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Surgical versus conservative management of adult intussusception: Case series and review



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ABSTRACT

INTRODUCTION: Intussusception is the telescoping of a segment of bowel into its adjacent segment. It is a known cause of abdominal pain in the pediatric population, however, it is rare in the adult. Adults do not always present with the typical symptoms seen in young children, making the clinical diagnosis more difficult. The etiology of adult intussusception can be idiopathic, benign, or malignant. Diagnosis is most accurately made with computed tomography, which is sensitive in detecting intussusception as well as potential lead points.

PRESENTATION OF CASES: This study presents four adult patients with intussusception. The first three patients are adults with idiopathic intussusception and no evidence of a lead point. The fourth case involves intussusception secondary to a jejunal carcinoid tumor which was treated surgically. Each case has unique features in terms of length and number of intussusceptions, duration of symptoms, and recurrence.

DISCUSSION: Surgical treatment was once argued to be universally appropriate for adult intussusceptions; however, with increased use of advanced imaging, newer literature is demonstrating that this is not true in all cases. Idiopathic intussusception presents with nonspecific symptoms and can be managed with supportive care when the history and clinical picture indicate low probability of a neoplasm.

CONCLUSION: This study aims to raise awareness to the potential diagnosis and management of intussusceptions, particularly the symptomatic idiopathic type in the young adult.

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1. Introduction

Intussusception is the telescoping of a segment of bowel into its adjacent segment. It is a known cause of abdominal pain in the pediatric population, however, it is rare in the adult. Unlike the classical signs and symptoms of intussusception seen in the pediatric population, such as short lived recurrent episodes of colicky abdominal pain, lethargy, fever, and currant jelly like stools, adult patients with intussusception usually present with atypical signs and symptoms [1,2]. Due to this fact, the clinical diagnosis can be challenging in adults. The etiology of adult intussusception can be due to idiopathic, benign, or malignant processes [3]. There are many publications in the literature about intestinal intussusceptions of various identifiable etiologies, however, there are only a few publications commenting on idiopathic intestinal intussusceptions. In this paper, four cases of entero-enteric intussusceptions are presented, with three of them idiopathic in etiology and one associated with a jejunal carcinoid tumor. While surgical

treatment was once argued to be universally appropriate for adult intussusceptions, recent literature suggests that a more selective approach is warranted. Our aim is to raise awareness to the potential diagnosis and management of intussusceptions, particularly the symptomatic idiopathic type in the young adult.

2. Presentation of case #1

A 20-year-old man presented to the emergency department (ED) after a motor vehicle accident with soft tissue contusions, several abrasions, and abdominal pain. The abdominal pain, however, was not associated with the trauma, as he developed a colicky abdominal pain two days prior to his presentation. During this time he also complained of loss of appetite, diarrhea, and one episode of nausea and vomiting. His vital signs were within normal physiological range. His physical exam revealed a soft, non-tender, and non-distended abdomen, a normal rectal exam, and no signs of obstruction or peritonitis. CT scan of his abdomen and pelvis with and without IV contrast revealed a 3 cm long intussusception of the small bowel without obstruction (Fig. 1). CBC, CMP, and urine analysis were all within normal limits. The patient was admitted for clinical follow up with a conservative approach. Serial abdominal examinations were performed. Further radiographic testing with

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Fig. 1. Computed tomography (CT) of the abdomen and pelvis with IV contrast showing a small bowel intussusception in the left mid abdomen, extending over a vertical height of about 3 cm. Note the appearance of a “target sign”.

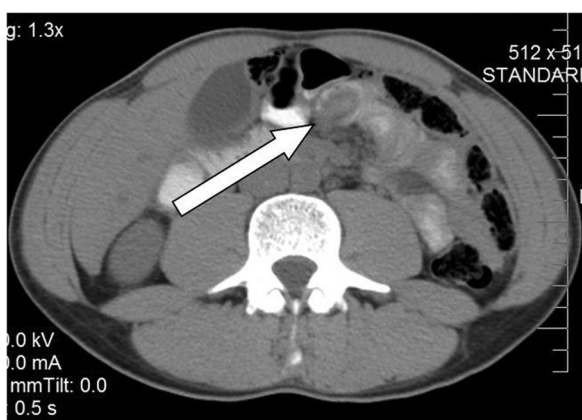


Fig. 2. CT Abdomen/Pelvis with oral contrast.

a small bowel series was undertaken to restudy the intussusception which showed resolution and no other pathology. Based on the clinical picture and radiographic findings, a diet was started and advanced as tolerated. He was discharged later that day. At the time of writing, the patient is without any signs or symptoms of recurrence.

