

Intussusception as a cause of bowel obstruction in adults

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Summary

Background: Due to its unspecific presentation, intussusception is often diagnosed with delay in adults

Methods: From 1986 to 2002, ten patients (men/women: 8/2, median age: 53.6 years) were managed for intussusception. Clinical, radiological and surgical management data were retrospectively analyzed.

Results: All patients presented with abdominal symptoms (pain: 10/10, nausea and vomiting: 3/10, diarrhoea: 2/10, “redcurrant jelly stool”: 2/10) during a median time of 8.3 months (2 days – 6 years) and with a trend for longer duration of symptoms for benign compared to malignant underlying disease (2 years *vs* 1 month). Two cases had developed acute bowel obstruction at the time of surgery. CT-scan was always performed, with

correct diagnosis in seven cases. Ultrasonography (4/10), contrast enema (5/10) or colonoscopy (4/10) either missed the intussusception or served merely to confirm the CT diagnosis. At surgery, an underlying lesion (six malignant and four benign tumours) was identified and removed in all cases (four small bowel, three right colon, two ileocaecal and one left colon resections). Eight were undiagnosed previously.

Conclusions: Intussusception is rare in adults, but should be considered in cases of chronic or acute bowel obstructions. Early surgical management allows detection and potential cure of underlying tumours.

Key words: adult; bowel obstruction; intussusception

Introduction

Bowel obstruction due to intussusception is rare in adults and accounts for 0.003 to 0.02% of hospital admissions and for only 1% of bowel obstructions [1]. Diagnosis is difficult due to its unspecific and extremely variable presentation [1, 2] and requires a high index of suspicion [3].

The present study reviews clinical presentation, investigation and treatment in ten patients with intussusception. It emphasizes the often chronic presentation and urges early diagnosis of the condition and of a possibly malignant underlying disorder.

Methods

Records of all adult patients at the University Hospital Geneva, Switzerland, Yverdon Regional Hospital, Switzerland and Uster Regional Hospital, Switzerland coded with a diagnosis of intussusception from 1986 to 2003 were retrospectively reviewed. Patients with rectal, stomal and gastroenterostomy intussusceptions were excluded. Clinical presentation, diagnosis, investigation as well as management and pathology were analysed. Special attention was given to the preoperative work-up. Follow-up was obtained through subsequent clinical visits or specific telephone contact with the patients.

Intussusceptions were classified according to the lo-

cation of the underlying tumour into enteric, ileocolic, ileocaecal and colocolic types. The ileocolic type involved the intussusception of a small bowel lesion through the ileocaecal valve and the ileocaecal type a prolapse of the ileocaecal valve or the caecum into the right colon with the ileum following. The enteric and the ileocolic types were thus related to a small bowel lesion, while the ileocaecal and the colocolic to a large bowel one. Cases were also classified according to the underlying pathology as benign or malignant.

Statistical analysis was performed using the Student-T test. $P < 0.05$ was considered significant.

Results

Ten patients were managed for intussusception over the 17 year-study period. They included eight men and two women with a median age of 53.6 years. Intussusceptions were enteric in four cases, ileocolic in three, ileocaecal in two and colocolic in one. Underlying lesions were malignant in six cases and benign in four.

All patients suffered from abdominal pain, in four located in the right lower abdomen. The remaining symptoms were those of bowel occlusion (table 1). Only one patient presented the classical

triad of intussusception with abdominal pain, “red-currant jelly stool” and a palpable mass. Median duration of symptoms was 8.3 months (ranges: 6 years – 2 days), with a trend for longer symptoms in benign compared to malignant underlying disease (2 years *vs* 1 month, *p*: 0.3). Two patients had a past history of malignancy (lymphoma, melanoma). One had undergone laparotomy with biopsy of coeliac lymph nodes two days before the operation for intussusception.

At the time of surgery, two patients presented clinical signs of acute intestinal obstruction with peritoneal irritation. An abdominal mass was found in seven cases (table 1).

