


Intussusception in Adults: A Retrospective Review from a Single Institution

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Purpose: Intussusception is uncommon in adults and often manifests as nonspecific symptoms. Owing to its low incidence and the lack of knowledge on the symptoms, causes, and treatment of adult intussusception (AI), many surgeons may have limited experience in the diagnosis and treatment of intussusception. This study aimed to describe the experience of AI and discuss its clinical presentation, etiology, and management.

Material and Methods: I retrospectively reviewed patients aged 19 years and older who were diagnosed with intussusception at a single institution between March 2010 and December 2019.

Results: Among 28 patients who were finally analyzed, abdominal pain was the most commonly observed symptom. Ileocolic and ileoileal intussusceptions were the most common locations, and a lead point was observed in 19 cases (68%), of which malignancy was observed in six (21%). Bowel resection was performed in 27 cases. According to the pathological findings of the tissue from the resected section, nine and three cases of small bowel intussusception (SBI) were benign and malignant, respectively, whereas 13 and three cases of colonic intussusception (CI) were benign and malignant, respectively. On comparing SBI and CI, it was observed that most variables did not significantly differ, except for the duration of symptoms.

Conclusion: SBI had a higher lead point than CI. The rate of malignancy in CI cases in this study was lower than that reported in other studies. En-bloc resection can be considered the first option for the treatment of AI.

Keywords: intussusception, bowel obstruction, lead point

Introduction

Intussusception refers to the invagination (telescoping) of a part of the intestine into itself. This is the most common abdominal emergency in infancy, especially in children aged <2 years. The majority of pediatric cases are idiopathic, and pathological lead points are identified in only 25% of pediatric cases.¹ Intussusception is rare in adults.²⁻⁶ The main causes of intussusception in adults are as follows: carcinomas, polyps, strictures, benign tumors, Meckel's diverticulum, and colonic diverticulum.⁷ It is estimated that only 5% of all intussusception cases occur in adults, and the diagnosis is often overlooked.²⁻⁵ In addition, adult intussusception (AI) often manifests as nonspecific symptoms, less obvious due to the marked symptoms of partial bowel obstruction.^{2,4,8} Therefore, the initial diagnosis is often missed or delayed, and this may cause a delay in treatment. Because of the low incidence, as well as the paucity of specific symptoms, many surgeons may have limited experience in the diagnosis or treatment of AI. This study aimed to describe

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the experience of AI and discuss its clinical presentation, etiology, and management in a regional hospital.

Materials and Methods

This retrospective study was approved by the Haeundae Paik Hospital Institutional Review Board (HPIRB 2021–03-005). Informed consent was waived by The Ethics Committee of Haeundae Paik Hospital of Inje University College of Medicine because it was practically impossible to obtain consent from the subject, and the process of data collection did not exceed the normal risk of harm to the participants. During this study, all data were secured in a password-locked computer file, and access to the research investigator was restricted. This study was in compliance with the Declaration of Helsinki.

This study included patients aged 19 years and older diagnosed with intussusception using the ICD-10 classification code of K56.1 on computed tomography or ultrasonography at Haeundae Paik Hospital between March 2010 and December 2019. Information was collected on age, gender, symptoms, duration of symptoms, surgical treatment, etiology of intussusception, pathological type, histology, and outcome from case notes and pathology records. Patients who underwent spontaneous bowel reduction were excluded from the study. The mode of presentation, calculated from the duration of symptoms, was classified as acute (duration of ≤ 14 days) and chronic (>14 days). Intussusception was preoperatively identified on abdominal ultrasonography based on the target and doughnut signs on the transverse view and on multi-slice spiral computed tomography scans based on the characteristic target or sausage sign, edematous bowel wall, and mesentery in the lumen. Intraoperative findings were described in the context of two parameters as follows: one was the triggering lesion, and the other was the site of intussusception. The triggering lesion was described as either an idiopathic or structural pathological lead point. Intussusception was considered idiopathic if no clear disease trigger or pathologic lead point was observed. Intussusception was categorized according to the location as follows: colonic intussusception (CI) and small bowel intussusception (SBI). An intussusception that involved only the jejunum or ileum was considered SBI. Ileocolic intussusception, which involved the ileum and the colon, was classified as CI. A lead point was defined as a pathological tissue (benign or malignant) observed in the specimen of the resected bowel that was involved in intussusception.

