

Management of Pediatric Abdominal Surgical Emergencies in Northern Benin

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Abstract

Background: Pediatric abdominal surgical emergencies are major causes of morbidity and mortality. The goal was to identify the main determinants of their management and access to assess their evolution. **Patients and methods:** This is a prospective, descriptive and analytical study performed at Parakou teaching hospital and Tanguieta district hospital. It has been conducted from January 1st to July 31st 2016. All children were included aged 0 to 15 years and admitted for an abdominal surgical emergency with a Clinical Classification of Emergency Patients listed from 3 to 5. **Results:** Pediatric abdominal surgical emergencies accounted for 42.8% of pediatric surgical emergencies. The average age was 9.3 ± 3.5 years old. The sex ratio was 1.7. The most encountered etiologies were peritonitis (36.76%), abdominal trauma (16.17%) and anorectal malformations (14.71%). The comparison of the delay in operative treatment with the World Society of Emergency Surgery shows a delay in 82.35% of cases. Mortality was high preoperatively and was related to the neonatal period ($p = 0.027$) and to a resuscitation length of stay higher than 36 hours ($p = 0.035$). **Conclusion:** Surgical care was delayed, mainly due to the lack of technical capacities. Morbidity and mortality were relatively low.

Keywords

Abdominal Surgical Emergency, Pediatrics, Peritonitis, Delay in Surgery

1. Introduction

In the pediatric environment, the diagnosis of abdominal surgical emergencies (ASE) is a real challenge for the surgeon, due to the usual severe prognosis [1]

[2]. The success of their care depends on the organization put in place. Unfortunately in Africa, pediatric surgery is not yet developed. Therefore, almost all cases are treated in adult surgical department. The main determinants identification and the management, morbidity and mortality assessment of pediatric abdominal surgical emergencies could lead to a real clinical and health interest.

2. Patients and Methods

This is a prospective, descriptive and analytical study realized in Parakou teaching hospital and Tanguieta district hospital. The study covered a period of 7 months from January 1st 2016 to July 31st 2016. Were included children aged from 0 to 15 years and admitted for an abdominal surgical emergency with a clinical classification of patients with emergencies (known as CCMU: Classification Clinique des Malades aux Urgences) quoted at 3, 4 or 5. CCMU is a score that allows the evaluation of patients in care in emergency department [3]. It comprises 7 degrees of severity: CCMU P (patient with a psychiatric pathology); CCMU 1 (patient considered stable); CCMU 2 (patient considered stable with a decision of complementary diagnostic or therapeutic act); CCMU 3 (patient whose condition is likely to worsen without being life-threatening); CCMU 4 (patient whose vital prognosis is engaged without need of imperative resuscitation maneuver); CCMU 5 (patient whose vital prognosis is engaged with imperative necessity of a resuscitation maneuver); CCMU D (deceased patient without any resuscitation maneuver). The distribution of children in age groups was the following: new-borns (0 to 28 days); infants: (29 days to 30 months); children (after 30 to 120 months) and adolescents (beyond 120 months).

The variables studied were the diagnosis delay, the preoperative resuscitation duration, the time for surgical management, the indication for surgery; complications and mortality. The time elapsed between the admission and the diagnosis was the diagnosis delay and the one between the diagnosis and the surgical procedure beginning, the time for surgical management. The delay in surgical management is defined by an operative time beyond the “Time of Acute Care Surgery (TACS)” defined by the “World Society of Emergency Surgery (WSES)” [4].

Collected data was analyzed using the Epi Info 7.2 software. Statistical tests used were arithmetic variance, Chi² and FISHER test. For comparisons, a probability $p < 0.05$ was considered as statistically significant.

3. Results

3.1. Sociodemographic and Diagnostic Data

68 cases of pediatric abdominal surgery emergency (PASE) were recruited, representing 42.8% of surgical emergencies in children and 27.6% of pediatric surgical activities. There were 43 boys (63.2%) and 25 girls (36.8%) with a sex ratio at 1.7. The average age was 9.3 ± 3.5 years with the extremes 1 day and 15 years. The average time for consultation was 5 days. The emergencies included

non-traumatic abdominal surgical emergencies (NTASE), 83.8%, and traumatic abdominal surgical emergencies (TASE), 16.2%. **Table 1** shows the distribution of these different emergencies.

3.2. Therapeutic Data

The average resuscitation duration was 22.8 ± 1 hours with extremes 25 minutes and 11 days. Out of the 68 children who had abdominal surgical emergencies, 62 were operated representing a percentage of 91.2%.

The average time for surgical management was 22 hours with the extremes 20 minutes and 10.8 days. **Table 2** shows that there was a delay in surgical management for all categories of interventions. Many factors were associated with that delay such as the patient age ($p = 0.07$); the pathology severity ($p = 0.7$); the lack of technical means ($p = 0.01$) and the lack of proficient personnel ($p = 0.6$). The different surgical procedures performed are shown in **Table 3**.

Table 1. Distribution of different pediatric abdominal surgical emergencies.

