Tech Coloproctol (2010) 14:253–255
DOI 10.1007/s10151-009-0545-8

TECHNICAL NOTE

Laparoscopic single-port colectomy for sigmoid cancer

F. H. Remzi · H. T. Kirat · D. P. Geisler

Received: 20 June 2009 / Accepted: 28 October 2009 / Published online: 2 December 2009

Abstract
Background Single-port laparoscopic surgery can be performed via one incision hidden in the umbilicus. Herein, we report a patient with a sigmoid colon cancer undergoing single-port laparoscopic sigmoid colectomy.
Methods Laparoscopic single-port sigmoid colectomy through a 3-cm umbilical incision was performed on a patient with a diagnosis of sigmoid cancer. Patient was 54-year-old female with a body mass index of 25.8 kg/m^2. Preoperatively, a CAT scan in the metastasis evaluation did not show any lesion.
Results The total operative time was 198 min. Estimated blood loss was 300 ml. Length of hospital stay was 3 days. Patient had no intraoperative or postoperative complications. Examination of pathological specimen showed a specimen containing a circumferential lesion measuring 5 cm × 2.5 cm × 2.5 cm with adequate surgical margins (10 and 5.5 cm), and no regional lymph node metastases in 14 lymph nodes collected. Patient did not receive adjuvant chemotherapy after surgery. Colonoscopy performed 1 year after surgery showed no neoplasm or polyp identified. Abdomen and pelvis CT also found no evidence of recurrence or metastatic disease.
Conclusion Single-port laparoscopic surgery may allow common benign procedures via an incision in the umbilicus. It can also be performed with good surgical and oncologic results in selected patients with a colorectal cancer.

Keywords Single-port · Laparoscopy · Colectomy · Sigmoid cancer

F. H. Remzi (✉) · H. T. Kirat · D. P. Geisler
Department of Colorectal Surgery,
Cleveland Clinic Foundation, Cleveland, OH, USA
e-mail: remzif@ccf.org

Introduction

Laparoscopic surgery is associated with fewer postoperative complications, decreased length of stay, faster return of gut function, and reduced surgical site infection over open approach in patients undergoing colorectal surgery [1–3]. Despite these advantages, surgeons have tried to decrease the number of ports used during conventional laparoscopy in order to achieve better cosmesis, less pain, and fewer risk of development of hernia. Therefore, natural orifice transluminal endoscopic surgery (NOTES) [4, 5] and single-port laparoscopic surgery (SPLS) [6–13] have drawn attention and been used in patients with urologic and surgical pathologies. Although NOTES offers scarless surgery, it is associated with steep learning curve, and extraction sites are major concerns compared to SPLS in which incision used to access the abdomen can be concealed in the umbilicus. Case reports including patients with colonic polyp and diverticulitis reported that SPLS is feasible and safe for colonic procedures [12, 13]. However, these reports included short-term results following SPLS. Herein, we report a patient with 1-year follow-up in whom a sigmoid colectomy performed for sigmoid cancer through a single-port technique.

Methods

SPLS through a 3-cm umbilical incision was performed on a patient with a diagnosis of sigmoid cancer using an R-port^{TM} System (Advanced Surgical Concepts Ltd., Wicklow, Ireland) with specially designed curved laparoscopic instrumentation (Fig. 1). Data was obtained from our prospectively maintained Institutional Review Board

approved laparoscopy and cancer databases. Patient was 54-year-old female with a body mass index of 25.8 kg/m^2. Preoperatively, a circumferential malign tumor in the sigmoid colon was detected during colonoscopy. A CT scan did not show any metastasis. Therefore, patient was elected for a sigmoid resection.

Patient had a bowel preparation prior to surgery. After anesthesia induction, patient was placed into Lloyd-Davis position. A small 3-cm incision was made vertical through the umbilicus, and an R-port^{TM} single-port device was used to access the abdominal cavity. A 5-mm straight camera and two 5-mm specially designed curved instruments, a LigaSure device^{TM} (Covidien Ltd., Norwalk, Connecticut, USA) and a grasper, were introduced via a multichannel port system. High ligation of the inferior mesenteric artery right below the pancreas was done using a LigaSure device. Subsequently, medial-to-lateral dissection was performed; left colon and splenic flexure were mobilized. An EndoGIA (Auto Suture, United States Surgical Corporation, Norwalk, Conn.) was fired twice from the 10-mm port of the R-port^{TM} to come across the level of the upper rectum safely. The 3-cm incision in the umbilicus was used to extract the specimen after application of an Alexis O^{TM} wound protector/retractor (Applied Medical, Rancho Santa Margarita, CA). The proximal resection was done with a TA-60 (Auto Suture, United States Surgical Corporation, Norwalk, Conn.). The anvil of a 31-mm circular stapler was placed outside the abdomen. An intracorporeal anastomosis was made with the circular stapler inserted through anus under direct vision. Hemostasis was obtained. Sigmoidoscopy was performed and showed no leak. The 3-cm incision was closed with a in a figure-of-eight fashion. Skin was closed with a subcuticular fashion (Fig. 2). No intraoperative complication was recorded. Patient tolerated the procedure well.

