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Recurrent Intussusception in Children

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Abstract

Background / Purpose : The etiology of intussusception in most cases of children is unknown. This makes the problem of recurrent intussusception even more puzzling. The purpose of this study was to present our experience of recurrent intussusception in our institute and to analyse the correlation of modes of treatment and the recurrence rate.

Methods : Medical records of patients treated for intussusception at the Queen Sirikit National Institute of Child Health from January 1988 to December 1998 were reviewed. The information about clinical manifestation, radiological findings and results of treatment were obtained. Clinical data of the patients with recurrent intussusception were assessed. The statistical differences were analysed by the Z test.

Results : Five hundred and seven patients were treated for 549 episodes of intussusception. Recurrent attacks of 42 episodes in 32 patients were noted. The total recurrence rate was about 8.2 per cent. Of the 32 patients, 17 were male and 15 were female. Their ages at the first episode was noted from 3 months to 11 years (average 14 months). Time interval before recurrence ranged from 1 day to 2 years (average 5 months). Numbers of the recurrence were recorded in 1-4 attacks. Seven cases recurred in the same admission, 2 cases after barium enema (BE), 3 cases after pneumatic and 2 cases after manual reduction. Non-operative management was successful in 313 episodes of intussusception. Recurrent attacks occurred in 35 of the 313 episodes of successfully non-operatively treated intussusception (11.2%), 18 of 135 episodes (13.3%) after BE reduction and 17 of 178 episodes (9.5%) after pneumatic or air reduction. There was no statistical difference between the recurrence rates after the two non-operative procedures ($p = 0.123$). Operative management was needed in 226 occurrences, successful manual reduction in 158 and intestinal resection was required in 68 cases. Recurrent attacks developed in 7 of the 226 surgically treated episodes (3.1%). All of them occurred after manual reduction only. The difference of the recurrence rates after the operative and non-operative managements of intussusception was statistically significant ($p < .001$). Of the 42 episodes of recurrence, 34 (80.1%) were successfully treated by BE and pneumatic reduction, although 4 of these 34 recurrences developed after previously successful manual reduction. The remaining 8 episodes of recurrence underwent manual reduction with or without ileocolopexy. Three of the 32 recurrent patients had leading points : Meckel's diverticulum, ileal and colonic polyp in one case each. There was no mortality among these 32 patients.

Conclusions : There was no statistical difference between the incidences of recurrent intussusception after successful management by BE and pneumatic reduction ($p > .05$), but the operative treatment had a lower incidence of recurrences than the non-operative procedures ($p < .05$). No recurrence was noted in any of the cases treated by manual reduction with ileocolopexy. It is concluded that the principle of management of recurrent intussusception should be similar to that of the primary intussusception in general.

Intussusception is one of the most common causes of intestinal obstruction in children under 2 years of age. It has been recognized for over two hundred years but the etiology of most intussusception is still unknown. However, recurrent attack creates one of the puzzling management problems of intussusception. This entity was written for little detail in the literature. The purpose of this study was to present our experience of recurrent intussusception in our institute and to analyse the correlation of modes of treatment and the recurrence rate.

Materials and Methods

Medical records of patients treated for intussusception at the Queen Sirikit National Institute of Child Health from January 1988 to December 1998 were reviewed. The information about clinical presentation, radiological findings and results of the treatment were obtained. Those who were admitted for more than one episodes of the disease were collected. Clinical data of the patients with recurrent intussusception were assessed. The recurrence rates after various types of the treatment were correlated. The statistical differences were analysed by the Z-test.

Results

Five hundred and seven pediatric patients were treated for 549 episodes of intussusception. Recurrent attack of 42 episodes were noted in 32 patients. The overall recurrence rate was about 8.2 per cent. Of the recurrent patients, 17 were male and 15 were female. Age of the 32 patients at the first episode was recorded from 3 months to 11 years (average 14 months). Thirty-four infants (75%) was under one year of age (Table 1). Time interval before each recurrence ranged from 1 day to 2 years (average 5 months). Fifty per cent of the recurrences had repeated attack within 6 months (Table 2). Numbers of the recurrence were 1-4 attacks. The highest number of recurrences was found in a girl, who was 5 months old at the first attack, with 5 episodes of intussusception which could be treated successfully by pneumatic or air reduction in all the 5 attacks (Table 3). Seven patients developed recurrence in the same admission, 2 after previous hydrostatic barium enema (BE) reduction, 2 after previous laparotomy manual reduction and 3 after previous pneumatic reduction.

