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Management of Acute Idiopthic Intestinal Invaginal in Infants at Conakry University Hospital

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Abstract

Introduction: Acute intestinal intussusception (AII) has been known for a long time but its diagnosis sometimes remains difficult and its etiologies, particularly the idiopathic forms, poorly elucidated. The objective of this study was to describe the clinical and therapeutic aspects of acute intestinal intussusception in order to contribute to the improvement of the management of this condition in the pediatric surgery department of the Donka National Hospital. **Materials and Methods:** This is a retrospective descriptive study of patients taken in charge of acute idiopathic intestinal intussusception over a period of 7 years (January 2017 to December 31, 2023). **Results:** We collected 72 patients operated on for IIA, *i.e.* a hospital frequency of 1.1% and an incidence of 10.3 cases per year. The mean age was 16.58 months with extremes of 3 months and 28 months. The sex ratio was 12.5 in favor of the boy. The triad of ombredanne dominated the clinical picture and paroxysmal abdominal pain with period of calm represented the main reason for consultation (72 cases) *i.e.* 100%, followed by vomiting (62 cases) and rectal bleeding (50 cases). Ultrasound was performed in 56 patients visualizing the intussusception sausage in 54 patients or 75%. The most common anatomoclinical variety of intussusception was the ileo-caeco-colic form with 35 cases (or 38%) followed by the ileocolic form 24 cases (33%). The surgical procedure performed was a manual reduction in 54 patients or 75% and an anastomosis resection in 18 patients; the appendectomy of principle was done in 62.25%. The postoperative course was simple in 64 patients or 88.88%. The mortality rate was 6.94 %. **Conclusion:** AII is a common abdominal surgical emergency in infants. Recognition of the Ombredanne triad especially abdominal pain with a period of

calm in children and infants in particular is an important element for vital prognosis. Early diagnosis and close interdisciplinary cooperation between pediatric, radiology and pediatric surgery teams could improve the management of IIA and allow this condition to remain benign in children.

Keywords

Acute Idiopathic Intussusception, Infant, Intussusception Sausage Pediatric Surgery

1. Introduction

Acute intestinal intussusception (AII) is the most common cause of intestinal obstruction in infants and children under 3 years of age [1]. It is defined by the incarceration of an intestinal segment and its mesentery in the immediately adjacent segment, constituting progressive ischemia [2]. Its overall incidence varies according to the geographical area and the health level [1] [3]. It is a common, serious and dramatic pediatric surgical emergency of the digestive tract requiring early diagnosis and treatment [4]. It is linked to a disorder of intestinal peristalsis whose etiology is still poorly understood [5]. In more than 90% of cases, AII is primary, occurring in a healthy child, without any identified pathology [6]. If the classic triad, made up of abdominal pain, vomiting, and rectal bleeding, systematically leads to the diagnosis. Mistakes and delays in management are common in less classic forms that can be life-threatening [1]. Ultrasound is the diagnostic examination of reference. It allows to determine the anatomical type, to identify digestive distress, to detect a primary lesion and to guide therapeutic management [7]. The management of acute intestinal intussusception in infants has changed considerably over the years. It has increasingly become the domain of interventional radiology [8]-[10]. Surgical treatment is reserved for failures of radiological reductions and for advanced or immediately complicated forms [11]. The late diagnosis of AII in our country, its lack of awareness by most front-line practitioners, constitutes a concern for the pediatric surgeon.

The aim of our study was to analyze the epidemiological, diagnostic and therapeutic aspects of acute idiopathic intestinal intussusception in the pediatric surgery department of Donka National Hospital.

