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A clinical study of intussusception in children.

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Abstract*: Intussusception is the most common cause of intestinal obstruction in infants and young children. In the present retrospective analysis of surgically treated children of intussusception, a total of 110 children (76 Males and 34 females with the ratio of 2.2:1) were treated. The median age of patients was 9 months, iliocolic type was the commonest with 89 patients (80.9 %). Majority of patients (52.72 %) presented after 72 hours of the onset of symptoms. Children with intussusception who had a failed hydroreduction and those presented late after 72 hours after the initiation of symptoms and patients with unfavorable abdominal signs were subjected to surgical treatment. All cases were subjected to open manual reduction, and the rate of bowel resection was 9.09 % (10 of 110 patients, lead point pathology was found in 3 patients (Meckel's diverticulum), there was no early recurrence and mortality following the surgery.*

Key words*: Intussusception, manual reduction, bowel resection, lead point pathology, Meckel's diverticulum.*

I. Introduction

Small bowel obstruction is the commonest surgical emergency encountered in childhood [1]. Intussusception remains the most common cause of bowel obstruction in young children, resulting into significant morbidity and mortality, if not promptly treated [2-4]. The peak age of presentation is 4 to 8 months [4]. The invagination of proximal bowel into more distal bowel results in venous congestion and bowel wall edema which may progress to arterial obstruction and bowel necrosis and perforation if not promptly treated [5]. Approximately 90% of intussusceptions in the paediatric age-group are ileocolic and idiopathic, [6] presumably caused by lymphoid hyperplasia [7]. Even though the first line of treatment is non operative hydroreduction or pneumoreduction of the intussusceptions, depending on the local expertise available and the timing of presentation, non-operative treatment is not always possible. In the present study, we have discussed the clinical presentation of intussusception, possible predisposing factors, surgical intervention and outcomes.

II. Materials And Methods

The study is a retrospective analysis of children with intussusception below 12 years of age, operated by the same surgeon from January 2010 to September 2015 in two institutes i.e. Shija Hospital and Research Institute, and Regional Institute of Medical Sciences (RIMS), Imphal. Patients with intussusception referred to the pediatric surgeon from the pediatricians and other centers that had a failed hydroreduction and those presented late after 72 hours after the initiation of symptoms and patients with unfavorable abdominal signs were subjected to surgical treatment and they comprised the study population. Patients treated non-operatively were excluded from the study.

The diagnosis of the intussusception was based on the ultrasonography of the abdomen. A detailed evaluation of the history and clinical findings were recorded for analysis. Baseline blood investigations were done (serum creatinine, serum urea, serum electrolytes and complete blood count).

In open reduction, manual reduction was achieved by milking the intussusceptum out of the intussuscipient. Bowel resection was performed when bowel necrosis, irreducible with rupture or perforation were found intra-operatively. Analysis of data was done by percentage, mean and median using Statistical Package for the Social Sciences (SPSS version 20.0; SPSS Inc, Chicago, US).

III. Results

A total of 110 children (76 Males and 34 females with the ratio of 2.2:1) with intussusception were treated surgically after the failed hydroreduction, unfavorable abdominal signs for which the hydroreduction was not attempted, and late presentation after 72 hours. Out of 110 patients, 35 patients were failed hydroreductions, 22 patients with distress with hemodynamic instability, 2 patients were for multiple recurrent intussusceptions and 51 patients presented late after 3 days with massive abdominal distention. Age of the patients ranges from 2 months to 7 years with the median of 9 months. The most common age group was between 6 months to 1 year comprising of 43 patients (39%). Infants below 6 months of age constitute 29 patients (26 %) of which 2 (6.89 % of the age group) were following the immunization of DPT and rotavirus vaccine.

Table 1: Age distribution of patients, lead point pathology and bowel resection

Age	No. of patients (percentage)	Median age (months)	No of patients with pathologic lead points	Resection of bowel
< 0.6 Year	29 (26 %)	9	0	6
0.6– 1 Year	43 (39 %)		0	1
1 – 2 Years	17 (15.5 %)		0	0
2 – 3 Years	12 (10.9 %)		0	0
3 – 4 Years	5 (4.5 %)		0	0
4 – 5 Years	1 (0.9 %)		1	1
> 5 Years	3 (2.7 %)		2	2
Total	110 (100 %)		3	10

Table 2: Symptom duration at presentation and bowel resection

Duration of symptoms	No of patients	Resection of bowel
24 – 48 hours	15 (13.6 %)	0
48 – 72 hours	37 (33.6 %)	5
> 72 hours	58(52.72 %)	5

Among the symptoms and signs complex vomiting was found in 95 patients (86.36 %), periodic pain abdomen in 92 (83.6 %), red currant jelly in 102 patients (92.7 %), abdominal mass in 35 patients (31.8 %), lethargy following episodes of irritability 20 (18.18 %), irritability 30 (27.27 %). The duration of symptoms range from 28 – 99 hours, and the mean duration of symptoms among the successful manual reduction cases was 72.48 ± 19.49 hours and 75.1 ± 16.62 hours among the cases with bowel resection.