Computed tomography (CT) was performed in all patients. The diagnosis was correct in seven cases with typical “target” or “sausage” images with an internal hypodense layer, but without inclusion of fluid or gas (figure 1a). Two patients had a preoperative CT diagnosis of mechanical bowel occlusion linked to carcinomatosis. In the remaining patient, CT showed no sign of intussusception, which was discovered incidentally during an operation for a pancreatic tumour. Free intra-abdominal fluid was present in six CT scans and an underly-

Table 1

Clinical presentation: Intussusception was symptomatic in all patients (10/10) and behaved as bowel obstruction.

Symptoms	
Abdominal pain	10/10
Nausea, Emesis	4/10
Diarrhoea	2/10
Bloody stools	2/10
Signs	
Abdominal tenderness	9/10
Abdominal mass	7/10
Peritoneal irritation	2/10
Fever	1/10
Increased bowel sounds	1/10

Figure 1

Ileocecal intussusception.
A: CT presentation with classical image of target (*);
B: intraoperative presentation.

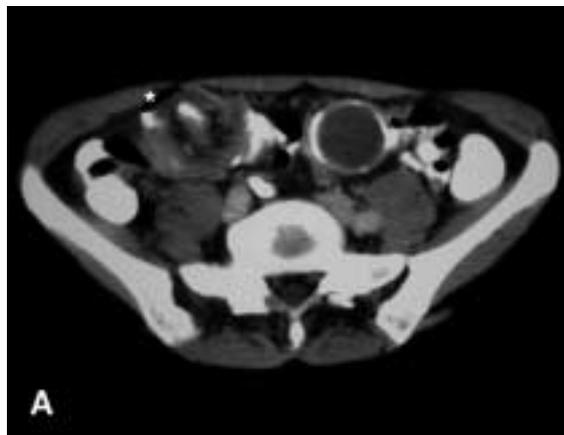


Table 2

Surgical and pathological data.

Location	Type of lesion	Resection	Reduction
Enteric	Lymphoma	Small bowel	No
	Melanoma metastasis	Small bowel	Yes
	Renal cell carcinoma metastasis ^c	Small bowel	Yes
	Polypoid hamartoma ^c	Small bowel	Yes
Ileocolic ^a	Lymphoma ^c	Right colon	Yes
	Lymphoma ^c	Ileocaecal	No
	Fibroid polyp ^c	Ileocaecal	Yes
Ileocecal ^b	Cystadenoma ^c	Right colon	Yes
	Colic adenoma ^c	Right colon	No
Colocolic ^c	Adenocarcinoma ^c	Left colon	No

^a intussusception involving a tumour located in the small bowel and protruding through the ileocaecal valve.

^b intussusception involving a lesion located in the caecum and protruding into right colon; small bowel is seen following the lesion.

^c lesion non diagnosed previously.

ing lesion was identified in four. When performed, ultrasonography, contrast enema and/or colonoscopy missed the intussusception (2/4, 2/5 and 4/4) or only confirmed the CT diagnosis (2/4, 3/5 and 0/4).

Half of the operations were performed as an emergency. An intussusception was present in all cases with a median length of 15 cm (10–20 cm) (figure 1b). These were located in the distal small bowel, in the right colon and in one case in the sigmoid colon (table 2). There was free fluid in two cases but no necrosis. A primary lesion was always present, including six malignant and four benign tumours (table 2). Eight of these lesions were undiagnosed previously. They were located in the mesentery (5/10) or had a bright implantation base in the bowel wall. A resection was performed in all

cases (four small bowel, three right colon, two ileocaecal, one left colon resection / table 2). Five small bowel (of seven) and one large bowel (of three) intussusceptions were reduced before resection, while the remaining four were not reduced because of adhesions (table 2). No perforation occurred during the manipulations.

Perioperative complications included one pneumonia and one abdominal wall abscess. Median follow-up was 49 months (3 months – 16.6 years). All patients with benign lesions were alive. Three patients with malignant lesions died two, four and six months post-operatively after progression of the malignancy. The other three patients were free of disease recurrence with one to three year-follow-up.

Discussion

Intussusception is rare in adults, but can be the first manifestation of a tumour, and it should always be kept in mind to allow earlier detection and treatment.