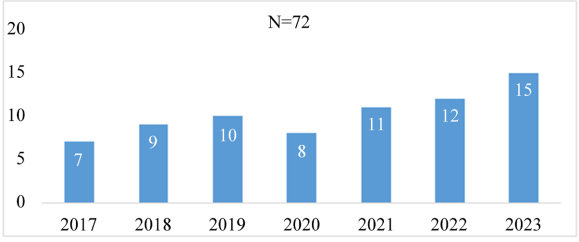
2. Patients and Methods

Our work is a retrospective descriptive study conducted from January 2017 to December 2023, a period of 7 years. It included the analysis of 72 records of children (infants in particular) hospitalized and operated on in the pediatric surgery department of the Donka National Hospital for acute intestinal intussusception during the study period. Incomplete records, children over 3 years of age and secondary intussusceptions (tumor, congenital malformation) were not included in this study. For each file, the parameters studied were hospital frequency, annual incidence, age, sex,

history, admission time, reasons for consultation, physical signs, general signs, paraclinical signs (ultrasound, ASP), time to treatment, appearance of the sausage, anatomopathological varieties, surgical procedures, postoperative follow-up, and length of hospitalization. All Our patients were on non-steroidal anti-inflammatory drugs (NSAIDs) postoperatively according to the service protocol: Nifluril suppo 400 mg: 1/2 suppo × 2/day for a duration of 8 days followed by a relay with Ibumol syrup: 5 - 10 mg; intravenous omeprazole 2.5 mg in the morning for all those who have I have intestinal anastomosis resection until resumption of oral feeding. Our data were collected from medical records entered by world 2013 and analyzed using SPSS statistical software 21. Patient anonymity was respected.

3. Results

Over a period of 7 years, 6533 children's files were hospitalized in pediatric surgery for surgical emergencies, of which 72 cases were acute intestinal intussusception files, representing a hospital frequency of 1.1% with an annual incidence of 10.3 cases/year (Figure 1). The average age was 16.58 months with extremes of 3 months and 28 months. The age group 3 - 9 months was the most affected in our study with a frequency of 32% (Table 1). We recorded 40 boys against 32 girls which corresponds to a sex ratio of 12.5 in favor of the boy (Figure 2). In terms of the history (Table 2) of our patients we noted 18 cases of pneumonia or 25%, 12 cases of gastroenteritis or 16.16; 18 cases of teething or 25%, 10 cases of nasopharyngitis and in 14 cases no history was found or 19.44. Paroxysmal abdominal pain was the main reason for consultation (72 cases) followed by periods of calm or 100%, accompanied by vomiting (62 cases) and rectal bleeding (50 cases). The mean admission time was 4.5 ± 2.7 days with extremes of 1 day and 14 days (Figure 3). Forty-eight (48) of our patients were febrile at 38˚C with a poor general condition, *i.e.* 66.7% of cases, followed by pallor in 20 patients. The abdomen was tender in all our patients. The sausage was palpated in 24 patients. Rectal bleeding was found in 50 patients, *i.e.* 69.7%, followed by abdominal distension in 48 patients. Rectal prolapse of the sausage was found in 4 cases. Forty-eight (48) of our patients underwent ASP, *i.e.* 66.7%, revealing fluid-air levels in 31 patients, *i.e.* 43.1%, and HCD opacity in 17 patients, *i.e.* 23.6%. Ultrasound was performed in 56 patients visualizing the intussusception in 54 patients or 75%. Table 3 groups the Diagnostic and Paraclinical Aspects of our patients and Figure 4 & Figure 5 illustrate the clinical and diagnostic images of our patients.



Annual incidence : 10.3 cases/year.

Figure 1. Hospital frequency: 1.1%.

Table 1. Distribution of patients by age.

Age (months)	Number (%)	Proportion (%)
[3 - 9]	23	32
[10 - 16]	16	22.2
[17 - 23]	19	26.4
[24 - 28]	14	19.4
Total	**72**	**100.00**

Mean age: 16.58 months with extremes of 3 months and 28 months.

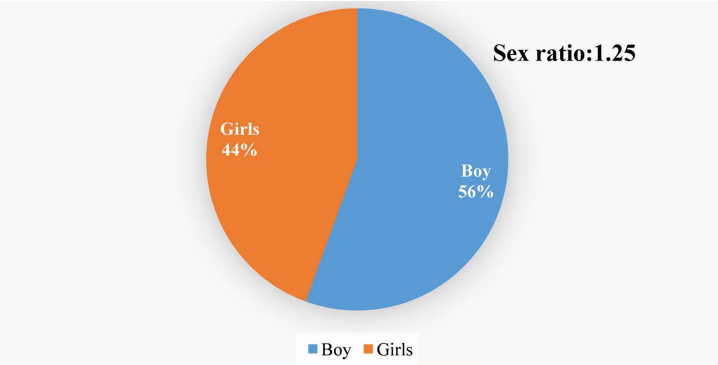


Figure 2. Distribution of patients according to gender.