Fig. 1 A 5-mm straight camera and two 5-mm specially designed curved instruments were used via an R-port^{TM} System

Fig. 2 Wound in the umbilicus at the end of the operation

Results

The total operative time was 198 min with 300 ml blood loss. Length of hospital stay was 3 days. Patients had no intraoperative or postoperative complications. Total length of specimen was 16 cm (Fig. 3). Surgical pathology report showed a 5 cm × 2.5 cm × 2.5 cm circumferential lesion, pT3 moderately differentiated invasive colonic cancer. Resected specimen had adequate surgical margins (10 and 5.5 cm). No regional lymph node metastasis was found among 14 lymph nodes examined. Figure 4 shows the completely healed scar at postoperative day 30. Patient did not receive adjuvant chemotherapy after surgery. CEA was tested every 3 months after surgery and was found within normal range. Colonoscopy performed 1 year after surgery showed that there was no neoplasm or polyp identified. Abdomen and pelvis CT also found no evidence of abdominal wall defect, recurrence or metastatic disease.

Fig. 3 Surgical specimen

Fig. 4 Incision site at postoperative day 30

Discussion

Laparoscopic surgery is associated with less pain, better cosmesis, and fewer risk of wound complications compared to open surgery [1–3]. Recently, SPLS has drawn attention for its potential advantages over conventional laparoscopy. It has been first used in general surgery and urology [6–11]. Subsequently, SPLS for colonic polyp by us [12] and diverticulitis [13] was reported. Although good short-term outcomes have been reported after SPLS for colorectal conditions, its feasibility and benefits for colorectal cancer have remained unknown. Herein, we report a patient with 1-year follow-up in whom a sigmoid colectomy performed for sigmoid cancer using SPLS.

Common laparoscopic procedures can be performed using single-port via umbilicus, and if necessary, additional ports can be added during the procedure. Although multiport laparoscopic skills are paramount for a safe SPLS and flexible instruments used have a learning curve, SPLS seems to be practical compared to NOTES. Also, current development of instruments used for SPLS helps optimize their range of motion and reduce the challenges of SPLS to move toward more complicated procedures. In addition, traction, counter traction, and tilting of the table to reverse trandelenburg and toward the right side to the patient help perform the task with two instruments only.

The patient in this report had a circumferential malign tumor in the sigmoid colon with no distant metastasis. The patient had no preoperative, intraoperative or postoperative morbidity. SPLS was able to be performed with sufficient margins and number of lymph nodes with respect to oncologic principle. Acceptable blood loss was recorded, and the total time for procedure was comparable to conventional laparoscopic procedures [14]. We present this case 1 year after the surgery was performed in order to evaluate oncologic results with a longer follow-up. The fact that colonoscopy and abdominopelvic CT scan performed 1 year after SPLS procedure found no recurrence or metastatic lesion showed that SPLS is promising for colorectal cancer patients.

In conclusion, SPLS seems to be a good technique in patients with colorectal cancer in terms of complications and oncologic outcomes after 1-year follow-up. However, we advise using this technique in selected colorectal cancer cases with a prospective data gathering and consenting until attainment of proficiency in SPLS.

References

1. Ng SS, Leung KL, Lee JF, Yiu RY, Li JC, Hon SS (2009) Long-term morbidity and oncologic outcomes of laparoscopic-assisted anterior resection for upper rectal cancer: ten-year results of a prospective, randomized trial. Dis Colon Rectum 52:558–566
2. Kennedy GD, Heise C, Rajamanickam V, Harms B, Foley EF (2009) Laparoscopy decreases postoperative complication rates after abdominal colectomy: results from the national surgical quality improvement program. Ann Surg 249:596–601
3. Poon JT, Law WL, Wong IW et al (2009) Impact of laparoscopic colorectal resection on surgical site infection. Ann Surg 249:77–81
4. Marescaux J, Dallemagne B, Perretta S et al (2007) Surgery without scars: report of transluminal cholecystectomy in a human being. Arch Surg 142:823–826
5. Zornig C, Emmermann A, von Waldenfels HA, Mofid H (2007) Laparoscopic cholecystectomy without visible scar: combined transvaginal and transumbilical approach. Endoscopy 39:913–915
6. Bresadola F, Pasqualucci A, Donini A et al (1999) Elective transumbilical compared with standard laparoscopic cholecystectomy. Eur J Surg 165:29–34
7. Piskun G, Rajpal S (1999) Transumbilical laparoscopic cholecystectomy utilizes no incisions outside the umbilicus. J Laparoendosc Adv Surg Tech A 9:361–364
8. Rispoli G, Armellino MF, Esposito C (2002) One-trocar appendectomy. Surg Endosc 16:833–835
9. Esposito C, Colella G, Settimi A, Centonze A, Signorelli F, Ascione G, Palmieri A, Gangemi M (2003) One-trocar laparoscopy: a valid procedure to treat abdominal complications in children with peritoneal shunt for hydrocephalus. Surg Endosc 17:828–830
10. Kaouk JH, Haber GP, Goel RK et al (2008) Single-port laparoscopic surgery in urology: initial experience. Urology 71:3–6
11. Desai MM, Rao PP, Aron M (2008) Scarless single port transumbilical nephrectomy and pyeloplasty: first clinical report. BJU Int 101:83–88
12. Remzi FH, Kirat HT, Kaouk JH, Geisler DP (2008) Single-port laparoscopy in colorectal surgery. Colorectal Dis 10:823–826
13. Leroy J, Cahill RA, Asakuma M, Dallemagne B, Marescaux J (2009) Single-access laparoscopic sigmoidectomy as definitive surgical management of prior diverticulitis in a human patient. Arch Surg 144:173–179
14. Veldkamp R, Kuhry E, Hop WC et al (2005) Colon cancer Laparoscopic or Open Resection Study Group (COLOR). Laparoscopic surgery versus open surgery for colon cancer: short-term outcomes of a randomised trial. Lancet Oncol 6:477–484