

INTUSSUSCEPTION: GENDER AND SEASONAL VARIATION AND DISEASE BURDEN IN CHITTAGONG MEDICAL COLLEGE & HOSPITAL

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Summary

Intussusception is a common gastrointestinal emergency in children and appears to have a somewhat different clinical spectrum in developing countries. Its etiology is still unclear, but a link to infective agents and viruses has been highlighted. This study aimed to assess the gender and seasonal variation and the disease load of intussusception in Chittagong Medical College and Hospital (CMCH). A retrospective review of the patients of Intussusception admitted in the department of Pediatric Surgery, CMCH, Chittagong; Bangladesh from January 2009 to December 2013 was done. Help was also taken from yearly departmental audits of 2009 to 2013. Data were analyzed with regard to occurrence, seasonal variation, gender variation, diagnosis, treatment and mortality. Statistical analysis was performed by the chi-square test, and mean and percentage values were calculated. $P < 0.05$ was considered to be statistically significant. There were 231 patients of Intussusception. Age range was 1 month to 15 years with median age of 8 months. Male to Female ratio was 2.9:1. There was significant difference between the rate of occurrence of Intussusception and gender ($P < 0.5$). There was a peak on seasonal variations of Intussusception during summer and quarterly distribution was statistically significant. Hydrostatic reduction was the most commonly performed procedure. The occurrence of Intussusception was 1.7% of all admissions. There was significant gender and seasonal variations.

Key words

Intussusception; Gender; Seasonal variation; Hydrostatic reduction.

Introduction

The invagination of a part of the bowel into another distal portion (or intussusception) is a common cause of intestinal obstruction in young children, and is a common emergency in infants and children [1]. It is probably the second most common cause of acute abdominal pain in infants and preschool children after constipation [2]. Worldwide, the incidence is approximately 1 to 4 in 2000 infants and children. Most series report more males than females with intussusception, usually at a 2:1 or 3:2 ratio [2]. Although intussusception can be seen in all pediatric ages from prenatal to the late teens, 75% of cases occur within the first 2 years of life and 90% in children within 3 years of age. More than 40% are seen between 3 and 9 months of age [2]. The etiology of intussusception is unknown, with an anatomic cause identified in only <10% of cases. The majority of intussusception cases in children are primary and their cause is still unclear [1]. Although there have been some reports about seasonal patterns in the occurrence of intussusception, this topic remains controversial [3,4]. There have been very few studies regarding the relationship between the occurrence of intussusception and climate factors. Intussusception often occurs after respiratory or gastrointestinal infection (diarrheal) in younger children, suggesting an etiological role for pathogenic agents in its pathogenesis [5]. In older children, intussusception occurs much less commonly but may result from an anatomic abnormality that forms a "lead point" or predisposing condition (eg, lymph node, lymphoma, intestinal polyp or tumor, Meckel's diverticulum) [5]. There is a paucity of studies regarding childhood intussusception in Bangladesh and particularly the study area. This study describes gender and seasonal variation of intussusception in our setting and highlights the type of management and burden of mortality from this disease.

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Materials & methods

It was a retrospective study done between Jan 2009-Dec 2013 (total 05 years) in the department of Pediatric Surgery, Chittagong Medical College Hospital (CMCH), Chittagong, Bangladesh. Within the study period in a total of 310 patients, provisional diagnosis of Intussusception was made. Among them 231 patients were finally diagnosed as Intussusception based on USG, Ba enema and operative findings. Other patients were excluded from the study. Hospital records of patients diagnosed as Intussusception were evaluated retrospectively. Help was also taken from yearly departmental audits of 2009 to 2013. Total number of patients in a year and during the study period was calculated. Year wise data were compiled and compared with these. Data were evaluated to see the yearly percentage of patient bulk, sex, age, seasonal variations, treatment, surgical intervention and mortality. Data were analyzed by SPSS 17. Statistical analysis was performed by the chi-square test, and mean and percentage values were calculated. P<0.05 was considered to be statistically significant.

Results

Out of 231 patients, 154 patients were less than 1 year, 29 between 1 and 2 years, 12 between 2 and 3 years, and 36 patients were more than 3 years old. Age range was 1 month to 15 years with median age of 8 months. Mean age was 23.7 ±34.2 months. Male (172) suffered more than the female (59) with Male to Female ratio was 2.9:1. There was significant difference between the rate of occurrence of Intussusception and gender (P<0.5) among the admitted patients. Table-I shows the sex distribution of Intussusception cases.

The number of admission per month varied with many fluctuations in the number. Figure-1a and 1b show the monthly and yearly distribution of admitted patients respectively over this 5 year period.

