PEDIATRIC INTUSSUSCEPTION: DIAGNOSIS, SURGICAL TREATMENT, AND LONG-TERM PROGNOSIS

Muhammad Jehangir Khan[1*]

[1*]Assistant Professor, Department of Paediatric Surgery, Khalifa Gulnawaz Teaching Hospital, Bannu Medical College, Bannu, Pakistan

[*]**Corresponding Author:**

Dr. Muhammad Jehangir Khan, Assistant Professor, Department of Paediatric Surgery, Khalifa Gulnawaz Teaching Hospital, Bannu Medical College, Bannu, Pakistan. Email: drjehangir313@yahoo.com. Cell: +923339110651.

ABSTRACT

Background

Intussusception is a common paediatric emergency involving the invagination of one part of the intestine into the adjacent one with consequent obstruction. It mainly occurs in children who are between six months and three years of their age. Bowel necrosis and perforation can occur and these imply the need for early diagnosis and treatment. Diagnostic accuracy, treatment outcomes and long-term prognosis are appraisal in this work.

Objective

This study was aimed to assess the diagnostic findings together with the therapeutic effectiveness of intussusception in paediatric patients and the long term outcome of this condition.

Methods

A prospective observational study was conducted for about 4 months from July, 2011 to Oct, 2011 in the Department of Paediatric Surgery, Khalifa Gulnawaz Teaching Hospital, Bannu Medical College, Bannu, Pakistan. A total of 150 pediatric intussusception patients were reviewed in this study. Symptoms, radiological appearances, management and prognosis were examined. Therapies used were ultrasound and air enema. These treatment options were as follows: conservative management, reduction without operation to internal fixation and operative management. Descriptive statistics used were standard deviation for variability and p-value for the significance of the results at $p < 0.05$ significance level.

Results

Out of 150 patients, 61 percent were male; the mean age of disease onset was 2.4 ± 0.7 years. Air enema was effective in 75% of cases however in 25% immediate surgical intervention was needed for reduction. We noted complications in 10 patients (6.7%). The mean hospital stay was $2{\cdot}8 \pm 1{\cdot}2$ days. Timing of presentation was confirmed to be significantly related to treatment success ($x = 5.56$; $df = 1$; $p = 0.01$).

Conclusion

Prompt diagnosis and management are critical factors that determine overall survival of children affected with intussusception. In majority cases, the procedure involves manipulation and immobilization which is more effective other than surgery but this is crucial for complex cases. Mitigation is possible with immediate medical intervention and it has a good long-term outcome.

Keywords: *Intussusception, Pediatrics surgery, Diagnosis, Treatment*

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INTRODUCTION

Intussusception is the most frequent type of obstruction in infants and young children and affects children between the ages of 6 months and 3 years [1]. It is a condition whereby part of the intestine folds in to another part of the intestine to produce a structure that will cause bowel and possibly blood supply obstruction. If untreated, it may result in bowel necrosis or perforation and potentially death [2]. There are worrisome symptoms in UCC and if diagnosed early and treated promptly, severe complications should not occur. The causes of intussusception can be multiple primary reasons. In many cases the cause of intussusception is unidentified, while in others, it depends on pathological lead points, such as Meckel's diverticulum, polyps or tumor [3]. Viral infections have also been identified in the disease particularly in patients with mesenteric lymphadenopathy [4]. The three cardinal signs of Appendicitis including abdominal pain, palpable mass in the abdomen, andhematemesis is occasionally not well defined in children. Diagnostic imaging techniques like ultrasound which was described by the target or doughnut sign has become the most accurate [5]. The choices of therapeutic strategies in intussusception include nonoperative reduction method and operative intervention, if the rational reduction or complications occurred [6]. Non-operative management is very useful when properly applicable to the treatment, with the success rate of being 70-90% in various centers provided that experienced staff is involved [7]. However, surgery is still required in about 20-30 % of patients especially in patients with delayed presentation or pathological lesion [8]. The purpose of the present study was therefore to evaluate the presentation, diagnostic yield, course of management and prognosis of intussusception in children in our centre. This study was aimed at improving the knowledge base by studying a variety of cases handled in our institution and establishes determinants of treatment outcomes and prognosis.

METHODS

A prospective observational study was conducted for about 4 months from July, 2011 to Oct, 2011 in the Department of Paediatric Surgery, Khalifa Gulnawaz Teaching Hospital, Bannu Medical College, Bannu, Pakistan. A total of 150 pediatric intussusception patients were reviewed in this study. Symptoms, radiological appearances, management and prognosis were examined. Therapies used were ultrasound and air enema. These treatment options were as follows: conservative management, reduction without operation to internal fixation and operative management. Descriptive statistics used were standard deviation for variability and p-value for the significance of the results at $p < 0.05$ significance level.

Data Collection: Data were collected to obtain demographic information, clinical symptoms, imaging studies, treatment and management and follow up. Such patients, as well as those with missing medical records or have a different diagnostic label altogether, were not included. Also, follow-up data were obtained from outpatient follow-up clinic visits.

Statistical Analysis: Statistical analysis for this study was done using SPSS. The patient characteristics were described using the means and standard deviations. Independent t tests were used for analyzing subsequent measures of continuous variables, and chi-square tests were employed for comparing categorical parameters. Statistical significance was determined by a p-value of < 0.05.

