

Diagnosis and Treatment of Digestive Emergencies in Two Hospitals in Douala (Cameroon)

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Abstract

Background: Gastrointestinal tract (GIT) surgical emergencies represent a significant amount within surgical pathologies, in Africa and throughout the world. Our study was aimed to assess the etiological, therapeutic and prognostic aspects of GIT surgical emergencies in patients from two hospitals in Douala, Cameroon. **Patients and Method:** A longitudinal prospective study was conducted from December 2018 to May 2019, including 203 patients of all ages and both sexes who presented with a GIT surgical emergency in any clinical form, and who underwent surgery within one of our hospitals. We collected patients' parameters through a survey, from complete history to clinical examination, then followed them up from surgery to post-operative time. Gathered information was analyzed by IBM Statistical Package for Social Science (SPSS) 23.0 software version. **Results:** GIT surgical emergencies accounted for 27.5% of all surgical emergencies. Our target population included 55.2% (n = 112) of men, and 44.8% (n = 91) of women, observing a sex-ratio of 1.23. The mean age of the patients was 36.3 ± 17.1 years, with extreme values of 6 months and 86 years. Abdominal pain was the most common symptom, vomiting and lack of bowel movement or gas pass, were the main associated symptoms in 27.6% and 16.7% of cases, respectively. Etiologically, leading pathologies were intestinal obstruction (32.0%, 64 cases), acute appendicitis (24.6%, 50 cases), then came peritonitis and abdominal trauma with respectively 22.7% (46 cases) and 21.7% (43 cases). Most patients underwent surgery within 24 hour. Laparotomy was the primary method

used in 90.6%, and laparoscopy (9.4%). Post-operative suture breakage and parietal suppuration were the most common complications post-operatively. Totally, the overall morbidity and mortality rates were respectively 8.9% and 0.98% among our patients. **Conclusion:** Acute surgical abdomens occupy an important place in surgical pathology because of their frequency. They have various aetiologies and require a diagnostic evaluation and multidisciplinary management without delay.

Keywords

Emergency, Digestive Surgery, Etiologies, Management, Douala (Cameroon)

1. Introduction

Digestive surgical emergencies are abdominal ailments marked by pain that have developed for a few hours or a few days (less than three) and which are related to surgical pathology, requiring urgent treatment [1]. According to Ducombier, they result from an acute pathological or traumatic process compromising one or more vital functions in the very short term, and therefore requiring rapid diagnostic evaluation and surgical treatment [2]. The emergency in digestive surgery mainly concerns young subjects with a predominance of men and results from various aetiologies around the world [3]. In the United States, 19 aetiologies including 5 surgical (acute appendicitis, acute cholecystitis, acute intestinal obstruction, duodenal ulcer, abdominal aneurysm) were found in 1000 patients with acute abdomen [4]. In Pakistan, Mushtaph *et al.* observed that digestive surgical emergencies accounted for 71.40% of surgical interventions [5]. In France, a study conducted by Arnaud observed a proportion of 42.63% (272/638) of digestive emergencies, out of all surgical emergencies [6]. Etienne *et al.* revealed that 5 of the top 10 etiologies of abdominal emergencies were acute appendicitis, acute cholecystitis, acute intestinal obstruction, perforated ulcers, and neoplastic pathologies [7]. In Africa, digestive surgical emergencies occupy an important place in the activity of the emergency services, and in some places about 60% of general surgical emergencies [3] [8]. In Dakar, Padonou *et al.*, studying the aetiologies of digestive emergencies, found 4 main ones: intestinal obstruction, peritonitis, acute appendicitis, and evisceration [9]. The Togolese study by Kassegne *et al.* observed an average patient age of 30.3 years (with extremes of one month and 80 years) and a sex ratio of 2.1 in favor of men [10]. The main prognostic factor linked to digestive surgical emergencies as for today remains both diagnostic and therapeutic delay, maintaining post-operative mortality, and post-operative consequences grafted to high morbidity. It generally results from initial diagnostic errors, the precariousness of the technical platform, the low socioeconomic level of the patients, the lack of qualified personnel (anesthetists-resuscitators and surgeons) and the geographical accessibility of health structures [11]. In the Konaté series in Mali, a 4.7% mortality rate was