Table 2. Distribution by medical history.

Medical history	Number	Proportion (%)
Bronchopneumopathy	18	25%
Gastroenteritis	12	16.16
Teething	18	25%
Nasopharyngitis	10	13.88
No history	14	19.44

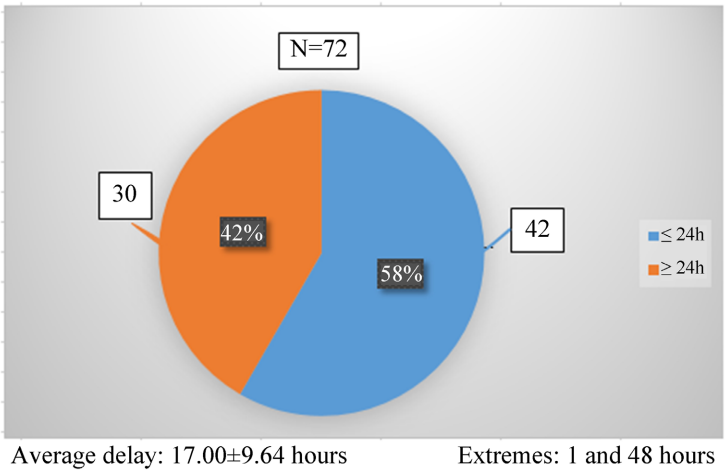


Figure 3. Distribution of patients according to treatment time. The average admission time was 4.5 ± 2.7 days with the extremes of 1 day and 14 days.

Table 3. Diagnostic and paraclinical aspects.

CHARACTERISTICS	n cases **[n%]**
Reasons for consultation	
Paroxysmal abdominal pain	72 cases [100%]
Vomiting	62 cases [86.11%]
Rectal bleeding	50 cases [69.44%]
General and physical signs	
Poor general condition	48 cases [66.66]
Fever (38˚C)	48 cases [66.66]
Clinical anemia	20 cases [27.77]
Pain on palpation	72 cases [100%]
Palpation of the sausage	24 cases [33.33]
Abdominal bloating	48 cases [66.66]
Rectal bleeding	50 cases [69.7%]
Prolapse of the sausage	4 cases [5.55]
Paraclinical signs	
ASP	48 cases [66.7%]
HAL	31 cases [43.1%]
O in RH	17 cases [23.6%]
Ultrasound with intussusception sausage	54 cases [75%]

HAL: hydroaeric levels; **O in R.H**: Opacity in the right hypochondrium.

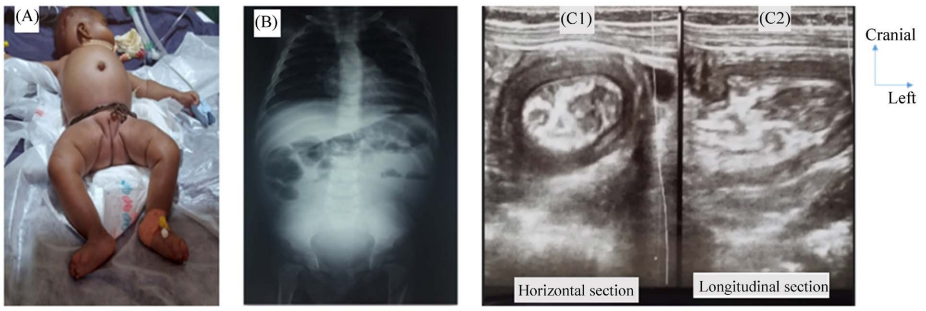


Figure 4. (A): Female infant aged 8 months with acute intestinal intussusception + obstruction syndrome; (B): The ASP shows abdominal distension and hydro-aerial levels an absence of gas in the pelvis; C1: roundel ultrasound image of the intussusception tube in horizontal section and sandwiched on the longitudinal section (C2). [Images from the pediatric surgery department of the Donka National Hospital (HND) of the CHU Conakry Guinea].

