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Original Research Article

Acute Intestinal Intussusception in Children at Somine Dolo Hospital in Mopti

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Abstract: ***Introduction*:** It is defined as the penetration of an intestinal segment and its meso into the lumen of the distal segment by a glove-like turning mechanism (invagination sausage) whose perpetuation results in obstruction of the intestinal lumen and the intestinal necrosis. Acute intestinal intussusception (IIA) or intussusception is the most common cause of intestinal obstruction in infants. IIA is primary or idiopathic in 90% and mainly affects infants between 2 months and 2 years with a peak frequency between 6 and 9 months. ***Objectives***: To study acute intestinal intussusception in children aged 0 to 15 years in the general surgery department of the "SOMINE DOLO" hospital in Mopti. ***Method***: This was a retrospective, descriptive study which took place from January 2017 to September 2020 in the general surgery department of the Sominé Dolo Hospital in Mopti. ***Result***: During the study period, 1244 children were operated on including 32 cases of IIA, representing a frequency of 2.57% of surgical interventions. The male gender was in the majority (62.5%) with a sex ratio of 1.7. The average consultation time was 6.2 ± 4.3 days. Infants were the majority in 68.8% of cases and the main reason for consultation was abdominal pain (78.1%). The average treatment time was 2.9 hours. The ileocecocolic form was more frequent in 50% cases. Manual disinvagination was most often performed in 75% and the postoperative course was simple in 56.3%. ***Conclusion***: AII is a common condition in our structure. It mainly affects infants and boys. Patients consult late but early treatment reduces mortality.

Keywords: Intussusception, Intestinal, Child, Infant, Somine Dolo Hospital, Mopti.

INTRODUCTION

Acute intestinal intussusception (IIA) or intussusception is the most common cause of intestinal obstruction in infants [1-3].

It is defined as the penetration of an intestinal segment and its meso into the lumen of the distal segment by a glove-like turning mechanism (invagination sausage) whose perpetuation results in obstruction of the intestinal lumen and the intestinal necrosis [4-6].

IIA is primary or idiopathic in 90% and mainly affects infants between 2 months and 2 years of age with a peak frequency between 6 and 9 months [7, 8]. It is most often secondary to a local or general pathology in 10% of cases and occurs before 2 months and after 2 years [5].

IIA is one of the most common pediatric abdominal emergencies [9, 10]. It occurs in 3 boys for 2 girls [11] with a peak during the cool season, favored by viral epidemics (acute gastroenteritis, respiratory and ENT infections).

In the United States, it is estimated between 0.5 and 2.3 per 1000 births [12].

In Europe, it varied between 1.1 and 4.3 per 1000 births [13].

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In Africa, IIA represents 4% to 22% of causes of intestinal obstructions.

In Mali, it represented 10.1% of acute occlusions in 2012 [8].

IIA is a condition that is too often overlooked and requires rapid diagnosis so as not to endanger life.

No study has been carried out on this pathology in the Mopti region, hence the need to carry it out with the aim of studying acute intestinal intussusception in children aged 0 to 15 years in the general surgery department of the "SOMINE DOLO" hospital in Mopti.

Specific Objectives

- Determine the hospital frequency of acute intestinal intussusception in children at the Mopti HSD.
- Describe the diagnostic and therapeutic aspects.
- Determine the prognosis of IIA and the factors likely to improve it.

METHODOLOGY

This was a retrospective, descriptive study over 4 years (January 2017 to September 2020) in the general surgery department of Sominé Dolo Hospital in Mopti.

The Mopti HSD is a second reference Public Hospital Establishment (EPH). It is located in the administrative zone of Sévaré on the edge of national road 16 (RN 16), built on a total area of six hectares and on two levels :

- ✓ The administrative service on the 2nd floor;
- ✓ The offices of the medical consulting staff (PC) on the 1st floor;
- ✓ Technical services on the ground floor.

The surgery department brings together all surgical specialties : general surgery, pediatric surgery, urology, orthopedics-traumatology, otolaryngology and maxillofacial.

This service is composed of :

- ✓ An office for the department head;
- ✓ An office for the supervisor on duty, which serves as a staff room;
- ✓ A duty room for surgeons;
- ✓ A treatment room, a store, a changing room for paramedical staff;
- ✓ Sixteen (16) hospital rooms and patient toilets.