observed, with post-operative morbidities dominated by wall complications and post-operative occlusions [12]. In Yaoundé, a study conducted in 2007 by Ngowe *et al.* found 100 deaths following a surgical emergency, out of 1242 patients included, *i.e.* an incidence of 8.1% [13]. However, very few studies in Cameroon have been devoted to digestive surgical emergencies, in particular in Douala, a city that is nevertheless predominantly demographically [14]. This is why we have found it useful to conduct this study in order to improve our knowledge of this pathological entity, and therefore its management in our country.

2. Patient and Methods

This was a descriptive longitudinal study, which took place from December 31, 2018 to May 31, 2019, in the Laquintinie and General hospitals in Douala. The study concerned all cases of digestive emergencies treated in the aforementioned structures, in particular in the emergency departments, operating theater and surgery. After obtaining the authorizations, recruitment was done from patients presenting with an emergency digestive surgical presentation in our two study centers. All the outlines of the study were explained to them in order to obtain their informed consent. Thus, were included in our study, patients of all ages and of both sexes who presented with confirmed digestive emergency, and who had undergone surgery in one of our study centers. In addition to those who did not give their consent, those patients who had gynecological and urological trauma were excluded. A data collection sheet was designed and completed by the investigator. The variables sought were age, sex, time of arrival at the facility, time to start of treatment, clinical and paraclinical data, pre-, per-, and post-operative treatments, intraoperative diagnostic, as well as post-operative follow-up. All these data were then processed using SPSS software version 23.0.

Ethical clearance was obtained from the Institutional and Ethics Committee of the University of Douala N° 1769 CEI-Udo/04/2019/T

3. Results

During the period of our study, 5486 patients were admitted in emergency, 792 were for a surgical emergency (14.4%). Of these, 218 digestive emergencies were admitted (*i.e.* approximately 4% of overall emergencies and 27.5% of surgical emergencies) and 203 of these patients made up our target population (fifteen patients were excluded because they didn't give their consent)

As shown in **Table 1**, the population consisted of 203 patients, of which 112 (55.2%) were male, and 91 (44.8%) females, for a sex ratio of 1.23 in favour of men. The mean age of the population was 36.32 ± 17.13 years old, with extremes of 6 months and 86 years. 67% of the patients were between 20 and 49 years old, and only 3.5% were over 70 years old. 45.3% were married, and 42.4% single.

The symptomatology was represented by abdominal pain in all patients (100%), vomiting in 56 cases (27.6%) and fever in 56 cases (27.6%). There were 73 cases (36.0%) of material and gas shutdown, 10 cases (4.9%) of Diarrhea. On physical examination, we noted 114 cases (56.2%) of abdominal distension, 107 cases

(52.7%) of abdominal contracture and 71 cases (35.0%) of abdominal defense. The digital rectal examination was painful in 12.8% of cases (57 patients).

Paraclinically, all the patients had a complete blood count, which is 23.6% of cases (48 patients) revealed anemia and in 40 patients (19.7%), hyperleukocytosis. Abdominal ultrasound was performed in 91 patients (44.8%), and contributed 34.4%, revealing cases of hemoperitoneum, rupture of the spleen, appendicitis, subcapsular hematoma, effusion, peritoneal. The x-ray of the abdomen without preparation (ASP) was performed in 65 patients (32.1%), with a contributing rate of 28.6%, revealing interhepato-diaphragmatic gas crescents, hydroaeric levels or diffuse grayness. Only 25 patients were able to have an abdominal CT scan; several cases of hemoperitoneum, fluid effusion, intra-abdominal tumors/masses, loop eventration were notably identified.

The indication for surgery was made on the basis of clinical and paraclinical signs pointing to an occlusive or peritoneal syndrome. The main clinical pictures are shown in **Table 2**.