All 72 patients were operated on. The time to treatment varied from one hour to 48 hours with an average of 17.00 ± 9.64 hours. This surgical procedure was performed under general anesthesia with a transverse subumbilical approach. The anatomoclinical varieties were 35 cases (38%) of ileocoecologic form, 24 cases (33.3%) of ileocolic form and 13 (18.1%) cases of ileo-eleal form. The intestinal intussusception was normal in 54 patients or 75%, very inflammatory with preperforative areas in 6 cases (8.33%) and necrotic in 12 patients or 16.66%. The neck of

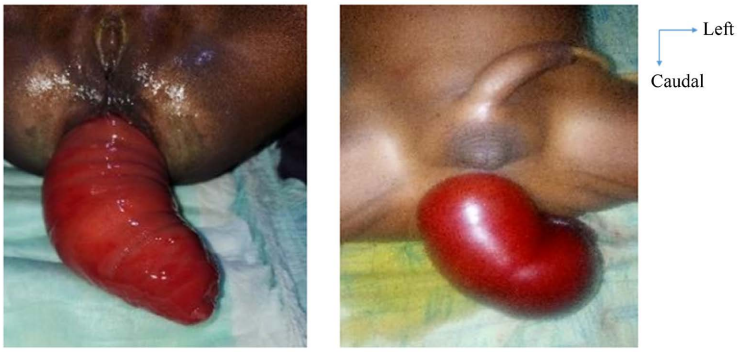


Figure 5. A: Prolapse of the intussusception sausage through the anus in an 11-month-old girl; B: Prolapsed intussusception sausage through the anus in an 11-month-old infant [12] (Images from the pediatric surgery department of HND Guinea, Conakry).

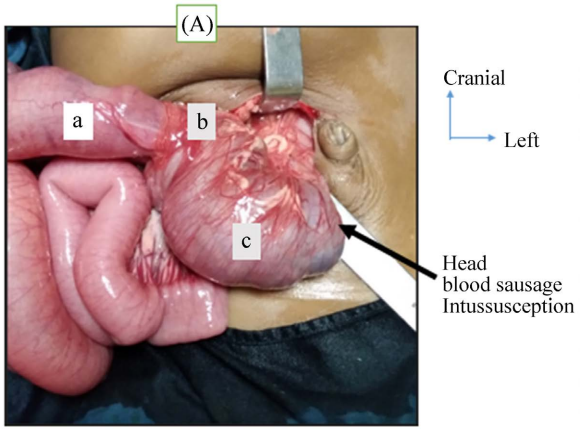


Figure 6. (A): Ileocecal-colic intussusception in a 6-month-old male infant; dilated ileum (a) entering the colon lumen through the neck (b) and forming the intussusception sausage (c).

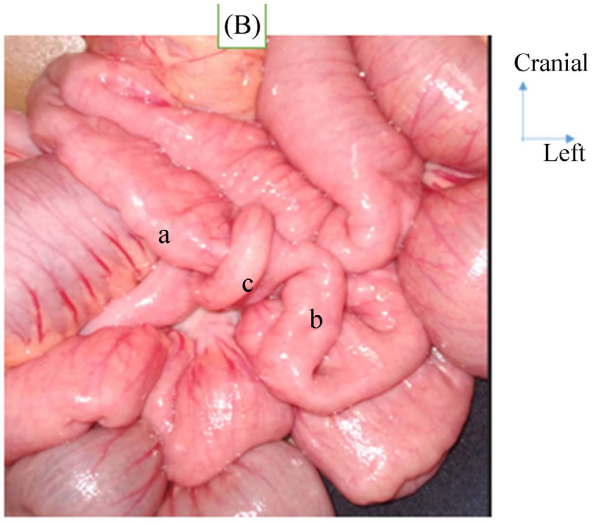


Figure 7. (B): Ileoileal intussusception in a 9-month-old boy. Proximal ileum (a), distal ileum (b) and intussusception sausage (c). Images of the pediatric surgery department of HND Guinea, Conakry.

