International Journal of Gastrointestinal Intervention

journal homepage: www.ijgii.org

Case Report

Ileus tube placement combined with laparoscopy in the treatment of refractory small bowel obstruction: Case series and literature review

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ABSTRACT

Post-surgery small bowel obstruction (SBO) has substantial morbidity and mortality. Even with refinement of surgical technique, SBO still remains challenging with the most common causes of acute hospital admission. Most SBOs can be managed with conservative treatment. However, the palliative methods may fail to relieve the symptoms in some clinical settings. Currently, laparotomy is the standard of care for difficult SBO. And laparoscopy offers an alternative approach for operative intervention in SBO and was first described by Bastug et al in 1991. Emerging literature demonstrated that laparoscopic surgery for SBO is less invasive, resulting in a shorter hospital stay than open surgery. And most recurrent adhesive SBO can be managed with ileus tube placement. This case series is to evaluate the efficacy of transnasal ileus tube placement combined with laparoscopic surgery in the treatment of consecutive 5 cases of refractory SBO post oncologic gastrointestinal surgery.

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Keywords: Ileus tube; Laparoscopy; Small bowel obstruction

Introduction

There is a high incidence (12%–18%) of adhesive small bowel obstruction (SBO) post operation.^{1–3} And SBO is the most common causes of acute hospital admission.⁴ Furthermore, admission for adhesion-related SBO is associated with a mortality rate as high as 10%.⁵ Most SBOs (67.2%) can be managed with conservative treatment.⁶ However, the palliative methods may fail to relieve the symptoms at some clinical settings. Currently, the laparotomy is the standard care for difficult adhesive SBO.

Laparoscopy offers an alternative approach for operative intervention in adhesional SBO and was first described by Bastug et al⁷ in 1991. Despite multiple studies, laparoscopy is not yet fully accepted as treatment of choice for SBO.⁸ A retrospective study found that laparoscopic surgery for SBO is less invasive than open surgery and equally feasible in selected patients.⁹ And most recurrent adhesive SBO can be managed with ileus tube placement.¹⁰

The authors reported our experience of management refractory SBO post operation for gastrointestinal tract malignancies using transnasal ileus tube catheterization combined with laparoscopy adhesiolysis in this case series.

Case Report

Five patients with refractory adhesive SBO post gastrointestinal cancer surgery, who had failed conservative treatment for at least 3 days received internal splinting using the intubation of an ileus tube combined laparoscopy adhesive band lysis, were included in this retrospective case series. The approval was waived by our institutional review board. Written consent form was obtained from each patient. All subjects were male, mean age 62.6 ± 7.1 years (range, 51–76 years). The following clinical data were collected for all patients at presentation: age, sex, body mass index, risk classification according to the physical status classification of the American Society of Anesthesiologists, operative history, vital signs, and laboratory results, including white blood cell count, highly selective C-reactive protein level, and amylase level. Early post-treatment outcomes (inpatient) such as length of hospital stay and times to flatus, oral intake, and defecation after the start of treatment were documented, as well as morbidity and mortality rates. The patients were monitored with physical examination, serial abdominal radiographs, and laboratory tests. Patients' basic characteristics are listed in Table 1.

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Received October 23, 2017; Revised March 18, 2018; Accepted June 11, 2018

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The deployment of the ileus tube was performed by experienced interventional radiologists (H.Q.C. and H.J.S.) under moderate conscious sedation in the angiographic suite. The CLINY Ileus Tube kit (Create Medic, Tokyo, Japan) was used. The ileus tube is 300 cm in length and 16 F or 18 Fr with four channels (suction channel, injection channel, and two balloon channels) and two balloons (anterior water balloon and posterior gas balloon). Other than the tip hole, there are side holes in the distal end of the tube. Compared with other long tubes, this tube has weighted tip for easier advancing. The posterior balloon is intended for contrast radiography. Water and contrast medium can be injected into the tube for lavage and imaging. The guidewire is 350 cm long and 0.049 inch in diameter. Under fluoroscopy guidance by DSA (Zeego Simens, Fleinberg, Germany), the ileus tube was advanced through nose with paraffin oil lubricating for easy insertion, and passed beyond the ligament of Treitz into the proximal segment of the jejunal lumen. Then the tube was advanced towards the end of ileum, propelled by peristalsis acting on the water-filled anterior balloon of the tube. This balloon directly dilates the narrowed intestines. The tube remained in the intestine for further support and splinting.

