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Research Article

A clinical study of children with intussusception

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ABSTRACT

Background: In early childhood the commonest cause of bowel obstruction is intussusception and is one of the common abdominal emergencies in children younger than 2 yr. Early diagnosis helps to reduce mortality and morbidity. The objective of the study was to find out the pattern of clinical manifestations in children with intussusception and the outcome.
Methods: A hospital based descriptive study using purposive sampling technique. 52 children below 12 years of age with a radiological diagnosis of intussusception attended the Emergency, outpatient and inpatient departments of Jubilee Mission Hospital, Thrissur Kerala (Tertiary care teaching hospital) were evaluated, during the study period from January 2012 to October 2012.
Results: Outcome of the problem was correlated with age, sex, symptoms, risk factors sonological findings treatment protocol and duration of hospital stay. Total 52 children of intussusception were managed during the 10 month period (2012) male to female ratio was 2.05 :1. The common symptoms were vomiting (76.9%) excessive cry (65.38%) blood in stool (53.8%) abdominal pain (34.6%) and irritability (25%). Ileocolic intussusception (88.4%) was the commonest type.
Conclusions: 42 children (80.76%) of the present study underwent hydrostatic reduction successfully. 4 children needed surgery. self-reduction occurred in 6 children (11.53%). The median hospital stay was 2 days and 39 children (75%) went home within 48 hrs. 9 children (17.3%) of the study population developed complications. 4 (7.69%) had shock. 2 each (3.84%) had perforation, peritonitis and septicaemia.

Keywords: Intussusception, Intestinal obstruction, Hydrostatic reduction, Self-reduction

INTRODUCTION

Intussusception is the condition where by a segment of proximal intestine (intussusceptum) is telescoping or invaginates into the lumen of the more distal bowel (intussuscipiens).[1] The reported incidence of intussusception varies by time and geographic location. The incidence varies from 1 to 4 per 1000 live births.[2] The male: female ratio is 3:1. Mostly in children intussusceptions occur in the first year of life and rarely occur before 2 months of age, reaches its peak in 5 to 7 month and start decline.[3,4] Intussusception was first described by Barbette of Amsterdam in 1674, after three centuries its sonographic features were described in 1977.[5,6] Since then ultrasonography is the main diagnostic tool of this condition and has got high specificity and sensitivity. The classical triad of symptoms, vomiting, abdominal pain, and passage of red "currant jelly" stool.[7] Are occurring in only one third of patients. In 60% of cases sausage shaped mass will be palpable in the right hypochondrium .Now commonest mode of diagnostic tool in childhood intussusception is ultrasonography, which is highly specific and accurate.[6] The most specific plain radiographic findings are the target and meniscus signs but 25-50% of case only it is demonstrable. So the role of plain radiography nowadays is used to rule out other complications like intestinal perforation and pneumoperitoneum.[8] Contrast enema examination requiring x-ray exposure has been the gold standard for the diagnosis of intussusceptions in the past.[9]

Ultrasound totally replaced fluoroscopy due to its superior performance, a high level of patients' comfort and safety. It also helps to differentiate paediatrician from similar conditions and helps to find out the lead points.[10] Many small bowel-small bowel and a few small bowel-colonic intussusceptions reduce spontaneously. In hydrostatic reduction, exerting pressure on the apex of intussusceptum in the colon until complete reduction obtained. Pushing it from the pathologic into the normal position.[11] There are so many techniques of nonsurgical reduction were tried but the use of ultrasound guidance instead of fluoroscopy allows an even more liberal approach to enema therapy.[12] It is a very safe, because the whole procedure is visualized with real time ultrasound, and also a nonoperative method and no risk of radiation exposure. The high success rate of this procedure has emerged as a useful alternative to surgery and fluoroscopy.[13] Untreated intussusception is potentially fatal. If left untreated, ileal-colic intussusceptions may lead to intestinal ischemia, gangrene, perforation, peritonitis, shock and death. Case fatality rates also vary widely by region. Deaths from intussusception are more common in developing countries. Delayed diagnosis and intervention is a significant contributing factor for increased morbidity and mortality.[14]

METHODS

The study was a hospital based descriptive study conducted in Department of Paediatrics, Emergency, outpatient and inpatient wards, Jubilee Mission Hospital, Thrissur, Kerala (Tertiary care teaching hospital) sample technique used was Purposive sampling.