3. Presentation of case #2

An 18-year-old man presented to the ED complaining of left upper quadrant abdominal pain. Physical exam, labs, and CT of the abdomen and pelvis were normal. Without any concerning findings, the patient was discharged. Three days later, the patient returned to the emergency department, describing intermittent left upper quadrant abdominal pain without any episodes of nausea, vomiting, fevers, chills, hematochezia, melena, diarrhea, or constipation. Vital signs were all within normal limits. His abdomen was soft and non-distended, however the left upper quadrant was tender to touch without peritoneal signs. His labs were within normal limits. The CT of the abdomen and pelvis revealed a jejuno-jejunal intussusception with a length of 2.9 cm in the left upper quadrant (Fig. 2). No bowel obstruction was found. The patient was admitted for observation with serial abdominal exams and conservative management. Resolution of the jejuno-jejunal intussusception was documented on repeat CT. His symptoms improved clinically and his exam findings and vital signs remained normal. He was subsequently discharged.

Three months later, the patient again presented to the ED with a half-day history of vague abdominal pain localized to the



Fig. 3. CT Abdomen/Pelvis without contrast. Note the intussusception in the anterior abdomen at the level of the umbilicus.

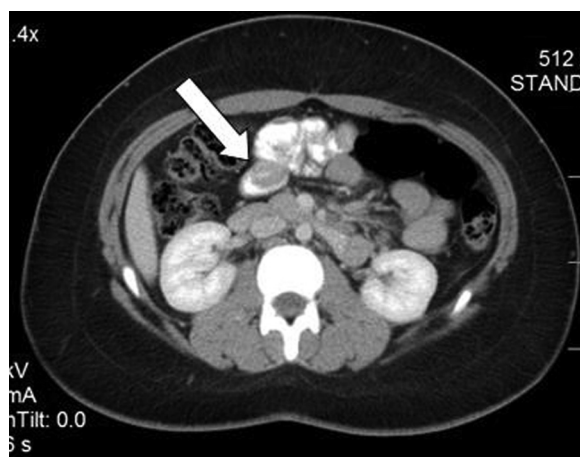


Fig. 4. CT Abdomen/Pelvis with IV and oral contrast.

umbilicus and associated nausea. According to the patient, the pain was similar to the pain from his previous presentation. Vital signs were all within normal limits. The abdominal exam was benign, without peritoneal signs. CT of the abdomen and pelvis revealed an intussusception, but this time at the level the umbilicus in the anterior abdomen, again without associated obstruction (Fig. 3). Labs revealed no abnormalities. The patient was admitted for observation with conservative management. Repeat CT of the abdomen and pelvis showed persistence of the intussusception, with a measured length of about 1.5 cm. A second focus of intussusceptions was also found inferior to the formerly described intussusception and slightly to the left of midline, which was measured to be about 2.2 cm without obstruction. He reported his pain to be less severe. Physical exam, vitals, and labs were normal. Subsequent small bowel follow-through studies revealed resolution of the intussusceptions. The patient's clinical status continued to improve, so he was discharged. He has had no recurrences to this date.

4. Presentation of case #3

A 19-year-old woman presented to the ED with pain localized to the mid/right upper abdomen, nausea, and a low grade temperature for approximately 2 weeks. The abdomen was found to be soft, non-distended, and tender in the right upper quadrant without peritoneal signs. All vital signs and labs were normal. CT of the abdomen and pelvis with IV and oral contrast revealed an intussusception with a length of 2.7 cm in the right upper quadrant without any signs of obstruction (Fig. 4). She was kept overnight and followed with conservative management. A repeat CT of the

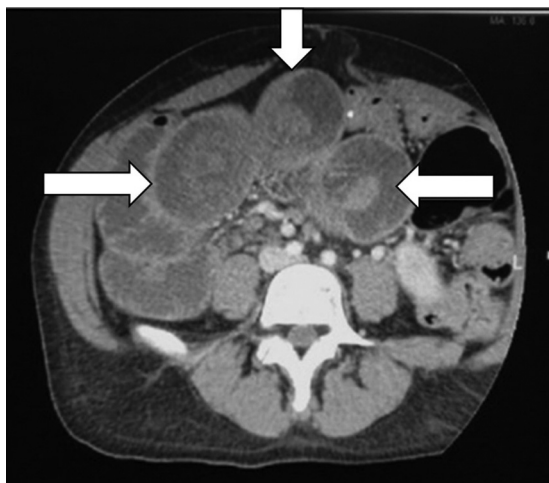


Fig. 5. CT abdomen without contrast showing multiple target signs in the small bowel (arrows).

