

## Original Article

# Diagnosis and treatment of intestinal intussusception in adults: a rare experience for surgeons

Fatih Ciftci

Vocational School of Health Services, Istanbul Gelisim University, Avcilar, Istanbul, Turkey

Received March 21, 2015; Accepted June 3, 2015; Epub June 15, 2015; Published June 30, 2015

**Abstract:** Aim: We evaluated the aetiological factors, diagnoses and treatment outcomes of adult cases of invagination of the intestine, or intussusception. We elucidated the role of ultrasonography (USG), computed tomography (CT) and other techniques in the diagnosis of such cases. Patients and Methods: Six patients with sufficient medical data, all of whom were followed-up and treated for intussusception at Safa Hospital, General Surgery Clinic, Istanbul, Turkey, between July 2008 and December 2013, were enrolled. Results: The site of intussusception was the small bowel in five cases. The aetiopathology was benign in 5 (83.3%) cases and included inflammatory fibroid polyp (IFP) and adhesion. The malignant case was adenocarcinoma. The bowel segments involved were ileoileal in five cases and ileocolic in one case. Conclusions: USG and CT aided with the diagnosis. Although more rare in adults than in children, cases of ileus presenting with acute abdominal disorder, particularly those with an uncertain diagnosis, should be considered possible intussusception cases.

**Keywords:** Adult, invagination (intussusception), diagnosis

## Introduction

The prolapse of one segment of the gastrointestinal tract into the lumen of an immediately adjoining segment is referred to as intussusception [1]. At a paediatric age, this is the most frequent cause of acute abdominal disorder second to acute appendicitis. However, the disorder is rare in adults, comprising 0.02-0.03% of all cases reported in the hospital and 1-3% of all cases of surgical intestinal obstructions [1, 2]. In contrast to the situation with children, the aetiological factors in adults are known in 80-90% of cases. In the present study, we evaluated the aetiological factors, diagnoses and treatment outcomes of adult cases of intussusception at our clinic over 4 years between July 2009 and December 2013.

## Patients and methods

Six patients with sufficient medical data, all of whom were followed-up and treated for invagination at BagcilarSafa Hospital, General Surgery Clinic, Istanbul, Turkey, between July 2008 and December 2013, were enrolled. The complaints and physical findings of the patients were recorded.

A midline incision was employed in five cases, whereas a Pfannenstiel incision was preferred in one patient who was pregnant. Surgical de-intussusception was attempted in one case with idiopathic small bowel intussusception due to adhesion, but it was not successful. In one case of destructed vascular perfusion, resection of the involved segments was accomplished. Stomas were established in cases with excessive dilation and oedema of the proximal segment of the bowel, and anastomosis was accomplished in those with sufficient perfusion and tolerable oedema and dilation.

## Results

Of the six patients included in our study, three (50%) were males, and three (50%) were females. The patients' median age was 40 years (range: 15-69 years). The median time between reporting to the emergency clinic and surgery was 2.33 days (1-3 days). All six patients had complaints for less than 7 days, and a median duration of 2.33 days (1-3 days). The most frequent complaints were abdominal pain, nausea and vomiting (**Table 1**). On physical examination, abdominal tenderness and peritoneal irritation were frequent. The median white

## Intussusception

**Table 1.** Symptoms of our patients

Symptom	Malignant	Benign	Total
Abdominal pain	1	5	6
Nausea	1	2	3
Vomiting	-	1	1
Bloody diarrhoea	-	1	1

blood cell count was  $15.37 \pm 3.3/\text{mm}^3$ . Ultrasonography of the abdomen disclosed intussusception in two (33%) cases, and oedema and dilation were described in another case. Computed tomography (CT) of the abdomen revealed intussusception in three (75%) of four patients. Prior to surgery, the definite diagnosis rate was 50% ( $n = 3$ ).

