Intussusception—current trends in management

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SUMMARY Barium enema reductions were attempted in 65 (90%) of 72 intussusceptions, of which 51 (79%) were successful. This represents a success rate of 70% overall. The average hospital stay was 3½ days. There was no mortality and, apart from a recurrence rate of 10%, no morbidity. It is suggested that barium enema reduction should be the treatment of choice provided that there is an emergency service of a paediatric radiologist and the patient is adequately resuscitated, the only absolute contraindication being evidence of pneumatosis intestinalis or peritonitis. Those patients who presented with shock, rectal bleeding, duration of symptoms longer than 48 hours, and pronounced degree of bowel obstruction had a higher rate of unsuccessful reduction. However, only the last two were significant. Further, provided that the clinical condition remains satisfactory and the reduction has been achieved to the caecum, a repeat barium enema after some hours may be successful in achieving reflux of contrast into the ileum, confirming complete reduction.

Recently, there has been a trend towards the use of barium enema reduction in the treatment of intussusception. This paper reviews and analyses all those patients treated with barium enema reduction at our hospital and looks into the factors that are in favour for or against its use.

Patients and methods

All patients with intussusception admitted into the hospital from June 1977 to December 1983 inclusive were studied. There were 66 patients with 72 cases of intussusception (six recurrences). The diagnosis was confirmed either radiologically or at operation. There were 46 boys and 20 girls. Sixty eight cases (94%) were under one year of age (mean 6.5 months). Abdominal pain and vomiting occurred in 64 (89%) cases and rectal bleeding in 36 (50%). A palpable abdominal mass was found in 53 (74%) cases and in two (3%) the mass was palpable per rectum. Blood was found at rectal examination in 47 (65%) cases. Thirty two (44%) were noted to be dehydrated on admission, and four (6%) were in shock. Plain films of the abdomen were taken in all cases and showed moderate to gross bowel obstruction in 22 (31%) and mild degree in 15 (21%). A soft tissue shadow suggestive of intussusception was found in 35 (49%). Intussusception was diagnosed on admission in 63 (88%) cases, and in the rest the diagnosis was delayed beyond 24 hours. The χ^2 test,

or where appropriate, Fisher's exact test were used to assess significance.

Results

After adequate resuscitation with half strength dextrose-saline or plasma, or both, barium enema reduction was attempted in 65 cases (90% of the total). Diazepam and hyoscine butylbromide in the appropriate dosage were given for sedation and bowel relaxation, respectively (diazepam 250–300 µg/kg by slow intravenous injection, hyoscine butylbromide 400 µg/kg by slow intravenous injection). In the other seven cases, barium enema was not attempted (three because of previous recurrence, three because of very gross bowel obstruction, and one because of the choice of the attending surgeon). Forty nine cases out of the 65 attempts were successfully reduced, and two more cases that were thought to be incompletely reduced were found to be completely reduced at laparotomy. The barium enema therefore completely reduced the intussusception in 51 of the 65 attempts, a success rate of 79%. There were five recurrences, and two were in one patient. The interval between the reintussusception varied between one month and eight months with an average of about three months. The recurrence rate was 10% (5 out of 51).

Twenty five cases were subjected to operation (14 after failed hydrostatic reduction, two after pre-

sumed failed hydrostatic reduction, seven who did not have reduction with barium enema attempted, and two because of suspicion of non-Peyer's patch lead points even after successful reduction). Gut resection was carried out in three cases, one because of Meckel's diverticulum and two because of gangrenous bowel. One patient with failed barium enema reduction was shown at surgery to have a volvulus of the small bowel associated with malrotation proximal to an intussusception, which was easily reduced. The intussusception was thought to have predisposed the volvulus.¹ There was one late recurrence after operation. This occurred in the same patient who had previously had two recurrences after successful barium enema reductions. Complications included two wound infections, one chest infection, and one postoperative bowel obstruction due to adhesions.

Analysis of the successful and failed barium reductions showed that age group did not seem to be a significant factor (Figure). Those cases with rectal bleeding, signs of shock, duration of symptoms for more than 48 hours, and a pronounced degree of bowel obstruction had a poorer chance of successful reduction. The Table shows that the presence of rectal bleeding or shock on admission did not achieve significance. There was, however, a much

Figure Age of patients in the groups with successful and failed barium enema reductions.