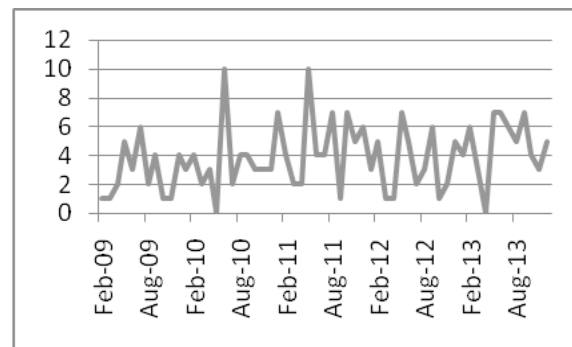
There was a peak on seasonal variations of Intussusception during the summer in the months of May and June when 58 (25% of yearly patients) patients had been admitted. Figure-2 shows the seasonal variations in the occurrence of Intussusception. When quarterly distribution of cases were compared with total number of admitted patients, there was significant difference found among the quarters (P<0.05). Table-II shows the quarterly distribution of cases.

Hydrostatic reduction was done in 107 patients; per-operative manual reduction in 62 patients, intestinal resection anastomosis in 56 patients and ileostomy was done 6 patients. Table III shows the procedures which was done for the treatment of intussusception and Fig-3 shows per-operative picture of intussusception. There were 13 deaths and the overall death rate was 5.6%.

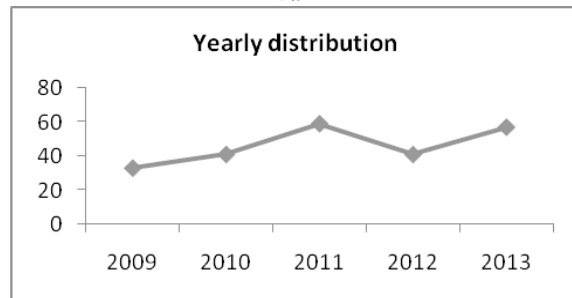
Table I : Sex distribution of Intussusception cases.

Sex	Total admissions	Intussusception	Percentage
Female	4457	59	1.3%
Male	8898	172	1.9%
Total	13355	231	1.7%

P value<0.5

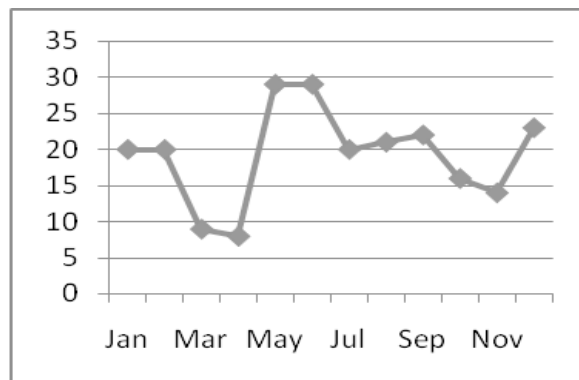


1a

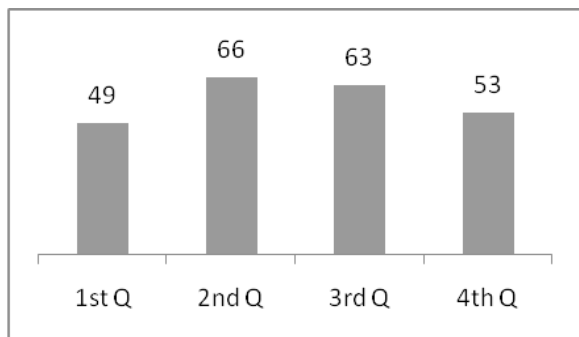


1b

Fig 1: Number of admissions for Intussusception. (1a-monthly distribution, 1b-yearly distribution)



2a



2b

Fig 2 : Monthly variations in the occurrence (2a) and Quarterly distribution (2b) of Intussusception.

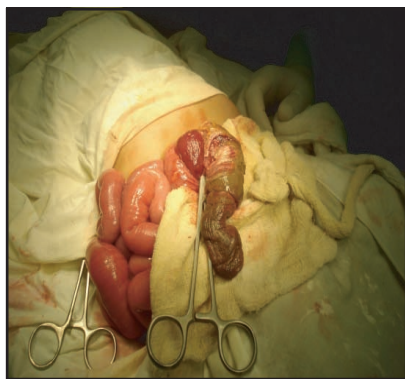
Table II : Quarterly distribution of cases.

Quarter	Total admission	intussusception	percentage
1st	3189	49	1.54
2nd	3564	66	1.85
3rd	3259	63	1.93
4th	3343	53	1.59
total	13355	231	1.73

*P<0.05



3a



3b

Fig 3 : Per-operative view of intussusception (3a) and gangrenous gut (3b).

