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"Intussusception in Children: A Study in Rajshahi Medical College Hospital, Rajshahi, Bangladesh"

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Abstract **Original Research Article**

Introduction: Intussusception is one of the common surgical emergencies in infancy and childhood. It occurs when one portion in the gut become invaginated within an immediately adjacent segment, invariably, it is the proximal in to distal bowel. The aim was to evaluate the clinical presentation of intussusception in children in Bangladesh. ***Material & Methods:*** This was a cross sectional study. This study included all cases of intussusception admitted in pediatric surgery unit of Rajshahi medical college hospital during the period of July 2008 to June 2009. Pediatric surgery unit of Rajshahi medical college hospital, Rajshahi, Bangladesh. The patients with intussusceptions admitted to RMCH during the study period from 01 July 2008 to 30 June 2009 were analyzed carefully. There were 50 patients with intussusceptions found in 12 months which was 3.2% of the total pediatric surgical admission of 1542 patient in the department of pediatric surgery of RMCH during this period. ***Results:*** A total of 1542 patients were admitted in pediatric surgery department of RMCH during this period. Patients with intussusception were 50 which is 3.2% of total admission in the selected hospital. Range of age of the patients was 1 month to 12 years. Patients were grouped in 1 month – 1yearrs, 1 – 2 years, 2 – 5 years, 5 – 12 years. and they were 40,6,2,2 patients in each group. Mucous and blood mixed stool was the commonest followed by vomiting. Abdominal distension, abdominal pain, and Palpable mass. Visible peristalsis rigidity, per-rectal mass, red currant jelly like stool and others. Among 50 patient's classical triad symptom (abdominal pain, vomiting. Red currant jelly like stool) present in only 20 (40%) patients but it was not found in 30 (60.00%) patients. Among 50 patients the complication that were observed are as follows – wound infection 16, peritonitis 5, Intra-abdominal abscess 1, post-operative leakage & reoperation 2, post-operative paralytic ileus 15, re-intussusception 1. Wound dehiscence 1 & death in 2 patients. Comparison of USG findings with per-operative findings of intussusception. Majority 44 patients were in true positive and their findings were also similar majority 97.77% were in positive predictive value. Comparison of clinical findings with ultrasonography findings of intussusception. Majority 27 patients were in true positive and their findings were also similar majority 93.10% were in positive predictive value. ***Conclusion:*** The study results correlate history, clinical Examination, ultrasonography, radiological & laboratory findings in the diagnosis & management of intussusception, which will help to policy makers and researchers for taking an effective strategy and do further research for reducing the burden of this problem from our country.

Keywords: Intussusception, Pediatric, Ultrasonography, Abdominal Distension.

INTRODUCTION

Intussusception is one of the most common causes of acute abdomen in infancy. Intussusception is an invagination of the bowel into itself, usually involving both small and large bowel. The more proximal bowel that herniates into more distal bowel is called the intussusceptum and bowel that contains it is called the intussuscipiens. Intussusception occurs when a portion of the digestive tract becomes telescoped into the adjacent bowel segment. This condition usually occurs in children most commonly in infants aged 5–9 months (67% occur by age 1 year) [1]. The classic triad of colicky abdominal pain, vomiting, and bloody stools is present in less than 25% children [2-4]. Delay in diagnosis and treatment is not uncommon, making enema reduction less successful, bowel resection more likely, and death due to bowel ischemia possible 5-7. In this age group, intussusception is idiopathic in almost all cases. The vast majority of childhood cases of

intussusception are ileocolic; that is, the ileum becomes telescoped into the colon. In the past, intussusception was a severe condition with high morbidity and mortality rates. Currently, prompt diagnosis and effective treatment lead to a favorable outcome, in most cases in infants and young children are 'idiopathic' in that the etiology of the intussusception is due to hypertrophied lymphoid tissue in the terminal ileum which results in ileocolic intussusception. In many cases, the clinical symptoms can be confusing. In fact, only 30%–68% of children with clinical findings suggestive of intussusception are shown to have this condition [8]. Most cases in infants and young children are 'idiopathic' in that the etiology of the intussusception is due to hypertrophied lymphoid tissue in the terminal ileum which results in ileocolic intussusception. Delay in diagnosis and treatment is not uncommon, making enema reduction less successful, bowel resection more likely, and death due to bowel ischemia possible [9]. Therefore, it is desirable to use diagnostic tools that are as innocuous as possible to avoid potential harm to these children, to diminish any adverse effects on the actual diseases, and to lessen the discomfort to the children who are not shown to have intussusception. To this end, the traditional diagnostic approach to childhood intussusception of plain radiography and enema examination is being changed to plain radiography and ultrasonography (US) at some institutions [10,11]. US is highly accurate in the diagnosis of intussusception with a sensitivity of 98%–100% and a specificity of 88%–100% [12]. Furthermore, use of US may lead to an alternative diagnosis, which is not readily achieved with a contrast material enema study [13]. Therefore, the enema could be reserved for therapeutic purposes when US is available [14]. There is continuing controversy as to which type of enema is most efficacious. This study will be undertaken to correlate history, clinical Examination, ultrasonography, radiological & laboratory findings in the diagnosis & management of intussusception.