abdomen and pelvis with oral contrast revealed resolution of the intussusception. The patient's pain resolved and her exam findings remained normal. Discharge ensued and she has not been back with similar symptoms since the previous admission.

5. Presentation of case #4 (Previously reported in Matulich et al. [4])

A 34-year-old woman with sudden onset of generalized abdominal tenderness was transferred from an outside hospital. Her history was significant for multiple prior admissions for abdominal problems, the first of which was for an ischemic bowel in 2005, which was treated with an ileo-colic anastomosis. In 2013, she presented with severe anemia and EGD revealed a carcinoid tumor in the lesser curvature of her stomach which was removed endoscopically. She presented again in 2013, shortly before her current admission, and CT scan revealed two nodules in the liver, a nodule in the left adrenal gland, and an umbilical hernia. Her liver nodules were concerning for carcinoid syndrome, but urine 5-HIAA at this time was negative. Her history was also significant for volvulus, multiple gastric ulcers, and a tubular adenoma found on colonoscopy.

When she arrived to our hospital in August of 2013, her physical exam was significant for diffuse abdominal tenderness. She reported that her last bowel movement was earlier on the day of admission. An abdominal CT was ordered, which showed multiple dilated loops of bowel and three distinct target signs (Fig. 5), as well as significant mechanical traction of the distal small bowel.

The patient was taken to the operating room for an exploratory laparotomy. A midline incision was made and an intussusception was visualized affecting the proximal jejunum (Fig. 6). A carcinoid tumor was identified which served as the lead point for the intussusception. The affected portion of bowel was resected, and a jejunojejunal anastomosis was created. An area of narrowed ileum was discovered near the ileocolic anastomosis previously created after her episode of ischemic bowel. Mesenteric foreshortening was noted throughout the bowel as were multiple fibrotic implants. An internal hernia and an umbilical hernia were noted, though they did not appear to act as lead points, and subsequently reduced.

The patient had no apparent complications from the procedure and recovered well. She was discharged on post-operative day 8 and was followed up in clinic as an outpatient.



Fig. 6. Area of intussusception found in proximal jejunum. Affected area of bowel was excised and jejunojejunal anastomosis was created.

6. Discussion

The etiology, clinical features, and management of intussusception differ markedly between adults and children. Intussusceptions are much more common in children, with adults accounting for about 5% of all cases [2]. It is the most common cause of bowel obstruction in children, whereas it is responsible for only about 1% of cases in adults [1,5]. Pediatric cases classically present with a triad of acute onset of abdominal pain, currant jelly stools, and a palpable sausage-like mass in the abdomen, while adults tend to have more chronic and nonspecific symptoms suggestive of partial obstruction [1,2]. Cases in children are idiopathic 90% of the time, where the lead point is thought to be caused by lymphoid hyperplasia after a preceding viral infection [1]. In contrast, adult intussusceptions are less likely to be idiopathic and more likely to be associated with a malignancy [2,3,6].

Many processes can act as lead points in adults, not limited to polyps, benign neoplasms such as lipomas, colonic diverticula, Meckel's diverticulum, strictures, feeding tubes, and malignant neoplasms of the bowel [2,7–10]. Common locations of intussusceptions in adults involve the intestinal segments lying between the freely moving bowel loops and attachments of any kind, such as the anatomical attachments to the retroperitoneum or bowel segments tethered by adhesions [2,11]. Entero-enteric intussusceptions account for the majority of cases in adults, though gastro-enteric, ileo-colic, and colo-colonic intussusceptions also occur [12,13]. In our patient population, all intussusceptions were entero-enteric. One case was caused by a carcinoid tumor in the proximal jejunum while three were transient and idiopathic in nature, with initial and follow up studies that did not demonstrate or suggest a suspicious lead point. Furthermore, none of the three patients with transient intussusception had any previous surgical history, thus eliminating adhesions as a potential contributor to their disease.