The service is made up of three (3) general surgeons and two (2) pediatric surgeons with a capacity of 59 distributed beds. There are other surgical specialties.

The activities carried out in the department are essentially the management of surgical and planned emergencies.

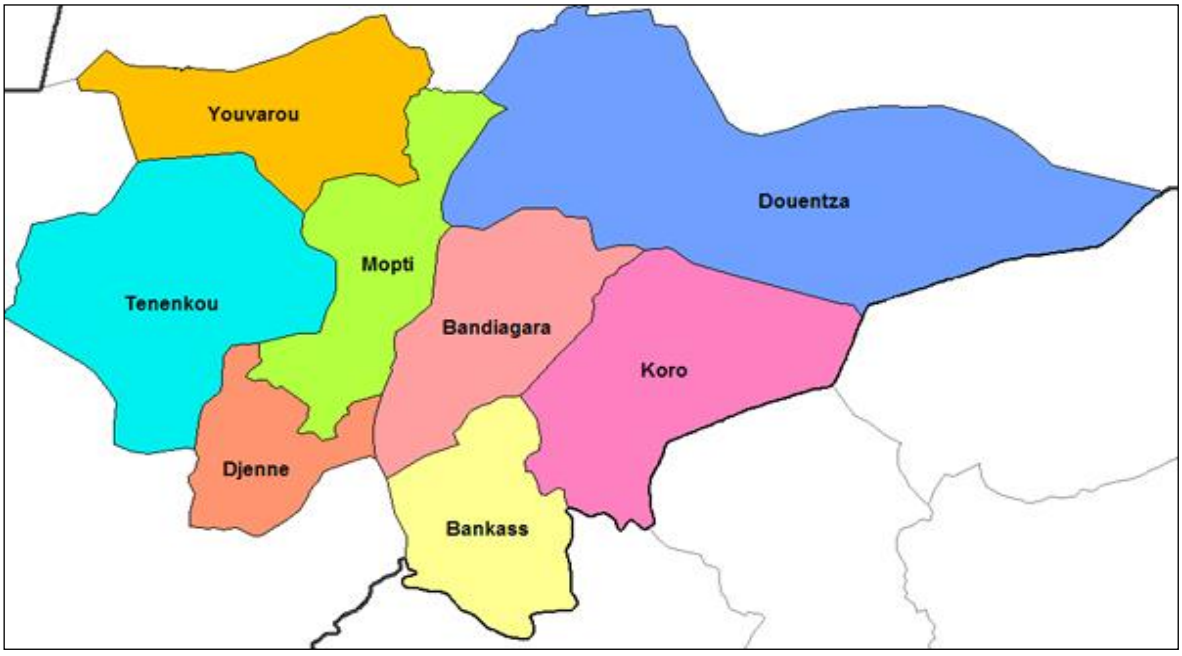
Inclusion Criteria

Any patient aged 0 to 15 years old received and operated on in the IIA department during the study period.

Non-Inclusion Criteria

- Patients who refused hospital care in favor of traditional treatment
- Patients who died before treatment.

Data analysis was carried out using Excel 2010 and SPSS statistics 20 software.



RESULTS

Epidemiology:

During the study period, 1244 children were operated on. This represented 2.57% of surgical interventions (N= 32).

The sex ratio was 1.7.

1- Clinical Aspect :

