

Classic triad of intussusception in patients aged 0 to 2 years in a tertiary hospital

Abstract

Intussusception is an infantile abdominal emergency where one portion of the intestine is introduced into another, varying its incidence according to the region. This study will focus on characterizing and analyzing cases of intussusception in children treated at the Antiguo Hospital Civil of Guadalajara "Fray Antonio Alcalde" between 2019 and 2024. The aim is to quantify the cases, describe the symptoms, and identify seasonal patterns. Methods: A total of 82 children aged 0 to 2 years with a diagnosis of intussusception were included in the Antiguo Hospital Civil Hospital of Guadalajara "Fray Antonio Alcalde", from January 1, 2019 to May 31, 2024. Sex, age, symptoms, type of management implemented, type of research, recurrent intussusception, association between therapeutic management and recurrent intussusception were reviewed, seasonal pattern, mortality. Results: A total of 82 children aged 0 to 2 years, with a median age of 7 months, were included. 50% were boys and 50% girls. 65 presented vomiting, 62 abdominal pain and 75 bloody stools; 6 children showed a single symptom, 32 had two, and 44 exhibited the complete triad. Use of laparotomy in 48.8% of cases, hydroenema in 28%. Ileocolic intussusception was the most common (50%), followed by ileocolic (40%). A seasonal pattern was observed, with 49 cases in the first six months of the year, with February standing out with 10 cases. Fisher's exact test showed a moderate association between therapeutic management and recurrence of intussusception ($p=0.018$). There was a mortality rate of 24.39%.

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Introduction

Intussusception is defined as alterations in peristalsis that cause a lesion in the intestines, causing a portion of the intestine to be introduced into the intestine itself and in a distal direction.¹ It is the most common emergency in early and second childhood, the most frequent cause of obstruction in infants, being more common in men in a proportion of 3:2; it is more frequent between 3 and 9 months, but it can extend up to 2 years.² However, it has been observed that the epidemiology of intussusception has a variability according to each country or region; in Asia, a peak of higher incidence was reported between 2 and 3 years of age.³ In some hospitals in the northeastern United States, only 5.5 cases occur per year; on the contrary, there are more than 12 per week in Shanghai hospitals.²

Regarding its clinical presentation, in patients with intestinal intussusception it can vary before the children are hospitalized, the characteristic triad of abdominal pain, vomiting and bloody stools in currant jam is not always present; therefore, there is a great variety of symptoms that can occur depending on the population analyzed. As the clinical picture progresses, a state similar to shock with fever and peritonitis can develop.⁴ The etiology is rarely identified in children, being mostly idiopathic.⁵ Among the main causes that have been linked are the anterior insertion of the terminal ileum into the cecum, the decrease in the rigidity of the cecum due to the poor development of the colonic tapeworms, and also the poor development of the longitudinal muscle fibers in the ileocecal valve. Of infectious origin in the spring, summer and mid-winter months, where diarrheal and respiratory diseases caused by viruses such as adenovirus and rotavirus predominate. Others are intestinal allergies, celiac disease and Crohn's disease; rarely neoplasms such as lymphoma.⁶ The association with a lead point has also been described, which is a lesion in the intestine such as Meckel's diverticulum, polyps, tumor or intestinal duplication cyst, which are dragged by peristalsis towards a distal segment of the intestine causing intussusception.⁷

The invaginated intestine causes a reduction in blood supply, ischemia and subsequent intestinal necrosis, this being one of the main complications.⁸ Immediate treatment after establishing the diagnostic suspicion is key to avoid complications, being the one of choice a non-surgical reduction, by hydrostatic or pneumatic image-guided enema, with ultrasound being preferred, resulting in both a diagnostic and therapeutic procedure. In patients with repeated enema failure, surgical management can be chosen, which is also indicated immediately in cases associated with peritonitis, open air, shock, sepsis and perforation.^{4,5} Due to the diverse clinical presentation and epidemiological characteristics, it is important to collect information that is useful for the diagnosis and timely management of intussusception in the pediatric population. In this way, management can be made more efficient and post-treatment complications can be prevented or reduced. This article shows the quantification of cases by age group, description of the clinical picture prior to hospital admission, as well as the frequency of presentation of the classic triad and identification of the seasonal pattern of pediatric patients diagnosed with intussusception at the Antiguo Civil Hospital of Guadalajara "Fray Antonio Alcalde" as of January 1, 2011. 2019 to May 31, 2024.

