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European Journal of Radiology 62 (2007) 406–415

EJR
EUROPEAN JOURNAL OF RADIOLOGY

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Review

The diagnostic role of abdominal CT imaging findings in adults intussusception: Focused on the vascular compromise

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Received 24 June 2006; received in revised form 29 December 2006; accepted 2 January 2007

Abstract

Intussusception is defined as telescoping of one segment of the gastrointestinal tract into an adjacent one. Unlike that in children, adult intussusception is a relatively rare condition. More than 90% of patients with adult intussusception have been reported to have an organic cause, with benign or malignant tumors for accounting for approximately 65% of the cases. In general, the diagnosis is easily made by means of computed tomography (CT) or magnetic resonance (MR) imaging. The imaging appearance of a bowel-within-bowel configuration with or without contained fat and mesenteric vessels, is pathognomonic. As the intussusceptum enters into the intussuscipiens, the mesentery is carried forward and trapped between the overlapping layers of bowel. The twisting or severe constriction of the mesenteric vessels may result in vascular compromise with subsequent edematous thickening of the involved bowel. In these circumstances, ischemic necrosis may develop if timely intervention is not undertaken. Therefore, determination of the presence or absence of intestinal necrosis in intussusception is important in patient management. On CT, the presence of well-known diagnostic CT criteria for strangulated obstruction (especially severe engorgement or twisting of the mesenteric vessels) as well as evidence of loss of the layered pattern, accumulation of extraluminal fluid collection, and bowel perforation, may suggest the diagnosis of intestinal necrosis.

CT and MR imaging are limited in determining the primary disease causing intussusception. However, CT and MR provide excellent preoperative evaluation, including the possible extension and/or dissemination of a malignant tumor. CT and MR imaging may also be useful in suggesting the presence of vascular compromise.
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Keywords: Intussusception; Intestinal obstruction; Computed tomography; Magnetic resonance imaging

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0720-048X/$ – see front matter © 2007 Elsevier Ireland Ltd. All rights reserved.
doi:10.1016/j.ejrad.2007.01.003

1. Introduction

Intussusception is defined as telescoping of one segment of the gastrointestinal tract into an adjacent one. Unlike that in children, adult intussusception is a relatively rare condition. More than 90% of patients with adult intussusception have been reported to have an organic cause, with benign or malignant tumors for accounting for approximately 65% of the cases [1,2].

In general, the diagnosis is easily made by means of CT or MR imaging [3–6]. The imaging findings include a mass with sausage-like or target-like appearance, often containing fat and mesenteric vessels. However, imaging modalities are limited in determining the primary cause of intussusception as well as in determining the presence or absence of ischemic injury at the involved bowel segment, which requires immediate surgery.

The purpose of this retrospective review is to show the usefulness of CT and MR imaging in 24 patients with adult intussusception in determining the primary cause of the intussusception as well as displaying the CT findings in cases with vascular compromise.

2. Materials and methods

A computerized search was conducted for cases from January 1999 to December 2003 of intussusceptions. Of 355 patients identified, 62 had undergone CT for the evaluation of intussusception. However, 38 of these patients were excluded from the review because of the followings: CT scans were not available ($n = 13$), the causes of intussusception were not confirmed by surgery ($n = 22$), and the image quality of CT scans was very poor ($n = 3$). Our review population, therefore, consisted of 24 consecutively evaluated patients with enteroenteric type intussusception ($n = 9$), enterocolic type ($n = 12$), and colocolic type ($n = 3$). Among the enteroenteric type, presumed spontaneous reduction of intussusception ($n = 1$) is also included. The patients ranged in age from 19 to 80 years (mean, 48 years). There were 10 women and 14 men. CT was available in 24 patients and MR imaging was also available in four of these patients.

In most, CT scans were obtained using a single-detector helical CT scanner (Somatom Plus-S; Siemens, Erlangen, Germany) from the diaphragm to the symphysis pubis with a beam collimation of 5 or 7 mm, a pitch of 1.5 or 1.7, and image reconstruction increment of 5 mm. In most, contrast material (600–900 ml; E-Z-CAT [barium sulfate suspension concentrate], EZ-Em, Westbury, NY) was administrated orally 30–40 min before scanning. A second contrast material (100–120 ml of Lopamiro 300 [iopamidol], Bracco Diagnostics or Ultravist 300 [iopromide], Schering) was administrated at a rate 3.0 ml/s intravenous injection to all patients, with injection starting approximately 120 s before scanning.

MR was performed using a 1.5T MR imager (Magnetom vision; Siemens Medical Systems, Erlangen, Germany). T1-weighted images (TR range/TE range 400–600/8–11) and T2-weighted images including HASTE sequence (TR range/TE range 3500–4500/100–120; echo train length 8; section thickness 4 mm; intersection gap 2 mm; field of view 15 cm; number of acquisition 3; matrix 512 × 512) were obtained. The water as negative contrast was administered. After a rapid bolus intravenous injection of gadopentetate dimeglumine (Magnevist; Schering, Berlin, Germany) T1-weighted images were obtained.

The primary cause of intussusception was proven at the surgery in all patients and included 17 primary small and large intestine tumors (5 lymphomas, 3 adenocarcinomas, 3 lipomas, 2 harmatomatous polyps associated with Peutz-Jegher syndrome, 2 inflammatory fibroid polyps, 1 mucocele, and 1 leukemia), four secondary metastatic tumors from melanoma or lung cancer, two adhesive bands and adhesions, and one eosinophilic enterocolitis (Table 1). Six of the 24 patients demonstrated vascular compromise on surgery.

On CT or MR imaging, the imaging findings of intussusception were evaluated by two radiologists (S.B.P., H.K.H.) in consensus and in a random order. Thereafter, we attempted to

Table 1
Types and causes of adult intussusception

Underlying pathology	Types				Total (24)
	Ileocolic	Colocolic	Ileoileal	Jejunojejunal	
Primary tumor					
Lymphoma	4		1		5
Colon cancer	2	1			3
Hamartomatous polyp (Peutz-Jegher syndrome)	1			1	2
Lipoma		1	2		3
Inflammatory fibroid polyp	2				2
Mucocele		1			1
Leukemia	1				1
Total					(17)
Secondary tumor					
Melanoma metastasis					3
Lung cancer metastasis	1		1	1	1
Eosinophilic ileocecal colitis	1		1		1
Total					(5)
Post-op adhesion			1	1	2

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