➢ **Patient Recruitment Period:**

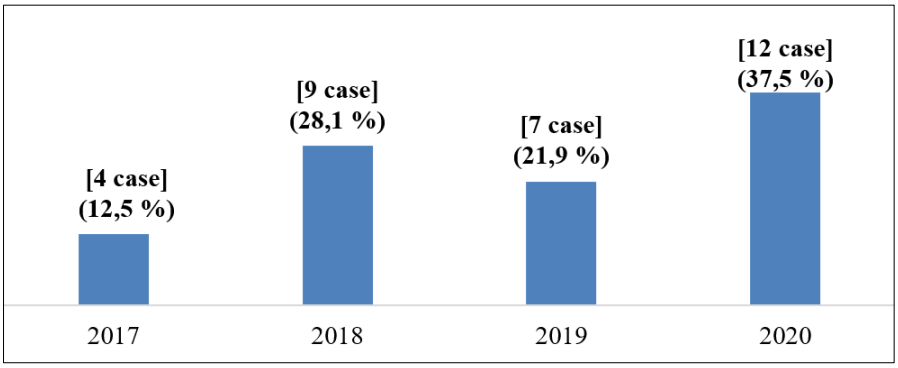


Fig. 1: Distribution of patients by years

➢ **According to Gender:**

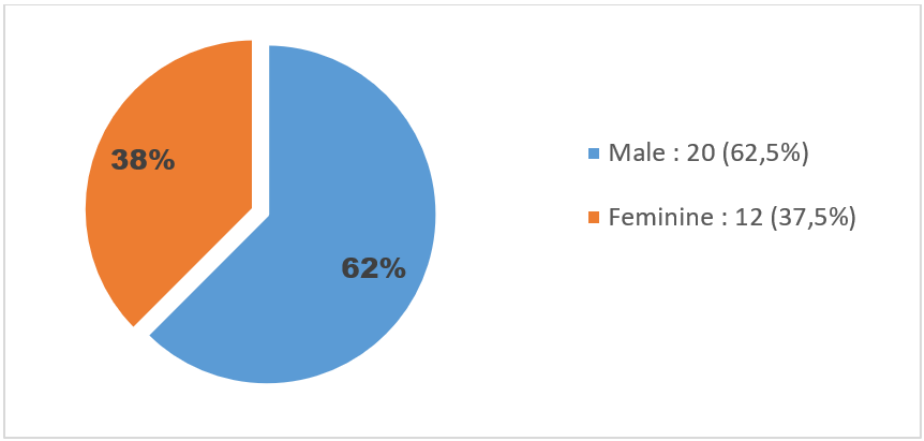


Fig. 2: According to gender

➢ **According to Age:**

Table 1: Distribution of patients by age

Age	Effective	%
New born	1	3,1
Infant	22	68,8
Little child	7	21,9
Big child	2	6,2
Total	**32**	**100**

Infants were the majority in our case.

➢ **Mode of admission**

Table 2: Distribution of patients according to mode of admission

Admission mode	Effective	%
Transferred from another department of the hospital	15	46,9
Referred from another structure	13	40,6
Came by itself	4	12,5
Total	**32**	**100**

Most of our patients were referred by another service.

- **Consultation time**

Table 3: Distribution of patients according to consultation time

Consultation deadline	Effective	%
1 - 3	**12**	**37,5**
4 - 6	8	25
≥ 7	12	37,5
Total	**32**	**100**

The average consultation time was 6.2 ± 4.3 days (Extremes : 2 and 20 days).

- **Reason for Consultation**

Table 4: Distribution of patients according to reason for consultation

Reason for consultation	Effective	%
Abdominal pain	25/32	78,1
Vomiting	22/32	68,8
Recectorgia	14/32	43,5
Material and gas shutdown	7/32	21,9
Refusal to feed	5/32	15,6
Diarrhea	4/32	12,5
Plaintive cries	1/32	3,1

- **Physical signs:**

Table 5: Distribution of patients according to physical signs

Physical signs	Effective	%
Abdominal bloating	18/32	56,3
Abdominal arch	7/32	21,9
vacuity of the right iliac fossa	11/32	34,4
Abdominal defense	4/32	12,5
Palpation of the sausage	16/32	50
Prolapsed blood sausage	5/32	15,6
Bloodstained finger cot	15/32	46,9

- **Ultrasound**

Table 6: Distribution of patients according to the result of abdominal ultrasound

Ultrasound result	Effective	%
Roundel and sandwich image	27	93,1
Inconclusive ultrasound	2	6,9
Ultrasound not performed	3	9,4
Total	**32**	**100**

Twenty-nine patients had undergone abdominal ultrasound including a roundel and sandwich image in most cases.

Hydro-aerial levels were found on the ASP in other patients (5/10).

- **Delivery time**

Table 7: Distribution of patients according to treatment time

Pick-up time (hours)	Effective	%
≤ 1	5	15,6
2-4	13	40,6
> 4	14	43,8
Total	**32**	**100**

The average treatment time was 2.9 hours (Extremes: 1 and 5 hours).