The site of intussusception was the small bowel in five cases. The aetiopathology was benign in five (83.3%) cases and included inflammatory fibroid polyp (IFP) and adhesion. The malignant case was adenocarcinoma. Idiopathic intussusception was diagnosed in one patient (16.6%) in whom no cause was ascertained. One of the cases that had IFP was 16 weeks pregnant. The bowel segments involved were ileoileal in five cases and ileocolic in one case. Segmentary small bowel resection and end-to-end anastomosis were accomplished in five cases. In one case, right hemicolectomy and ileotransversostomy were accomplished. The median length of the resected bowel was  $28.1 \pm 19.1$  cm. Wound site infection occurred in one patient. The median length of stay in the hospital was 5.3 days (3-9 days). There was no mortality in our series.

### Discussion

Intussusception occurs as a result of unequal motility between adjacent segments of the intestine. The proximal segment is referred to as the intussusceptum, and the distal segment is referred to as the intussusciptens. The aetiopathology of intussusception is not well known; however, the predisposing factors of trauma, allergic reaction, genetic tendency, and physical, bacterial, metabolic and chemical stimuli have been suggested as precursors of the process, leading to lesions on the bowel wall and irritation caused by abnormal peristalsis. Many forms of classification have been used. IFPs develop most frequently in the gastrointestinal system. In the literature clinicopathological features of 21 cases of intussusception

due to IFP presented between 2009 and 2014 (**Table 2**). However, most frequently, anatomical forms arise that include the gastric antral (65-75%), ileocolic, colocolic (3-8%), enteroenteral (17-21%), duodenal (1%), oesophageal (1%), gallbladder (1%) and jejuno gastric regions [1, 3].

The cause of intussusception in children can be established in only 5% of cases, and the majority remain idiopathic. In adults, the aetiology is established in 80-90% of cases; in previous studies, the causes were a benign or malignant neoplasm in 65% of established cases and a non-neoplastic cause in 15-25% of cases [4, 5]. In the present study, the percentage of cases in which the cause of intussusception was established was 83.3%, in line with previous studies. Intussusception involving the small intestine is more frequent, and 90% of the causes involve polypoid lesions such as haematoma, IFP, adenoma, leiomyoma and Peutz-Jeghers syndrome; tuberculosis and Meckel's diverticulum are other causes. Malignant causes of small bowel intussusception are rare and include primary (particularly adenocarcinoma) or metastatic tumours. The aetiology of colocolic intussusception is malignancy in 50-60% of all cases [5, 6]. In the present study, most cases involved the small bowel, and the pathological causes were predominantly benign.

Evaluation of previous studies has shown that the median age for intussusception varies between 45 and 57.5 years [6-9]. Gender distribution appears to be equal between males and females. In the present study, gender distribution was in agreement with previous data; however, the median age was younger.

The rate of emergent laparotomy for intussusception varies from 20% to 61.5% in previous studies [3, 6, 10, 11]. Intussusception frequently presents with acute abdominal pain, nausea, vomiting and high WBC count. However, the presentation may be subacute or chronic in the case of partial obstruction. Most of our cases reported to the emergency clinic within 1-3 days of the onset of symptoms and were admitted for emergency surgery with a clinical diagnosis of an acute abdomen disorder or intestinal obstruction.

The pre-operative identification of intussusception is controversial. Correct identification is based on an accurate anamnesis, complete

## Intussusception

**Table 2.** Clinicopathological features of 21 cases of intussusception due to IFP presented between 2009 and 2014 in the literature

