mesentery supplied by an abnormal remnant of the distal right vitelline duct artery. The Meckel's diverticulum may contain ectopic tissue such as gastric mucosa, pancreatic tissue, and colonic tissue. A frequent complication of a Meckel's diverticulum is obstruction secondary to intussusception, volvulus, or incarceration within a femoral or inguinal hernia. Another common symptom is bleeding, secondary to acid secretion of ectopic gastric tissue. Diverticulitis also can occur in a Meckel's diverticulum. If any of these complications occur, the diverticulum should be resected. If an asymptomatic Meckel's diverticulum is found incidentally, then the indication to resect is more relative.

Malignant tumors of the small bowel account for less than 1% of gastrointestinal malignancies. Nearly half of these tumors are not diagnosed preoperatively. Carcinoid tumors typically are located in the ileum and, less commonly, in the duodenum. Only 10% of carcinoids are symptomatic, thus making preoperative diagnosis difficult. Lymphomas and sarcomas most commonly are located in the jejunioileum. On the other hand, adenocarcinomas usually are located in the duodenum, and may require pancreaticoduodenectomy. Jejunioileal adenocarcinomas, lymphomas, and carcinoid tumors require wide mesenteric resection and lymphadenectomy, but sarcomas do not because they generally do not metastasize to the lymph nodes. Benign tumors, including leiomyomas, adenomas, lipomas, and Peutz-Jeghers polyps, are less common indications for small bowel resection.