OBJECTIVES

General objective

- To evaluate the clinical presentation of intussusception in children.

Specific objectives

- To evaluate the diagnostic tools of intussusceptions.
- To find out the sensitivity and specificity of ultra-sonogram in diagnosis of intussusceptions.
- To find out the surgical outcome.

METHODOLOGY AND MATERIALS

This was a cross sectional study. This study included all cases of intussusception admitted in pediatric surgery unit of Rajshahi medical college hospital during the period of July 2008 to June 2009. Pediatric surgery unit of Rajshahi medical college hospital, Rajshahi, Bangladesh. The patients with intussusceptions admitted to RMCH during the study period between 01 July 2008 to 30 June 2009 were analyzed carefully during the study. There were 50 patients with intussusceptions found in 12 months which was 3.2% of the total pediatric surgical admission of 1542 patient in the department of pediatric surgery of RMCH during this period. Though it is not an actual incidence of the intussusceptions in our country, it can be assumed to be representative of prevalence of the disease among children, as RMCH is one of the established tertiary hospital in northern area of Bangladesh whose patient come from different districts of north Bengal.

Inclusion criteria

- Children (age <12yrs.) of either sex who were admitted with the complaints of intermittent colicky abdominal pain.
- Passage of blood and mucous mixed stool.
- Sausage shaped abdominal lump.
- Diarrhea followed by passage of blood & mucous mixed stool.
- Patients with features of intestinal obstruction.
- Which were operatively confirmed as intussusceptions?

Exclusion criteria

- Patient with co-morbidity
- Late arrival in the hospital > 72 hrs.
- Unwilling to participate in this study.

RESULTS

A total of 54 patients were admitted during the period from 1st July, 2008 to 30 June, 2009 with provisional diagnosis of intussusception. USG was done in 35 patients and operation was done also in 49 patients. Total sample size was 50. (Table I) A total of 1992 patients were admitted in pediatric surgery department of RMCH during this period were 1942 patients had non intussusception and 50 patients had intussusception. (Table II) shows that the patients with intussusception were 50 which are 3.2% of total admission in the selected hospital. Range of age of the patients was 1 month to 12 years. Patients were grouped in 1 month – 1years, 1 – 2 years, 2 – 5 years, 5 – 12 years and they were 40,6,2,2 patients in each group. (Table III) shows the incidence of intussusception below 1 year of age. Majority 14% were in 6 months and others have the similar results. (Table IV) shows the mucous and blood mixed stool was the commonest followed by vomiting. Abdominal distension abdominal pain and Palpable mass. Visible peristalsis rigidity, per-rectal mass, red currant jelly like stool and others. Among 50 patient's classical triad symptom (abdominal pain, vomiting. Red currant jelly like stool) present in only 20 (40%) patients but it was not found in 30 (60.00%) patients. (Table V) shows the distribution of Electrolyte in the participants majority (56.52%) were