Abdominal pain, vomiting and rectal bleeding developed in 81, 71 and 52 per cent of all the recurrent episodes respectively (Table 4). Abdominal mass was palpable in 27 occurrences (64%). The average duration of the symptoms before admission of the recurrent attacks was 16.7 hours, compared to 30.2 hours of the initial episodes ($p<.001$).

Of the initial episodes in 507 patients, non-operative management was attempted in 454. This was successful in 313 occurrences of intussusception (69%). Recurrent attacks occurred in 35 of the 313 episodes of successfully non-operatively treated

Table 1 Age of the 32 patients at the first episode of intussusception.

Age	Number	Per cent
0 - 1 year	24	75
1 - 2 years	3	9.4
2 - 5 years	4	12.5
over 5 years	1	3.1
Total	**32**	**100**

Table 2 Time interval of each recurrence (n = 42).

Time interval	Numbers	Per cent
within 1 - 7 days	9	21.4
7 - 30 days	8	19.1
1 - 6 months	14	33.3
6 - 12 months	8	19.1
1 - 2 years	3	7.1
Total	**42**	**100**

Table 3 Numbers of recurrence (n = 42).

Recurrent attack	Numbers	Per cent
1 episode	26	81.3
2 episodes	3	9.4
3 episodes	2	6.2
4 episodes	1	3.1
Total	**32**	**100**

Table 4 Clinical presentation of the initial and recurrent episodes of intussusception.

Symptomatology	Initial intussusception (n = 32)		Recurrent intussusception (n = 42)	
	No.	Per cent	No.	Per cent
Vomiting	30	93.8	30	71.4
Abdominal pain	28	87.5	34	80.9
Bloody stool	27	84.4	22	52.4
Normal stool	5	15.6	20	47.6
Palpable mass	25	78.1	27	64.3
History of viral infection	5	15.6	5	11.9

Table 5 Correlation of modes of treatment and the recurrence rate.

Modes of treatment	Successful treatment	Recurrence		P value
	No.	No.	Per cent	
Non-operative				
BE reduction	135	18	13.3	0.123
Pneumatic reduction	178	17	9.5	
Operative				
Manual reduction	158	7	4.4	<.001
Intestinal resection	68	0	0	

intussusception (11.2%). Hydrostatic BE reduction was initially attempted in 211 episodes and the intussusceptions were successfully reduced in 135 episodes (64%) with 18 recurrences. The recurrence rate after successful BE reduction was about 13.3 per cent. Pneumatic reduction was attempted in 243 episodes and the intussusceptions were successfully reduced in 178 episodes (73.2%) with 17 recurrences. The recurrence rate after successful pneumatic reduction was about 9.5 per cent (Table 5). There was no statistical difference between the recurrence rate after the two non-operative procedures ($p = 0.123$). Of the 226 patients who underwent laparotomy, manual reduction of intussusception was successful in 158 episodes and intestinal resection was required in the remaining 68 cases. Recurrences developed in 7 patients after the 226 surgical treatment (3.1%). All of the 7 recurrences occurred after the 158 manual reductions only (4.4%). The difference of the recurrence rate after operative and non-operative management of intussusception was statistical significant ($p < .001$).

Hydrostatic BE reduction was attempted in 20 of the 42 recurrence. This was successful in 19 of the 20 episodes (95%). Two of the 19 successful BE reduction cases had the history of operative munual reduction from the previous intussusception. One girl had a colonic polyp at the left transverse colon. She developed colocolic intussusception and successful BE reduction in all 2 episodes. She underwent a polypectomy by colonoscopy 2 days after BE reduction. Pneumatic reduction was attempted in 19 of the 42 recurrences. This was successful in 15 of the 19 episodes (79%). Two cases of the 15 successful pneumatic reduction had their previous intussusception treated with operative manual reduction. Eight patients required laparotomy, 5 after failure of non-operative reduction and the remaining 3 patients underwent primary surgical exploration. All of the eight intussusceptions could be manually reduced. An ileocolopexy was also performed in 3 cases. Two patients underwent intestinal resection after successful manual reduction because of Meckel's diverticulum

Table 6 Comparison of the recurrent intussusception from the literature.