Non-normally distributed continuous variables are expressed as the median and interquartile range (IQR). Categorical data are described as counts and percentages. The Shapiro–Wilk test was performed to verify the assumption of normality. After descriptive analyses were performed, the chi-square test or Fisher’s exact test was used to compare categorical variables between groups, while the Mann–Whitney *U*-test was used to compare continuous variables between the groups. A difference was considered significant if the two-tailed *p*-value was <0.05 . Data analysis was performed using SPSS v25 (IBM Inc., Armonk, NY, USA).

Results

Among patients who presented to the emergency department, 32 patients diagnosed with intussusception were admitted during the study period. Four of them who were managed with conservative treatment were excluded from the study due to spontaneous reduction during admission. The data of 28 patients were analyzed. Of the 28 patients, 10 (36%) were male, and 18 (64%) were female. The median age of the patients was 51 years (IQR, 40–70 years). All patients were symptomatic, with symptoms persisting for one to four weeks. The period from the appearance of symptoms to the initial hospital visit was less than two weeks in 20 (71%) cases and over two weeks in 8 (29%) cases. All patients had a history of abdominal pain. The next most frequent symptoms were nausea and diarrhea, which occurred in 8 (29%) patients. Intussusception was located in the colon 16 (57%) and the small intestine 12 (43%). The ileocolic type was the most common, occurring in 10 (36%) cases, followed by the ileoileal type in 9 (32%) cases. A lead point was observed in 19 (68%) cases, of which 6 (21%) were malignant lesions. Bowel resection was performed in 27 (96%) cases, and postoperative complications occurred in 5 (18%) cases (Table 1). There were 3 cases of surgical site infections, 3 cases of adhesive ileus, and 1 case of surgical site infection and adhesive ileus. According to the pathological findings of intussusception, 9 and 3 cases of SBI were benign and malignant, respectively, while 13 and 3 cases of CI were benign and malignant, respectively (Table 2). On comparing SBI and CI, it was observed that most variables did not significantly differ, except the duration of symptoms ($P=0.044$) (Table 3).

Discussion

In this study, abdominal pain was the commonest symptom among the patients, and most had ileocolic and

Table 1 Summary of Patients Demographics

Patient Demographics	Total Patient (n=28)	No. (%)
Age	Year, median (IQR)	51 (40–70)
Gender	Male	10 (36)
Symptoms	Abdominal pain Nausea Diarrhea Vomiting Anorexia Constipation Bleeding per rectum Bowel habit change Abdominal distension Weight loss	28 (100) 8 (29) 8 (29) 5 (18) 4 (14) 3 (11) 3 (11) 2 (7) 2 (7) 1 (4)
Duration of symptoms	Day, median (IQR) Acute (≤ 2 weeks)	4 (2–14) 20 (71)
Type	Colocolic Ileocolic Ileocecal Ileoileal Jejunioileal Jejunojunal	4 (14) 10 (36) 3 (10) 9 (32) 1 (4) 1 (4)
Location	CI SBI	16 (57) 12 (43)
Cause of intussusception	Presence of lead point Malignant	19 (68) 6 (21)
LOS	Day, median (IQR)	11 (9–15)
Treatment	Bowel resection Reduction	27 (96) 1 (4)
Postoperative complication	Presence of complication	5 (18)

Abbreviations: IQR, interquartile range; CI, colonic intussusception; SBI, small bowel intussusception; LOS, length of hospital stay.

ileoileal intussusceptions. A lead point was observed in 19 (68%) cases, malignancy was observed in six (21%), and bowel resection was performed in 27.

