

Case Report

Adult Intussusception: A Radiological Approach

Margaret Linny Austin¹, Venkatanarayana Ravi Hoisala¹, Majid Ali Jamal²
Departments of ¹Radiology and ²Surgery, Jahra Hospital, Kuwait

Kuwait Medical Journal 2007, 39 (3): 271-274

ABSTRACT

Intussusception is defined as the telescoping of consecutive segments of bowel. While being relatively common in the pediatric population, intussusception is an unusual cause of small bowel obstruction in the adult group and is often due to an underlying lead point. We

present the imaging findings and diagnosis by sonography and computed tomography (CT) of intussusception in a young adult male with ulcerative colitis. The clinical findings were masked by the steroid cover given for ulcerative colitis.

KEYWORDS: adult, imaging, intussusception

INTRODUCTION

Bowel intussusception is described as the progressive invagination of one segment of bowel - the intussusceptum into an adjacent segment - the intussusciptiens. Intussusception is the commonest cause after appendicitis, of acute abdomen in the pediatric age group between three months and three years^[1]. It may present with the classic triad of severe colicky, abdominal pain, "red currant" jelly stools and a palpable mass, accompanied by vomiting and diarrhea^[2]. The incidence is higher in spring and autumn suggesting a viral etiology. In 90% the cause is idiopathic. Less than 10% of children have a lead point usually a Meckel's diverticulum, hemangioma or a polyp^[3].

In adults, intussusception is uncommon, accounting for only 5% of mechanical small bowel obstruction. 20% of cases are idiopathic. A demonstrable cause is found in 80%, the majority being caused by primary colonic carcinomas. Other causes include lipomas, polyps, edema or post-operative fibrosis. Symptoms include non-specific chronic abdominal pain related to recurrent sub-acute obstruction, bleeding per rectum or an abdominal mass. Ileocolic intussusceptions are common in children, while colo-colic intussusceptions are common in adults^[3]. Intussusception is also more common in the post-operative period due to edema or adhesions^[4].

Intussusception is a continuous telescoping process due to abnormal peristalsis producing unequal longitudinal forces in the intestinal wall. The bowel wall invaginates into the lumen and is propelled onwards. Pressure builds up in the wall, impeding first the venous followed by the arterial

supply eventually causing ischemia. Hence early diagnosis is essential to prevent onset of infarction and perforation^[5].

Small bowel intussusceptions are generally related to benign neoplasms including lipomas, leiomyomas, neurofibromas, hemangiomas; other benign causes include adhesions, Meckel's diverticulum, lymphoid hyperplasia, and adenitis, trauma, celiac disease, intestinal duplication, villous adenoma of the appendix and Henoch-Schonlein purpura. Malignant etiology is rare and usually due to metastases especially from melanomas. Large bowel intussusceptions have a more sinister cause including adenocarcinoma and lymphoma^[5].

A significant incidence of intussusception has been linked with acquired immunodeficiency syndrome (AIDS). This is due to association of AIDS with a variety of infectious and neoplastic conditions of the bowel, including Crohn's disease, lymphoid hyperplasia, Kaposi's sarcoma, and non-Hodgkin's disease^[5].

All authors agree that, in adult intussusception, laparotomy is mandatory in view of the high possibility of an underlying pathology^[6].

CASE REPORT

A 26-year-old man (non-alcoholic, non-smoker), was admitted with a one month history of recurrent attacks of abdominal pain and straining at stool, with evacuation of blood stained motions.

He had been diagnosed two weeks earlier as having ulcerative colitis by sigmoidoscopic biopsy and was on steroid therapy. Clinical examination

Address Correspondence to:

Dr. Margaret Linny Austin, Department of Radiology, Al-Jahra Hospital, Kuwait. P.O. Box 21396, Safat 13074, Kuwait. Tel: 4577198, E-mail: Linny_Austin@hotmail.com



Fig. 1: Plain radiograph abdomen showing soft tissue density on the right

revealed a vague tender mass in the right side of the abdomen thought to be an inflammatory or appendicular mass and was referred for ultrasound. Laboratory tests were normal.

Plain X-ray of the abdomen revealed a soft tissue opacity in the right side of the abdomen shifting all bowel loops to the left (Fig. 1). Sonography in the longitudinal plane revealed a long tubular mass in the right side of the abdomen, related to the ascending colon. The mass was made up of multiple parallel stripes of varying echogenicity giving a "sandwich" like or "pseudo kidney" appearance (Fig. 2).

