Laparoscopic Surgery for Adult Intussusception: Case Series

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ABSTRACT

Background: *Intussusception is a rare condition in adults which accounts for 1% of all intestinal obstructions. It usually requires surgical treatment and the classic approach is laparotomy. This article presented six adult patients who underwent laparoscopic surgery for intestinal obstruction due to intussusception.*

Method: *Between January 2017 and July 2019, six adult patients underwent laparoscopic surgery for intestinal obstruction due to intussusception. The patients were evaluated in terms of presenting symptoms, diagnosis, treatment modality, morbidity, mortality and histopathological results.*

Results: *All patients presented with acute (50%) or subacute (50%) symptoms. All patients had intestinal obstruction (partial, complete) findings. Intussusception was diagnosed by abdominal computed tomography (CT). The patients with ileocolic and colo-colonic intussusception underwent colonoscopy. In the preoperative period, the etiology of intussusception (neoplasm, idiopathic, etc.) was diagnosed only in one patient (16.6%). Two patients underwent laparoscopic segmental small bowel resection, two patients underwent laparoscopic right hemicolectomy, one patient underwent laparoscopic left hemicolectomy, and one patient underwent laparoscopic anterior resection. None of the patients developed intraoperative or postoperative complication. The histopathological examination revealed malignancy in two patients (33.3%).*

Conclusion: *CT is helpful in diagnosing of adult intussusception. However, it is usually difficult to define the underlying pathology with CT. Laparoscopic approach seems to be safe and effective as open surgery, both in diagnosis and treatment of intussusception.*

Keywords: *Adult intussusception, laparoscopy, bowel obstruction, entero-enteric, colo-colonic*

INTRODUCTION

Intussusception is a condition where an intestinal segment telescopes into the adjacent intestinal loop. This may lead to severe complications such as intestinal obstruction, intestinal necrosis and sepsis. Of all intussusceptions, 5% occur in adults which also accounts for 1% of intestinal obstructions.[1] Unlike the pediatric group -in most cases- there is an organic lesion (intramural, mural or extramural) in the underlining etiology.[2] Therefore, surgical treatment is recommended in patients.[3] Due to nonspecific and often acute occurrence of symptoms and difficulties in diagnosis, laparotomy is usually performed.[4] However, this approach tends to change with the advancement of minimally invasive surgical technique. The aim of this study was to evaluate the diagnostic and therapeutic management in adults with intussusception as well as the efficacy of minimally invasive surgery.

MATERIALS AND METHODS

Six adults (above 18 years of age) who were treated with the diagnosis of intestinal obstruction due to intussusception in our clinic between January 2017 - July 2019, were included in the study. All patients were evaluated preoperatively by routine blood tests (hemogram, biochemistry, serology and bleeding tests), direct abdominal X-ray, chest X-ray and abdominal computed tomography (CT). In all cases, pneumoperitoneum was established using the open technique below the umbilicus. The operations were carried out with four trocars (12 mm, 10 mm and 25mm). Monitor, surgical team and the placement of trocars were determined according to the intraabdominal localization of intussusception on CT. Two of the intussusceptions were ileoileal. The patients underwent laparoscopic segmental ileal resection. Ileoileal anastomosis was created intracorporeal isoperistaltic side-to-side using endostapler with 60 mm blue cartridge (3.5 mm staple height). Stapler space was repaired using the continuous suture technique over double layer with prolene suture 3-0. The specimen was brought out of the abdomen after enlarging the 12-mm port site by 1 cm. Resection was performed in accordance with the oncological principles in patients with colo-colonic and ileo-colic intussusception. In the patients who underwent laparoscopic right and left hemicolectomy, anastomosis

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was performed extracorporeally with endostapler using 60 mm blue cartridge (3.5 mm staple height). In the case with laparoscopic anterior resection, anastomosis was performed intracorporally using a 28-mm circular stapler.