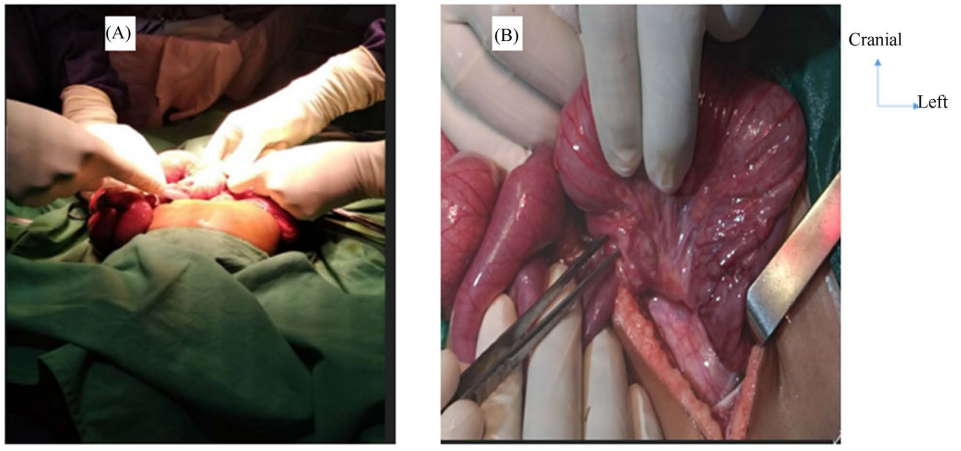


Figure 8. Manual disinvagination gesture A: Beginning of ileocecal disinvagination; B: progressive disinvagination of the sausage and the dissecting forceps indicating the loose neck. Images belonging to the pediatric surgery department of HND Conakry, Guinea.

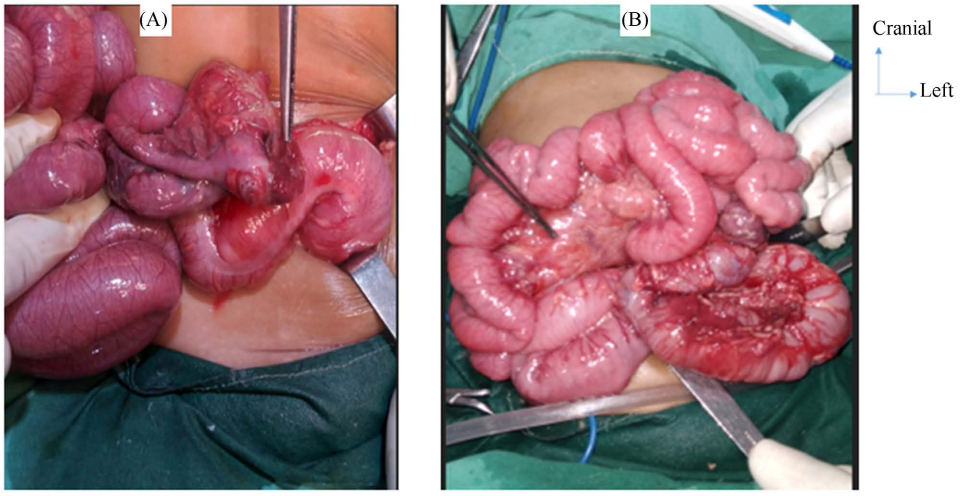


Figure 9. (A): Inflammatory areas of the coecoappendix (head of the intussusception) after complete digital disintussusception. B: Multiple mesenteric lymphadenopathies (images from the pediatric surgery department of HND).

the intussusception was not very tight with a long meso in 60 cases; Large mesenteric adenopathies were noted in all cases located at the ileocecal junction. The surgical procedures performed were manual reduction in 54 patients or 75% and anastomosis resection in 18 patients. A principle appendectomy was associated in 62.25% of cases (**Figures 6-9**). The postoperative course was simple in 64 patients or 88.88% with a good aesthetic result. On the other hand, 2 cases of suppuration of the surgical wound, 1 case of evisceration, 2 cases of anastomosis release were found. The length of hospitalization of our patients was between 1 day and 27 days with an average of 6.96 ± 4.89 days. During our study we recorded 5 cases of postoperative death (6.94%) and septic shock was the main cause. **Table 4** groups the therapeutic and evolutionary aspects. The postoperative control marked in the files was 6 months and it was without particularity.