Table 1. Distribution of patients by sex and age.

Variables	Effective (%)
Sex	
Male	112 (55.2)
Female	91 (44.8)
Age (years)	
Mean ± Standard Deviation	36.32 (±17.13)
Minimum	6 months
Maximum	86 years
Age group	
[0 - 9]	12 (5.9)
[10 - 19]	15 (7.4)
[20 - 29]	44 (21.7)
[30 - 39]	56 (27.6)
[40 - 49]	36 (17.7)
[50 - 59]	14 (6.9)
[60 - 69]	19 (9.4)
[70 - 79]	3 (1.5)
>80	4 (2.0)

Table 2. Main pathologies.

Variable	Effective (n)	Percentage (%)
Bowel obstruction	64	32.0
Appendicitis	50	24.6
Peritonitis	46	22.7
Abdominal trauma	43	21.7
Total	203	100.0

In the majority of cases (67%), surgical advice is given to patients in less than 3 hours. Only 28.6% of opinions were given between 4 and 8 hours after the arrival of patients in the emergency room, and 5.4% more than 9 hours after.

In the preoperative management of digestive emergencies, patients systematically received an infusion of fluids, as well as analgesics. Antibiotic therapy was instituted in 90.6% of cases, a PPI was added to treatment in 94.6% of cases, and an antispasmodic in 31% of cases. A urinary catheter was placed in 10.8% of patients, and a nasogastric one in 2% of them. 13.8% of patients were transfused.

A total of 87.6% of surgeries was held within 24 hours of receiving patients in the emergency room, and 10.8% of them waited between 25 and 48 hours to be performed. General anesthesia was the primary method used (85.2%).

The indication for surgery was made on the basis of clinical and paraclinical signs pointing to an occlusive or peritoneal syndrome.

Concerning the surgical treatment, the main causes of bowel obstruction observed were adhesions/flanges (35.1%). They were managed by simple adhesiolysis, or with debridement of the loops. Next came volvulus (18.9%), which was managed by intestinal resection + end-to-end anastomosis, and in 1 case (2.7%), by hemicolectomy. Tumor obstruction (18.9%) was managed by enlarged colectomy, and in some cases by hemicolectomy. The 5 cases of intussusception benefited from various surgical methods, including (02) hemicolectomies, (01) colectomy, and manual and taxi disinvagination.

Half (50%) of the cases of acute peritonitis were operated on at most 12 hours after their admission to the emergency room. Only 6 cases (13.6%) were postponed to the day after admission. The laparotomy route was the only route used for all procedures. Here again, the midline incision was the most performed (87.0%), with a few exceptions where the xypho-pubic approach (8.1%) and on an old scar (4.3%) were preferred. In the operative management of peritonitis, general anesthesia was used in 80.4% of cases. 9 (19.6%) patients of the total had undergone spinal anesthesia (mainly in cases of gastrointestinal perforations and pelviperitonitis) (**Tables 3-5**).

As it appears in **Table 4**, Splenic affections (rupture, fracture, etc.) were the most common (41.9%). In the majority of cases (16/18), a total splenectomy was performed, and in 2 cases a splenic suture + hemostasis was performed. Resection + anastomosis was the treatment of choice for traumatic intestinal lesions, and cures (simple or prosthetic) were prescribed for cases of evisceration.

Among appendicitis, the catarrhal (48%), abscess (34%) forms were the most common. Anterograde appendectomy was the most common, in 100% of all acute appendicitis. Abscess drainage was added to the procedure in 34% of appendicitis abscesses (**Table 5**).

Postoperatively, the infusion of fluids was prescribed systematically in all patients. Saline 9/1000, glucose sera and Ringer Lactate were administered in 74.3%, 62.6% and 77.3% of cases, respectively. The combination Ceftriaxone + Metronidazole + Gentamicin was used 77.3% (157 cases). In 19 patients, Ceftriaxone was dissociated from this therapeutic triad, and was administered alone.