Study population (n)

52 children below 12 years of age with intussusception were included consecutively, during the study period from January 2012 to October 2012.

Inclusion criteria

All children below 12 years of age with a radiological diagnosis of intussusception attending the emergency, outpatient and inpatient departments of Jubilee Mission Hospital, Thrissur.

Exclusion criteria

Children with intussusception below 12 years who got referred to outside hospitals were excluded from the study.

Study period was 1st January 2012 to 31st October 2012 (10 months) Parents were explained the need for the study and a written consent was taken. A total of 52 children were included in the study. A detailed proforma was used to register the relevant details including name, age, sex, vital signs, presenting complaints, details of complementary feeding, history of atopy and past history of similar illness. The details regarding the method of diagnosis, treatment modality and the immediate outcome in the next 48 hours were also recorded in the proforma. The presence of complications if any was also noted. Hospital stay in hours/days was also recorded. Weight of the children was recorded using an electronic weighing machine and expressed in kilograms. Height was measured using seca stadiometer in children more than 2 years and on an infantometer in children below 2 years. The weight and height were plotted on growth chart (NCHS) and those falling between 5th and 95th centiles were taken as normal.[15]

Ethical consideration

The study protocol was submitted for institutional ethical committee approval and approval was obtained. Statistical methods used were:

1. Frequency distribution of the clinical variables were derived and presented.
2. Percentage analysis was carried out and represented as pie chart and bar diagram.
3. Chi square analysis.

RESULTS

52 children were included in the study that fulfilled the inclusion and exclusion criteria in the study period of10 months. All children were diagnosed by ultrasound technique. 61% of intussusception occurred between 6 months and two years. The mean age of presentation was 17 months and 80.2% of children were below two year of age. 19.2% more than 2 yrs of age (Table 1).

Table 1: Age wise distribution (n =52).

Age	No. of children	Percentage
< 6 months	10	19.23
6 months - 2 years	32	61
> 2 years	10	19.23
Total	52	100

The study group included 52 children out of which, 61% belonged to age group between 6 month to 2 years.10 children (19.23%) fell in the age group less than 6 months and more than 2 years each.

Table 2: Distribution based on age of complementary feeding.

Age of complementary feeding	No. of children	Percentage
< 2 months	2	3.846
2 – 4 months	41	78.84
4 – 6 months	8	15.38
> 6 months	1	1.92

41 children (78.84%) were given complementary feeds between 2 – 4 months of age. 8 children (15.38%) were given complementary feeds between 4 – 6 months.2 children (3.84%) were given complementary feeds before 2 months.

Table 3: Distribution based on treatment modality.

Treatment modality	No. of children	Percentage
Surgery	4	7.69
Hydrostatic reduction	42	80.76
Self-reduction	6	11.53
Total	52	100

42 children (80.76%) of the present study underwent hydrostatic reduction successfully. 4 children needed surgery. Self-reduction of the intussusception occurred in 6 children (11.53%).

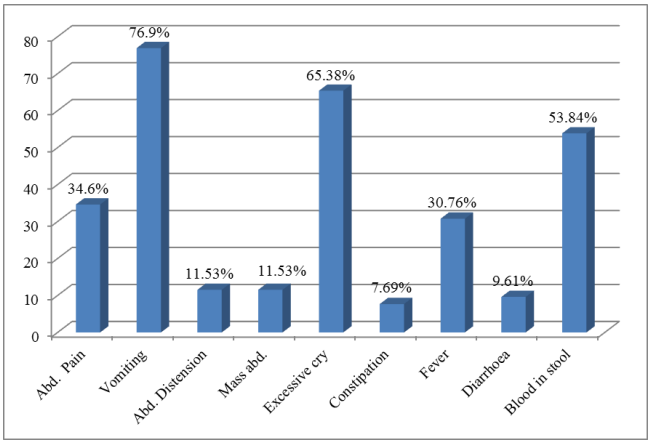

Figure 1: Percentage distribution based on presenting complaints (n = 52).

40 children (76.9%) had vomiting as the presenting complaint. 34 children (65.38%) had excessive cry. 28 children (53.84%) presented with blood in stool. 34.6% of children had abdominal Pain. 16 children (30.76%) had fever.

