Clinics in Pediatric Surgery

Review Article
Published: 23 Jun, 2020

Surgical Outcome of Bowel Atresia at the Neonatology Unit of the Teaching Hospital Gabriel Toure, Bamako, Mali

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Abstract

Introduction: Bowel atresia is a partial or total interruption of digestive lumen in the level of a segment. It is rare.

Objectives: To determine the hospital frequency of intestinal atresia and to describe surgical outcome of intestinal atresia at the Teaching Hospital Gabriel Toure.

Patients and Method: This was a retro and prospective study carried out from January 1, 2012 to December 31, 2019 in all newborns admitted and operated for intestinal atresia. Esophageal atresia and other causes of neonatal occlusion were not included in this study.

Results: During this study period, intestinal atresia accounted for 14.8% of neonatal occlusions. The average age of patients was 1.42 days with extremes of 1 and 6 days. The sex ratio was 0.8. Abdominal distension was the most common reason for admission (70%). Atresia was at the duodenal level in 17 cases (23.6%), jejunal in 23 cases (32%) ileal in 29 cases (40.3%) and colic in 3 cases (401%). Excision of the diaphragmatic membrane was the most used technique (44.4%). Fourteen of our patients (19.4%) died on the operating table because they did not wake up and 24 (33.3%) in the immediate suites. The mortality rate was not related to the patients' sex, weight, the presence of associated malformation, the site and the type of atresia. However, the resection- anastomosis and ostomy have influenced the mortality ($p \leq 0.05$).

Conclusion: Intestinal atresia is a common cause of bowel obstruction in our daily practice. Antenatal diagnosis with early management in a multidisciplinary context will improve the patients' prognosis.

Keywords: Intestinal atresia; Frequency; Diagnosis; Treatment; Mali

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Received Date: *22 May 2020*
Accepted Date: *19 Jun 2020*
Published Date: *23 Jun 2020*

Citation:
Coulibaly Y, Amadou I, Diall H, Coulibaly OM, Doumbia A, Kamaté B, et al. Surgical Outcome of Bowel Atresia at the Neonatology Unit of the Teaching Hospital Gabriel Toure, Bamako, Mali. Clin Pediatri Surg. 2020; 1(1): 1004.

Introduction

Intestinal atresia is a complete or partial absence of the lumen of the intestine. Its prevalence, estimated at 3 per 10,000 live births, seems to be increasing [1,2]. It is a medical and surgical emergency. The diagnosis is possible in the antenatal period between the 2nd and 3rd trimester of gestational life by obstetric ultrasound assisted by fetal MRI [3]. Its management requires resuscitation. The prognosis depends on the anatomical type, the seat, the length of the small intestine involved and especially the presence of associated malformations.

The absence of a specific study about intestinal atresia in our country motivated this work with the aim of determining the hospital frequency of intestinal atresia and describing the therapeutic aspects and the outcome of intestinal atresia in the teaching hospital Gabriel Toure.

Patients and Methods

This was a retro-prospective study carried out from January 1, 2012 to December 31, 2019 in all newborns admitted to the neonatology unit and operated on for intestinal atresia. Esophageal atresia and other causes of neonatal obstruction were not included in this study. Data were collected from patient files, hospital registers and operating reports. The Chi statistical test was used to compare the data [2].

Results

Over a period of 8 years, we collected 485 cases of neonatal occlusion among which there were

Table 1: Causes of death.

	n	%
Sepsis	7	18.4
Electroionic inbalances	11	28.9
Dehydration	6	15.8
Anesthesic difficulties	14	36.8
Total	38	100

72 cases of intestinal atresia. This represented 14.8% of neonatal occlusions. The mean age of the patients was 1.42 days with extremes of 1 and 6 days. Seventeen children (23.6%) were born premature and 6 newborns (8.3%) post-term. The sample size was composed of 32 boys (44%) and 40 girls (56%). The sex ratio was 0.8. Abdominal distension was the most common reason for admission (70%) followed by vomiting (68%) and no meconium emission (56%). The average time for admission was 1.29 days with extremes of 10 h and 6 days. The average birth weight was 2020 g. We recorded 15 cases of hypotrophy (20.8%) and 4 cases of macrosomia (5.6%).

Peristaltic ripples were seen in 13 cases (18%). Plain abdominal film revealed double bubble image in 17 cases (23.6%) and multiple hydro-aeric levels in 52 cases (72%). The malformation assessment made notes: A cardiac malformation in 8 cases (11.1%), a renal malformation in 6 cases (8.3%), and a skeletal abnormality in 4 cases (5.6%). After resuscitation measures, laparotomy was performed in all newborns. On exploration, atresia was present at the duodenal level in 17 cases (23.6%), jejunal in 23 cases (32%) ileal in 29 cases (40.3%) and colic in 3 cases (4.1%). At the duodenal level, according to Gray/Skandalakis the atresia was of type I in 13 cases and type II in 4 cases. At the jejunal level according to Grosfeld the atresia was of type I in 8 cases, type II in 7 cases, type IIIa in 4 cases, type IIIb in 3 cases and type IV in 1 case.