The most commonly used analgesics were Trabar/Tramadol injection (83.7%), Acupan/Nefopam 20 mg/2ml injection (71.9%) and Perfalgan 1 g injection (71.4%). A PPI was added therapeutically almost systematically (86.7%), as well as a low molecular weight heparin (LMWH) in 62.6) Four patients received a transfusion during the postoperative period.

Table 3. Surgical procedures performed concerning bowel obstruction.

Pathology	Findings	Effective (%)	Surgical gesture
	<i>Adhesion and flanges</i>	13 (20.3)	<ul style="list-style-type: none"> • Adhesiolysis + debridement (3) • Adhesiolysis + Intestinal emptying (10)
	<i>Intestinal volvulus</i>	7 (10.9)	<ul style="list-style-type: none"> • Bowel resection + Anastomosis (4) • Reconstruction (1) • Hemicolectomy (2)
	<i>Tumor</i>	7 (10.9)	<ul style="list-style-type: none"> • Hemicolectomy (3) • Enlarge Colectomy (4)
Bowel obstruction	<i>Intussusception</i>	5 (7.8)	<ul style="list-style-type: none"> • Manual disinvagination (1) • Disinvagination/Taxis (1) • Bowel resection (1) • Hemicolectomy (2)/Enlarged colectomy (1)
	<i>Ileal dilation</i>	2 (3.1)	<ul style="list-style-type: none"> • Bowel resection + Anastomose (3)
	<i>Pyloric stenosis</i>	1 (1.6)	
	<i>Small bowel necrosis</i>	1 (1.6)	<ul style="list-style-type: none"> • Hemicolectomy (1)
	<i>Stangled hernia</i>	28 (45.3)	<ul style="list-style-type: none"> • Hernia repair (27) • Prosthetic hernia repair (1)

Table 4. Surgical procedures performed concerning abdominal trauma.

Variables	Effective (%)	Surgical gesture
Spleen	18 (41.9)	
<i>Splenic burst</i>	2 (4.7)	
<i>Splenic fracture</i>	10 (23.3)	<ul style="list-style-type: none"> • Splenectomy (16)
<i>Splenic rupture</i>	6 (14.0)	<ul style="list-style-type: none"> • Splenic suture + hemostasis (2)
Stomach	2 (4.7)	
<i>Gastric injury</i>	1 (2.3)	<ul style="list-style-type: none"> • Gastric suture
<i>Omental evisceration</i>	1 (2.3)	<ul style="list-style-type: none"> • Evisceration repair + Suture
Small bowel	15 (34.9)	
<i>Duodenal perforation</i>	1 (2.3)	
<i>Jujenal perforation</i>	5 (11.6)	<ul style="list-style-type: none"> • Intestinal resection + Anastomosis
<i>Ileal wound</i>	2 (4.7)	
<i>Mesenteric wound</i>	2 (4.7)	<ul style="list-style-type: none"> • Mesenteric suture
<i>Hail-colic evisceration</i>	5 (11.6)	<ul style="list-style-type: none"> • Evisceration repair + Suture
Colon	7 (16.3)	
<i>Sigmoid laceration</i>	3 (7.0)	<ul style="list-style-type: none"> • Resection /suture + Anastomosis
<i>Post-operative evisceration</i>	2 (4.7)	<ul style="list-style-type: none"> • Evisceration repair + Washing
<i>Colonic perforation</i>	1 (2.3)	<ul style="list-style-type: none"> • Intestinal resection + Anastomosis
<i>Giant eventration</i>	1 (2.3)	<ul style="list-style-type: none"> • Prosthetic repair
Liver tumor rupture	1 (2.3)	<ul style="list-style-type: none"> • Arterial hemostasis

Table 5. Surgical procedures performed concerning peritonitis and appendicitis.