Table 3: Presenting symptoms and signs of the patients

Presenting symptoms and signs	No of patients (percentage)
Vomiting	95 (86.36 %)
Pain abdomen	92 (83.63 %)
Blood in stool/ red currant jelly	102 (92.7 %)
Irritability	30 (27.27 %)
Abdominal mass	35 (31.8 %)
Constipation	15 (13.6 %)
Lethargy	20 (18.18 %)
Viral Upper respiratory tract infection	47 (42.72 %)

All patients were treated by open surgery (laparotomy). The manual reduction was done by milking the tip of the intussusception by providing constant pressure at the intussusceptum through intussuscipiens and at the same time compressing the intussusceptum throughout its length with one hand to avoid rupture or bursting of the intussusception mass laterally instead of the reduction proximally.

Eighty nine patients (80.9 %) had ileocolic intussusception, 16 patients (14.5 %) had ileoileocolic and 5 patients (4.5 %) had multiple intussusception of ileocolic region with ileoileal and jejunojejunal segments. There were associated multiple mesenteric adenopathy(larger than 10 mm) in 72 patients (65.45 %). Only 2 cases were recurrent cases following hydroreduction, one was the second episode and the other was the sixth episode and both of them were operated for failed hydroreduction. They were reduced manually and cecopexy and plication of terminal ileum with caecal wall were done.

A total of 10 patients needed resection of the bowel of which, 4 patients failed to reduced with rupture of the mass for which resection of the mass was done from the terminal ileum upto transverse colon in 3 cases, and upto splenic flexure in 1 case. In one patient presented with severe sepsis and hemodynamic instability for which resection of the mass was done with terminal ileostomy and mucus fistula of the descending colon, the other three had ileo-transverse anastomosis. One patient had perforation at the ileal segment of the intussusceptum (ileoileocolic type), which was revealed after the reduction of the intussusception, for which resection anastomosis of the terminal ileum with transverse colon were done. Two patients had irreducible gangrenous mass for which resection with ileo-transverse anastomosis was done. Three patients had Meckel's diverticulum as the lead point for which limited resection of the segment of the terminal ileum was done with end to end anastomosis.

Appendectomy was performed in 57 patients (51.8 %) as the appendix was congested with wall hematomas, walls looked inflamed and edematous. There were no major complications in the post operative period and recovery was smooth and uneventful. Only 2 patients had superficial surgical site infection. No patient had early recurrence after the surgery. There was no mortality in the study population. The mean duration of hospital stay among the successful manual reduction was 3.24 ± 0.47 days (range 3 – 5 days) and 7 ± 1.25 days (range 5 – 9 days) among the bowel resection cases.

IV. Discussion

The prevalence of intussusceptions is most common in the infants below the age of 1year constituting 65 % of the study population as in other studies (46.8 % of Claudio Costantino, et al) [8]. The incidence is more common among males for reasons unknown [8,9]. In our present series, most of the patients were reported late, no patient was presented in the first 24 hours, in contrast to the study by Wong et al where 39 % reported before 24 hours and 86 % before 48 hours [9]. Eighty six percent of the study population presented after the 48 hours as compared to 13.9 % of the study by Wong et al and 58 patients (52.72 %) presented after 72 hours [9]. The late presentation in our study could be due to many possible reasons like we have analysed the patients with operative treatment only excluding the nonoperatively treated patients who could have presented earlier and many patients have wasted time during evaluation and treatment for possible gastroenteritis and dysentery in the ill equipped peripheral health centers where less number of pediatricians are available and lack of awareness of the surgical pathology of children among the peripheral health care providers. Moreover, the presenting symptoms of intussusceptions are often non-specific and may mimic viral gastroenteritis, presenting as vomiting and diarrhea. The classic triad of red currant jelly stool, abdominal pain, and abdominal mass is not often encountered, and the diagnosis may easily be delayed or missed [10].