Intussusception develops due to a difference of motility between two intestinal parts. A segment (intussusceptum) enters a neighbouring one (intussusceptiens). Fixed bowel due to a retroperitoneal position (ileocaecal region) or to adhesions are frequently involved.

In the adult, an underlying tumour is present in over 80% of the cases [1, 2, 4–10]. In our series, as in others, the leading pathology is often located in the mesentery or has a broad implantation base in the wall of the bowel [1, 2, 6]. This creates a mechanical disturbance of peristalsis and favours intussusception. Polyps with narrow implantation bases are only seldom involved.

Intussusception developed in males and females equally [2, 5, 8], as well as in patients of any age with a mean around 50 years [2, 5, 9].

Clinical presentation is highly unspecific leading in many cases to an incorrect preoperative diagnosis [1]. While some patients have no previous symptoms [6, 11], two third of the patients present with chronic, recurrent, colicky pain [6], which may reflect transient intussusceptions [12]. These symptoms may occur for years before diagnosis [1, 5, 6, 8, 12, 13] and they are more often linked to benign than to malignant tumours [1].

A transient intussusception may be missed by routine examinations and an extra-luminal tumour cannot be reached endoscopically. The patient may be dismissed as having a functional problem, leading to delayed treatment of a potential malignant underlying tumour. One should thus take into account associated symptoms such as nausea and vomiting, more often linked to benign underlying tumours, and malaena and guaiac positive stools linked to malignant tumours [1]. Palpation of an abdominal mass is rare in some series [8, 9] but was

possible in most of our cases and can help with diagnosis.

Patients with long lasting abdominal pain should be further investigated. Ultrasonography can provide the correct diagnosis in some cases [13], as may colonoscopy or contrast enema in the case of large bowel lesions. In the present study, these investigations however failed to reveal the intussusception or served merely to confirm a known diagnosis. CT is the diagnostic instrument of choice [14, 15], allowing, in some series, a correct preoperative diagnosis in up to 80% of the cases [1, 8]. The CT appearance is complex, including the outer intussusceptiens, the inner intussusceptum and an eccentric fat density mass representing the intussuscepted mesenteric fat. According to the cut axis, the intussusception appears as a “sausage” or a “target” mass. CT also allows a close correlation with the pathological staging [14]. The early stages appear with a hypodense inner layer. In more advanced stages, venous drainage is impaired and fluid collects between the two bowel segments. As congestion increases, ischaemia and necrosis and gas collections appear [14]. Besides intussusception itself, CT can identify metastases, lymphadenopathy, free liquid or proximal bowel dilation. Detection of the causal lesion remains, however, difficult.

In the adult, primary lesions are involved in over 80% of the cases. In the small bowel, they are most often benign, including lipoma, leiomyoma, Meckel's diverticulum, adenoma and inflammatory fibrous polyps [5, 6]. Apart from some rare primary small bowel malignant lesions, metastases and lymphoma are the most frequent malignant lesions involved in the small bowel. In the large bowel, malignant lesions are found in over 60% of the cases and include adenocarcinoma and lymphoma [2, 5, 6]. The benign lesions are similar to those found in the small bowel.

Previous operations can be involved in up to

one third of the cases [7]. These postoperative intussusceptions are created by the mechanical disturbance of peristalsis induced by lesions such as a suture line, submucosal bowel oedema or adhesions. Our case of enteric intussusception after laparotomy for biopsy of colic lymphadenopathy is in keeping with other reports [2, 7] and suggests that the post-operative dysmotility itself can also favour intussusception.

In children conservative reduction of intussusception with contrast media, saline or air has success rates reaching up to 90% [16]. These procedures cannot be applied to adults because of the high incidence of lesions associated with intussusception and a systematic surgical revision is required. This revision can be achieved laparoscopically or with open surgery [11, 17], both of which allow confirmation of the diagnosis and establishment of an operative strategy. In some rare post-operative and posttraumatic cases [1, 2] or when the tumour has been removed endoscopically [5], a reduction alone or associated with adhesiolysis can be performed. This is not the rule and a resection is most often required.