The presentation of adult intussusception is highly variable, making diagnosis in the adult patient difficult. Intussusception involves the telescoping of a segment of bowel, along with its mesentery, into an adjacent segment. If venous blood flow is compromised, the tissue can become edematous, ischemic, and eventually necrotic. Frequently, patients will complain of vague, chronic, and nonspecific symptoms. Pain seems to be the most common symptom, being present in 71–90% of adult patients [3,14]. Nonspecific symptoms in adults can include nausea, vomiting, changes in bowel habits, abdominal distension, and hematochezia [2,8,13]. When intussusception coexists with a malignant lesion,

symptoms may also include weight loss, melena, or a palpable abdominal mass [15].

Imaging with CT is a sensitive test for diagnosing adult intussusception [2,3,5]. In addition, it can aid in identifying pathological lesions which may be serving as lead points, can be used to detect vascular compromise, and can be used to predict the likelihood of self-resolution [16,17]. Ultrasound is less sensitive than CT, but can visualize the pathognomonic target sign in some cases [2]. It has been shown to be particularly useful in evaluation of adult intussusception presenting as a palpable abdominal mass, where it has an accuracy of greater than 90% [18]. Plain abdominal films, upper GI contrast series, and barium enema examinations are helpful when obstruction is suspected [2]. On the other hand, these exams sacrifice diagnostic accuracy, as one study found that upper GI contrast series and barium enema had accuracies of 21 and 54%, respectively [5].

Due to the high rates of malignancy and other structural abnormalities in adult intussusception, it has traditionally been considered an indication for surgery [2]. However, due to more frequent use of CT scan, detection of transient intussusceptions without underlying pathology has increased [15]. Many retrospective studies have analyzed the cause of adult intussusception using various inclusion criteria. When looking at patients with a postoperative diagnosis of intussusception, Azar et al. found that 93% of patients had an identifiable lesion and 48% of enteric lesions were malignant [5]. Weilbaecher et al. analyzed 160 case reports from 1952 to 1971, with 90% of cases being due to a pathologic lesion, and malignancy present in 24% of enteric cases and 54% of colonic cases [8]. In a review of 41 adults with 44 intussusceptions as a postoperative diagnoses, Wang et al. found tumors associated with 54.5% of intussusceptions, of which 27.3% were malignant [18].

Many of the retrospective studies underrepresent or fail to include cases of transient intussusception which were treated nonoperatively. Rather than looking at postoperative diagnoses, several retrospective studies have used documentation of adult intussusception on reports of imaging studies as criteria for inclusion. In one review of 33 adults diagnosed with intussusception based on CT or MRI findings, a malignant mass was present in 21.2% of cases while 48% were considered idiopathic [13]. Lvoff et al. used a computerized search to identify 37 cases of adult intussusception found on CT examination. 84% of these patients were managed nonoperatively, while the remaining 16% had an identifiable lead point and received surgery [16]. Rea et al. used CT reports to identify 170 patients with adult intussusception. 17.1% had a lead point, 17.6% were treated operatively, and 5 cases were associated with malignancy [12].

The more frequent use of cross-sectional imaging modalities in recent years has increased recognition of these transient intussusceptions in adults [19]. As in three of the cases presented here, many of these are idiopathic, with no evidence of underlying organic intestinal disease. They are most likely due to transient abnormalities in peristalsis and are highly likely to resolve with conservative therapy. Additionally, high rates of intestinal intussusception are present in patients with chronic intestinal disease, particularly in celiac disease [19,20]. In the case of celiac disease, it is theorized that abnormal inward rotation of bowel is permitted when normal peristaltic waves reach the dilated and flaccid regions of damaged bowel [21]. Transient intussusception has also been noted in Crohn's disease, again postulated to be due to peristaltic waves encountering pathological changes in the bowel wall [22]. These small bowel intussusceptions without an identifiable lead point are more likely to create an intussusception that is transient, non-obstructing, of smaller diameter, and shorter length compared to one with a lead point [13,15,16,23].