Classical symptom of sudden onset of severe, colicky, intermittent abdominal pain that brings the legs up (in infants) and lasts only a few minutes occurs in 85 % of patients, which occurred in 83.63 % of our study population [11]. Per rectal bleeding or red currant jelly stool signify bowel ischaemia and mucosal sloughing but is a rather late sign [9]. The rectal bleeding and classical red currant jelly stool was present in 102 patients (92.7 %), which is much higher as compared to other studies, which ranges from 40 % - 60 % [9,11]. This may be due to the late presentation of the study population leading into more cases of bowel ischaemia and mucosal sloughing. Vomiting was a very common presenting symptom present in 95 patients (86.36 %) as in other studies [7,12]. In our study only 35 (31.8 %) patients had palpable abdominal mass, as the palpation was hampered by the irritable child and abdominal distention associated with the late presentation. In all the patients, at least one of the symptom complex of periodic pain abdomen, abdominal mass and red currant jelly stool were found. In 91 patients (82.73 %) at least 2 of the 3 symptoms were found.

Viral infection may have a role as a causative factor of intussusception.[13-15]. We have 47 (42.72 %) patients with viral upper respiratory tract infection as a predisposing factor. Two patients had intussusception following vaccination. The lympho-proliferation of lymphatic tissue of the gastrointestinal system in viral infections, vaccinations could have a role to play in causing intussusception. Three cases had lead point pathology.

The rate of bowel resection in operated cases of intussusception is quite variable. Soomro et al reported 80 % bowel resection rate (12 of 15 cases) [1]. Similarly Ghritlaharey et al reported a 65.90 % resection rate (58 out of 88 cases) [16]. Whereas, Costantino et al, reported a lower resection rate of 7.8 % (15 of 192 operated cases) [8]. In our present study only 10 of 110 cases (9.09 %) required surgical resection of bowel for various indications, 3 cases for pathological lead point (Meckel's diverticulum), 1 for perforation, 2 for gangrenous segment and 4 cases for rupture of the intussusception mass during reduction. The nature of bowel resection varies from segmental resection of ileum, right hemicolectomy to extended right hemicolectomy upto splenic flexure with reconstruction of the bowel continuity by ileo-ileostomy, ileo-transverse anastomosis and end ileostomy as in other studies [16]. Twenty two patients had sero-muscular tear during manual reduction, but the simultaneous compression or pressure throughout the length of the intussusception mass through the intussucepiens reduce the chance of rupture of the mass with more success of reduction. The seromuscular tears were repaired in single layer interrupted 4 – 0 vicryl without any complication, which showed that seromuscular tear is not an indication of resection provided further rupturing of the full thickness of the bowel is prevented by proper lateral compression during the manual reduction. Addition of appendectomy in manual reduction cases is debated [17]. In the present study, appendectomy was done in 57 patients (51.8 %) of case due to the congestion, edematous and inflamed appendix.

Ultrasonography has a high sensitivity (98%-100%) and specificity (88%-100%) in diagnosis of intussusception [18]. Once diagnosed, reduction of the intussusception by air-contrast enema is currently preferred and standard treatment, as it has a high success rate and is well tolerated with few complications [19]. Surgery is reserved for children with peritonitis, shock/sepsis, pneumoperitoneum, or a preoperatively evident pathologic lead point [20]. Depending on the expertise in different studies, success of non-operative treatment is different. Therefore, operative intervention should not be delayed in those patients who encounter doubtful or failed non-operative reduction [9]. In the study by Costantino, the non operative reduction was reported as low as 18.5 % [8] as compare to Wong et al report of a high 79.4% success rate [9].

In the present study, the success rate of the non operative treatment cannot be evaluated as most of the attempt of reduction has already been attempted in other units or centres. But the success rate seems to be low as high percentage of patients are diagnosed late due to late presentation or miss evaluation in the line of gastroenteritis or dysentery. Therefore, identifying the clinical situation with a high index of suspicion and early

referral of suspected cases to a tertiary treatment centre can significantly reduce morbidity associated with late diagnosis in the child. The more awareness of the pediatricians while dealing with irritable infants and children with colicky or periodic pain abdomen with or without rectal bleeding will reduce the late presentation with resultant complications.

The presence of a palpable abdominal mass has been shown as a risk factor for failure of non-operative reduction [9]. Even though the delayed in presentation and surgery have not been shown to be related with successful manual reduction or the need of bowel resection, the length of hospital stay is significantly reduced in patients who do not required bowel resection. For patients in whom non-operative reduction fails, laparoscopic reduction has been demonstrated to be feasible and successful in uncomplicated intussusception [21,22].