Authors	Year	Country	Recurrence rate (%) after successful reduction		
			BE	Pneumatic	Operative
Ein SH[3]	1975	Canada	11	-	3
Sparnon AL[9]	1984	Australia	17	-	2.4
Liu KW[10]	1986	Ireland	10	-	4
West KW[11]	1987	USA	12	-	0
Mackay AJ[12]	1987	Australia	17	-	0
Wilson-Storey[13]	1988	England	10	-	1.1
Skipper RP[14]	1990	USA	21	-	3.1
Palder SB[15]	1991	Canada	10	4	0
Sringer DA[16]	1990	Canada	11	8	-
Beasley SW[17]	1987	Australia	4.4	6.5	-
Renwick AA[18]	1992	Australia	9	8	0
Daneman A[19]	1998	USA	11	8	-
Present Study	2000	Thailand	13.3	9.5	3.1

and an ileal polyp in one case each.

Of the 42 recurrences, ileocolic intussusception occurred in 38 episodes while enteroenteric and colocolic intussusception occurred in 3 and 1 episode respectively. There was no death among these 32 patients.

Discussion

The overall recurrence rate of intussusception occurs in about 5 per cent.[1-5] There is about 10 per cent recurrence after barium or air reduction and a 2 to 4 percent recurrence rate after operation.[3-8] It has been well shown that the operative reduction had the lower incidence of recurrence rate than the non-operative procedures,[3,9-15] and there was no statistical difference between the recurrence rates after successful BE and pneumatic reduction.[16-20] Our experience was similar to those reported in the literature (Table 6). Adhesions created by the operative manual reduction and incidental appendectomy may explain the lower recurrence rate after surgical reduction of the intussusception. Indeed, ileocolic resection is claimed to virtually eliminate recurrent intussusception. Many authors have suggested that the use of pneumatic reduction offers several advantages over BE reduction because it allows easier reduction of the intussusception, less exposure to radiation, more safety following bowel perforation during attempted reduction and lower incidence of recurrent attack.[16-23]

In this series, 75 per cent of the patients were under one year of age at the first episode of intussusception and the recurrence developed within 6 months in the vast majority of cases. Eighty percent of the 32 patients had one recurrence. Except for abdominal pain, there were fewer symptoms and signs in the recurrent episodes. It took a shorter time interval between presenting symptom and admission of the recurrent attack than the first episode because their parents gained the experience from the previous occurrence.[3,16] The typical symptoms, especially acute colicky pain, alerted their parents to recognize the recurrent intussusceptions.

Most of the initial episodes of intussusception were the ileocolic variety and the recurrences frequently developed at the same sites. In contrary, immediate recurrence after operative reduction and after successful non-operative reduction with leading points may occur as enteroenteric variety. We found the jejuno-jejunal intussusception in one case with immediate recurrence after manual reduction and the ileo-ileal intussusception in 2 cases with Meckel's diverticulum and ileal polyp occurring after successful BE and pneumatic reduction. The recurrence rate in the patients with leading points were reported as high as 20 per cent or about four times that was seen in all

cases of intussusception.[23,24]

In the past, patients with recurrent intussusception should underwent laparotomy in order to rule out the possibility of a leading point.[25] Current concept suggests that the initial management of recurrent intussusception should be non-operative even if they recur after previous operative reduction.[3,16,26] From this study, the success rate of pneumatic and BE reduction were as high as 79 and 95 per cent respectively. The higher success rate of non-operative reduction was possibly due to early clinical presentation and early diagnosis of the recurrent intussusception. How many recurrences should have occurred before the patients should be subject to surgery is still controversial. In the cases with having a leading point, surgical excision or intestinal resection must be performed in order to eliminate the recurrent attacks. However, if there is no evidence of leading points during laparo-tomy in such patients, an ileocolopexy should be done using the Burrington's technique.[27]

Conclusion

Thirty-two children with 42 episodes of recurrent intussusception were reviewed. Three-fourth of the patients were under one year of age at their first episodes. Time interval of the recurrence was within 6 months in about 75 per cent of all the attacks. The recurrent episodes had the clinical presentations less than the symptoms in the initial intussusception. There was no statistical difference between the incidences of recurrent intussusception after successful management by BE or pneumatic reduction, but the operative treatment had a lower incidence of recurrence than the non-operative procedures. No recurrence was noted in any of the cases treated with manual reduction and ileocolopexy. It is concluded that the principle of treatment of recurrent intussusception should be similar to that of the primary intussusception in general.

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