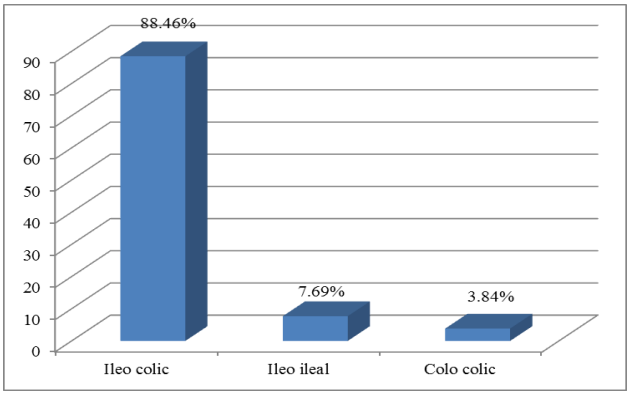

Figure 2: Percentage distribution based on the type of intussusception.

Out of 52 children, 46 (88.46%) had Ileo colic type of intussusception. 4 children (7.69%) had ileo ileal and 2 (3.84%) had colo-colic type.

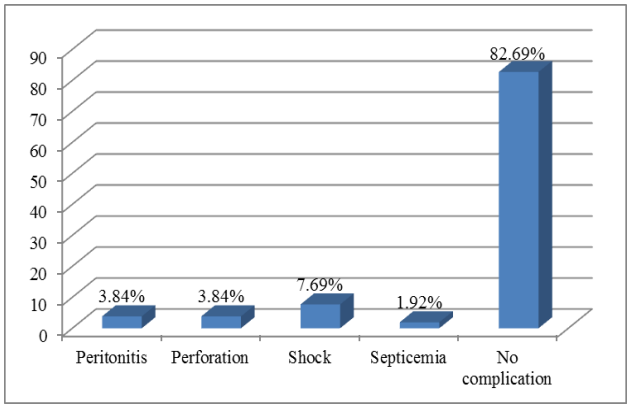

Figure 3: Percentage distribution based on complication.

9 children (17.3%) of the study population developed complications. 4 (7.69%) had shock. 2 each (3.84%) had perforation and peritonitis. One child developed septicemia.

Age of occurrence was similar to be observed in other studies. Youngest age was 4 months and oldest one was 9years. The most common symptoms noted on admission of definite intussusceptions cases were vomiting (77%), abdominal pain (34.6%), and excessive cry (65.38%) bloody stools (28%). Other signs and symptoms included abdominal distension (11.5%), abdominal mass (11.5%), fever (16%), Diarrhoea and constipation were found in 9.6% and 7.69% children respectively (Figure 1).

92% of cases presented with five or more symptoms. 40 children (76.9%) had vomiting as the presenting complaint.34 children (65.38%) had excessive cry. 28 children (53.84%) presented with blood in stool. 34.6% of children had abdominal Pain. 16 children (30.76%) had fever. Abdominal distension and mass abdomen were found in 11.53% of children. Diarrhoea and constipation were found in 9.6% and 7.69% children respectively. 41 children (78.84%) were given complementary feeds between 2-4 months of age. 8 children (15.38%) were given complementary feeds between 4-6 month 2 children (3.84%) were given complementary feeds before 2 months Only one child was exclusively breast fed for 6 months of age (Table 2).

Out of 52 children, 46 (88.46%) had Ileo colic type of intussusception. 4 children (7.69%) had ileo ileal and 2 (3.84%) had colo-colic type (Figure 2). Out of 52 children only 7 (13.46%) had respiratory tract infection concurrently or within 2 weeks. Out of 52 children 6 (11.53%) had gastro intestinal infection concurrently or within 2 weeks. Only 7 children (13.46%) in the present study had history of atopy. 11 children (21.15%) had disease during the month of February and 8 children

(15.38) had during September number of Most cases were in the month of February(21.15%), followed by September (15.4%). 2 children (3.84%) had past history of same disease. 7 children (13.46%) suffered recurrence within 48 hours.45 children (86.53%) had no recurrence. 42 children (80.76%) of the present study underwent hydrostatic reduction successfully . 4 children needed surgery. Self-reduction of the intussusception occurred in 6 children (11.53%) (Table 3). 9 children (17.3%) of the study population developed complications. 4 (7.69%) had shock. 2 each (3.84%) had perforation and peritonitis. One child developed septicemia, there was no death in the death. 39 children (75%) left hospital within 48 hrs. 3 children (5.76%) had to spent more than 1 week in hospital due to complications (Figure 3).