Transverse scanning revealed several concentric rings known as the "doughnut" sign or "target" sign, classically described for intussusception (Fig. 3). Since the patient was an adult, it was decided to proceed to CT abdomen to further evaluate this mass and rule out other possibilities for thickened bowel including an inflammatory mass or lymphoma as well as to search for an underlying cause or a lead point.

For computed tomography, oral, rectal and IV contrast was administered prior to imaging. A long tubular, sausage shaped mass was seen in the right side of the abdomen (Fig. 4). The terminal ileum



Fig. 2: Longitudinal sonography showing the "sandwich" sign



Fig. 3: Transverse sonography showing the "doughnut" sign of concentric rings of intussusception

was seen to invaginate the ascending colon with intervening layers of fat attenuation representing the mesentery (Fig. 5). A "target" appearance of concentric rings of the bowel was seen in the lower cuts at the initial level of the intussusception. No definite lead point could be identified. At the time of imaging, there was no evidence of bowel infarction.

The patient was rushed to surgery. The terminal ileum was seen to invaginate the ascending colon till the hepatic flexure. The last 60 cm of the intussuscepting ileum was found to be gangrenous. A limited right hemi-colectomy was performed.

The pathological specimen revealed an ileocecal intussusception due to a single lipomatous polyp measuring 5.5 x 2 cm. The terminal segment of the ileum was found to be gangrenous.

The post-surgical course was uneventful. The patient is on regular follow-up for his ulcerative colitis.

DISCUSSION

Plain radiography

Initial radiographs may be normal. Subsequent radiographs may show right sided paucity of gas especially absence of cecal gas, being replaced by



Fig. 4: Axial CT scanning showing the "target" sign of intussusception

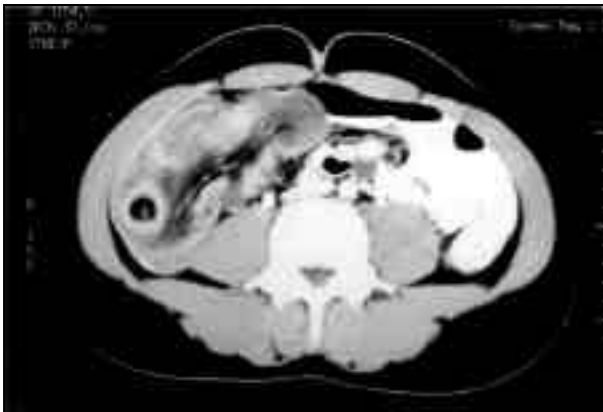


Fig. 5: CT showing "reniform" appearance of invaginating ileum and mesentery, with ileo-cecal valve

soft tissue density. There may be evidence of proximal small bowel dilatation and obstruction. The apex of the intussusception may show the pathognomonic radiolucent "crescent" sign. This sign is due to intestinal gas being trapped between the apposing intestinal surfaces. This lucent crescent is wider than normal bowel and superimposed on the round soft tissue density of the intussusception. Due to the high occurrence of false negatives on plain radiography, ultrasound is recommended as the primary imaging technique^{1,2}.

Barium studies

The classic appearance of intussusception on barium studies is the coil spring appearance of barium trapped between the intussusceptum and intussusciens¹¹. Previously, a contrast enema was considered to be the diagnostic and therapeutic method of choice in children, provided the child was clinically stable and a pediatric surgeon was available on the premises. The rule of three was employed - three attempts being made with a contrast (barium or non-ionic) reservoir suspended at three feet above the fluoroscopy table, each attempt being sustained for three minutes. Barium has since been replaced by water and air, which are

safer and cheaper. In adults, contrast enemas are rarely employed for non-operative therapy, since an underlying lead point is usually demonstrated⁸¹.

Ultrasound

This technique has proved to be most efficacious in the diagnosis of intussusception especially in children⁷¹. The radiologist initially searches for a 3 - 5 cm diameter soft tissue mass. Transverse scanning shows the classical "target lesion" or "doughnut" sign representing concentric layers of bowel. The hypoechoic halo is produced by the mesentery and the edematous wall of the intussusciens; the inner hyperechoic center is produced by the mucosal, submucosal and serosal surfaces of the intussusceptum. On longitudinal imaging, the hyperechoic center assumes a tubular shape in continuity with the intestinal lumen and is covered on each side by the hypoechoic intussusciens - called the sandwich sign⁷¹. Intraperitoneal fluid is an occasional finding. Color Doppler sonography can detect early ischemia, precluding a non-operative reduction. The major limitation to sonography is the presence of air-filled bowel, leading to poor transmission of the beam⁶¹. With increasing experience, more radiologists are relying on sonography for diagnosis or exclusion of intussusception²¹. False positives are obtained with impacted stool, Crohn's disease of terminal ileum, volvulus and needs clinical correlation.