Methods

A retrospective, observational, descriptive, longitudinal study was conducted on the clinical record data of pediatric patients diagnosed with intussusception of bowel from 0 to 2 years of age in the Pediatric Surgery Service of the Antiguo Hospital Civil de Guadalajara "Fray Antonio Alcalde" from 2019 to 2024. After an extensive literature review on the main characteristics of patients with intussusception, with emphasis on the clinical presentation in children, it was found that in general pediatric patients show a characteristic triad of symptoms (abdominal pain, vomiting and hematic stools in currant jelly). After analyzing the scientific background, we proceeded to collect the necessary documents to request the Ethics Committee of the Antiguo Civil Hospital of Guadalajara "Fray Antonio Alcalde" to provide

access to the electronic records of pediatric patient’s diagnosis of intussusception from 2019 to 2024. For the selection of participants, patients with the following characteristics were included: patients between 0 and 2 years of age at the time of diagnosis, who have been attended by the Pediatric Surgery Service at the Antiguo Hospital Civil de Guadalajara “Fray Antonio Alcalde”, in addition to excluding those patients older than 2 years of age, those who have been admitted to the hospital outside the established period and patients with clinical records that did not contain sufficient information to meet the established variables. Data were collected using Excel Office. A descriptive analysis was elaborated with the IBM SPSS program where frequencies and analysis of measures of central tendency were used (Figure 1).



Figure 1 Methodology.

Results

Figure 2 shows the number of children who participated in the study, 41 boys and 41 girls.

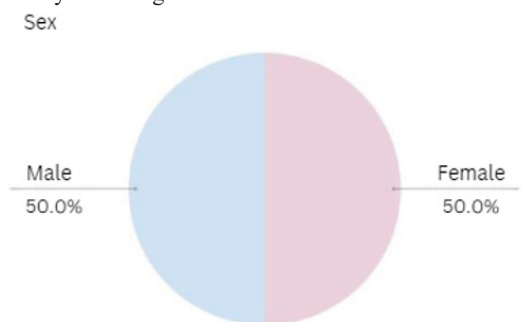


Figure 2 Sex of the patients evaluated.

The patients presented with the diagnosis of intussusception with a considerable age variation from the first month of life to 2 years. The age of the patients in which they were most diagnosed with this pathology was 6 months (11 patients in the study) (Figure 3).

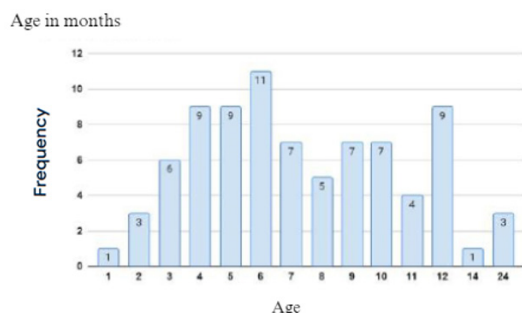


Figure 3 Age prevalence in months of children diagnosed with intussusception in the study.

The symptoms that were considered for the evaluation of the patients’ prehospital clinic were abdominal pain, vomiting and hematic stools, which are part of the classic triad of intussusception. The patients who presented abdominal pain were 62 (75.6%), patients who presented vomiting were 65 (79.3%), and in turn patients who presented blood stools were 75 of the total (91.5%) (Figures 4, 5 & 6).

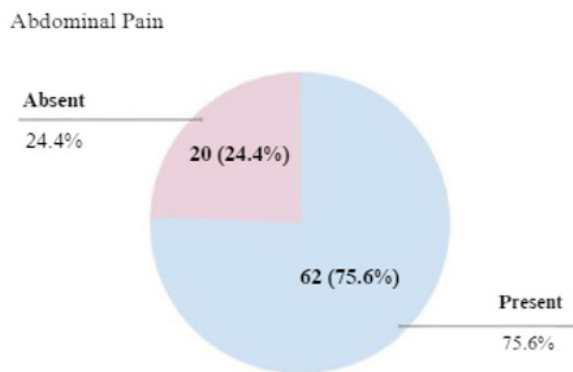


Figure 4 Percentage of patients who presented abdominal pain as a symptom of intussusception.

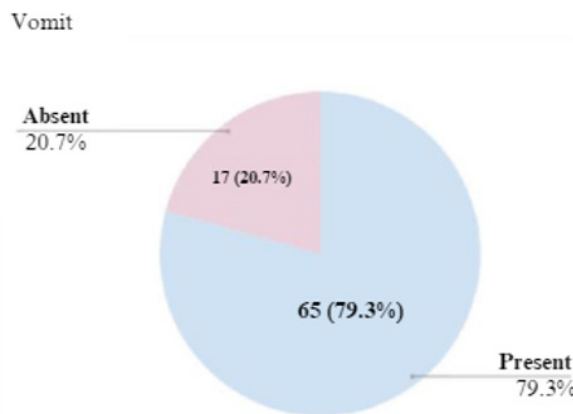


Figure 5 Percentage of patients who presented vomiting as a symptom of intussusception.