DISCUSSION

Intussusception is one of the common pediatric surgical emergencies in children below 2 years of age.[16] With an estimated occurrence of 1-4 per 1000 lives birth. The present study aimed at describing the clinical profile of children with various types of intussusception. It also studied the various treatment modalities used and their outcome. We evaluated 52 cases of intussusception which were diagnosed by ultrasound imaging during study period. Among children, most intussusceptions develop in 1st 2 year of life. There were 32 children (61% of the study population) between 6 months-2 years which is consistent with the literature showing 80% cases occurring before 2 years of age.10 children (19.2%) belonged to less than 6 months and 10 children were more than 2 years. Some researchers have reported 50% of cases occurring in the second year of life.[16]

Yacin S et al found 67% of his study population under 1 year.[17] Intussusception are rare in neonates. There was no case of intussusception in the new-born age during the course of this study. Weihmiller et al found median age to be 21.1 months in his study.[18] In the present study median age was 17 months. Out of the 52 children 35 (67%) were males. Several investigators world over have found a male predominance.

Weihmiller et al in his study found 61% of males and male: female ratio of 1.58:1. In the present study male: female ratio is 2.05:1. This value is corresponding to most of the studies worldwide. Bajaj et al also found a male predominance which was 60% in his study.[19] Khan J et al found male: female ratio 3.4:1 in his study.[20] Kumar K et al found 64% males in his study group.[21] Weihmiller et al study indicated male gender as a significant predictor of intussusceptions It is a mere intuition makes us to suspect intussesption in children, where most them are male. Most of the studies have reported that 60% to 75% children with intussusceptions were male. 40 children (77%) presented with vomiting which was found to be most common symptom in the present study.

Kumar K et al found the commonest symptom to be colicky abdominal Pain. In the present study most common presenting complaint was vomiting, followed by excessive cry and blood in stool. This was comparable to study of Yalcin S et al where vomiting was the commonest complaint. Abdominal pain was felt in 78.08% of patients in Khan J et al and in 50- 85% patients in studies reported by Julie EB et al, Hutchinson et al and Ein SH et al, Mansur SH et al have reported vomiting, abdominal distension, blood in stool and a palpable abdominal mass are the commonest presenting features.[22-25] Loss of passively acquired maternal immunity after 6 month and early weaning away from breast milk has been known to be present in patients with idiopathic ileocolic intussuception.[26] In the present study 78.84% children were given complementary feeds between 2-4 months of age and 8 children (15.38%) were given between 4-6 months of age as against the recommendation of 6 months exclusive breast feeding. 2 children (3.84%) were given complementary feeds before 2 months of age. only one child was breastfed exclusively for 6 months. The exclusive breastfeeding for 6 months may have a possible protective effect. It is postulated that the introduction of new food proteins results in swollen Payers patches in the terminal ileum. Lymphoid hyperplasia is another related risk factor.

Proliferated mass of lymphoid tissue leads to invagination of the ileum in to the proximal colon, thus causing an Intussusception. Mostly, 90% of case is idiopathic but a lead point could be found in the average of about 2-12%. Pathological apex of intussusceptum is noticed in less than 5% in intussusception, 60% of all patients older than 5 years recognizable lead points for Intussusception are found, such as Meckel diverticulam, polyp, neurofibromas, duplication cyst, inverted appendix stump, leiomyoma, hamartomas, ectopic pancreatic tissue, anastomotic suture lines, enterostomy tubes, post-transplant lymphoproliferative diseases, haemangioma or malignant conditions such as lymphoma, Kaposi sarcoma, the older the child the higher the risk of a lead point.[10] In our study no lead points were identified. Prior / concurrent respiratory tract infection was found in only 7 children (13.46%) in the present study .Correlation with prior or concurrent respiratory tract infection has been noted in other studies also. It was also associated with a number of childhood viral illnesses such as adenovirus; respiratory syncytial virus (RSV) infection has been reported recently. Gastrointestinal tract infection was associated with 6 children concurrently or within 2 weeks (11.53%). Although rotavirus produces an enter toxin there is no correlation was recognised between wild type human rotavirus and intussusceptions. In Acute gastroenteritis, hyper peristalsis and mesenteric adenitis have been associated with idiopathic ileocolic intussusception. Increased incidence of intussusceptions in children 1 year age or younger after receiving a tetra valent rhesus human reasserting rotavirus vaccine within 2 weeks of immunisation.[27,28] The Advisory Committee on Immunisation Practice no longer recommends this