In the three cases treated conservatively in this study, all patients were young adults with a mean age of 19, and therefore we felt the risk of malignancy was low. Furthermore, these

patients presented with mild-to-moderate abdominal pain, non-specific symptoms, and no peritoneal signs, and bowel obstruction was ruled out by imaging studies. CT scan showed idiopathic intussusception without any features concerning for a lead point or vascular compromise. Among these three cases, CT scan revealed a mean intussusception length of 2.4 cm. In an analysis of 37 cases of adult intussusception identified by CT, Lvoff et al. found a significant difference between the length of the intussusception between surgically and conservatively managed cases and found a length of <3.5 cm as likely to be self-limiting [16]. The same value was found to be highly sensitive and specific in directing therapy of pediatric patients [24,25]. In contrast, the fourth case presented had multiple risk factors for a more serious condition including a history of carcinoid tumors and a history of multiple abdominal surgeries with associated adhesions. Surgical exploration of her abdomen detected a jejunal carcinoid tumor as well as an ileal stricture, both of which were repaired with bowel excision and primary anastomosis.

Collectively, these studies support the utility of a conservative approach to cases of adult intussusception where the probability of malignancy, lead point, and ischemia are low and the likelihood of spontaneous resolution is high. Despite the transient nature of many intussusceptions detected on CT, all patients need to be observed for progression or regression of their clinical picture in order to avoid potential complications such as obstruction, ischemia, and potential necrosis of the affected bowel segment. Additionally, a diagnosis of inflammatory bowel disease should be considered in patients with recurrent idiopathic intussusception [13,15]. Patients presenting with a vague clinical picture and symptoms at the time of presentation, short intussusception length on imaging studies, simultaneous nature of intussusceptions in different locations, and the absence of a lead point in the pathogenesis based on follow up imaging studies, conservative management is appropriate, albeit with caution. If the patients had developed signs of obstruction, bowel ischemia or necrosis, exploratory surgery is indicated.

7. Conclusion

In patients who present with a vague history and constellation of abdominal symptoms pointing towards obstruction and are found to have a short segment intussusception, it is a valid option to apply a conservative approach with caution. Based on the available literature, CT evaluation seems to have both diagnostic and prognostic value, as it provides enough evidence with regards to signs indicating the need for surgery. If exam and CT findings, as described earlier, hint or point towards a self-limiting intussusception, then conservative management with caution is appropriate with serial abdominal exams, bowel rest, IV fluids, and appropriate labs on an as needed basis, along with a follow-up imaging studies to assess the etiology and the status of the intussusceptions. In recurrent cases, further GI evaluation is warranted. With this conservative approach and in the light of absence of evidence of other coexisting pathologies, an emergent laparotomy can be avoided. In equivocal cases, diagnostic laparoscopy can assist in decision making, surgical planning, and treatment.

Conflicts of interest

None.

Funding

None.

Ethical approval

Not applicable.

Consent

Yes, consent was obtained on all patients in this study.

Authors contribution

Dr. Nail Aydin—Involved in treatment of patients. Conceived the project. Involved in analysis of patients and literature, manuscript preparation. They approved the final form of the manuscript.

Mr. Andrew Roth—Involved in analysis of patients and literature, manuscript preparation. They approved the final form of the manuscript.

Dr. Subhasis Misra—Involved in analysis of patients and literature, manuscript preparation. They approved the final form of the manuscript.

Guarantor

Dr. Subhasis Misra.