Pathology	Variables	Effective (%)	Surgical gesture
Peritonitis	<i>Gastric perforation</i>	19 (41.3)	• Gastric suture + Epiploic patch • Evisceration repair
	<i>Pelvipерitonitis</i>	6 (13.0)	• Abscess drainage • Salpingectomy
	<i>Ileal perforation</i>	6 (13.0)	• Intestinal suture • Ileostomy
	<i>Appendicular peritonitis</i>	4 (8.7)	• Appendectomy
	<i>Post-operative peritonitis</i>	4 (8.7)	• Bowel resection + anastomosis
	<i>Jejunal perforation</i>	2 (4.3)	• Bowel resection + anastomosis
	<i>Small bowel necrosis</i>	1 (2.2)	• Intestinal suture
	<i>Duodenal perforation</i>	1 (2.2)	• Cholecystectomy
	<i>Urinary peritonitis</i>	1 (2.2)	• Bladder suture
Appendicitis	<i>Catarral</i>	24 (48.0)	
	<i>Phlegmonous</i>	8 (16.0)	• Antegrade appendectomy
	<i>Gangrenous</i>	1 (2.0)	
	<i>Abscess</i>	17 (34.0)	• Appendectomy + drainage of the abscess

We observed 18 cases of postoperative complications, among which: 4 cases of parietal suppuration, 10 cases of suture loss, 1 case of eventration, 1 case of paralytic ileus, 1 case of septic shock and 1 case of digestive fistula, or a postoperative morbidity of 8.9%. Postoperative mortality was 0.98% (2 cases of peritonitis).

The median return to transit in operated patients was 3 (2 - 4) days. The cases of peritonitis were those with the longest hospitalization, with an average duration of 14.21 (± 7.728) days. Then came intestinal obstruction and abdominal trauma, with 11.29 (± 3.03) and 10.75 (± 3.92) days of hospitalization, respectively.

4. Discussion

Over our study period, digestive surgical emergencies represented 27.5% of general surgical emergencies. This value is similar to those mentioned in the studies by Harouna and Magagi in Niger, where acute surgical abdomens represented 25.6% and 22.87% respectively of general surgical emergencies [3] [15]. Even higher rates were found in other series, like those of Coulibaly (70%) and Konaté (72.77%) in Mali, Mushtaph (71.40%) in Pakistan, Arnaud in France (42.6%) [5] [6] [16] [17]. These data demonstrate the growing importance of digestive surgical emergencies in Africa and around the world.

In our series, 55.2% of patients were men, with a sex ratio of 1.23 in their favour. This agrees with most African authors, who found a sex ratio higher than

ours, we can cite Gaye (2.9), Coulibaly (2.3), and Magagi (3/1) [15] [16] [18]. In a study carried out in Marrakech in 2017 by Karim A., the most affected age group was between 21 and 30 years old and included 35.60% of digestive emergencies [19]. Cassina *et al.* report that digestive surgery emergencies concern young adults with an average age ranging from 30 to 40 years [20]. Magagi *et al.* found an even lower average age, 22.91 ± 18.14 years old [15]. We agree with these authors because the average age in our series was 36.32 ± 17.13 years, with the majority (67%) being between 20 and 49 years old. It was found in the Western series that the majority of patients were over 50 years old. In the Sauters *et al.* study, only 20.6% of patients were under 50 years old and the most represented age group was 80 - 89 years old with 25.3% of cases [21]. Vester-Andersen *et al.* found 36.7% of cases under the age of 60 and only 12.5% under 40 with 60 - 79 years as the largest age group (45.6%) [22]. This young population, found in African series, would certainly reflect our demography where the pyramid of ages is broad-based

Abdominal pain was present in all patients in our study, as reported by the studies by Padonou N., Coulibaly, and Konaté M. [3] [9] [16]. Defense and abdominal contracture were the major physical signs mentioned by all the authors. Coulibaly observed abdominal defense in 56% of the cases in his study [16]. In our study, there was abdominal defense on examination in 39.4% of patients. A total of 27.6% of the patients in our study had a temperature $> 38.5^{\circ}\text{C}$. Higher values were found in the studies by Magagi, Soumah, and Coulibaly, where hyperthermia was found in 26.05%, 42.04%, and 60% of cases, respectively [15] [16] [23]. In our study stopping transit was the most frequent functional sign (36%), followed by vomiting (27.6%). Soumah study's vomiting was present in 90.9% of cases and stopping transit in 34.09% and Coulibaly found vomiting in 88 cases (88%) and 32% cases of discontinuation of materials [16] [23].