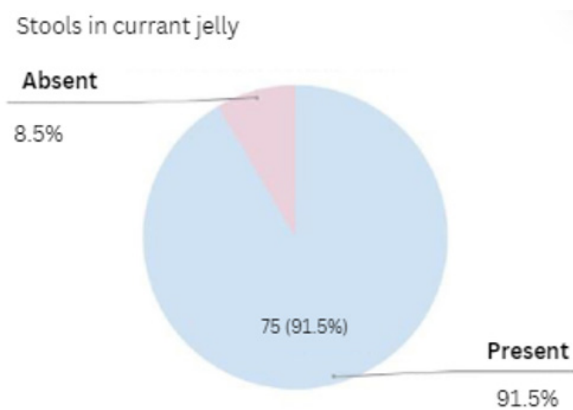


Figure 6 Percentage of patients who had bloody stools as a symptom of intussusception.

Figure 7 shows the number of symptoms of the classic triad: 44 (53.7%) patients presented the 3 symptoms (abdominal pain, vomiting and currant jelly stools), 32 (39%) patients presented only 2 of the 3 symptoms and finally a minority only presented 1 symptom 6 (7.3%) patients.

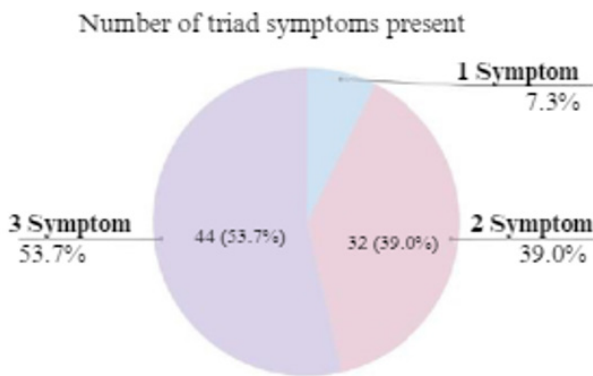


Figure 7 Number of symptoms present of the classic triad of intestinal invagination.

Regarding therapeutic management, laparotomy was the first choice for 40 patients (48.8%), while the second choice with 23 patients was hydroenema and finally only 19 patients underwent hydroenema first (28%) and due to this failure, laparotomy was later performed (23.2%) (Figure 8).

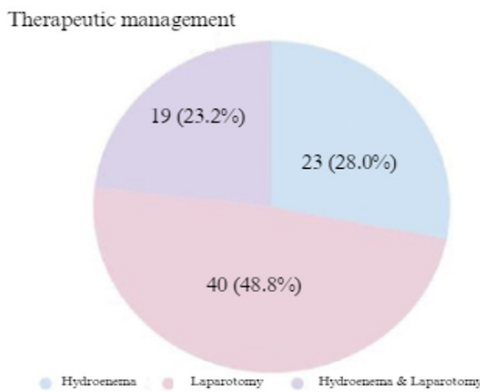


Figure 8 Frequency of therapeutic management in the 82 patients with intussusception.

The type of intussusception that was most frequent in the patients in the study is ileocecolic (41 patients), followed by ileocolic (33 patients); The types that were less frequent are colocolic intussusception, ileocecal intussusception, and the ileocecolic and colocolic combination, present in only one patient each (Figure 9).

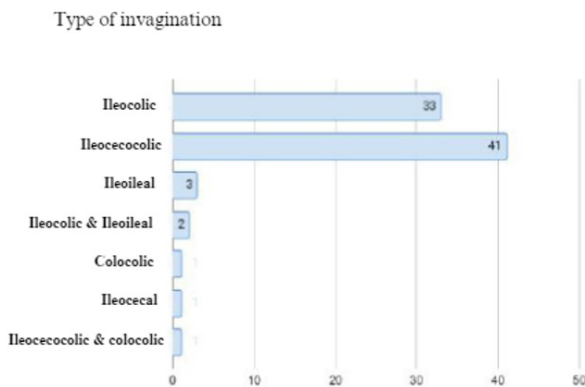


Figure 9 Reported frequency of intussusception in pediatric patients in the study over a 6-year span.

Of the 82 patients, 8 of them presented intussusception for the second time, corresponding to 9.8%. Figure 10.

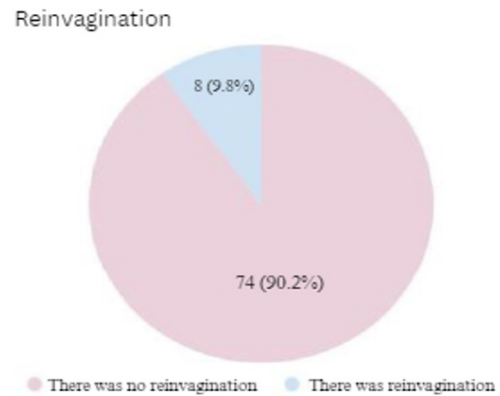


Figure 10 Cases of recurrent intussusception.