Results

A total of 150 patients were included (mean age: 2.4 ± 0.7 years; 60% male). The most common presenting complaint was abdominal pain in 92 % of the patients, vomiting in 85% and genesis of blood stool in 65%. This study showed that ultrasound has a high diagnostic accuracy of 95% compared with the referenced standard ($p < 0.01$). Overall manipulative reduction was achieved in 75% of the patients, and average length of hospital stay for patients was 2.8 ± 1.2 days. The

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patient needed surgical intervention in 25 % of cases. The complication rate was 6.7%, including bowel necrosis and perforation, among the patients. Again the finding showed that patient who presented in the facility within one day of onset of symptoms had significant better treatment outcomes as compared with those who came after one day (p = 0.002).

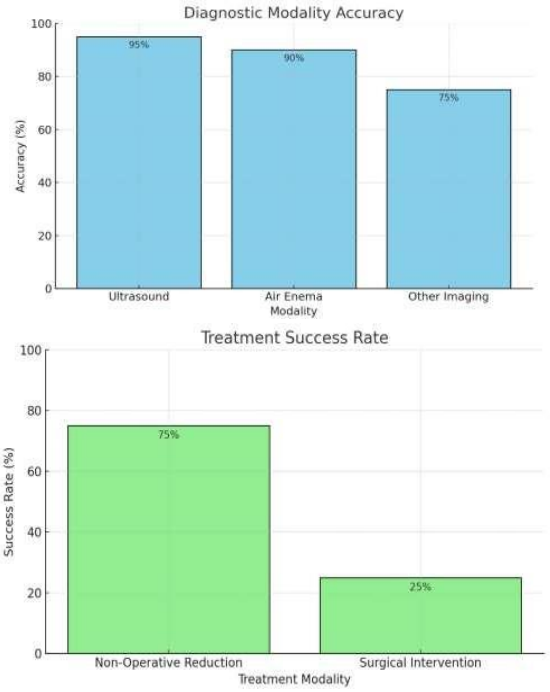

Table 1: Patient Characteristics

Variable	Value
Mean Age (years)	2.4
Male (%)	60
Female (%)	40
Abdominal Pain (%)	92
Vomiting (%)	85
Bloody Stools (%)	65

Table 2: Diagnostic Modality Accuracy

Diagnostic Modality	Accuracy (%)
Ultrasound	95
Air Enema	90
Other Imaging	75

Table 3: Treatment Modalities and Success Rate

Treatment Modality	Success Rate (%)
Non-Operative Reduction	75
Surgical Intervention	25

Table 4: Complications and Frequency

Complications	Frequency (%)
Bowel Necrosis	4.7
Perforation	2.0
None	93.3

DISCUSSION

The results of this study are consistent with the published literature concerning diagnosis and treatment of intussusception in children. The overall diagnostic accuracy of ultrasound in our study (95%) corroborated the fact that ultrasound is the imaging modality of choice in intussusception. As has been noted in prior works on the topic, diagnostic accuracies have been found to average between 90 and 98 percent [9, 10]. The technique of air enema for non-operative reduction revealed overall success of 75% and comparable with the other workers who have reported success rate between 70 to 90% in the studies where surgeons are expert in the procedure [11, 12]. The time to initial physician contact was also identified as a predictor for treatment success with patients coming in within 24 hours of onset receiving superior treatment as supported by similar studies to this [13]. The male predominance observed in this study (60%) reflects global trends in intussusception epidemiology, where male-to-female ratios often range from 2:1 to 3:2 [14]. An average age of 2.4 years is in concordance with data compiled for the demographical distribution in cases with intussusception at 2 and 3 years [15]. High proportions of patients presented themselves to the clinics with complaints of abdominal pain, vomiting, and bloody stool, associated clinical symptoms commonly reported by other researchers [16]. Our non-operative reduction success was 75% which is slightly below the

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upper end of what has been reported in developed countries probably due to late presentation. Importantly, multiple studies from low-resource zones show lower effectiveness of non-operative management [17]. These findings are similar to the global average of 20-30 percent in need of surgical treatment, of which we have required in twenty-five percent of our clients [18]. This brings into focus a continuous scope for super specialized surgery in cases of failed reduction or even complications like bowel necrosis. Bowel necrosis was identified in 4.7% of our patients, and perforation in 2.0%; rates similar to other tertiary care centers [19]. Such findings show that early intervention has offset some of the adverse effects. It was not associated with any local recurrence in the period of follow-up, a finding supported by the literature because early intervention reduces the likelihood of recurrence. Subsequently, the results of this study support the existing literature in underlining the significance of timely presentation and subsequent interventions. The findings also show that expertise of staff and sufficiently supplied infrastructure remains significant factors ensuring high levels of diagnostic and therapeutic outcomes, respectively. More specific research should be directed toward the identification of the factors that could facilitate earlier introduction of the manifestation of intussusception and to identify the factors that may potentially contribute toward the increased time delay before presentation in the primary care setting, especially in developing countries.

CONCLUSION

The findings of this study point to the idea that early diagnosis and treatment of the disease are critical in treating intussusception in children. Diagnosis is clinical with ultrasound as the gold standard, while non-operative management of the condition is nearly always successful. Early identification leads to a highly favorable prognosis as extensive harm lasting for a long time will be avoided in the paediatric patients.

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