RESULTS

Four patients were male and two patients were female. The median age was 53 years (range, 27-74). The most common symptom was abdominal pain. Of the patients, 50% (3/6) presented with acute symptoms and 50% (3/6) with subacute symptoms. The location of intussusception was small intestine in two patients, ileocolic in one patient and colonic in three patients (Figure 1). The patients' demographic data, symptoms and duration of symptoms are summarized in Table 1. In all patients, intussusception was diagnosed by CT (Figure 2). Preoperative colonoscopy was performed in patients with colo-colonic and ileo-colic intussusception. The cause of intussusception could be detected only in one patient with ileocolic intussusception (16.6%). In other patients, the underlining lesion of intussusception could not be detected preoperatively. All operations were performed laparoscopically. None of the cases had conversion to open surgery. The median operative time was 110 minutes (range, 80-160). On the 3th postoperative day, oral food intake was initiated for all patients. The patients were discharged on the 5th postoperative day. Complications such as wound infection, leak, and/or hernia, etc. did not occur. The histopathological examination revealed malignancy (adenocarcinoma) in two of cases (33%). A tumoral lesion located in the cecum measuring 4x3 cm (T3N0M0) was detected in the patient with ileocolic intussusception and a tumoral lesion in the sigmoid colon measuring 5x4 cm (T3N0M0) was detected in one of the patients with colo-colonic intussusception. The localization of intussusception, operative data, length of hospital stay and histopathological findings are summarized in Table 2. The median follow-up time was 17 months (range, 3-30). No recurrence was observed during this period.

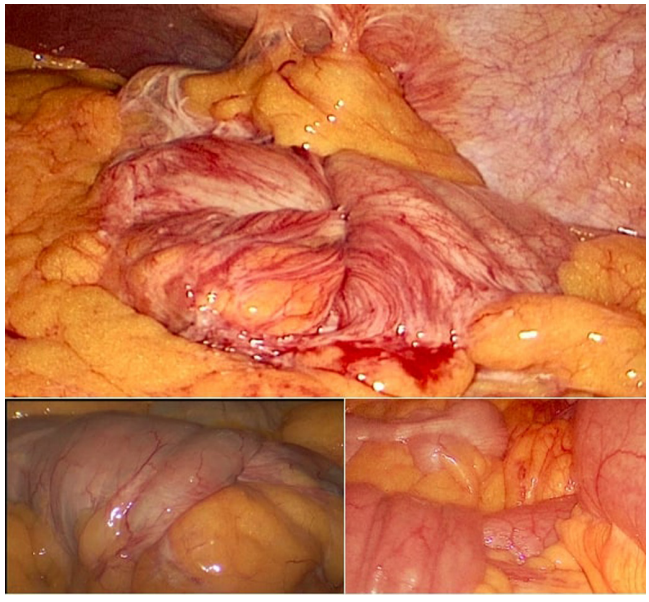

Figure 1. The intussuscepted bowel.

DISCUSSION

Intussusception is a rare entity in adults. The absence of specific symptoms and pathognomonic clinical findings complicates the diagnosis. The most common presenting symptom is abdominal pain. Abdominal pain is usually accompanied by nausea, vomiting, gastrointestinal bleeding, and bowel habit changes.[4] The symptoms may arise at different times (acute, subacute, chronic).[1-4] In our case series, the most common symptom was abdominal pain. In all patients, the symptoms occurred during the acute or subacute period.

The clinical picture is nonspecific and the rate of preoperative correct diagnosis is low (58.3%).[3] Therefore, the most important diagnostic tool in the diagnosis are imaging tests. Among the imaging tests, computed tomography (CT) has the highest sensitivity. It has been reported that 58-100% of the cases are diagnosed by CT.[1,5] CT may also provide information about the location of intussusception, the status and width of the intestinal segment causing intussusception.[5] The most significant characteristic of intussusception in adults is the presence of an organic lesion in more than 90% of the cases.[4,6] However, imaging studies may not provide sufficient information about the presence and characteristics of organic lesion.[7] In the present study, the presence and characteristic of organic lesions could not be obtained in any of patients. This is the most important problem affecting the treatment plan. Neoplasms (73.5% malignant, 26.5% benign) account for 77.3% of the lesions.[2] Surgical intervention is inevitable due to the presence of organic lesion and the risk of malignancy.[2-4] Moreover, the presence of partial or complete intestinal obstruction is another problem that needs to be solved. Removal of intestinal obstruction and exclusion of malignancy form the basis for the surgical strategy. Surgical approach varies depending on the localization of intussusception, status of the intestine (ischemia, perforation, obstruction), presence and characteristic of organic lesion (malignant, benign). In cases of ileocolic

Table 1. Patient's Characteristics and Demographic Data

	Age (Year)	Gender	BMI (kg/m^2)	ASA Score	Symptoms	Duration of symptoms (day)	Physical Examination
1	50	Female	29.3	2	Abdominal Pain, Nausea, Vomiting	2	Abdominal Distension, Tenderness
2	48	Male	31.4	2	Abdominal Pain, Nausea, Vomiting	1	Abdominal Distension, Tenderness, Right Lower Quadrant Rebound Tenderness
3	56	Male	26.1	2	Abdominal Pain, Change in Bowel Habits, Nausea, Vomiting	4	Abdominal Distension, Left Lower Quadrant Mass
4	62	Male	32	2	Abdominal Pain, Obstipation	10	Abdominal Distension, Tenderness
5	74	Male	31.3	3	Abdominal Pain, Change in Bowel Habits, Hematochezia	15	Abdominal Distension, Left Lower Quadrant Mass
6	27	Female	25	1	Abdominal Pain, Change in Bowel Habits, Hematochezia	20	Abdominal Distension, Right Lower Quadrant Mass