A blood count was performed in 150 patients (73.9%) in our series. Hyperleukocytosis was found in 19.7% of them. A higher value was revealed by some authors, Magagi (57.23%), Coulibaly (44%) and Soumah (73.9%) [15] [16] [23].

ASP in our series was performed in 32% ($n = 65$) of patients, and systematically in patients with suspected bowel obstruction. Abdominal ultrasound was performed in 91 cases (44.8%). The rate of performing the abdominal CT scan in our series (12.3%). In many studies, these rates differ depending on several reasons. In different studies, these rates differ depending on several reasons. In Gaye's study, for example, the abdomen without preparation (38.87%), abdominal CT scan (23.59%) [18]. In Coulibaly, the unprepared abdominal x-ray and abdominopelvic ultrasound contributed to the diagnosis in 46% of cases and 18% of cases, respectively [16]. Soumah had reported that an unprepared abdominal x-ray was taken in all patients [23]. We can therefore also note that the scanner has not been carried out in several African studies. Some authors did not need radiological assessments to manage certain abdominal emergencies; this is the case of Kambire who reported that no radiological exploration had been carried out for the management of colic emergencies in his study and that

the indication for surgery had been retained on the basis of the existence of an occlusive syndrome or peritoneal syndrome. The scarcity and high cost of this exam in our context may be the cause of this difference [24]. However, morphological radiological examinations are rarely carried out due to their lack of availability emergency despite their paramount importance above all acute abdominal pain syndrome.

According to the aetiologies, the digestive emergencies that we found were dominated by intestinal obstruction (32.0%), appendicitis (24.6%), then came peritonitis and abdominal trauma with respectively 22.7% and 21.7%. This order differs from one author to another, although the pathologies in question are practically the same. Thus, Magagi found, for example, in the order, the peritonitis acute (51.61%), acute bowel obstruction and acute appendicitis with 27.49% and 9.65% respectively and abdominal trauma (8.52%) [15]. For Gaye, the most frequently encountered pathologies were peritonitis (25.5%), occlusions (22.9%) and appendicitis (16.8%) [18]. While Coulibaly had found acute appendicitis (35%) as the most frequent etiologies followed by acute peritonitis (31%) and acute intestinal obstruction (15%) [16].

Among our patients, 87.6% had been operated within 24 hours on admission, 10.8% were operated between 25 and 48 hours after admission. Moulaye O. found an identical value (87.6%) in his study [25]. These figures testify to a delayed management of digestive emergencies in our context (<6 hours), which could be attributable to diagnostic hesitation in certain cases, to the lack of financial means or to problems of staff availability, intrinsic to hospital services. Magagi in Niger and Zue in Gabon found an average pick-up time of around 9.13 hours. Some authors have reported longer deadlines [15] [26]. It should in all cases be recognized that our rate seems to approach the recommended standard of fewer than two hours for peritonitis [27]. Regarding occlusions, some authors have reported the benefits of conservative treatment (preoperative), because some patients have seen their obstacle removed thanks to this treatment [28]. This result, however, should not encourage an increase in the duration of observation of patients, because some overbite can see their case progress to intestinal strangulation with necrosis (3% to 6% in the literature) or, in others. Also, in this case, the delay between diagnosis and surgery has been found to be a risk factor for postoperative complications [29] [30].