Under general anesthesia, laparoscopy (Storz, Tuttlingen, Germany) operation was performed by the general surgeons (W.H.S. and N.Y.Y.) in the operating room. An umbilical port using an 10-mm trocar was introduced into the peritoneal cavity by the Hasson technique, and the cavity was insufflated with CO₂ gas to establish pneumoperitoneum with an intraperitoneal pressure of 12 to 15 mmHg. Under visual confirmation, other ports were inserted in the opposite direction to the obstructive adhesive band. Scope placement and port location were not consistent and depended on the location of the adhesions avoiding the prior scars. In most of the cases, the 3-port technique was used, but if visualization of the operation field was inadequate, 1 or more additional ports were introduced for traction. A flexible laparoscope for visualization, a harmonic scalpel, and scissors with surgical clips were used. No surgical drain was inserted. After thoroughly checking the peritoneal cavity, the adhesive bands between the bowel and parietal abdominal wall were then cut.¹¹

In this case series, mean time until flatus occurred was 2.8 ± 1.4 days (range, 1–5 days), defecation 3.8 ± 1.4 days (range, 2–7 days), and return to normal diet 14 ± 2.4 days (range, 8–17 days). Mean hospital stay was 20.8 ± 4.9 days (range, 14–33 days).

Case 1

A patient with SBO refused any further operative therapy after 4 days conservative therapy, so only ileus tube intubation was used to relief his symptoms. The patient was discharged without bowel obstruction 20 days after admission. He died of brain metastasis 11 months later.

Case 2

Laparoscopic lysis of adhesions was performed to manage SBO post 3 days conservative therapy, but obstruction symptoms were not relieved 3 days post-procedure, necessitating placement of the ileus tube. He was able to restart his normal diet 8 days later.

Case 3

An intestinal volvulus was diagnosed with mesenteric vessel rotation sign by enhanced abdominal computed tomography imaging at admission. Decision was made by surgeon to place the ileus tube first for failed 3 days conservative management. Laparoscopic surgery was then performed to lyse the adhesive band after the ileus tube deployment for a week. The patient recovered fully and was discharged another 7 days later (Fig. 1–3).

Case 4

The process was very similar to Case 1, SBO was developed on the 9th day post laparoscopic rectal cancer resection, while he was at hospital. While failing conservative treatment for 1 week, his intestinal function returned to normal 14 days later post ileus tube placement.

Fig. 1. Coronal enhanced computed tomography imaging shows small bowel volvulus with mesenteric vessels rotation.

Table 1 Baseline Patient Characteristics and Clinical Outcomes

Case no.	Age (yr)	Sex	Prior operation	ASA	WBC (10 ⁹ /L)	SBO therapy	Hospital stay (day)	Follow-up (mo)
1	62	M	Gastric cancer, 8 mo	2	3.00	Ileus tube	20	12 (died)
2	51	M	Gastric cancer, 24 mo	2	10.89	LS + ileus tube	14	18
3	76	M	Gastric cancer, 32 mo	3	3.66	Ileus tube + LS	20	16
4	67	M	Rectal cancer, 9 days	3	7.83	Ileus tube	33	10
5	57	M	Rectal cancer, 17 mo	2	6.93	Ileus tube + LS	17	2

ASA, American Society of Anesthesiologists; WBC, white blood cell; SBO, small bowel obstruction; M, male; LS, laparoscopic surgery.