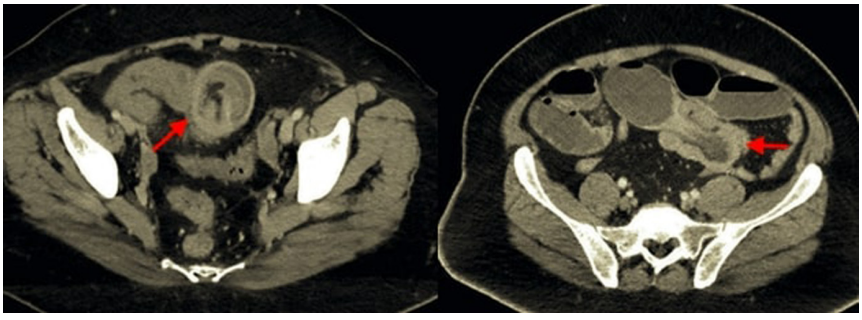

Figure 2. Contrast-enhanced abdominal computed tomography (CT) scan showing the bowel intussusception. The red arrows show the intussusception.

Table 2 Surgical Interventions for Intussusception

No	Location	Surgical Operation (Laparoscopic)	Type of Anastomosis	Operation Time (Minute)	Hospitalization (Day)	Histopathology
1	Ileoileal	Segmentary small bowel resection	Isoperistaltic, side-to-side, intracorporeal	80	5	Meckel' s diverticulum (Ileum)
2	Ileoileal	Segmentary small bowel resection + appendectomy	Isoperistaltic, side-to-side, intracorporeal	100	5	Inflammatory fibroid polyp (Ileum)
3	Colo-colonic	Left hemicolectomy	Isoperistaltic, side-to-side, extracorporeal	150	5	Lipoma (Descending colon)
4	Colo-colonic	Right hemicolectomy	Isoperistaltic, side-to-side, extracorporeal	90	5	Tubulovillous adenomatous polyp (Ascending colon)
5	Colo-colonic	Anterior resection	Isoperistaltic, end-to-side, intracorporeal	160	5	Adenocarcinoma (Cecum) (T3N0M0)
6	Ileocolic	Right hemicolectomy	Isoperistaltic, side-to-side, extracorporeal	80	5	Adenocarcinoma (Cecum) (T3N0M0)

and colo-colonic intussusception, resection is recommended in accordance with the oncological principles. It has been reported that malignant recurrence develop in 80-90% of the cases secondary to the primary malignancy.[2] Perforation of the intestine or manipulation of the tumor during reduction may cause intraluminal, intraperitoneal and venous spread of tumor cells. The general approach to entero-enteric intussusception is first of all the reduction of intraoperative intussusception in cases of benign causes and/or requiring extended bowel resection.[8] However, it may not always be possible to determine the cause of preoperative or intraoperative intussusception. Malignancy is the underlining cause in 22.5% of the entero-enteric intussusceptions.[3] Therefore, it may be more appropriate to prefer resection in cases where the cause of intussusception cannot be established. In two cases, resection without reduction was preferred because of the presence of acute intestinal obstruction, edematous and fragile intestine and the inability to determine the underlining cause of intussusception.

The classic approach for intussusception is laparotomy.[4] However, recently, this approach tends to change with increasing frequency to minimal invasive surgery. Laparoscopy has been shown to be useful and safe to diagnose intraabdominal pathologies and excluding malignant lesions.[9] In addition, many urgent or elective gastrointestinal procedures can now be performed with the laparoscopic technique.[10,11] In the present study, all procedures were performed laparoscopically without conversion to open surgery. Laparoscopic surgery has been shown to improve cosmetic appearance, reduce response to surgical stress, accelerate the healing of the gastrointestinal tract, reduce mesenteric and intestinal trauma, shortens hospital stay and reduce the risk of incisional hernia.[10,12] The efficacy of laparoscopy in the diagnosis and treatment of intussusception has been demonstrated in some case series.[13-15]