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References

- [1] M. Waseem, H.K. Rosenberg, Intussusception *Pediatr. Emerg. Care* 24 (11) (2008) 793–800.
- [2] A. Marini, A. Yiallourou, L. Samanides, N. Dafnios, G. Anastasopoulos, I. Vassiliou, T. Theodosopoulos, Intussusception of the bowel in adults: a review, *World J. Gastroenterol.* 15 (4) (2009) 407–411.
- [3] S. Yalamarthy, R.C. Smith, Adult intussusception: case reports and review of literature, *Postgrad. Med. J.* 81 (953) (2005) 174–177.
- [4] J. Matulich, K. Thurston, D. Galvan, S. Misra, A case of carcinoid likely causing jejunal intussusception, *Case Rep. Surg.* 2014 (2014) 949020.
- [5] T. Azar, D.L. Berger, Adult intussusception, *Ann. Surg.* 226 (2) (1997) 134–138.
- [6] K. Takeuchi, Y. Tsuzuki, T. Ando, M. Sekihara, T. Hara, T. Kori, H. Kuwano, The diagnosis and treatment of adult intussusception, *J. Clin. Gastroenterol.* 36 (1) (2003) 18–21.
- [7] W.T. Stubenbord, B. Thorbjarnarson, Intussusception in adults, *Ann. Surg.* 172 (2) (1970) 306–310.
- [8] D. Weilbaecher, J.A. Bolin, D. Hearn, W. Ogden 2nd, Intussusception in adults. Review of 160 cases, *Am. J. Surg.* 121 (5) (1971) 531–535.
- [9] M.N. Akcay, M. Polat, M. Cadirci, B. Gencer, Tumor-induced ileo-ileal invagination in adults, *Am. Surg.* 60 (12) (1994) 980–981.
- [10] S. Krishna, R. Prabhu, S. Thangavelu, R. Shenoy, Jejuno-jejunal intussusception: an unusual complication of feeding jejunostomy, *BMJ Case Rep.* (2013) 2013.
- [11] M. Sachs, A. Encke, Entero-enteral invagination of the small intestine in adults: a rare cause of uncertain abdomen, *Langenbecks Arch. Chir.* 378 (5) (1993) 288–291.
- [12] J.D. Rea, M.E. Lockhart, D.E. Yarbrough, R.R. Leeth, S.E. Bledsoe, R.H. Clements, Approach to management of intussusception in adults: a new paradigm in the computed tomography era, *Am. Surg.* 73 (11) (2007) 1098–1105.
- [13] D.M. Warshauer, J.K. Lee, Adult intussusception detected at CT or MR imaging: clinical-imaging correlation, *Radiology* 212 (3) (1999) 853–860.
- [14] H.A. Reijnen, H.J. Joosten, H.H. de Boer, Diagnosis and treatment of adult intussusception, *Am. J. Surg.* 158 (1) (1989) 25–28.
- [15] Y.H. Kim, M.A. Blake, M.G. Harisinghani, K. Archer-Arroyo, P.F. Hahn, M.B. Pitman, P.R. Mueller, Adult intestinal intussusception: CT appearances and identification of a causative lead point, *Radiographics* 26 (3) (2006) 733–744.
- [16] N. Lvoff, R.S. Breiman, F.V. Coakley, Y. Lu, R.S. Warren, Distinguishing features of self-limiting adult small-bowel intussusception identified at CT, *Radiology* 227 (1) (2003) 68–72.
- [17] T. Fujimoto, T. Fukuda, M. Uetani, Y. Matsuoka, K. Nagaoki, N. Asoh, I. Isomoto, T. Okimoto, H. Ohtani, N. Matsunaga, H. Mori, K. Hayashi, Unenhanced CT findings of vascular compromise in association with intussusceptions in adults, *AJR Am. J. Roentgenol.* 176 (5) (2001) 1167–1171.
- [18] N. Wang, X.Y. Cui, Y. Liu, J. Long, Y.H. Xu, R.X. Guo, K.J. Guo, Adult intussusception: a retrospective review of 41 cases, *World J. Gastroenterol.* 15 (26) (2009) 3303–3308.
- [19] G. Maconi, E. Radice, S. Greco, C. Bezzio, Bianchi Porro G: transient small-bowel intussusceptions in adults: significance of ultrasonographic detection, *Clin. Radiol.* 62 (8) (2007) 792–797.
- [20] N. Mushtaq, S. Marven, J. Walker, J.W. Puntis, M. Rudolf, M.D. Stringer, Small bowel intussusception in celiac disease, *J. Pediatr. Surg.* 34 (12) (1999) 1833–1835.
- [21] M.D. Cohen, D.J. Lintott, Transient small bowel intussusception in adult coeliac disease, *Clin. Radiol.* 29 (5) (1978) 529–534.
- [22] M.C. Knowles, E.K. Fishman, J.E. Kuhlman, T.M. Bayless, Transient intussusception in Crohn disease: CT evaluation, *Radiology* 170 (3 Pt. 1) (1989) 814.
- [23] Y. Erbil, L. Eminoglu, A. Calis, E. Berber, Ileocolic invagination in adult due to caecal carcinoma, *Acta Chir. Belg.* 97 (4) (1997) 190–191.
- [24] M.M. Munden, J.F. Bruzzi, B.D. Coley, R.F. Munden, Sonography of pediatric small-bowel intussusception: differentiating surgical from nonsurgical cases, *AJR Am. J. Roentgenol.* 188 (1) (2007) 275–279.
- [25] R. Smyth, W.A. McCallion, A. Paterson, Total jejunoileal intussusception: a case report and literature review, *Ulster Med. J.* 78 (1) (2009) 10–12.

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