Table 4. Therapeutic and evolutionary aspect.

Characteristics	Number of cases	Percentage
Anatomopathological varieties		
Ileocaecocolic	35	48.61%
Ileocolic	24	33.33%
Ileo-ileal	13	18.06%
Intussusception sausage appearance		
Normal	54	75%
Inflammatory and preperforative are	6	8.33%
Necrotic	12	16.66%
Neck and meso appearance		
Tight neck and short meso	12	16.16%
Little tight and long meso	60	83.33%
Mesenteric adenopathy	72	100%
Surgical procedure		
Manual reduction	54	75%
Resection anastomosis	18	25%
Appendectomy	45	62.5%
Postoperative course		
Simple	64	88.88%
Parietal suppuration	2	2.77%
Evisceration	1	1.39%
Anastomosis release	2	2.77%
Death (septic shock)	5	6.94%

The average length of hospitalization was 6.96 with extremes of 1 day and 27 days. The follp was 6 months; presence of large mesenteric lymphadenopathy.

4. Discussion

Acute intussusception is the most common abdominal emergency in young children. It is defined by the penetration of an intestinal segment into the lumen of the downstream intestine, causing digestive obstruction and vascular compression at the neck [5]. It is the leading cause of occlusion in infants, where it most often occurs during a benign pathology [2] [3]. During our study, we collected 6533 records of patients hospitalized for surgical emergencies, of which 72 were patients operated on for IIA, *i.e.* a hospital frequency of 1.1% and an annual incidence of 10.3 cases per year. Our hospital frequency was close to that reported by Harouna Y *et al.* [13] in Niger (2%). This frequency is probably underestimated, because all the cases certainly did not reach us due to the relocation of the service within the hospital of the Camayenne camp where there was only one hospitalization room and the existence of a pediatric surgery unit at the Ignace Deen national hospital.

The average age was 16.58 months with extremes of 3 months and 28 months. The age group 3 - 9 months was the most affected in our study with a frequency of 32%. Our result was close to that of Mouafo TFF *et al.* [14] who reported the age group of 3 - 12 months. It emerges from our that IIA is the pathology of the infant and this fact corroborates with the data of the literature [15]. A male predominance of 56% with a ratio of 1.25 was observed in our series. This observation was identical to that of Thanh Xuan N *et al.* [15] who had reported a male predominance with a sex ratio of 1.46. Zanga SM. *et al.* [10] had also reported a male predominance of 58.73%. However, this situation was different from that of Mouafo TFF *et al.* [14] who had reported a predominance of the female sex in 70% of his cases. This male predominance observed in our series would be related to the literature and would be linked to the richness of the ileocecal junction in lymphoid tissue in boys than in girls [1] [3]. The mean admission time in our study was 4.5 ± 2.7 days with the extremes of 1 day and 14 days. Our result was different from that of Rokatoarisoa B *et al.* [4], who reported a mean delay of 44.1 hours with extremes of 6 hours and 5 days. This long admission delay in our series could be linked on the one hand to the systematic recourse to self-medication, to traditional treatment in our context due to their geographical and cultural proximity, the low socio-economic level as well as the frequent unavailability of ultrasound and radiography in the health structures of the periphery and on the other hand by the lack of knowledge of the condition by both paramedical and front-line medical staff.