Ref	Publ. year	Gender	Time of discomfort	Physical mass	Radiological devices	Surgical preference	Tumour area	Tumour length in cm	Age in years
Ruffolo et al.	2009	F	3 d	NS	CT	S. resec.	Ileum	3.7	44
Szcepanow et al.	2009	F	2 d	-	USG	S. resec.	Ileojejunal	3	72
Gara et al.	2009	F	NS	-	CT	S. resec.	Ileum	5.5	76
Akbulut et al.	2009	F	5 d	-	USG	S. resec.	Ileum	11	73
Yakan et al.	2009	F	NS	NS	Urgent	S. resec.	Ileum	NS	60
	2009	F	NS	NS	CT	R. hemicol.	Ileum	NS	56
	2009	F	NS	NS	Urgent	S. resec.	Jejunum	NS	28
	2009	F	NS	NS	CT	S. resec.	Ileum	NS	62
Toydemir et al.	2010	M	2 mo	-	CT	W. res.	Ileum	4	54
Singhal et al.	2010	M	NS	-	NS	S. resec.	Ileum	4.5	65
	2010	F	NS	-	NS	S. resec.	Ileum	3	45
Nonose et al.	2011	F	45 d	-	CT	S. resec.	Ileum	4.5	56
Chelimila et al.	2012	F	2 mo	-	CT	S. resec.	Ileum	NS	43
Rabbani et al.	2012	F	NS	NS	CT	S. resec.	Ileum	NS	39
Jacobs et al.	2013	M	3 mo	NS	USG, CT	R. hemicol	Cecum	4.8	-
Ida et al.	2013	M	NS	NS	USG, CT	S. resec.	Ileum	3	79
Antonio et al.	2013	F	NS	NS	USG	S. resec.	Ileum	5	82
Martis et al.	2013	F	NS	+	USG	S. resec.	Jejunum	3	50
Neishaboori et al.	2013	F	3 d	NS	USG	S. resec.	Jejunum	18	40
Teli B et al.	2013	F	3 d	NS	CT	S. resec.	Ileum	10	45
Joyce et al.	2014	M	NS	+	CT	S. resec.	Jejunum	4	62

M: male; F: female; d: days; mo: months; S. resec: segmental resection; NP: not performed; NS: not stated; UA: unavailable; R. hemicol: right hemicolectomy; Ecl: enteroclysis; USG: ultrasonography; DL: diagnostic laparoscopy; CT: computed tomography; MRI: magnetic resonance imaging; Lp: laparoscopy; W. resec: wedge resection.

# Intussusception

corporeal examination and exclusive imaging techniques, such as X-ray, ultrasonography (USG), CT, enteroclysis, endoscopic practice, angiography and capsule endoscopy. Particularly, abdominal X-ray is the primary diagnostic used because obstructive signs possess clinical characteristics in many cases. Nowadays, enteroclysis is seldom used for the identification of intussusception. Barium enema was the preferred choice for the identification of intussusception until 1981 when studies showed that USG could be used to precisely diagnose the condition. Although obstructive signs are contraindicated for capsule endoscopy, this new practice for interpreting the small bowel could be useful in cases with a negative outcome on radiological identification. Colonoscopy is helpful only in cases in which colonic involvement is strongly suspected, and lesions can be identified and biopsied [12-15].

USG is frequently employed for the diagnosis of intussusception. Despite its high sensitivity and specificity, a pseudo-kidney sign in the sagittal plane is not diagnostic. Target and ox eye signs in the transverse plane favour the diagnosis of intussusception [15-19]. However, bowel wall oedema and sigmoid volvulus may also manifest the sign [5, 10, 20]. A large amount of faeces in the colon, a perforated Meckel's diverticulum, malrotation and intraabdominal haematomas are other causes of misdiagnoses [13, 22]. Moreover, acute obstructive symptoms and air levels decrease the reliability of USG [5, 23]. The rate of a correct diagnosis using USG was 30-35% in previous studies [7, 23]. In the present study, it was 33% (n = 2) in agreement with this. CT is the gold standard for the diagnosis of intussusception. However, it comprises 50-80% of the diagnostic data [2]. A sausage sign and target mass on CT are not pathognomonic for intussusception [3, 24, 25]. CT may provide sufficient information about metastasis, lymphadenopathy, free liquid and proximal bowel dilation [14, 26-28]. In the present study, the diagnostic value of CT was in agreement with previous data. However, our population was very small. The limited use of CT may be due to patients undergoing emergency surgery. Magnetic resonance imaging is not used routinely for the diagnosis of intussusception in either adults or children.