Intussusception in children often presents with sudden onset of intermittent abdominal pain, vomiting, currant jelly stool, and the presence of a palpable abdominal mass. However, AI may present with acute, subacute, or chronic

Table 2 Pathological Findings of Adult Intussusception Specimens

Location		Pathology of Lead Point	No.
SBI	Benign (n=9)	Idiopathic	3
		Lipoma	2
		Inflammatory fibroid polyp	2
		Gastrointestinal stromal tumor	1
		Ectopic pancreas	1
	Malignant (n=3)	Malignant lymphoma	1
		Adenocarcinoma	1
Metastatic carcinoma of unknown primary origin		1	
Total		12	
CI	Benign (n=13)	Idiopathic	6
		Lipoma	3
		Leiomyoma	1
		Tubulovillous adenoma	1
		Neurofibroma	1
		Inflammatory fibroid polyp	1
	Malignant (n=3)	Adenocarcinoma	2
		Appendiceal mucinous neoplasm	1
	Total		16

Abbreviations: SBI, small bowel intussusception; CI, colonic intussusception.

non-specific symptoms.^{5,9} Some studies reported an acute presentation duration ranging from several days to two weeks in more than half the patients.^{5,6} However, the clinical presentation of AI is often characterized by non-specific chronic symptoms that may be related to intermittent partial bowel obstruction caused by intussusception.^{2,10,11} In this study, the median duration for which symptoms lasted prior to presentation was 4 days (IQR, 2–14 days), and 20 (71%) patients presented with acute symptoms. Regarding the comparison of the duration of symptoms between SBI and CI, Azar et al reported that SBI had a longer duration, while Chiang et al reported that CI had a longer duration.^{2,12} In this study, as in the Azar group's study, the incidence of chronic symptoms was higher in SBI cases than in CI cases.

The most common symptoms were abdominal pain, followed by vomiting and nausea, as observed in several other studies.^{2,3} Hematochezia and a palpable abdominal mass were reported in a few patients.¹³ These symptoms were related to the obstructive nature of most intussusceptions. In this study, abdominal pain was the most common

Table 3 Comparison Between CI and SBI

	SBI (n=12)	CI (n=16)	P-value
Age (y), median (IQR)	54 (39–68)	52 (40–72)	0.953
Gender (Male:Female)	3:9	7:9	0.434
LOS (days), median (IQR)	14 (9–20)	11 (9–15)	0.349
Benign:Malignant	9:3	13:3	1.000
Duration of symptoms (Acute:Chronic)	6:6	14:2	0.044
Complication (No:Yes)	9:3	14:2	0.624

Abbreviations: IQR, interquartile range; CI, colonic intussusception; SBI, small bowel intussusception; LOS, length of hospital stay.

symptom, present in 28 cases (100%), followed by nausea and diarrhea in eight cases (29%), vomiting in five cases (18%), and bleeding per rectum in three cases (11%).

About 70–90% of intussusceptions in adults have a lead point, which is a well-defined pathological abnormality.^{2,5,14} Neoplasms are the most common etiology of adult intussusception, and malignant lesions account for approximately 60% of all neoplasms causing intussusception.¹⁵ In general, the majority of lead points in the small bowel consist of benign lesions, such as benign neoplasms, inflammatory lesions, Meckel's diverticulum, appendix, and adhesions. Malignant lesions (either primary or metastatic) account for approximately 30% of SBI cases.^{3,9,12} In contrast, intussusception in the large bowel is more likely to have a malignant etiology and represents approximately 75% of total cases.^{3,14–18} This study found lead points and malignancy in 67.9% and 21% of patients, respectively. The incidence rate of malignancy in the small bowel was 25%, which was similar to that reported in other studies. However, malignant neoplasms in the large bowel were observed in 18.8% of cases, which was lower than that reported in other studies. In CI cases, acute symptoms were commonly observed, with an incidence of 88% (n=14), and seem to be related to idiopathic causes (35%), such as mucosal or submucosal hemorrhage, or nonspecific inflammation, the incidence of which was higher than that of malignancy (18.8%) with chronic symptoms.