Table No (%) of patients with signs and symptoms in the groups with successful and failed barium enema reductions

Signs and symptoms	Group with successful reduction (n=51)	Group with failed reduction (n=14)
Symptoms > 48 hours*	3 (6)	5 (36)
Rectal bleeding	33 (65)	12 (86)
Shock on admission	2 (4)	2 (14)
Pronounced degree of bowel obstruction**	9 (18)	9 (64)

*p<0.01; **p<0.001.

larger percentage of patients with symptoms longer than 48 hours in the failed group than in the successful group ($\chi^2=0.06$, $df=1$, $p<0.01$). Also, a pronounced degree of bowel obstruction was related to a failed reduction ($\chi^2=11.93$, $df=1$, $p<0.001$).

There was no mortality in this series treated either by operation or with barium enema reduction. Apart from the 10% recurrence rate in the cases treated with barium enema reduction there was no other morbidity, whereas there was a small but definite morbidity in the group treated by operation. This might be due to the poorer condition of the cases chosen for operation. The duration of stay in hospital also differed significantly, being 8½ days in the group treated by operation and 3½ days in the group treated with barium enema reduction.

Discussion

The use of barium enema reduction has become increasingly the method of choice in the treatment of intussusception. The success rate varies in different centres from 18% to 85%.²⁻⁹ In our series a success rate of 79% of those attempted was obtained. This represents a success rate of 70% overall.

It has been considered that barium enema reduction should not be attempted in patients whose duration of symptoms is greater than 24 hours and who are very ill.^{10 11} Yet we had nine patients whose symptoms were longer than 24 hours, two patients with symptoms greater than 48 hours, one patient with symptoms over 72 hours, and two cases presenting in shock, and all of them were successfully reduced with barium enema. In such cases, however, there is a poorer prospect of reduction, and they should be approached with extra caution as being at greater risk of the disaster of perforation during barium enema.^{12 13} The only absolute contraindication to attempted hydrostatic reduction, in our opinion, is evidence of peritonitis or pneumatosis intestinalis (none in our series) provided that the following principles are strictly observed:

- (1) A paediatric radiologist is readily available.
- (2) The facility of image intensification and timer is available.
- (3) Adequate resuscitation of the patient.
- (4) Ready access to operative intervention if hydrostatic reduction fails.
- (5) Recurrence more than once calls for operation reduction.

One objection to hydrostatic reduction is the radiation involved. Most reductions take only seven to eight minutes' screening time, and with the low radiation factors possible with image intensification and a small field the level of irradiation seems

acceptable. Problems that may arise from using barium enema reduction include perforation of the colon, reduction of non-viable bowel, incomplete reduction, missed reduction of a non-Peyer's patch lead point, and delay of operative treatment in the unsuccessful cases. Perforation of the colon is very rare.¹²⁻¹⁴ No rupture of the bowel was encountered in our series. From our experience perforation is unlikely to occur if the barium receptacle is no more than one metre higher than the table. Attempts at reduction are abandoned if the condition of the child is poor, if more than 15 minutes fluoroscopy is required, or if the head of the intussusception remains stationary for ten minutes as shown by occasional screening. Reduction of non-viable bowel does not seem to occur with the moderate hydrostatic pressure employed. Incomplete reduction is unlikely if it is mandatory that free reflux is observed into the small bowel. In fact, even when no free reflux took place, reduction was later shown to be complete either at operation (two cases) or repeat barium enema (nine cases). This is probably explained by decreasing oedema in the bowel and at the ileocaecal valve¹⁵ and by the effect of the relaxants.⁹ Thus provided that the clinical condition of the patient is satisfactory, and repeat barium enema is readily available, complete reduction can be confirmed or further reduction attempted. The incidence of aetiological lead points other than Peyer's patch is low in most series.⁷⁻⁹ In our series only one patient had a lead point of aetiological importance. The only causative lesion of concern is lymphosarcoma, which usually causes chronic intussusception^{3,7} and is unlikely to be missed. Significant delay of operative treatment in those unsuccessful cases should not occur if facilities for operation are readily available.

Our study thus favours the use of barium enema reduction in the treatment of intussusception, as the complication rate is low, the duration of hospital stay is shorter, and the child is spared an operation.

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