V. Conclusion

Inspite of the most common cause of intestinal obstruction in children, intussusception is being diagnosed and referred late to the surgeon leading into more cases being subjected to surgery instead of the non-operative reduction. The study has a limitation of studying only the operated cases, making it unable to find out the outcome and success rate of the non-operative reduction in the management of intussusception. Urgent surgical treatment is important in failed non-operative treatment and hemodynamically unstable patients to avoid the morbidity and prolonged hospital stay associated with bowel resection.

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References

[1]. Soomro S, Mughal SA. Intestinal Obstruction in Children. Journal of Surgery Pakistan (International) 2013;18 (1) January – March:20-23.
[2]. Pujari AA, Methi RN, Khare N. Acute gastrointestinal emergencies requiring surgery in children.Afr J PaediatrSurg 2008;5:61-4.
[3]. Saleem MM, Al-Momani H, Abu Khalaf M. Intussusception: Jordan University Hospital experience. Hepatogastroenterology2008;55:1356-9.
[4]. Bines J, Ivanoff B. Acute intussusception in infants and children: incidence, clinical presentation and management: a global perspective. Report 02.19. Geneva: World Health Organization; 2002
[5]. Stringer MD, Pablot SM, Brereton RJ. Paediatric intussusception. Br J Surg 1992;79:867-76.
[6]. Bajaj L, Roback MG. Postreduction management of intussusception in a children's hospital emergency department. Pediatrics 2003;112:1302-7
[7]. DiFiore JW. Intussusception. SeminPediatrSurg 1999;8:214-20.)
[8]. Costantino C, Restivo V, Cuccia M, Furnari R, Amodio E and Vitale F. Analysis of hospitalizations due to intussusception in Sicily in the pre-rotavirus vaccination era (2003–2012). Italian Journal of Pediatrics (2015) 41:52
[9]. Wong CWY, Chan IHY, Chung PHY, Lan LCL, Lam WMW, Wong KKY, Tam PKH. Childhood intussusception: 17-year experience at a tertiary referral centre in Hong Kong. Hong Kong Med J 2015;21:Epub
[10]. Reijnen JA, Festen C, Joosten HJ, van Wieringen PM. Atypical characteristics of a group of children with intussusception. ActaPaediatrScand 1990;79:675-9.
[11]. Ein SH, Stephens CA. Intussusception: 354 cases in 10 yrs. Journal of pediatric surgery 1971;6:16.)
[12]. Losek JD. Intussusception: don't miss the diagnosis! PediatrEmerg Care 1993;9:46-51.
[13]. Mayell MJ. Intussusception in infancy and childhood in Southern Africa.A review of 223 cases. Arch Dis Child1972;47:20-5.
[14]. Mangete ED, Allison AB. Intussusception in infancy and childhood: an analysis of 69 cases. West Afr J Med1994;13:87-90.
[15]. O'Ryan M, Lucero Y, Pena A, Valenzuela MT. Two year review of intestinal intussusception in six large public hospitals of Santiago, Chile.Pediatr Infect Dis J 2003;22:717-21.]
[16]. Ghritlaharey RK, Budhwani KS, Shrivastava DK. Exploratory laparotomy for acute intestinal conditions in children: A review of 10 years of experience with 334 cases. Afr J Paediatr Surg. 2011;8:62-9.]
[17]. Richter HM. Jr, Silver JM. Surgical treatment of intussusception in infants - Effect of Added Appendectomy. AMA Am J Dis Child. 1953;86(2):184-185.
[18]. Bhisitkul DM, Listernick R, Shkolnik A, et al. Clinical application of ultrasonography in the diagnosis of intussusception. J Pediatr 1992;121:182-6.
[19]. Stringer DA, Ein SH. Pneumatic reduction: advantages, risks and indications. PediatrRadiol 1990;20:475–7
[20]. Applegate KE. Intussusception in children: evidence-based diagnosis and treatment. Pediatr Radiol 2009;39(Suppl. 2):S140–3.
[21]. Schier F. Experience with laparoscopy in the treatment ofintussusception. J PediatrSurg 1997;32:1713-4.
[22]. Poddoubnyi IV, Dronov AF, Blinnikov OI, Smirnov AN,Darenkov IA, Dedov KA. Laparoscopy in the treatment ofintussusception in children. J PediatrSurg 1998;33:1194-7.