The clinical diagnosis of acute intestinal intussusception is based on the classic triad of Ombredanne which are: paroxysmal painful attacks, vomiting and rectal bleeding. In our series, the reasons for admission were dominated by paroxysmal abdominal pain 72 cases (100%), followed by vomiting 62 cases (86.11%) and rectal bleeding 50 cases (69.44%) as described in the literature [12] [14]. The absence of the classic triad should in no case delay the diagnosis. Ignorance of the signs of IIA often wrongly treated as gastroenteritis, colic or teething could explain the frequency of wanderings as in our case; therefore, great vigilance of the clinician is necessary in the face of non-typical presentations, which must not be responsible for a delay in diagnosis. In the event of a diagnostic delay, necrosis of the intestinal wall occurs. It is of the order of 3% before 48 hours of evolution and reaches more than 80% after 72 hours [16]. But the stricture of the neck may not be very tight, explaining the good tolerance of certain intussusceptions despite several days of evolution. Regarding the physical signs, forty-eight (48) of our patients were febrile at 38˚C with a poor general condition, *i.e.* 66.7% of cases, followed by pallor in 20 patients. The intussusception was palpated in 24 patients. Rectal bleeding was found in 50 patients, *i.e.* 69.7%, followed by abdominal distension in 48 patients. Rectal prolapse of the intussusception was found in 4 cases. This situation denotes the severity of the clinical picture linked to the delayed diagnosis in our study; in the literature and in developing countries this situation is found. The intussusception was present in the majority of patients in the study by Mouafo TFF *et al.* [14]; Rakotoarisoa B. *et al.* [4] had reported the presence of the

intussusception in 45.45% of cases, including 3 cases prolapsed to the anus. Sacko MLS *et al.* [12] in Guinea reported in 2022, 4 clinical cases of acute intestinal intussusception in infants with prolapsed sausage at the anus; These 4 cases in our department denote the delay in diagnosis and the severity of this condition and were the subject of a scientific article published in the African Francophone Journal of Pediatric Surgery Volume 7(2) 978 -983, 2022. Plain abdominal radiography (ASP) has little diagnostic value in IIA and is no longer performed in some centers in the presence of abdominal pain and a fortiori in the presence of suspected IIA. However, it often remains the first step in the presence of any abdominal pain in children and only this radiography can rule out pneumoperitoneum [17] [18]. In our study, the signs observed at the ASP were dominated by hydroaeric images in 31 patients or 43.1% and an absence of gas in the pelvis, this situation proves that these patients are received in a table of frank occlusion. Abdominal ultrasound has established itself as the diagnostic reference in suspected acute intestinal intussusception [19], it is the imaging modality that is requested as a first-line test in infants because it allows to make the positive, etiological diagnosis but also to choose the therapeutic modality with a specificity of 88% - 100%. The only limits of ultrasound exploration are gaseous interposition as can be encountered in major occlusive syndromes of advanced IIA or ileoileal. It was performed in 56 of our patients or 77.8%, visualizing the sausage in 54 patients or 75%.

Over the years, the management of IIA has become less and less surgical. Indeed, the reduction of IIA is increasingly the domain of interventional radiology. Surgical treatment is reserved for failures of radiological reductions and for advanced or immediately complicated forms (pneumoperitoneum, acute peritonitis, significant deterioration of the general condition with shock) [19]. In our situation, the delay in diagnosis and the poor condition of the patients were a formal contraindication for water-soluble enema under scopic or ultrasound control and pneumatic enema under scopic control and this justified the choice of laparotomy in our study. This technique requires the presence of the pediatric surgeon, the pediatric radiologist and the anesthesiologist [19]. The average time to treatment in our study was 17.00 ± 9.64 hours with extremes of 1 and 48 hours (**Figure 3**). Forty-eight percent (48%) of our patients had a delay of more than 24 hours. Mouafo T FF *et al.* [14] in the pediatric surgery department of the Yaoundé hospital had found a delay in therapeutic treatment of more than 48 hours. The surgical procedure should not be delayed by several hours or even days and this delay in surgical management associated with a long admission time would promote necrosis of the sausage or even intestinal perforation as in our case. In our context, it is made difficult by patients who were slow to honor the drugs for resuscitation, the surgical kits and the preoperative assessment by the low socio-economic level of the populations and by the absence of health insurance. It should be noted that the surgical exploration had noted large mesenteric adenopthia in 100% without other malformative or tumoral organic anomaly. These adenopthia were located on the mesentery of the terminal ileum. This proves the idioptic nature of this anomaly in infants; ENT and pulmonary infections would be at the origin of these

adenopthia, which in turn would cause the peristalsis disorder responsible for the intussusception. It should be noted that Emrah Aydın *et al.* [20] reported 1 rare case of intussusception recurring original food in a 22-month-old boy. During the assessment diagnosis, we discovered that he was suffering of an allergy non-IgE food. The child has not developed others episodes intussusception after stopping the allergenic diet. We did not find investigation on the food cause in this study.