In laparoscopic approach, there may be some technical difficulties specific to intussusception. Intestinal distension may increase the risk of iatrogenic injury during the first port insertion. There is no ideal technique in this regard. The important point is that the surgeon chooses the most appropriate technique according to his/her regular practice and experience.[16] In our case series, the first trocar insertion was carried out with the open technique. Insufficient intraabdominal field of view and exploration difficulty are another challenge. As a matter of fact, the most common reason for conversion in intussusception was reported as the difficulty of exploration and requirement of intestinal resection.[15] Patient selection and experience of the surgical team are also of importance. In patients with proximal obstruction, an intestinal diameter less than 4 cm and no previous abdominal surgery may be more eligible for the laparoscopic technique.[17]

In conclusion, problems still remain in the diagnosis of adult intussusception particularly in definition of the underlining cause. In experienced centers, bowel resection and anastomosis can be safely performed with the laparoscopic technique.

Ethics Committee Approval: Health Sciences University Kocaeli Derince Training and Research Hospital Clinical Research Ethical Committee; Approval date: 10.11.2019 Reference Number: 2019-99

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REFERENCES

1. Azar T, Berger DL. Adult intussusception. Ann Surg. 1997;226(2):134-138. [CrossRef]
2. Honjo H, Mike M, Kusanagi H, Kano N. Adult intussusception: a retrospective review. World J Surg. 2015;39(1):134-138. [CrossRef]
3. Hong KD, Kim J, Ji W, Wexner SD. Adult intussusception: A systematic review and meta-analysis. Tech Coloproctol. 2019;23(4):315-324. [CrossRef]
4. Erkan N, Hacıyanlı M, Yıldırım M, et al. Intussusception in adults: an unusual and challenging condition for surgeons. Int J Colorectal Dis. 2005;20(5):452-456. [CrossRef]
5. Gayer G, Apter S, Hofmann C el, et al. Intussusception in adults: CT diagnosis. Clin Radiol. 1998;53(1):53-57. [CrossRef]
6. Cakir M, Tekin A, Kucukkartallar T, et al. Intussusception: as the cause of mechanical bowel obstruction in adults. Korean J Gastroenterol. 2013;61(1):17-21. [CrossRef]
7. Onkendi EO, Grotz TE, Murray JA, Donohue JH. Adult intussusception in the last 25 years of modern imaging: is surgery still indicated? J Gastrointest Surg. 2011;15(10):1699-1705. [CrossRef]

8. Barussaud M, Regenet N, Briennon X, et al. Clinical spectrum and surgical approach of adult intussusceptions: a multicentric study. Int J Colorectal Dis. 2006;21(8):834-839. [CrossRef]
9. Easter DW, Cuschieri A, Nathanson LK, Lavelle-Jones M. The utility of diagnostic laparoscopy for abdominal disorders: audit of 120 patients. Arch Surg. 1992;127(4):379-383. [CrossRef]
10. Khaitan L, Holzman MD. Laparoscopic advances in general surgery. JAMA. 2002;287(12):1502-1505. [CrossRef]
11. Sauerland S, Agresta F, Bergamaschi R, et al. Laparoscopy for abdominal emergencies: evidence-based guidelines of the European Association for Endoscopic Surgery. Surg Endosc. 2006;20(1):14-29. [CrossRef]
12. Mari GM, Crippa J, Costanzi ATM, et al. Intracorporeal anastomosis reduces surgical stress response in laparoscopic right hemicolectomy: a prospective randomized trial. Surg Laparosc Endosc Percutan Tech. 2018;28(2):77-81. [CrossRef]
13. Siow SL, Mahendran HA. A case series of adult intussusception managed laparoscopically. Surg Laparosc Endosc Percutan Tech. 2014;24(4):327-331. [CrossRef]
14. Palanivelu C, Rangarajan M, Senthilkumar R, Madankumar MV. Minimal access surgery for adult intussusception with subacute intestinal obstruction: a single center's decade-long experience. Surg Laparosc Endosc Percutan Tech. 2007;17(6):487-491. [CrossRef]
15. Tartaglia D, Bertolucci A, Palmeri M, et al. The role of laparoscopy in adult bowel obstruction caused by intussusception. Ann Ital Chir. 2014;85(4):328-331.
16. Ahmad G, O'Flynn H, Duffy JMN, Phillips K, Watson A. Laparoscopic entry techniques. Cochrane Database Syst Rev. 2012;2(2):CD006583. [CrossRef]
17. Farinella E, Cirocchi R, la Mura F, et al. Feasibility of laparoscopy for small bowel obstruction. World J Emerg Surg. 2009;4:3. [CrossRef]