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Intussusception in children 2 years of age or older

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The hospital records of 111 children aged 2 to 15 years who were treated for intussusception between mid-1974 and mid-1984 were reviewed. Severe intermittent abdominal pain was the most consistent, and frequently the only, clinical feature. Hydrostatic reduction was almost as successful as in children under 2 years of age, and its success was independent of the duration of symptoms. Most cases were idiopathic, but lead points were common in children 6 years of age or older. There was an unexpectedly high recurrence rate, 20%. In all three children with lymphoma the signs and symptoms were clearly atypical and were suggestive of pre-existing disease. In the absence of suspicious clinical or radiologic findings, laparotomy to rule out lymphoma is not warranted.

Revue des dossiers hospitaliers de 111 enfants de 2 à 15 ans traités pour invagination intestinale entre mi-1974 et mi-1984. Le symptôme le plus fréquent, et souvent le seul, est une vive douleur abdominale intermittente. La réduction hydrostatique réussit presque aussi bien qu'avant 2 ans, quelle que soit la durée de l'évolution. La récidive survient chez 20% des sujets, chiffre qui surprend. La plupart de nos cas sont idiopathiques; la présence de causes locales n'est pas rare passé 6 ans. Chez les trois porteurs de lymphomes les symptômes, fort atypiques, avaient fait penser à la présence d'une maladie préalable. En l'absence de signes cliniques ou radiologiques suspects, la laparotomie à la recherche d'un lymphome n'est pas indiquée.

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Intussusception is a common surgical emergency in infants and children. It occurs primarily in children under the age of 2 years and presents with intermittent abdominal pain, vomiting, rectal bleeding and an abdominal mass. In this age group significant delay in diagnosis often necessitates laparotomy and may result in complications.

However, this diagnosis is not often considered in older children. Few series have dealt specifically with the older child, and the relatively small numbers of patients in some of these studies may preclude definite conclusions. Older patients may present atypically, with a longer clinical course and little or no clinical deterioration, even days after the initial presentation.[1,2]

We reviewed all cases of intussusception in children 2 years of age or older treated at our hospital over a 10-year period. Our goals were to examine any differences in clinical presentation between infants and older children, to evaluate specific clinical clues to the diagnosis and the indications for and outcome of hydrostatic reduction in older children, and to review cases in which lymphoma presented with intussusception.

Methods

The medical records were searched for all patients 2 years of age or older with the diagnosis of intussusception seen at the hospital between mid-1974 and mid-1984. The following information was noted from their charts: age, sex, cause,

presenting signs and symptoms, details of barium enema reduction or surgery, pathological results and whether intussusception recurred. We subdivided the patient population according to age and then compared the age groups with regard to duration of symptoms, idiopathic and secondary causes, and rate of successful barium enema reduction. The lymphoma cases were examined in detail.

Results

A total of 111 consecutive patients (76 boys and 35 girls ranging in age from 2 to 15 years) were seen at the hospital during the study period. During the same period 207 children less than 2 years of age with intussusception were seen.

The incidence of intussusception decreased rapidly with increasing age (Table I). Symptoms had been noted 48 hours or more before presentation in 41% of the patients, but only three, two of whom had lymphoma, had had symptoms for more than 2 weeks.

The most consistent and diagnostically reliable symptom was severe, intermittent abdominal pain of sudden onset, which invariably interrupted the child's activities or sleep and frequently caused the child to cry (Table II). The three children who described atypical pain (a vague, dull, constant ache) had malignant disease: two had lymphoma and one had disseminated Wilms' tumour. In 27 patients (24%) severe intermittent abdominal pain was the only presenting feature; this presentation was more common in patients aged 4 years or more (34%) than in those under 4 years (18%). Apart from their pain, most children looked "well" at presentation, and less than 10% were dehydrated.

The intussusception was idiopathic in 83 children (75%). In the 28 other patients the causes were as follows: Meckel's diverticulum (in 7 children), culture-proven concurrent gastroenteritis (in 7), lymphoma (in 3), Henoch–Schönlein purpura (in 2), Peutz–Jeghers syndrome (in 2), recent surgery (in 2) and one case each of bowel hemangioma, cystic fibrosis, idiopathic thrombocytopenic purpura, familial polyposis and mesenteric adenitis, documented at surgery. The child with idiopathic thrombocytopenic purpura was entirely asymptomatic, intussusception having been discovered at splenectomy.