in Low Na^+, 47.82% were in Low C1 47.82% and Low K^+ were 30.43%**.** (Table VI) shows the percentage of dyselectrolytemia In this series 35 undergone USG examination Pseudo- Kidney sign was found in 25 patients followed dough-nut sign in 23 patient's multiple concentric rings in 2 patients and 1 patient has intestinal obstruction, released intussusception in 1 patient (initial USG shows features of intussusception but on subsequent USG the signs of intussusception was absent. (Table VII) shows the Per- operative findings of intussusceptions forty-nine (49) undergone laparotomy and ileocolic varty (28 patients 57.14%) was the most common followed by Colo-colo-colic (11 patients, 22.44%), ileo ileocolic (7 patients 14.28%) and ileo-ileal variety in 1 (2%), patient in each group. Most cases below the age of 5 yrs. the causes were idiopathic. 2 cases above the 5 yrs. of age the intussusception was due to Meckel's diverticulum & hypertrophied payer's patches. (Table VIII) shows the complication of intussusception. Among 50 patients the complication that were observed are as follows – wound infection 16, peritonitis 5, Intra-abdominal abscess 1, post-operative leakage & reoperation 2, post-operative paralytic ileus 15, re-intussusception 1. Wound dehiscence 1 & death in 2 patients. (Table IX) shows the Clinical, USG and preoperative findings majority 31patients were in true positive and their findings were also similar majority 97.77% were in post predictive value. (Table X) shows the Comparison of USG findings with per-operative findings of intussusception. Majority 44 patients were in true positive and their findings were also similar majority 97.77% were in positive predictive value. (Table XI) shows the Comparison of clinical findings with ultrasonography findings of intussusception. Majority 27 patients were in true positive and their findings were also similar majority 93.10% were in positive predictive value.

Table-I: Proportion of intussusception and non-intussusception cases in admitted patients (n=1992).

Type of disease	N	%
Non-Intussusception	1942	97.49
Intussusception	50	02.21

Table-II: Distribution of Age group in the study subjects. (n=50)

Age	N	%
1 months to 1 year	40	80
1-2 years	6	12
2-5 years	2	04
5-12 years	2	04

Table-III: Shows incidence of intussusception below 1 year of age. (n=40)

Age in Months	N	%
3	2	04
4	3	06
5	3	06
6	7	14
7	3	06
8	6	12
9	3	06
10	6	12
11	3	06
12	4	08

Table-IV: Distribution of the patients with intussusception in the series presented with a number of symptoms. (n=50)

Signs and symptoms	N	%
Vomiting	38	76
Red currant jelly like stool	32	64
Abdominal distension	20	40
Abdominal pain	19	38
Palpable Abdominal mass	13	26
Visible peristalsis	9	18
Rigidity	9	18
Per-rectal mass	8	16
Constipation	6	12
Per-rectal prolapse	1	2

Table-V: Distribution of Electrolyte in the participants (n=31)

Name of Electrolyte	N	%
Low Na^+	13	56.52%
Low Cl^-	11	47.82%
Low K^+	7	30.43%

Table-VI: Shows types and percentage of dyselectrolytemia. (n=50)

Sign	N	%
Pseudo-Kidney	25	71.42%
Doughnut sign	23	65.71%
Multiple concentric rings	4	05.71%
Intestinal obstruction	1	02.8%
Released intussusception	1	02.8%

Table-VII: Per- operative findings of intussusceptions. (n=49)

Findings	N	%
laparotomy and ileocolic variety	28	57.14%
Colo-colo-colic	11	22.44%
ileo ileocolic	7	14.28%
ileo-ileal variety	1	02.00%

Table-VIII: Shows complication of intussusception. (n=50)

Complication	N	%
Wound infection	16	32%
Post-operative paralytic ileus	15	30%
Peritonitis	5	10%
Intra-abdominal abscess	1	2%
Anastomotic leakage	2	4%
Wound dehiscence	1	2%
Recurrent intussusception	1	2%
Mortality	2	4%

Table-IX: Clinical, USG and preoperative findings. (n=50)

USG findings	Results	USG findings	Results
True positive	31	Sensitivity	91.17%
False positive	0	Specificity	100%
False negative	3	Positive predictive value	100%
True negative	1	Negative predictive value	25%
		Accuracy	91.42%

Table-X: Comparison of USG findings with per-operative findings of intussusception. (n =50)

USG findings	Results	USG findings	Results
True positive	44	Sensitivity	89.79%
False positive	1	Specificity	0%
False negative	5	Positive predictive value	97.77%
True negative	0	Negative predictive value	0%
		Accuracy	88%

Table-XI: Comparison of clinical findings with ultrasonography findings of intussusception. (n=50)

USG findings	Results	USG findings	Results
True positive	27	Sensitivity	84.37%
False positive	2	Specificity	33.33%
False negative	5	Positive predictive value	93.10%
True negative	1	Negative predictive value	16.66%
		Accuracy	77.77%