The most common locations of intussusception in the gastrointestinal tract are the junctions between freely-moving segments and the retroperitoneal space or segments fixed by adhesions.⁴ Several types of intussusception occur in adults.^{19,20} In this study, the ileocolic type was the most common, occurring in 10 (36%) patients, and the ileoileal type was observed in 9 (32%) patients.

AI lead points are observed more often, and the incidence of malignancy is high.^{14,15,21} Therefore,

preoperative barium or air reduction is not recommended.⁴ The optimal management is definitive surgical resection, which is performed in almost all cases.^{5,15} The main issue in the debate regarding the treatment of AI concerns primary en bloc resection versus initial reduction followed by a more limited resection.^{2,3,22,23} The controversy on the extent of bowel resection and intraoperative bowel reduction in AI is yet to be resolved. Factors supporting en bloc resection of the bowel are the risk of intraluminal or venous dissemination of tumor cells through the manipulation of the intussuscepted bowel or the risk of perforation of the ischemic, friable, edematous bowel, which may lead to seeding of tumor cells and microorganisms into the peritoneal cavity.^{2,3} However, in SBI cases, the possibility of malignancy is low; thus, reducing the intussuscepted bowel could prevent short bowel syndrome by preserving the length of the intestine.²⁴ Moreover, Begos et al reported that if a preoperative diagnosis of a benign lesion is safely established, surgeons can reduce the intussusception by milking from the distal to the proximal direction.³ Despite advances in radiological procedures, it is difficult to differentiate between benign and malignant lesions preoperatively in cases of intussusception.²³ Therefore, the best treatment options for managing this problem remain debatable. In this study, en bloc bowel resection and primary anastomosis were performed in all patients except one patient who had a simple operative reduction.

This study has several potential limitations. First, the data were retrospectively collected from medical records, and no randomization technique was applied. Second, the study included a small number of patients admitted to a single institution. Therefore, there is a possibility that the lack of samples may have reduced the statistical significance. To clarify these issues, future prospective, large-scale, multicenter studies are required.

Conclusions

The clinical findings of this study were similar to those of other reports in the literature. SBI cases had a higher occurrence of lead points than CI cases. In this study, the rate of malignancy in CI was lower than that reported in other studies. Definitive surgery, including en bloc resection, can be considered the first treatment option for AI. Although the incidence of malignancy was low in this study, other treatment methods, such as reduction and limited resection, should be investigated in further studies.

Disclosure

The author declares no conflicts of interest.