Fig. 2. Laparoscopic image reveals a single adhesive band (long arrow) and proximal obstructed bowel distension (short arrow).

Fig. 3. Radiography demonstrates ileus tube passing beyond the anus 5 days post laparoscopy.

Case 5

Therapy process was identical as Case 3, except no evidence of volvulus. First line therapy was ileus tube placement 1 week for failed 3 days conservative treatment, followed by laparoscopy adhesiolysis.

No conversion to laparotomy was need in this series.

Mean follow-up was 11.6 ± 4.5 months (range, 2–18 months). All patients survived except Case 1. No recurrence SBO was recorded during the follow-up.

Discussion

Combining with ileus tube placement, laparoscopic surgery as an initial management of SBO post previous oncologic surgery is effective as well as safe, and may avoid conversion to more aggressive laparotomy. No serious complications occurred in this series, such as iatrogenic small bowel perforation, massive bleeding or surgical site serious infection. No recurrence SBO was reported during mean 11.6 months follow-up interval.

Adhesive post-surgical SBO has a high rate of morbidity and mortality, with an even poorer prognosis from previous oncologic operations. There is a surgery teaching dogma says that “to never let sun rise and set on a episode of small bowel obstruction”. In the past decade, two thirds SBOs were managed with conservative treatment, one third need aggressive operative treatment.⁶ Laparotomy is the standard care for SBO even though this approach tends to generate new adhesions and predisposes the patient to more recurrence of SBO due to the operative abdominal wall trauma, peritoneal cavity bleeding and surgical site infection. Compared with laparoscopy, open surgery seems increase the risk of SBO by a factor of four.³ Laparoscopy has been shown to be superior to open surgery in the management of adhesive SBO with less pain, faster recovery, less invasive, fewer complications and shorter hospital stays.^{12–14} With the combination of sharp dissection with use of electrocautery or the ultrasonic scalpel for lysis of adhesions and attention to active electrode of the instrument while gently grasping the opposite small bowel, the risk of inadvertent iatrogenic perforation may be significantly reduced.¹¹ With the refinement of laparoscopic technique, less than 25% of

cases of SBO were need conversion to laparotomy.¹⁵

Non-surgical, internal intestinal splinting using a nasointestinal ileus tube under fluoroscopy is simple, safe and effective treatment of recurrent adhesive SBO, even in some inoperable patients and showed promising outcomes. Long tube placement during operative SBO was more popular utilization in Japan than Western countries.¹⁶ The ileus tube has advantages over nasogastric tube in initial or palliative treatment of SBO.^{10,17} Transnasal ileus tube intubation can provide early intestinal decompression, sufficient working space and accurate diagnostic information to indicate the obstruction site and transition zone for laparoscopic resection of SBO.

Laparoscopy and ileus tube may be a good marriage in the treatment of intractable SBO. Ileus tube intubation either pre or post laparoscopic adhesiolysis may increase the success rate of SBO therapy. Optional use these two minimally invasive techniques would decrease the conversion rate to laparotomy, especially in some oncologic patients with advanced disease.^{18,19}

The limitation of the case series is its small sample size and a single institutional retrospective experience. Further large scale randomized controlled trials are warranted to demonstrate the benefit of this mini-invasive strategy in the treatment of refractory SBO.

Conflicts of Interest

No potential conflict of interest relevant to this article was reported.

Acknowledgments

This project was supported by Changzhou High-Level Medical Talent Training Project (2016CZBJ059).