	Population size	(%)
NTASE		
Acute generalized peritonitis	25	36.8
Anorectal malformations	10	14.7
Acute intestinal obstruction	8	11.8
Acute intussusception	6	8.8
Incarcerated hernia	4	5.9
Acute appendicitis	3	4.4
Intra-abdominal foreign body	1	1.4
TASE		
Abdominal blunt	7	10.3
Abdominal wound	4	5.9
TOTAL	68	100

Table 2. Time taken for WSES and our series.

	Ideal time between diagnosis and intervention according to WSES	Code colour	Our series
Haemorrhagic emergency	Immediate surgical intervention		3.3 h
Strangulated hernia, viscera perforation, diffuse peritonitis, soft tissue infection associated with sepsis	Surgical intervention within 1 hour		18.7 h
Soft tissue infection not associated with sepsis	Surgical intervention within 6 hours		18.8 h
Appendicitis, cholecystitis	Surgical intervention within 12 hours		90 h

Table 3. Distribution of children operated for an abdominal surgical emergency according to the surgical procedure.

	Surgical gesture	Population size	%
Peritonitis	Excision-suture washing and drainage	18	29
	Appendectomy washing and drainage	4	6.4
	Resection-ileal anastomosis	3	4.8
MAR	Colostomy according to Pena	9	14.5
Acute bowel obstruction	Bridle section	2	3.2
	Adhesiolysis flange section	2	3.2
	Devolvulation	1	1.6
Acute intestinal intussusception	Disinvagination	3	4.8
	Disinvagina resection anastomosis	2	3.2
Incarcerated hernia	Cure hernia	3	4.8
	Hernial curing umbilicus fixation	1	1.6
Appendicitis	Appendectomy	2	3.2
	Appendectomy drainage	1	1.6
Intra-abdominal foreign body	Gastrotomy and extraction	1	1.6
Abdominal Contusion	Washing Drainage	4	6.4
	Splenectomy wash drainage	1	1.6
	Vesico-urethral drainage suture	1	1.6
Penetrating wound of the abdomen	Excision suture	2	3.2
	Resection anastomosis	2	3.2
Total		62	100

3.3. Evolutive Data

During preoperative resuscitation, 6 deaths occurred, representing 8.8% of preoperative deaths. Neonatal period and resuscitation time higher than 36 hours significantly influenced preoperative death ($p = 0.027$ and $p = 0.035$, respectively). For operated children ($n = 62$), post-operative history was complicated in 9.7% ($n = 6$). There were 3 cases of deep suppuration, 2 two of parietal suppuration and one of postoperative peritonitis. The postoperative mortality rate was 4.8% ($n = 3$).

4. Discussion

4.1. Sociodemographic and Diagnostic Data

The average age of the patients in this study was 9.3 years. That age is similar to the one reported from a study conducted by Pujari *et al.* in India [5] and Abantanga *et al.* in Ghana [1] respectively at 7 and 8.8. The sex ratio at 1.7 is close to 1.5 found by Abantanga *et al.* [1] and Abubakar *et al.* in Nigeria [6].

The average time for consultation was 5 days. This is superior to 2 days reported by the Harouna *et al.* in Niger [7] and 4 days in the Nigerian series by Abubakar *et al.* [6]. Delay in consultation is frequent in our context as reported in many other previous studies in sub-Saharan Africa [8] [9] [10]. It would be related to many factors including ignorance of parents, prior use of traditional

medicine and sometimes to misdiagnosis.

4.2. Therapeutic Data

22.8 hours as resuscitation duration was very long in the context of the severe emergencies. It had led to the death of six children. In fact, the resuscitation time greater than 36 hours significantly influenced preoperative death ($p = 0.035$). The neonatal period also influenced the occurrence of death during preoperative resuscitation ($p = 0.027$).

The time for surgical management was 22 hours. Basing on WSES classification [4], we were able to conclude that the average time for surgical management was not adequate. This delay in management was mainly due to the inadequacy of the technical capacities ($p = 0.01$).

As peritonitis is the main diagnosis, it directed the majority of surgical procedures toward excision, intestinal suture with washing and drainage. Perforation is very common in Africa and associated with typhoid fever. Typhoid fever is a disease encountered in regions with low socioeconomic level and leads to ileal perforation as complication [11]. Colostomy according to Pena was the colostomy technique performed in case of anorectal malformation and it was effective given the absence of postoperative complication in our study.

4.3. Evolutive Data

Postoperative morbidity in our study was 9.7% with a deep suppuration predominance. In Niamey, Harouna Y *et al.* [7] reported a rate of 55% among infants treated for intussusception in a general surgery department in 2000. They attributed this very high rate to the delay in diagnosis, the problems of resuscitation and the lack of pediatric surgeon. Postoperative mortality is low compared to 23% reported by Matoko *et al.*, [12] and 22.8% by Mhando S *et al.* [13].

5. Conclusion

Pediatric abdominal surgical emergencies mostly affected boys and the time for consultation was long. Peritonitis and anorectal malformations were the main diagnoses in our context. Operative management was delayed, mainly due to the lack of adequate technical capacities. Morbidity and mortality were relatively low in comparison with other series.

Conflicts of Interest

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

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