vaccine. In present study none of our children received any rotavirus vaccine. Atopic tendency was noted in 7 children (13.46%). Past history of intussusception was noted in 2 children. The maximum number of cases was in February followed by September although the study period included only 10 months. Seasonal incidence was noticed in other studies, peaks in fall and winter most common type of intussusception was ileocolic which is comparable to most of the other studies. 46 children (88.46%) had ileo colic type followed by ileo ileal and colo-colic types.

USG screening for suspected intussusception increases the yield of diagnostic or therapeutic enemas and reduces unnecessary radiation exposure in children. Ultrasound has a sensitivity of approximately 98-100% and a specificity of approximately 98% in diagnosing intussusceptions. Pneumatic reduction is associated with minimum complications and lesser radiation exposure than contrast hydrostatic methods. Reduction of invagination is an emergency procedure and should be performed immediately after diagnosis in preparation for possible surgery. In the present study 42 children (80.76%) underwent ultrasound guided hydrostatic reduction successfully. In patients with ileocolic intussusceptions in other studies also contrast reduction under fluoroscopy or hydrostatic reduction in ultrasonic guidance has got success rate of approximately 80-95% Spontaneous reduction of intussusceptions occurs in approximately 4-10% of patients. Self-reduction occurred in 6 children (11.53%). In patients with prolonged intussusception with signs of shock, peritonitis, and pneumoperitoneum hydrostatic reduction should not be attempted. 4 children (7.69%) required surgery. Bowel perforations occurred in 2 children in our study. In other studies 0.5-2.5% of attempted barium and hydrostatic (saline) reductions perforation occurred. The perforation rate with air reduction is 0.1-0.2%.

Surgical reduction is indicated in the presence of refractory shock, suspected bowel necrosis or perforation, peritonitis, and multiple recurrences with lead point In those required surgery delayed presentation was a feature. Delayed diagnosis has got an important predictive value in the management of intussusceptions, determining the way of reduction and its outcome.[29] 100% of the study population in Bajaj et al required surgery. In ileo-ileal intussusception reduction hydrostatic reduction might not be possible. Such intussusceptions can develop insidiously after surgery and require exploration if they do not reduce spontaneously. Ileo ileal disease is common with Henoch-Schönlein purpura and other unidentifiable disorders and usually resolves without the need for any specific treatment. If manual operative reduction is impossible, resection of the intussusception is necessary, with end-to-end anastomosis. In our study 2 children underwent resection. Recurrence rate after reduction of intussusception is about 10% and after hydrostatic reduction 5-8% none has recurred after surgical resection.[30] In the present study 7 children (13.46%) had recurrence within 48 hours of hydrostatic reduction. None had recurrence after surgical reduction. Bajaj et al showed 10.3% of recurrence. Yalcin S et al in his study found a recurrence rate of 2.2% only. Study by Krishna Kumar et al showed no recurrence within 24 hours. Chronic intussusception can occur in milder form in which the symptoms at recurrent intervals, likely to occur with or after acute gastroenteritis and can happen in older children as well as in infants. It was also not noticed in our studying the present study. 9 children developed complications, out of which 4 children had shock, 2 each had perforation and peritonitis and one child had septicemia. There was no death in the present study.

We acknowledge the potential limitations of our study: Exact times of occurrence of symptoms not evaluate and type of intussusceptions and recurrence not correlated.

CONCLUSION

The present study was a hospital based descriptive study on various aspects of intussusception. In more than 75% of the study population intussusception was noted below 2 years of age. Vomiting, excessive cry, blood in stool and abdominal pain were the common symptoms. Commonest type of intussusception was ileo colic. Ultrasound guided hydrostatic reduction using saline is a simple and effective technique. It can be used to diagnose intussusception, to reduce it and to confirm reduction. It is less time consuming, cost effective, has no radiation hazard, almost no complication and minimal hospital stay. Untreated intussusception is potentially fatal. Occurrence of sequence of events in the signs and symptoms guide one to early diagnosis and decision for early intervention to save the gut and the life of the child.

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