The basic treatment of intussusceptions encountered in adults was surgical. De-intus-

susception may provide successful treatment in cases where bowel perfusion is not disrupted, particularly when intussusception is due to adhesions subsequent to surgery. However, the de-intussusception procedure may lead to perforation in cases of inflamed, ischemic and colonic intussusceptions. Hence, the procedure is not recommended in such cases. Particularly, colonic intussusception may also cause the spread of tumour cells. In that situation, segmental resection or wedge resection of the involved bowel segment should be preferred [3].

## Conclusion

The characteristics of adult patients with intussusceptions in our study agree with those in previous studies. However, the mean age of our cases was older. Intussusception is rare in adults; however, this diagnosis should be considered in cases presenting with suitable manifestation. In addition, USG and CT aid in the diagnosis. Although more rare in adults than in children, cases of ileus presenting with acute abdominal disorder, particularly those with an uncertain diagnosis, should be considered possible intussusception cases. In addition to cases in which surgery is preferred, resection including the invaginated segment should be accomplished.

## Acknowledgements

The authors express their gratitude to all of the participating patients and clinical staff.

**Address correspondence to:** Fatih Ciftci, Vocational School of Health Services, Istanbul Gelisim University, Basaksehir Mah., Erciyes Sok. No: 15, Daire 24, Basaksehir, Avcilar, Istanbul 34306, Turkey. Tel: +90 505 616 4248; Fax: +90 212 462 7056; E-mail: oprdrfatihciftci@gmail.com

## References

- [1] Akbulut S. Intussusception due to inflammatory fibroid polyp: A case report and comprehensive literature review. *World J Gastroenterol* 2012; 18: 5745-5752.
- [2] Azar T, Berger DL. Adult intussusception. *Ann Surg* 1997; 226: 134-138.
- [3] Toso C, Erne M, Lenzlinger PM, Schmid JF, Büchel H, Melcher G, Morel P. Intussusception as a cause of bowel obstruction in adults. *Swiss Med Wkly* 2005; 135: 87-90.