Computed tomography (CT)

This modality is availed of primarily in adults to confirm the diagnosis and evaluate for an underlying cause or lead point. Intussusception has a virtually pathognomonic appearance on CT⁵¹. It appears as a complex soft tissue mass consisting of an outer intussusciens and central intussusceptum. There is an eccentric, crescent-like low attenuation fatty mass, representing entrapped mesenteric fat⁸¹. The intussusception will appear as a "target" when the beam is perpendicular to the long axis of the mass and a sausage-shaped or reniform mass when the CT beam is parallel to it⁵¹. These patterns of CT appearance can also reflect the severity and duration of the disease process, the target appearance being the earliest stage, progressing to a sausage-shaped mass. Finally a reniform or "pseudokidney" mass develops due to edema, mural thickening, and vascular compromise^{1,31}. The etiology of intussusception is rarely established and is possible with lipomas, lymphadenopathy, and abdominal metastatic disease.

Another described finding is that of a rim shaped accumulation of oral contrast encircling the intussusceptum, due to contrast coating the opposing walls of the bowel. Additional findings on CT are

small amounts of ascites and proximal obstruction^[8]. CT scanning has been found to be the most accurate, with ultrasound being the second most useful modality in the diagnosis of intussusception.

Magnetic resonance Imaging (MRI)

Recent developments in MRI with ultrafast multiplanar techniques now allow for rapid evaluation of bowel obstruction^[9]. The multiplanar HASTE (half-fourier single shot turbo spin echo) is particularly useful in the diagnosis of intussusception, since this sequence is motion insensitive. The high contrast resolution between the increased signal of the trapped intraluminal fluid and the intermediate to low signal of the bowel wall can clearly demonstrate the pathology.

Treatment

The optimal treatment of adult intussusception is mandatory laparotomy to identify the underlying lead point^[6]. Weilbacher *et al* established the principle of primary resection without reduction in ileo-colic, ileo-ceocolic, and colo-colic intussusception in adults due to the high incidence of underlying malignancy^[10]. In patients with small bowel intussusception, without evidence of ischemia, inflammation or malignancy, reduction can be initially attempted^[11].

CONCLUSION

With the widespread use of imaging in the evaluation of non-specific abdominal pain the diagnosis of intussusception in adults is most often

made by the radiologist. Imaging by plain imaging, barium studies, sonography in children, and CT and MRI in adults hastens the detection of intussusception thus preventing the dreaded complications of infarction, gangrene and perforation. It also aids in surgical planning while also demonstrating an underlying cause.

REFERENCES

1. Gore RM, Levine MS. Textbook of gastrointestinal radiology. Saunders, 1994; 1251-1256.
2. Daneman A, Alton DJ. Intussusception. Issues and controversies related to diagnosis and reduction. Radiol Clin North Am 1996; 34:743-756.
3. Byrne AT, Goeghegan T, Govender P, Lyburn ID, Colhoun E, Torreggiani WC. The Imaging of intussusception. Clin Radiol 2005; 60:39-46.
4. DiFiore JW. Intussusception. Semin Pediatr Surg 1999; 8:214-220.
5. Gayer G, Zissin R, Apter S, Papa M, Hertz M. Adult intussusception-a CT Diagnosis. Br J Radiol 2002; 75:185-190.
6. Takeuchi K, Tsuzuki Y, Ando, *et al*. The diagnosis and treatment of adult intussusception. J Clin Gastroenterol 2003; 36:18-21.
7. Verschelden P, Filiatrault D, Garel L. Intussusception in children: reliability of ultrasound in diagnosis-a prospective study. Radiology 1992; 184:741-744.
8. Gayer G, Apter S, Hofmann C, *et al*. Intussusception in adults: CT diagnosis. Clin Radiol 1998; 53:53-57.
9. Marcos HB, Semelka RC, Worawattanakul S. Adult intussusception: demonstration by current MR techniques. Magn Reson Imaging 1997; 15:1095-1098.
10. Weilbaecher D, Bolin JA, Hearn D, *et al*. Intussusception in adults. Am J Surg 1971; 121:531-535.
11. Begos DG, Sander A, Modlin IM. The diagnosis and management of adult intussusception. Am J Surg 1997; 173:88-94.