References

1. Ntoulia A, Tharakan SJ, Reid JR, Mahboubi S. Failed Intussusception Reduction in Children: correlation Between Radiologic, Surgical, and Pathologic Findings. *AJR Am J Roentgenol*. 2016;207(2):424–433. doi:10.2214/AJR.15.15659
2. Azar T, Berger DL. Adult intussusception. *Ann Surg*. 1997;226(2):134–138. doi:10.1097/0000658-199708000-00003
3. Begos DG, Sandor A, Modlin IM. The diagnosis and management of adult intussusception. *Am J Surg*. 1997;173:88–94. doi:10.1016/S0002-9610(96)00419-9
4. Marinis A, Yiallourou A, Samanides L, et al. Intussusception of the bowel in adults: a review. *World J Gastroenterol*. 2009;15(4):407–411. doi:10.3748/wjg.15.407
5. Yakan S, Caliskan C, Makay O, Denecli AG, Korkut MA. Intussusception in adults: clinical characteristics, diagnosis and operative strategies. *World J Gastroenterol*. 2009;15(16):1985–1989. doi:10.3748/wjg.15.1985
6. Balogun OS, Olajide TO, Afolayan M, Lawal A, Osinowo AO, Adesanya AA. An Appraisal of the Presentation and Management of Adult intussusception at a Nigerian Tertiary Hospital. *Niger Postgrad Med J*. 2019;26(3):169–173. doi:10.4103/npmj.npmj_47_19
7. Kassir R, Debs T, Boutet C, et al. Intussusception of the Meckel's diverticulum within its own lumen: unknown complication. *Int J Surg Case Rep*. 2015;10:111–114. doi:10.1016/j.ijscr.2015.03.042
8. Martin-Lorenzo JG, Torralba-Martinez A, Liron-Ruiz R, et al. Intestinal invagination in adults: preoperative diagnosis and management. *Int J Colorectal Dis*. 2004;19(1):68–72. doi:10.1007/s00384-003-0514-z
9. Felix EL, Cohen MH, Bernstein AD, Schwartz JH. Adult intussusception; case report of recurrent intussusception and review of the literature. *Am J Surg*. 1976;131:758–761. doi:10.1016/0002-9610(76)90196-3
10. Ongom PA, Opio CK, Kijambu SC. Presentation, aetiology and treatment of adult intussusception in a tertiary Sub-Saharan Hospital: a 10-year retrospective study. *BMC Gastroenterol*. 2014;14(1):86. doi:10.1186/1471-230X-14-86
11. 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. doi:10.1007/s11605-011-1609-4
12. Chiang JM, Lin YS. Tumor Spectrum of Adult Intussusception. *J Surg Oncol*. 2008;98(6):444–447. doi:10.1002/jso.21117
13. Marsicovetere P, Ivatury SJ, White B, Holubar SD. Intestinal Intussusception: etiology, Diagnosis, and Treatment. *Clin Colon Rectal Surg*. 2017;30(10):30–39. doi:10.1055/s-0036-1593429
14. Kim KH, Namgung H, Park DG. Adult intussusceptions: preoperative predictive factors for malignant lead point. *Ann Surg Treat Res*. 2014;86(5):244–248. doi:10.4174/astr.2014.86.5.244
15. Huang BY, Warshauer DM. Adult intussusception: diagnosis and clinical relevance. *Radiol Clin N Am*. 2003;41:1137–1151. doi:10.1016/S0033-8389(03)00116-7
16. Tan KY, Tan SM, Tan AG, Chen CY, Chng HC, Hoe MN. Adult intussusception: experience in Singapore. *ANZ J Surg*. 2003;73:1044–1047. doi:10.1046/j.1445-2197.2003.t01-22-x
17. Wang LT, Wu CC, Yu JC, Hsiao CW, Hsu CC, Jao SW. Clinical entity and treatment strategies for adult intussusceptions: 20 years' experience. *Dis Colon Rectum*. 2007;50:1941–1949. doi:10.1007/s10350-007-9048-8
18. Eisen LK, Cunningham JD, Aufses AH. Intussusception in adults: institutional review. *J Am Coll Surg*. 1999;188:390–395. doi:10.1016/S1072-7515(98)00331-7
19. Mandeville K, Chien M, Willyerd FA, Hostetler MA, Bulloch B. Intussusception: clinical presentations and imaging characteristics. *Pediatr Emerg Care*. 2012;28(9):842–844. doi:10.1097/PEC.0b013e318267a75e
20. Demirkan A, Yağmurlu A, Kepenekci I, Sulaimanov M, Gecim E, Dindar H. Intussusception in Adult and Pediatric Patients: two Different Entities. *Surg Today*. 2009;39(10):861–865. doi:10.1007/s00595-009-3979-8
21. Haas EM, Etter EL, Ellis S, Taylor TV. Adult intussusception. *Am J Surg*. 2003;186:75–76. doi:10.1016/S0002-9610(03)00108-9
22. Barussaud M, Regenet N, Briennon X, et al. Clinical spectrum and surgical approach of adult intussusceptions: a multicentric study. *Int J Colorectal Dis*. 2006;21:834–839. doi:10.1007/s00384-005-0789-3
23. Yalamarthi S, Smith RC. Adult intussusception: case reports and review of literature. *Postgrad Med J*. 2005;81:174–177. doi:10.1136/pgmj.2004.022749
24. Lianos G, Bali XC, Baltogiannis G, Ignatiadou E. Adult bowel intussusception: presentation, location, etiology, diagnosis and treatment. *G Chir*. 2013;34(9–10):280–283.

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