- **Pathological Type of Intussusception**

Table 8: Distribution of patients according to type of intussusception

Pathological type	Effective	%
Ileo-caeco-colic	16	50
Ileo-colic	7	21,9
Colo-colic	5	15,6
Ileo-ileal	3	9,4
Jejuno-jejunal	1	3,1
Total	**32**	**100**

Table 9: Distribution of patients according to the state of the intestine

Intestinal condition	Effective	%
Viable cove	24	75
Intestinal necrosis	5	16,5
Intestinal perforation	3	9,4
Total	**32**	**100**

- **Actions Taken**

Table 10: Distribution of patients according to the procedure performed

Action taken	Effective	%
Manual desinvagination	24/32	75
Anastomosis resection	5/32	15,6
Ostomy resection	3/32	9,4
Appendectomy	16/32	50

- **Aftermath of Surgery**

Table 11: Distribution of patients according to surgical outcomes

Aftermath of surgery	Effective	%
Simple	18	56,3
Complicated	14	43,7
Total	**32**	**100**

- **Postoperative Complications**

Table 12: Distribution of patients according to post-operative complications

Postoperative complications	Effective	%
Parietal suppuration	5	35,7
Dropping the wires	4	28,6
Evisceration	3	21,4
Digestive fistula	2	14,3
Total	14	100

- **Length of Hospitalization**

Table 13: Distribution of patients according to length of hospitalization

Length of hospitalization (days)	Effective	%
1-5	9	28,1
6-10	17	53,1
11-15	6	18,8
Total	**32**	**100**

The average length of hospitalization was 7.6 ± 3.4 days (Extremes: 1 and 15 days).

- **Complication and Consultation Delay**

Table 14: Distribution of patients according to complication and consultation time

	Post-operative complication		
Consultation time (days)	**Oui**	**Non**	**Total**
1-3	1	11	12
4-6	3	5	8
≥ 7	10	2	12
Total	**14**	**14**	**32**

P= 0,001, Chi-square= 13,8

DISCUSSION

We carried out a retrospective study on IIA in children in the general surgery department of the Sominé Dolo hospital in Mopti. Over a period of 4 years, 32 patients met our inclusion criterion.

Our study had certain limitations such as the insufficiency of the technical platform which did not allow the carrying out of certain biological analyzes (ionogram, TP and TCK) and therapeutic gestures such as enema (radiological reduction), the lack of financial means parents to provide care in an emergency context and their reluctance to undergo surgical intervention.

Table 15: The average annual frequency in the series

Series	Fréquence	P Valeur
CA Karadag [14]	41,9 cas/an	0,001
Adamou [4]	11,75 cas/ an	0,2
Coulibaly A [15]	8,67 cas/ an	0,5
Our study	8 cas/ an	

According to the WHO, the incidence of IIA varies from country to country and region to region. It is higher in developing countries than in industrialized countries. This variation would be linked to the method of recruiting patients and the degree of knowledge of this condition by caregivers.

Our frequency (8 cases/year) was statistically comparable to that of Adamou and Coulibaly [4, 15] (P > 0.05), on the other hand it was statistically lower than that of Karadag [14].

Table 16: The average time for admission to the series

Series	Average consultation time	P Valeur
Belabdelli Z [16]	2,5 jours	0,2
Bujida [17]	2 jours	0,1
Coulibaly [15]	5,6 jours	0,6
Traoré K [18]	2,8 jours	0,2
Our study	6,2 jours	

The time taken to admit a surgical emergency is a determining indicator in the recovery of patients.

In our study, this delay was long. This was statistically comparable to that of Coulibaly [15] and superior to those of other authors [15-18].

This could be explained by the diagnostic delay linked on the one hand to the socio-cultural and economic conditions of disadvantaged populations who resort to traditional treatments before considering a medical consultation and on the other hand an insufficiency in the evaluation of health professionals where digestive symptoms are wrongly attributed to gastroenteritis.