Reduction of intussusception before resection is controversial [5, 6]. As there is a risk of perforation and of embolization of malignant cells, a reduction should not be attempted in case of bowel ischaemia or of a clearly malignant tumour. In all other cases, a reduction should be attempted in order to provide sufficient bowel mesentery

length, thus avoiding unnecessary excision of healthy bowel [8]. This procedure is of even greater interest in small bowel lesions, because of the lower incidence of malignant causal lesions and of the increased need to spare bowel length.

Reduction should be performed by careful massage of the distal segment and traction on the proximal one. Traction alone or more complex methods, such as the insertion of a Foley catheter distal to the intussusception [3] should be avoided, because of a higher risk of bowel damage. In the present study, no intussusception presented signs of ischaemia at surgery and two thirds could be reduced before resection without perforation.

The main clinical presentation of intussusception in the adult is chronic abdominal pain. Recognition is often difficult and can lead to the wrong diagnosis. One should keep this condition in mind in order to allow earlier recognition and treatment. Surgical revision is the rule as the condition is frequently associated with a primary lesion, often not previously diagnosed and possibly malignant.

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References

- 1 Azar T, Berger DL. Adult intussusception. *Ann Surg* 1997; 226:134-8.
- 2 Begos DG, Sandor A, Modlin IM. The diagnosis and management of adult intussusception. *Am J Surg* 1997;173:88-94.
- 3 Steinwald PM, Trachiotis GD, Tannebaum IR. Intussusception in an adult secondary to an inverted Meckel's diverticulum. *Am Surg* 1996;62:889-94.
- 4 Donhauser JL, Kelly EC. Intussusception in adults. *Am J Surg* 1950;673-7.
- 5 Weilbacher D, Bolin JA, Hearn D, Ogden W. Intussusception in adults: Review of 160 cases. *Am J Surg* 1971;121:531-5.
- 6 Nagorney DM, Sarr MG, McIlrath DC. Surgical management of intussusception in the adult. *Ann Surg* 1980;193:230-6.
- 7 Agha FP. Intussusception in adults. *AJR* 1986;146:527-31.
- 8 Eisen LK, Cunningham JD, Aufses AH. Intussusception in adults: institutional review. *J Am Coll Surg* 1999;188:390-5.
- 9 Ugwu BT, Mbah NK, Yiltok SJ, Legbo JN, Uba AF. Adult intussusception: the Jos experience. *WAJM* 2001;20:213-6.
- 10 Takeuchi K, Tsuzuki Y, Ando T, Sekishara M, Hara T, Kori T, et al. The diagnosis and treatment of adult intussusception. *J Clin Gastroenterol* 2003;36:18-21.
- 11 Zager JS, Shaw JP, P. KJ, DeNoto G. Three cases of small bowel intussusception in relation to a rare lesion: inflammatory fibrous polyps. *Dig Surg* 2001;18:142-6.
- 12 Zissin R, Gayer G, Konen O, Shapiro-Feinberg M. Transient colocolic intussusception. *J Clin Imaging* 2000;8-9.
- 13 Sofia S, Casali A, Bolondi L. Sonographic diagnosis of adult intussusception. *Abdom Imaging* 2001;483-6.
- 14 Fujimoto T, Fukuda T, Uetani M, Matsuoka Y, Asoh N, Isomoto I, et al. Unenhanced CT findings of vascular compromise in association with intussusceptions in adults. *AJR* 2001;176:W.
- 15 Gayer G, Zissin R, Apter S, Papa M, Hertz M. Adult intussusception - a CT diagnosis. *Brit J Radiol* 2002;75:185-90.
- 16 Hadidi AT, El Shal N. Childhood intussusception: a comparative study of nonsurgical management. *J Pediatr Surg* 1999;34:304-7.
- 17 Hackam DJ, Saibil F, Wilson S, Litwin D. Laparoscopic management of intussusception caused by colonic lipomata: a case report and review of the literature. *Surg Laparo Endo* 1996; 6:155-9.

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