DISCUSSION

The results of this study showed that infants were those commonly diagnosed with intussusception. This finding was in agreement with those of other studies [15]. In a study Aziz [16] found incidence intussusceptions was 1.61%, but in this study the incidence during this period were 2.21% patients had intussusception. Incidence of intussusception is high in this study probably due to; there is no pediatric surgery unit in districts & Medical College hospital neighboring the Rajshahi Medical College hospital. So, all cases of childhood intestinal obstruction were referred here. Incidence of intussusception among male and female are 3:2. In this study the incidence is 6:1. Yalcins *et al*. show the incidence was 5:1. Our study also shows male predominance. Here peak incidence of age is 1 month to 1 year, which is 40 in number (80%) and lowest incidence was 2-5 years and 5-12 years. It is said that two third of all child with intussusceptions are younger than 1 year. Ts chirch FT *et al.* [17] shows maximum age at presentation is within 1 year, which correlates with our study. In this study patient presented with abdominal pain in 20 (40%) but abdominal pain was the presenting complaints in 75% & 80% patients in Justice FA *et al*. [18] & Yoo RP *et al*. [19] study & Wm & Stringer MD *et al*. [20] shows that the Initial complaints was 83% & 75% in Dennison study. Our study does not correlate with this. In our study we found that the vomiting was present in 38 (76%) patients. In intussusception vomiting in 85% of patients. Dennison & shaker (1970)[21] found in 70% of patients. All are almost similar with our study. In this series triad of symptom present in 20 (40%) of patients which is much higher than the study of Gierup. *et al.* [22] in which it was present only 10% of patient, but our data is almost similar with the report of young [23]. In this study intussusceptions prolapse through anus in 2% of patient, which was 1-2% & 3% in other series. Constipation in this study was in 6 (12%) abdominal distention 20 (40%). Verschelden P *et al.* [24] & Yoo R P *et al*. [19] found constipation in 35% & 10% and abdominal distention in 51.5% & 42.2% respectively. Dennison & Shaker found constipation in 72% of patients in their series. In our study, we found that the electrolyte in the participants majority (56.52%) were in Low Na^+, 47.82% were in Low C1 47.82% and Low K^+ were

30.43%**.** we also found the percentage of dyselectrolytemia in this series 35 undergone USG examination Pseudo- Kidney sign was found in 25 patients followed dough-nut sign in 23 patient's multiple concentric rings in 2 patients and 1 patient has intestinal obstruction, released intussusception in 1 patient. The findings of Per- operative intussusceptions was forty-nine (49) undergone laparotomy and ileocolic varty (28 patients 57.14%) was the most common followed by Colo-colo-colic (11 patients, 22.44%), ileo ileocolic (7 patients 14.28%) and ileo-ileal variety in 1 (2%), patient in each group. Most cases below the age of 5 yrs. the causes were idiopathic. 2 cases above the 5 years. In USG and preoperative findings majority 31patients were in true positive and their findings were also similar majority 97.77% were in post predictive value. The Comparison of USG findings with per-operative findings of intussusception. Majority 44 patients were in true positive and their findings were also similar majority 97.77% were in positive predictive value. The Comparison of clinical findings with ultrasonography findings of intussusception. Majority 27 patients were in true positive and their findings were also similar majority 93.10% were in positive predictive value. In conclusion, the accuracy of Ultrasonography diagnosis in experienced hands was high and could increase the diagnostic confidence in patients with suspected intussusceptions. Thickened bowel wall in other gastrointestinal conditions could produce Ultrasonography features of intussusceptions. Therefore, a high index of suspicion is recommended.

LIMITATIONS OF THE STUDY

Although the result of this study supports the hypothesis, there are some facts to be considered which might affect the result. The following limitation encountered by investigator is to be kept in mind while reviewing the report.

- Because limitation of time and financial binding, the study was conducted with small sample size. So, it may not be adequate to represent the total population.
- This was a single hospital-based study, so the result of the present study may not be representative.
- The sample was taken purposively, so there may be a chance of bias which can influence the result.
- Since the time period was very limited and there were other constrains the sample size could not be taken as desired.

CONCLUSION AND RECOMMENDATIONS

Intussusception is one of the more common causes of intestinal obstruction in children. The diagnosis may be based mainly on clinical features; however, there are no classic signs and symptoms that are common to all cases. The study results correlate history, clinical Examination, ultrasonography, radiological & laboratory findings in the diagnosis & management of intussusception, which will help to policy makers and researchers for taking an effective strategy and do further research for reducing the burden of this problem from our country.

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