## Intussusception

- [4] Ahn JH, Choi SC, Lee KJ, Jung YS. A clinical overview of a retrospective study about adult intussusceptions: focusing on discrepancies among previous studies. *Dig Dis Sci* 2009; 54: 2643-2649.
- [5] Ghaderi H, Jafarian A, Aminian A, Mirjafari-Daryasari SA. Clinical presentations, diagnosis and treatment of adult intussusception, a 20 years survey. *Int J Surg* 2010; 8: 318-320.
- [6] Wang N, Cui XY, Liu Y, Long J, Xu YH, Guo RX, Guo KJ. Adult intussusception: a retrospective review of 41 cases. *World J Gastroenterol* 2009; 15: 3303-3308.
- [7] Yakan S, Caliskan C, Makay O, Denecli AG, Korut MA. Intussusception in adults: clinical characteristics, diagnosis and operative strategies. *World J Gastroenterol* 2009; 15: 1985-1989.
- [8] Marinis A, Yiallourou A, Samanides L, Dafnios N, Anastasopoulos G, Vassiliou I, Theodosopoulos T. Intussusception of the bowel in adults: a review. *World J Gastroenterol* 2009; 15: 407-411.
- [9] Theodoropoulos GE, Linardoutsos D, Tsamis D, Stamopoulos P, Giannopoulos D, Zagouri F, Michalopoulos NV. Gastrointestinal stromal tumor causing small bowel intussusception in a patient with Crohn's disease. *World J Gastroenterol* 2009; 15: 5224-5227.
- [10] Akbulut S, Sevinc MM, Cakabay B, Bakir S, Senol A. Giant inflammatory fibroid polyp of ileum causing intussusception: a case report. *Cases J* 2009; 2: 8616.
- [11] Gara N, Falzarano JS, Limm WM, Namiki TS, Tom LK. Ileal inflammatory fibroid polyp causing chronic ileocolic intussusception and mimicking cecal carcinoma. *World J Gastrointest Oncol* 2009; 1: 89-92.
- [12] Toydemir T. Inflammatory fibroid polyp of the ileum presenting with small bowel obstruction in an adult patient: a case report. *J Med Case Rep* 2010; 4: 291.
- [13] Szczepanowski A, Kaluzniacki P, Mazurek A, Golyski J, Rudzki S. Inflammatory fibroid polyp of the small bowel causing intestinal obstruction due to intussusception-a case report. *JPCCR* 2009; 3: 122-123.
- [14] Nonose R, Valenciano JS, da Silva CM, de Souza CA, Martinez CA. Ileal Intussusception Caused by Vanek's Tumor: A Case Report. *Case Rep Gastroenterol* 2011; 5: 110-116.
- [15] Singhal M, Singh P, Misra V, Dhingra V, Bhatia R. Inflammatory fibroid polyp of small intestine: Report of two cases with review of literature. *JCDR* 2010; 4: 3241-3244.
- [16] Morales-Fuentes GA, de Ariño-Suárez M, Zárate-Osorno A, Rodríguez-Jerkov J, Terrazas-Espitia F, Pérez-Manauta J. Vanek's polyp or inflammatory fibroid polyp. Case report and review of the literature. *Cir Cir* 2011; 79: 242-245.
- [17] Ruffolo C, Scarpa M, Bassi D, Angriman I. Inflammatory fibroid polyp causing intestinal obstruction following restorative proctocolectomy for ulcerative colitis. *Dig Surg* 2009; 26: 285-286.
- [18] Joyce KM, Waters PS, Waldron RM, Khan I, Orosz ZS, Nemeth T, Barry K. Recurrent adult jejuno-jejunal intussusception due to inflammatory fibroid polyp-Vanek's tumour: a case report. *Diagn Pathol* 2014; 9: 127.
- [19] Tartaglia D, Bertolucci A, Palmeri M, Kauffmann EF, Napoli N, Galatioto C, Lippolis PV, Zocco G, Seccia M. The role of laparoscopy in adult bowel obstruction caused by intussusception. *Ann Ital Chir* 2014; 85: 328-331.
- [20] Teli B, Cp M, SS, Mv S. Ileo-ileal Intussusception in an Adult Caused by Vanek's Tumour: A Rare Case Report. *Clin Diagn Res* 2013; 7: 2994-2995.
- [21] Rabbani K, Narjis Y, Jgounni R, Semlani Z, Difa'a A, Benelkhaat R, Louzi A, Finech B. Adult intussusception caused by an inflammatory fibroid ileal polyp. *Acta Chir Belg* 2012; 112: 157-159.
- [22] Neishaboori H, Maleki I, Emadian O. Jejunal intussusception caused by a huge Vanek's tumor: a case report. *Gastroenterol Hepatol Bed Bench* 2013; 6: 210-3.
- [23] Martis JJ, Rajeshwara KV, Murulya KS, Raghavendra BK, Alex KM. A rare cause of jejunojejunal intussusception in an adult. *Indian J Surg* 2013; 75: 18-20.
- [24] Maya AM, Gallo A, Castelli M, Paz L, Espinosa JC, Giunipero A. [Small bowel intussusception and Vanek's tumor in an elderly woman]. *Medicina (B Aires)* 2013; 73: 461-463.
- [25] Ida S, Matsuzaki H, Kawashima S, Watanabe M, Akiyama Y, Baba H. Adult intestinal intussusception caused by an inflammatory myofibroblastic tumor. *Case Rep Gastroenterol* 2013; 7: 224-228.
- [26] Jacobs TM, Lambrianides AL. Inflammatory fibroid polyp presenting as intussusception. *J Surg Case Rep* 2013; 2: 263-267.
- [27] Chelimilla H, Ihimoyan A, Carvajal S, Bhavna B. Ileoileal intussusception secondary to an ileal fibroma. *Case Rep Gastroenterol* 2012; 6: 734-740.