Table 17: Reasons for consultation according to series

Authors	Abdominal pain	Vomiting	Recectorgia
Hassan A [19]	90,8% (P : 0,004)	37,5% (p : 0,0004)	9,17% (p : 0,00002)
CA. Karadag [14]	85% (p : 0,1)	70% (p : 0,5)	29% (p : 0,02)
Mohamed [20]	90% (p : 0,01)	73% (p : 0,3)	26% (p : 0,008)
Mouafo [21]	88,4% (p : 0,04)	81,4% (p : 0,03)	72,2% (p : 0,0003)
Boujida [17]	84,37% (p : 0,1)	78,12% (p : 0,09)	50,00% (p : 0,1)
Our study	78,10%	68,80%	43,50%

Abdominal pain generally represents the first reason for consultation with the IIA. It presents in the form of crying or screaming in infants. However, it may be absent in incomplete forms.

Vomiting during IIA is due to intestinal lumen obstruction and nerve compression. In children, it is inaugural and subsequently replaced by a refusal to breastfeed.

Rectorrhagia reflects mucosal lesions of ischemic origin. It raises fears of intestinal necrosis when it is late and significant.

The classic IIA triad that was found in our study has been observed in the literature [14, 17, 19-21].

When the classic functional triad of IIA is absent, the diagnosis must be considered in the face of paroxysmal and intermittent abdominal pain, and confirmed by paraclinical examinations.

The cessation of materials and gases (28%) which is early in narrow neck intussusceptions observed in the study was also noted by Mouafo and Boujida [21, 17] who found 24.6% and 25% respectively. P = 0.3. It is the most common cause of occlusion in infants [22].

Mohamed H, Korana and Saida [20, 23, 24] reported 18%, 16.84%, 15.8% of cases of diarrhea respectively. P = 0.2. The presence of diarrhea is often misleading. But it should in no case rule out the diagnosis of IIA. In fact, there are entero-colitic forms where the symptoms are dominated by diarrhea.

Dehydration, conjunctival pallor and deterioration in general condition are due to vomiting, diarrhea and rectal bleeding. Early fever is generally related to the ENT or respiratory infectious context contemporary with intussusception. But when the fever is secondary, it can mean a general complication such as sepsis or a local complication such as peritonitis.

Table 18: Frequency of physical signs according to series

Series Country, Year	Bloating abdominal	Sensitivity abdominal	Palpated blood sausage	Prolapsed blood sausage	Soiled finger cot
Boughaleb [25] Maroc, 2016	35,20% (p : 0,007)	4,80% (p : 0,06)	12,40% (p : 0,0001)	1,90% (p : 0,0007)	56,20% (p : 0,1)
Ouedraogo [26] Ouaga, 2012	37,61 (p : 0,01)	11,01 (p : 0,5)	57,8 (p : 0,1)	1,83 (p : 0,0007)	26,61 (p : 0,002)
Coulibaly [15] Bobo, 2017	46,50% (p : 0,2)	42,30% (p : 0,001)	34,61 (p : 0,01)	7,69 (p : 0,09)	30,76% (p : 0,07)
Our study Mali, 2020	53,3%	12,5%	50%	15,6%	46,90%

The physical examination of our patients made it possible to demonstrate an intussusception tube, with a rate statistically comparable to those of Mouafo and Ouédraogo [21, 26] and higher than those of Coulibaly and Boughaleb [15, 25].

Palpation of the intussusception tube is not always easy, especially when the child is crying incessantly, experiencing intense pain or abdominal distention.

Abdominal bloating, which is a late sign indicating an occlusive syndrome, was found at a rate higher than that of Ouédraogo and Mohamed [26, 20].

Preoperative resuscitation which depends on the general condition of the patient is the first phase of treatment.

All our patients benefited from hydro-electrolyte supplementation, analgesics and antibiotic therapy. The same therapeutic attitude is reported by Traoré [18, 15].

This resuscitation was carried out in all our patients.

Table 19: Frequency of surgical treatment in series

Series	Sample (Frequency of surgery)	P Valeur
Chalya [27]	56 (100%)	0,001
Traoré K [18]	40 (100%)	0,002
Adamou [4]	47 (100%)	0,007
Boujida [17]	32 (100%)	0,1
Our study	32 (100%)	

Surgical treatment, even if it is reserved for failures of radiological reductions, in advanced or immediately complicated forms, was our therapeutic approach, as observed in several series in developing countries [4, 17, 18, 28].