Concerning the varieties of intussusception, the ileo-caeco-colic form was the most found at 48.61%. Our results were identical to those of Rakotoarisoa B. *et al.* [4] who had also found the ileo-caeco-colic form in 73%. On the other hand, it was different from that of Esteghamati A. *et al.* [16] who had a predominance of ileocolic form with (87.87%). According to Harouchi, nearly 90% of IIAs are located at the ileocecal junction. In our study, the intussusception was viable in 54 patients, *i.e.* 75%, inflammatory in 6 and necrotic in 12 patients, *i.e.* 16.66%, and the neck was very tight in these 12 cases. This necrotic situation would be due to the tight nature of the intussusception and the diagnostic delay widely described in the literature [15]. The majority of patients in our study benefited from manual intussusception using the Hutchinson technique, *i.e.* 75%, and 25% had an anastomosis resection. Appendectomy was performed in 45 cases, *i.e.* 62.5% of patients operated on. Our results were identical to those of Rakotoarisoa B *et al.* [4] in Madagascar who reported that the main surgical procedures were gentle manual reduction in 72.72%, appendectomy in 63.63%. However, they were different from that of Mouaffak Y *et al.* [21] in a series of 25 cases admitted to the pediatric intensive care unit of the children's hospital in Rabat who found 64% intestinal resection; 36% manual disinvagination. Morbidity is linked to complications such as: intestinal necrosis, perforation, prolapse of the invagination sausage at the anal level [12] [22], and septic shock. In our study, the postoperative course was simple in 64 patients or 88.88%. We observed 6.93% of complications dominated by parietal suppurations at 2.77%, evisceration 1.39 and anastomosis failure in 2 patients or 2.77%. These results could be explained by late patient management due to delayed diagnosis and management. This has a predictive influence on poor vital prognosis. Currently, in developed countries the mortality rate of this condition fluctuates between 0 and 1%. In developing countries, mortality, although underestimated, would reach 50% [23]. We recorded a mortality rate of 6.94 %. Our result was lower than that of Rakotoarisoa B *et al.* [4] in Madagascar in 2001 and Badji N *et al.* [24] in Senegal in 2022 who had respectively reported a mortality rate of 22.7% and 11.1%. Our result was close to that of Rakotoarisoa B *et al.* [4] who reported in 2001 in Madagascar 5 cases of postoperative death. These different results would be linked to a delay in diagnosis and management taken in our developing countries.

Among the 5 deaths recorded during our study, septic shock was the main cause.

The mean length of hospitalization was 6.96 ± 4.89 days with extremes of 1 and 27 days. Rakotoarisoa B *et al.* [4] reported a length of hospitalization that varied between 5 days and 10 days with a mean length of hospitalization of 5.6 days.

Simon *et al.* [25] recorded a median length of stay of 4 days. This allows us to say that it is extremely important to diagnose an IIA in the first hours of its evolution because the simple reduction method and the resection rate depend essentially on the diagnostic delay and that of management. Indeed, when the diagnostic delay was delayed, the use of surgical reduction and the rate of intestinal resection increased proportionally, and consequently the morbidity linked to surgery would rise.

5. Conclusion

Acute intestinal intussusception, being the incarceration of an intestinal segment and its mesentery in the lumen of the immediately adjacent intestinal segment, is responsible for progressive intestinal ischemia which, in the absence of correct management, would evolve into digestive necrosis leading to major intestinal resections or even stomas. It constitutes a diagnostic and therapeutic emergency. To improve the prognosis of this condition in our work context, it is necessary to raise awareness and train first-line medical personnel on the elements of his diagnosis and secondarily promote close collaboration between the pediatrics, radiology, pediatric surgery and anesthesia teams for correct care.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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