Table III: Procedures done for the treatment of intussusception.

	Hydrostatic reduction	Manual reduction	Resection-anastomosis	Ileostomy	
2009	4	9	19	1	33
2010	16	12	11	2	41
2011	29	17	12	1	59
2012	24	9	6	2	41
2013	34	15	8	0	57
Total	107	62	56	6	231

Discussion

During the five years of study period, 231 patients of Intussusception were admitted which was 1.7% of all admissions in the department of Pediatric Surgery. The median age of 8 months means that most of the cases presented during their typical age of disease occurrence according to literature [2]. On the other hand, although only 36(15.6%) patients were more than 3 years old, it was more than the percentage seen in literature, which suggests an occurrence of less than 10% in this age group [2-7]. It was these older patients which shifted the mean age to 23.7 months while 66.7% patients were less than 1 year old. Interestingly there were 13 patients who presented before 6 months of age, before the age of weaning. In our series, a patient was 01 month of age, there was respiratory tract infection, which was followed by intussusception, laparotomy finding was mesenteric lymph adenitis, which made luminal obstruction from outside. There were 36 patients more than 03 years, of which barium enema reduction was successful in 07 patients, remaining 29 patients underwent laparotomy, among them malrotation was in 11 patients, 02 patient was Meckel’s diverticulitis, blunt trauma was inciting factors in 02 patients, ileo-caecal tuberculosis in 03 patient, lymphoma colon was in 01 patient, colonic carcinoma in 01 patient, vascular malformation was in 01 patient, polyp was in 01 patient and 07 patients had mesenteric lymphadenitis.

Male suffered more than the females with a male to female ratio of 2.9:1. It was statistically significant, although the number of admissions for other disease was also more in male with a male to female ratio approaching towards 2:1. This increase rate of occurrence in male is more than that reported in most of series which shows a male to female ratio of 2: 1 to 3:2, although Chalya reported a ratio of 3.3:1 [2-7].

There was seasonal variation in the occurrence of intussusception with about 25% patients admitted during the months of May and June; the 2nd quarter comprised 28.7%. Overall, more patients were admitted in the 2nd and 3rd quarters of the year which has a predominantly hot weather. The seasonal variation correlates with that of the literature where most cases had been seen in May, June, and July. Chen et al. analyzed 7,541 intussusception cases in Taiwan between 1998 and 2007; and found that the mean number of monthly cases was significantly higher during the warmer months than in the cooler months [8]. However, Sáez-Llorens et al. collected data in 11 Latin American countries and found that the occurrence of intussusception patterns varied in different geographic regions [9]. Moreover, Ho et al. concluded that there was no seasonal trend in 952 intussusception cases in Taiwan from 1999 to 2001[10]. While the size and extent of the Chen study is especially robust and provides support for our data, the review of the literature emphasizes that unexplained variability in the seasonal periodicity of intussusception exists. Nevertheless, a strong body of literature now suggests that variations in geographic and climatic factors might correlate with the occurrence of intussusception [2,11].

The incidence of a preceding viral illness has been reported to be as high as 20% [2]. A proposed link between viral infective causes and intussusception was highlighted by reports of a spatial and temporal increased risk of intussusception 3–14 days after initial vaccination with the rhesus reassortant rotavirus (RRV) vaccine which led to the withdrawal of this specific vaccine from the market [12-18]. However, the most recent review of the safety data, generated by countries using 2 new vaccines licensed by the WHO Global Advisory Committee on Vaccine Safety, reported that there was no statistically significant evidence of vaccine-associated adverse events and that an intussusception risk of the order of magnitude of the RRV vaccine could be ruled out [19]. Nevertheless, WHO recommended that postmarketing surveillance should be conducted in countries that introduce rotavirus vaccine.

Hydrostatic reduction was the most commonly performed (46.3%) procedure for the treatment of intussusception. Moore et al showed that in South Africa 40% of patients submitted to surgery underwent intestinal resection because of perforation, peritonitis, gangrenous bowel, or failure to reduce even at surgery. This reflected a much higher incidence of surgery and bowel resection than seen in some international settings] but was more

representative of what occurs in developing countries [20-22]. But in our series, only 26.8% underwent intestinal resection and more patients were managed either by hydrostatic reduction or by manual reduction. This is an important achievement given the socioeconomic condition of our patients. The death rate is still a worry which mostly represents the extremely delayed presenters.

Conclusion

The occurrence of Intussusception was 1.7% of all admissions. Male suffers more than females and May and June are the most vulnerable period. Hydrostatic reduction is successful if the patient presents early.

Disclosure

All the authors declared no competing interest.

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