References

1. Dindo D, Schafer M, Muller MK, Clavien PA, Hahnloser D. Laparoscopy for small bowel obstruction: the reason for conversion matters. *Surg Endosc*. 2010;24:792–7.
2. Duron JJ, du Montcel ST, Berger A, Muscari F, Hennen H, Veyrieres M, et al. Prevalence and risk factors of mortality and morbidity after operation for adhesive

- postoperative small bowel obstruction. *Am J Surg*. 2008;195:726–34.
3. Angenete E, Jacobsson A, Gellerstedt M, Haglind E. Effect of laparoscopy on the risk of small-bowel obstruction: a population-based register study. *Arch Surg*. 2012;147:359–65.
 4. Suh SW, Choi YS. Laparoscopy for small bowel obstruction caused by single adhesive band. *JSLs*. 2016;20:e2016.00048.
 5. Menzies D, Parker M, Hoare R, Knight A. Small bowel obstruction due to postoperative adhesions: treatment patterns and associated costs in 110 hospital admissions. *Ann R Coll Surg Engl*. 2001;83:40–6.
 6. Jafari MD, Jafari F, Foe-Paker JE, Phelan MJ, Carmichael JC, Pigazzi A, et al. Adhesive small bowel obstruction in the United States: has laparoscopy made an impact? *Am Surg*. 2015;81:1028–33.
 7. Bastug DF, Trammell SW, Boland JP, Mantz EP, Tiley EH 3rd. Laparoscopic adhesiolysis for small bowel obstruction. *Surg Laparosc Endosc*. 1991;1:259–62.
 8. Wiggins T, Markar SR, Harris A. Laparoscopic adhesiolysis for acute small bowel obstruction: systemic review and pooled analysis. *Surg Endosc*. 2015;29:3432–42.
 9. Otani K, Ishihara S, Nozawa H, Kawai K, Hata K, Kiyomatsu T, et al. A retrospective study of laparoscopic surgery for small bowel obstruction. *Ann Med Surg (Lond)*. 2017;16:34–9.
 10. Chen XL, Ji F, Lin Q, Chen YP, Lin JJ, Ye F, et al. A prospective randomized trial of transnasal ileus tube vs nasogastric tube for adhesive small bowel obstruction. *World J Gastroenterol*. 2012;18:1968–74.
 11. Tierris I, Mavrantonis C, Stratoulas C, Panousis G, Mpetsou A, Kalochristianakis N. Laparoscopy for acute small bowel obstruction: indication or contraindication? *Surg Endosc*. 2011;25:531–5.
 12. Zimmermann M, Hoffmann M, Laubert T, Bruch HP, Keck T, Benecke C, et al. Laparoscopy for bowel obstruction—a contradiction? Results of a multi-institutional survey in Germany. *Int J Colorectal Dis*. 2016;31:1011–9.
 13. Oyasiji T, Helton SW. Survey of opinions on operative management of adhesive small bowel obstruction: laparoscopy versus laparotomy in the state of Connecticut. *Surg Endosc*. 2011;25:2516–21.
 14. Simmons JD, Rogers EA, Porter JM, Ahmed N. The role of laparoscopy in small bowel obstruction after previous laparotomy for trauma: an initial report. *Am Surg*. 2011;77:185–7.
 15. Sajid MS, Khawaja AH, Sains P, Singh KK, Baig MK. A systematic review comparing laparoscopic vs open adhesiolysis in patients with adhesional small bowel obstruction. *Am J Surg*. 2016;212:138–50.
 16. Shibuya N, Ishizuka M, Iwasaki Y, Takagi K, Nagata H, Aoki T, et al. Usefulness of a laparoscopic approach for treatment of small-bowel obstruction due to intersigmoid hernia: a case report. *Surg Case Rep*. 2017;3:22.
 17. Cui H, Jiang X, Li H. Adhesive small-bowel obstruction treatment using internal intestinal splinting with a nasointestinal ileus tube. *Minerva Chir*. 2015;70:327–30.
 18. Ohtsuka T, Nagai E, Toma H, Ohuchida K, Takanami H, Odate S, et al. Single-incision laparoscopy-assisted surgery for bowel obstruction: report of three cases. *Surg Today*. 2011;41:1519–23.
 19. Nordin A, Freedman J. Laparoscopic versus open surgical management of small bowel obstruction: an analysis of clinical outcomes. *Surg Endosc*. 2016;30:4454–63.

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