Radiological reduction of IIA in children, apart from contraindications, is the first-line therapeutic approach recommended by many authors [19, 29, 30].

This approach was not carried out due to the limitation of the technical platform in our structure.

Table 20: The anatomopathological types of IIA according to the series

Series Country, Year	Ileo-coeco-colic	Ileo-colic	Ileo-ileal	Colo-colic
Traoré K [18] Mali, 2020	65% (p : 0,1)	32,50% (p : 0,07)	-	2,50% (p : 0,0003)
Ouédraogo [26] Burkina Faso, 2012	54,29% (p : 0,3)	17,14% (p : 0,2)	10,48% (p : 0,5)	21,90% (p : 0,1)
Coulibaly B [15] Burkina Faso, 2017	40% (p : 0,1)	8% (p : 0,004)	32% (p : 0,00004)	20% (p : 0,2)
Boujida [17] Maroc, 2016	54,29% (p : 0,3)	-	16,28% (p : 0,09)	20,94 (p : 0,2)
Our Study Mali, 2020	50%	21,50%	9,40%	15,60%

The predominance of IIA in the ileocecal region is justified by the presence of numerous lymphoid formations in this region in children [2].

This form was the most frequent in our study as observed in the African literature [15, 17, 18, 26].

However, Enehwi, Moore and Ekenze [31-33] found a high frequency of ileo-caecal form.

Table 21: Local complications according to series

Series	Effective	Intestinal Necrosis	Intestinal perforation
Boughaleb [25]	39	10,20% (p : 0,1)	7,70% (p : 0 ,5)
Coulibaly A [15]	34	27,27% (p : 0,06)	9,09% (P : 0,5)
Boujida [17]	32	31,86% (p : 0,01)	10,62% (p : 0,4)
Our Study	32	17%	9,40%

Intestinal necrosis was noted in 17% of our patients and intestinal perforation in 9.4%. These rates were statistically higher than that of Boughaleb [25] and lower than those of Coulibaly and Boujida [15, 17] P<0.05

The delay in diagnosis and treatment would explain the frequency of this intestinal suffering.

Table 22: Gestures performed according to the series

Series	Effective	Manual reduction	Intestinal resection
Boughaleb [16]	105	69,20% (p : 0,2)	25,80% (p : 0,5)
Traoré K [18]	40	77,50% (p : 0,2)	22,50% (p : 0,3)
SO. Ekenze [33]	71	55% (p : 0,02)	45% (p : 0,02)
Boujida [17]	32	90,60% (p : 0,02)	9,40% (p : 0,05)
Our Study	32	75%	25%

Manual reduction remains the first surgical treatment for IIA. It was the most commonly performed surgical procedure in our study, followed by intestinal resection as observed by certain African authors [16-18, 33]. This could be explained by the low rate of intestinal complications.

In our study, postoperative complications (43.8%) were statistically higher than those of Chalya and Saida [24, 27] who found 32.1% and 15% respectively. P = 0.03. This could be explained by the delay in diagnosis and treatment.

During our study, the mortality rate (18.75%) was statistically comparable to those of Chalya and Coulibaly [15, 27] who found 14.3% and 15.4% respectively. P = 0.2.

This high mortality could be explained by insufficient resuscitation resources and diagnostic and therapeutic delays.

Table 23: Duration of hospitalization according to series

Series	Average duration hospitalization	P Valeur
Saida [24]	5 jours	0,2
Boujida [17]	6,3 jours	0,3
Traoré [18]	7 jours	0,5
Coulibaly [15]	8,6 jours	0,5
Our Study	7,6 jours	

The duration of hospitalization is mainly linked to the state of the viscera (necrosis, perforation), the occurrence of complications and the procedures performed. It is longer in patients who have undergone intestinal resection.

In our study, the average duration of hospitalization was comparable to that of Traoré and Coulibaly [15, 18] who found 8.6 days and 7 days respectively, P = 0.5. But lower than that of Saida [24] who found 5 days. P = 0.2.

CONCLUSION

AII is a common condition in our structure. It mainly affects infants and boys. Several patients consult late from the 7th day. The clinical picture is generally typical and dominated by plaintive cries, vomiting and refusal of food.

Conflict of Interest: The authors declare no conflict of interest.

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