A Fisher's exact test was performed to evaluate the association between the type of management implemented and cases of recurrent intussusception in a sample of 82 patients. The results showed the existence of a significant association between these variables (bilateral exact significance = 0.018,) (Considering the p value of <0.05). It is suggested with a moderate degree of association (the value of phi obtained was 0.319). Regarding the seasonal pattern of case incidence, the trend observed from 2019 to 2024 was that the cases occurred mostly in the first 6 months of the year (with 49 cases), compared to the remaining six months (33 cases); The month in which the most cases were observed in the six years that were evaluated was February (with 10 cases in total), and the months in which the fewest cases were observed were August and October (with 3 cases each) (Figure 11).

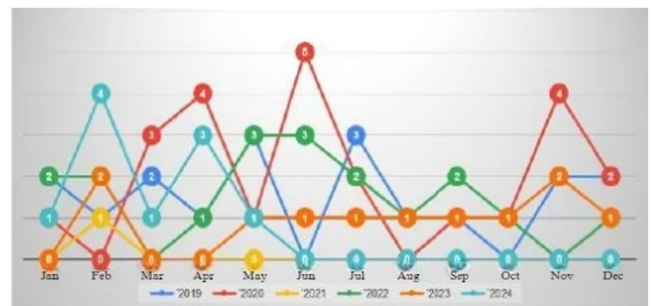


Figure 11 Seasonality pattern of intussusception cases in children from 2019 to 2024.

With regard to mortality in the study population, 2 deaths were registered, corresponding to 2.4%. When analyzing this information, the mortality rate of intussusception was 24.39% in this study population per 1,000 patients, which indicates a high mortality of the disease.

Discussion

The classic triad of symptoms of intussusception (abdominal pain, vomiting, and hematic currant jelly stools) is well known and described in the literature. This study agrees with this description, as most patients presented with these symptoms. However, it is important to note that not all patients showed the complete triad. Some presented with only one or two of the symptoms, underscoring the need for careful differential diagnosis.^{2,4,6,9} The incidence of intussusception in this study was mostly observed in the first 6 months of the year, with a peak in February. This seasonal pattern has also been reported in other

studies, although the exact reasons for this seasonality are not yet fully elucidated. Some authors suggest that environmental or behavioral factors could influence this trend.^{1,8,10,11} The therapeutic management of intussusception has evolved over time. In this study, mainly two approaches were used: laparotomy and hydroenema. Laparotomy was the first choice in most cases, followed by hydroenema. This finding is in line with current practice in many health centers, where laparotomy is considered the treatment of choice due to its efficacy and safety.¹²

However, it is important to note that the literature also discusses the efficacy of hydroenema as an initial treatment, especially in uncomplicated cases. Some studies suggest that hydroenema may be effective and reduce the need for surgical interventions. The rate of Intussusception after hydroenema in this study was relatively low, which supports this idea.¹² The significant relationship between therapeutic management and Intussusception indicates that the therapeutic approach may be crucial to avoid complications. These findings highlight the importance of proper diagnosis and management to improve clinical outcomes. Furthermore, statistical significance was observed with Fisher's exact test between therapeutic management and cases of Intussusception.¹² The study found that ileocecolic intussusception was the most common, followed by ileocolic. This finding is consistent with the literature, where it is reported that these types of intussusception are the most frequent. The literature also mentions that other types of intussusception, such as ileoileal and colocolic, are less common, which is reflected in the results of this study.^{1,8,10,11}

The mortality rate reported in this study is relatively high (24.39%). This may be due to several factors, including the severity of cases and the effectiveness of treatment. The literature suggests that mortality may vary significantly between different centers and regions, depending on the availability of resources and the experience of medical staff.¹³

The findings of this study may help improve the management of pediatric patients with intussusception in the hospital and other health care facilities. Rigorous evaluation of patients and close follow-up after treatment is recommended to prevent recurrence of intussusception. In addition, the implementation of protocols based on the results of this study is suggested to standardize the management of these cases.^{1,8,10,11} This study is based on retrospective data, which limits the ability to establish causality. In addition, the sample was limited to patients aged 0 to 2 years in a single hospital, which may not be representative of other populations. Prospective, multicentre studies are recommended to validate these findings.

Conclusion

In conclusion, this study may contribute significantly to the understanding of intussusception in pediatric patients, providing useful data to improve the management of this condition. The results emphasize the need for a comprehensive and personalized approach in the treatment of intussusception, considering both clinical factors and associated risk factors. Future research should continue to explore these aspects to further improve the care and outcome of affected patients. Implementation of evidence-based management protocols and the identification of epidemiological patterns can significantly improve clinical outcomes and reduce complications associated with this condition.

Acknowledgments

None.

Conflicts of interest

The authors declared that there are no conflicts of interest.

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