Laparoscopic high anterior resection with natural orifice specimen extraction (NOSE) for early rectal cancer

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Abstract Laparoscopic surgery for colorectal cancer requires an abdominal incision to extract the resected specimen. We describe a technique for laparoscopic resection of an early-stage upper rectal cancer in a 51-year-old man followed by transanal specimen delivery, hence avoiding the need for making any additional abdominal incisions for retrieval of the specimen. Pneumoperitoneum was created, followed by medial-to-lateral mobilization of the sigmoid colon, and take down of the splenic flexure and division of the inferior mesenteric vessels laparoscopically. The upper rectum distal to the tumour and proximal colon was transected with a laparoscopic stapler. The specimen was retrieved transanally via an opening in the rectal stump. The proximal colon was then delivered transanally and the anvil of the circular stapler inserted before returning it to the pelvic cavity. The rectal stump was transected again just below the opening to close off the stump, and the colorectal anastomosis was then completed intracorporeally. The patient, a 51-year-old male (BMI 18.6 kg/m²) with a 2.5-cm, early-stage posterior rectal cancer 12 cm from the anal verge, underwent the above-described procedure. Postoperative recovery was uneventful. He resumed normal daily activities 1 week after surgery. Histology confirmed a T1N0 upper rectal cancer. In the effort to minimize surgical trauma and postoperative pain, natural orifice specimen extraction techniques have been attempted. This procedure may be applicable to benign tumours and early colorectal cancer, and serves as an intermediate step between laparoscopic and natural orifice surgery.

Key words Laparoscopy • Surgery • Rectal carcinoma • NOSE

Introduction

Surgical techniques in colorectal surgery have made tremendous progress over the last two decades. In the past, standard anterior resection required a long midline incision. Recently, with laparoscopic surgery much smaller incisions have become possible. Laparoscopic colorectal surgery has become feasible and more widely accepted. Most colectomies performed laparoscopically commonly require an abdominal incision to retrieve the specimen and perform some components of the operation extracorporeally. Retrieval of the colonic specimen through the anus is not new having been described as early as 1993 by Franklin et al. [1] using a snare via a flexible sigmoidoscope. Darzi et al. [2] also described a
total laparoscopic approach to sigmoid colectomy. But such techniques were not commonly performed by other surgeons because current instrumentation did not allow a reliable and speedy intracorporeal reanastomosis. We re-explored this technique, which we describe in this report together with a discussion of the indications and controversies in this approach.

Surgical technique

The operation was performed in a 51-year-old man with 2.5-cm malignant flat polyp in the posterior upper rectum, 12 cm from the anal verge. The patient’s body mass index was 18.6 kg/m² (weight 65.8 kg, height 1.88 m). Colonoscopy was performed to exclude proximal synchronous cancer. A preoperative CT scan of the abdomen and pelvis, and a chest radiograph showed no distal or regional metastasis. Preoperative CEA was 1.2 µg/l (normal). The patient was placed in the Lloyd-Davis position. Carbon dioxide pneumoperitoneum was created by the open technique in the subumbilical region for the camera port. Two 12-mm trocars were placed one in the right and one in the left iliac fossa regions. Two 5.5-mm trocars were placed one in the left hypochondrium and one in the right hypochondrium. Laparoscopic exploration was performed. Medial to lateral mobilization of the sigmoid colon was performed, including take down of the splenic flexure and a high division of the inferior mesenteric vessels laparoscopically, taking care to identify and preserve the left ureter and gonadal vessels, as previously described [3]. The location of the tumour was confirmed by intraoperative sigmoidoscopy and the rectum was clamped distal to the tattoo marking done preoperatively. A thorough distal rectal irrigation with chlorhexidine solution was performed. The rectum was then transected using a laparoscopic linear stapler. The mesentery was divided proximally to the level of the proximal margin with the aid of a vessel-sealing energy device. The proximal colon was subsequently divided with the laparoscopic linear stapler; hence the specimen was now free in the peritoneal cavity.

The transected distal rectal stump was opened transversely by dividing the stapler line using laparoscopic scissors, and held in place by three bowel graspers. A long Babcock grasper was inserted transanally by the perineal operator through the opened rectal stump. The specimen was then grasped by the Babcock and retrieved transanally, as shown in Fig. 1. It is essential at this stage that there is no resistance to the delivery of this large specimen via the rectum and the passage should be smooth to prevent splitting of the rectal wall or damage to the anal sphincter. The proximal colon was also delivered transanally in the same manner. The anvil of the circular stapler was now inserted to the exteriorized proximal colon with a purse-string suture before returning it to the pelvic cavity (Fig. 2).

The edges of the open distal rectal stump were grasped and aligned, and then were transected again with the laparoscopic linear stapler just below the opening to close off the stump. This transected short (about 1 cm) cuff of rectum was then retrieved through the 12-mm port. An end-to-end colorectal anastomosis was then completed intracorporeally with a circular stapler in the usual manner. A pelvic drain was inserted.

Outcome

The patient had little postoperative pain and did not require any narcotic analgesia from the second postoperative day. His bowel function returned on postoperative