Barium enema examination for diagnosis and treatment was performed in 92 patients (83%) (Table III). Barium enema was not attempted in the presence of suspected peritonitis or when laparotomy was clearly needed. Among the 92 procedures, hydrostatic reduction was achieved in 77 (84%). Two attempts were necessary in a few cases, and administration of glucagon (which has been reported to promote reduction[3]) may have helped in three. Barium enema reduction was equally successful whether the symptoms had lasted less than 48 hours (69%) or longer (70%). The rate of success was particularly high in patients aged 2 to 5 years. In the patient with cystic fibrosis the intussusception was easily reduced with barium: the lead point was inspissated stool.

Of the 34 cases of intussusception that required surgical reduction, 26 were easily reduced manually, and 8 required bowel resection. Of the three patients with necrotic resected bowel, two had had symptoms for 24 hours or less.

Most of the intussusceptions (86%) were ileocolic (Table IV). The proportions of ileoileal, ileoileocolic and jejunojejunal intussusceptions increased with increasing age, and in every case surgery was necessary.

Sixteen patients (14%) had an early recurrence (within 4 days of the initial episode); eight (7%) had a late recurrence (4 months or more after the initial episode). Recurrence after surgical reduction of intussusception was seen in only one patient, a 15-year-old who had undergone the surgery 4 months earlier at another hospital; we found that Meckel's diverticulum acted as the lead point.

Of the 111 patients 3 died, 2 from disseminated lymphoma and 1 from metastatic Wilms' tumour. The three deaths were related to the primary disease and not to the intussusception or its treatment.

Discussion

Intussusception in older children was seen at

Table I — Characteristics of 111 children aged 2 to 15 years with intussusception

	No. of patients				
				Duration of symptoms, h	
Age, yr	Total	Boys	Girls	< 48	≥ 48
2–3	67	45	22	41	26
4–15	44	31	13		
4–5	27			15	12
6–9	11			7	4
10–15	6			3	3
Total	111	76	35	66	45

our institution at a rate of about one case per month. However, this city has been reported to be an area of high incidence,[4] along with Melbourne, Glasgow, Sweden and Denmark.[5] Cases may not be seen as frequently in other parts of the world.

The most consistent and reliable clinical feature was a history of severe intermittent, crampy abdominal pain. Like Fallis,[1] we believe that persistent colic in a child of any age indicates intussusception until proven otherwise. The presence of atypical pain (a continuous, vague, dull ache) or no pain at all was infrequent and invariably associated with another primary diagnosis. In two of the three patients with lymphoma the pain was vague and had lasted for many weeks, becoming crampy shortly before presentation. Ein and Stephens[4] and Sparnon and colleagues,[6] from studies primarily in infants, reported that 15% of their cases presented without pain; only 2% of our cases presented without pain.

Gross or occult blood in the stool was infrequent among our patients and those described by Turner and associates,[2] and only 40% vomited. These symptoms tend to be much more frequent in infants.[4,7,8]

Table II — Signs and symptoms at presentation

Sign or symptom	No. (and %) of patients
Pain	
Intermittent	104 (94)
Atypical	3 (3)
None	2 (2)
Unknown	2 (2)
Vomiting	62 (56)
Abdominal mass	44 (40)
Fever or upper respiratory tract infection	23 (21)
Rectal bleeding	21 (19)
"Ill-looking" or dehydrated	21 (19)
Diarrhea	12 (11)
Constipation	5 (5)

Table III — Rate of success of barium enema reduction

Age, yr	No. (and %) of procedures	
	Performed	Successful
2–3	56	54 (96)
4–5	25	19 (76)
6–9	7	4 (57)
10–15	4	0 (0)
Total	92	77 (84)

Table IV — Types of intussusception

Age, yr	Type; no. (and %) of patients	
	Ileocolic	Ileoileal, ileoileocolic or jejunojejunal
2–3	63 (94)	4 (6)
4–5	21 (78)	6 (22)
6–9	8 (73)	3 (27)
10–15	3 (50)	3 (50)
Total	95 (86)	16 (14)

In our opinion, the only absolute contraindication to barium enema reduction is peritonitis. Otherwise, this procedure can safely be attempted in any child who is considered fit for laparotomy, if needed. We encountered no complications of attempted barium enema reduction. Our rate of success in children 2 to 5 years of age, 90%, was similar to that reported for infants.[9–11]

As in other series,[11] the highest frequency of lead points and failure of barium enema reduction in our series occurred in patients 6 years of age or older. The proportion of cases with a lead point, 13%, was higher than that reported by Eklöf and coworkers,[11] 3%. We also had a higher rate of failure of barium enema reduction in patients aged 6 years or older than those investigators, 64% v. 41%. Perhaps the age range in our older children was wider, which could account for some of the difference.