At the ileal level, it was of type I in 8 cases, type II in 7 cases, type IIIa in 6 cases, type IIIb in 3 cases and type IV in 5 cases. At the colonic level, 3 cases of type I atresia were noted. Depending on these anatomical forms, we performed a duodenoduodenostomy in 4 cases (5.6%), a resection-anastomosis in 22 cases (30.6%), an ostomy in 14 cases (19.4%) and excision of the intraluminal membrane in 32 cases (44.4%). The average duration of the intervention was 54 min with extremes of 35 and 85 min. The average length of hospital stay was 8 days with extremes of 5 and 20 days. Fourteen of our patients (19.4%) died on the operating table because they did not wake up and 24 (33.3%) in the immediate aftermath. Anesthetic problems and ionic disorders were the main causes of death (Table 1). Peristomal ulceration was noted in 14 patients (19.4%) and parietal suppuration in 10 others (13.8%). Parietal suppuration was the most common complication of all techniques. Diaphragmatic excision and resection-ostomy was the most significant contributor to death ($p \leq 0.05$) (Table 2). The sex, weight, the presence of associated malformation, the type and location of atresia did not influence mortality ($p>0.05$).

Table 2: Post-operative events according to surgical techniques.

	Complications		p	Death		p
	Yes	No		Yes	No	
Resection -anastomosis	10	12	0.7865	16	6	0.0255
Excision of diaphragm	6	26	0.0002	11	21	0.0054
Resection -Stoma	14	0	0	8	6	0.7173
Duodeno-duodenostomy	1	3	0.4561	3	1	0.3629
Total	31	41		38	34	

Chi2=0.0733
Chi2=7.7182

Discussion

Frequent cause of neonatal obstruction, intestinal atresia occupies the 3rd place of neonatal occlusions [4]. It made up 14.8% of neonatal occlusions in our neonatal unit with an admission rate of 9 cases per year. It represented the 1st surgical indication of congenital anomalies of the digestive tract in Zimbabwe and the 1st cause of neonatal occlusions in Benin [5,6]. Despite this place, it remains a rare pathology.

Shakya et al. [7] in Nepal reported a frequency of 5.6 cases/year. Even if newborns are cared of in other structures (private clinics, reference health centers), our hospital remains the reference center for neonatal surgery, and therefore we receive newborns from all over the country.

Intestinal atresia occurs in both boys and girls [8]. The sex ratio in our series was for girls.

Intestinal atresia is an extreme therapeutic emergency [3]. An antenatal diagnosis allows rapid patient management at birth. If this diagnosis isn't made, an occlusive syndrome with vomiting, abdominal distension and absence of emission of meconium sets in within 48 h of birth [9]. The average age of our patients at diagnosis was 1.42 days. Shakya et al. [7] and Ezomike et al. [8] reported an average age of 3 and 10 days, respectively. Several reasons explain these delays to treatment (local beliefs and diagnostic errors). The diagnostic mistakes are mainly linked to incomplete occlusion signs. Meconium emission is not exceptional in intestinal atresia. It mainly involves emptying the distal segment of atresia or an incomplete obstruction of transit. Meconium was emitted at birth in 44% of the cases in our study. Abdominal distension, related to air stasis upstream of the obstacle can be replaced by a flat abdomen when the seat of atresia is high located. Abdominal distension was the main reason for consultation in our series (68%). Bilious vomiting is precocious when the obstacle is higher. They can be responsible for rapid and significant hydro-electrolyte disorders because of their frequency and/or their abundance.

Calisti et al. [10] reported 34% of antenatal diagnosis. No antenatal diagnosis had been made in our context. In post-natal, because of an occlusive syndrome, plain abdominal Film is the examination of 1st intention. It allows highlighting hydroaeric levels and an absence of aeration of the rectum. Intra-abdominal calcifications testify to a meconial peritonitis linked to the perforation of a loop [11].

Atresia can occur in any segment of the digestive tract. It can be serious in the duodenum because of its relationship with the pancreas and the common bile duct. It represented 23.6% of our series. This rate is lower than that of the literature which varies between 41.02% and 47.72% [12,13]. Jejuno-ileal involvement represented 72.3% of our patients, comparable to 51.28% of Gupta et al. [12] but greater than 45.45% of Pipera et al. [13]. Colon atresia represents only 1.8% to 15% of intestinal atresia [14]. Our rate of 4.1% is comparable to that reported by various authors ($p>0.05$) [8,9].

The management of intestinal atresia has benefited from advances in resuscitation, but surgical procedures depend on the anatomical lesion [2]. The choice between a primary resection-anastomosis and stoma depends on several factors (patient general condition, intestine quality, presence of associated cardiac malformations, etc.). Hillyer

et al. [15] reported 76.1% of resection-anastomosis at one time and concluded that it was better compared to the stoma. Our rate of 30.6% of resection-anastomosis is lower than his. The excision of the diaphragmatic membrane was the most used method in our series. The stoma was performed in 20% of the cases, restoration of digestive continuity being made six months later when the newborn gained a little weight.

The morbidity and mortality from intestinal atresia has been improved by the progress of resuscitation [2]. Mortality varies from less than 10% in developed countries to more than 50% in less affluent nations [2,4,16]. We recorded 53% of mortality higher than 21.7% of Ezomike et al. [8] ($p<0.05$). Our mortality rate was not influenced by the patients' sex, weight, the presence of associated malformation, the site and the type of atresia. However, the resection anastomosis and ostomy have influenced the mortality rate. Difficulties in anesthesia in the neonatal period and the lack of parenteral nutrition may be the main causes of death in our context.

Conclusion

Intestinal atresia is a common cause of bowel obstruction in our daily practice. Antenatal diagnosis with early management in a multidisciplinary context will improve the prognosis of patients.

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