Contrary to the results of studies in younger children,[4,7,9] we found that the success of barium enema reduction in older children was independent of the duration of symptoms, as was suggested by Turner and associates.[2]

Successful hydrostatic reduction in patients aged 10 years or older was rare, because in most of these patients there was an anatomic cause. The patient with cystic fibrosis, in whom inspissated stool appeared to act as a lead point, was the exception; such exceptions are rare. Patients with a lead point may be left with a filling defect, usually in the cecum, despite seemingly successful barium enema reduction.[12] When such a defect persists, laparotomy is indicated.

As the benefit is unproven, we do not ordinarily use glucagon at our institution. In general, surgery is performed if an adequate attempt at hydrostatic reduction fails. Attempts at reduction have been repeated in exceptional cases only.

Ileocolic intussusception accounted for most of our cases, as it has done among infants.[4] As expected, most of the cases of ileoileal intussusception had an underlying cause.

Ten patients had had identical symptoms months or years before the definite diagnosis of intussusception. Various organic or psychosomatic disorders had been diagnosed. At least some of these patients may have had an intussusception that underwent spontaneous reduction.

The rate of early recurrence in our series was 14%, compared with reported rates of 4% to 10% in younger children.[4,6,10] Altogether 20% of our patients had a recurrence (early, late or both). We have no satisfactory explanation for this remarkably high rate, although the length of follow-up may have been a factor.

Several authors have mentioned the need to rule out lymphosarcoma when a child older than 6 years has intussusception.[8,13,14] In fact, Singleton and colleagues[15] recommended that no attempt at

hydrostatic reduction be made in children over 2 years of age. We strongly disagree with this. Although two of our three patients with lymphoma presented before the age of 6 years, lymphoma seemed likely in all three at presentation because of a long history (more than 1 week), weight loss or a hard, fixed abdominal mass. A review of 1000 infants and children with intussusception at our institution, of whom 9 had lymphosarcoma as a lead point, yielded similar findings.[16] Ein[17] considered it unlikely that an intussusception due to ileal lymphosarcoma would be successfully reduced by barium enema. Lymphoma should be considered in any child more than 2 years old who has intussusception. However, we do not advocate laparotomy or other investigations when the presentation is typical, barium enema reduction is successful, and there are no persistent radiologic findings suggestive of mucosal abnormalities or a remaining mass.

Most of the children in our series did well regardless of the duration of illness, even those who presented up to 2 weeks after the onset of symptoms. The three deaths were related to the primary disease. A long history is not in itself a contraindication to hydrostatic reduction, nor is it an automatic indication for laparotomy.

In the past, recurrence of intussusception was considered an indication for laparotomy.[18] This opinion was later challenged by Ein.[19] We encountered only three children in whom laparotomy was necessary under such circumstances. Some children had up to six early recurrences, with successful barium reduction each time. One of these patients finally underwent laparotomy after the sixth recurrence to rule out a lead point, but no anatomic cause was found. As demonstrated by Ein[19] and by Eklöf and Reiter,[10] there is no reason to expect a high incidence of lead points in patients with recurrences. Therefore, we advocate barium enema reduction in cases of recurrence. As long as the reduction is successful (i.e., there are no abnormal clinical or radiologic findings), laparotomy is not needed in these cases. In older children, therefore, the underlying primary diagnosis seems to be the chief determinant of both the short-term complications and the long-term outcome.

Conclusions

Despite several differences in presentation, duration of symptoms and incidence of recurrence, there are similarities between young children with intussusception and older children, especially those between 2 and 5 years of age, with intussusception. Those between 2 and 5 years of age resemble infants in the cause of intussusception and the success of barium reduction. In children 6 years of age or older intussusception tends to have a definite cause that necessitates laparotomy for reduction. However, in the absence of peritonitis, barium enema reduction can safely be performed at any age.

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