The surgical approach and surgical treatment depended on the etiology of the emergency. All of our appendicitis cases had been treated by appendectomy, which made it the most frequently performed procedure, as described by Soumah *et al.* in their study [23]. In our study, in cases of laparotomy (64% of cases), the midline incision was mainly made in our study in 36% (n = 18) of cases, followed by that of Mc Burney in 18% of (n = 9). Ngowe *et al.* observed the opposite in their study, finding cases of McBurney and median (supra/subumbilical) incisions in 71.5% and 22.3%, respectively [31]. This could be explained by the fact that in our context, surgical practitioners explored the abdominal cavity as a whole before performing ablation and peritoneal lavage. Laparoscopy was per-

formed in our study in 34% of cases. Ngowe *et al.* in 2007 did not find this therapeutic modality in theirs. The reason may be that this method was not yet practiced in Yaoundé where the study took place [31].

In cases of acute peritonitis, a laparotomy was performed routinely. Gastrointestinal suturing was the most common procedure (in 47.8% of cases) with the cleaning of the peritoneal cavity and placement of an omentum patch (in cases of gastric perforation). Similar management was found in Karim A.'s study for ulcer perforations, consisting of suturing, ulcerectomy and peritoneal washing [19]. Intestinal resection + end-to-end anastomosis came second (21.7%) in the treatment of jejuno-ileal perforations.

Adhesiolysis (associated with bowel emptying) was the main surgical treatment for bowel obstruction (35.1%), with bridles being the main aetiology observed. Colectomy was performed in tumor occlusions. Laparotomy was performed in all patients, and the midline incision in 89.2% of cases. For umbilical and epigastric hernias in the study by Moulaye O., the technique was wall repair after the reintegration of healthy herniated viscera into the peritoneal cavity [25]. As in ours, where simple hernia treatments were systematically performed, with the exception of one case of Spiegel's hernia that we observed, for which a non-absorbable prosthesis had been placed.

Regarding cases of abdominal trauma, we performed 16 splenectomies (37.2%) or exactly 16/18 cases of admitted spleen trauma, *i.e.* 88.9% of cases. This rate remains lower than that of certain authors such as Sambo with 17/18 splenectomies (94.44%) [32]. These rates may be further reduced if radiological monitoring could be systematic because cases of spontaneous healing of major splenic lesions are contacted [33] [34].

The postoperative follow-up was straightforward in 185 patients (91.1%). They were enamelled with complications in 8.9% cases, among which, 4 cases of parietal suppuration (2%), 10 cases of suture loss (4.9%), 1 case of eventration, 1 case of paralytic ileus, 1 case of septic shock and 1 case of digestive fistula, *i.e.* 0.5% for each case. Soumah *et al.*, revealed postoperative morbidity of 18.2%, with parietal suppurations of 11.38% [23]. Magagi found postoperative morbidity of 38.1%, with the predominance of septic complications [15]. As for Gaye, the morbidity was 4.3%, but the author explains that the latter was underestimated because a large part of the complications had not been noted in the register, this morbidity was largely related to the occurrence of the parietal suppurations in post [18]. As some authors pointed out, postoperative parietal suppurations are largely due to the problem of asepsis in the operating room and good monitoring of operative wounds in hospital rooms [18].

The postoperative mortality that we found (0.98%) remains relatively low in comparison with other African authors. For Rasamoelina, The mortality rate was 37.5% patients, for Magagi (13.67%), Gaye (4.9%), Coulibaly (3%). These causes widely discussed here were the delay of consultation and surgical care, pecuniary problems, and bad practices of blood volume correction and antibiotherapy.

Limitations of the Study

During our study, we encountered some limitations. First of all, our recruitment was not able to extend to certain other hospital facilities, because we did not obtain the authorizations due to administrative slowness; preventing us from having a larger sample. Then, the journey of patients from the operating room to hospitalization was not well ordered in the structures chosen. The operative reports were sometimes poorly or not completed by the practitioners, preventing certain information from being fully available. The high cost of examinations to be performed by patients has sometimes hampered their care.

5. Conclusion

Acute surgical abdomens occupy an important place in surgical pathology because of their frequency. Having various aetiologies according to the authors, require a diagnostic evaluation and multidisciplinary management without delay, because very often involving the vital prognosis of the patients. Our study reveals that they represent 27.5% of all surgical emergencies, and mainly concern young adult males. The clinical pictures are diverse, but abdominal pain remains their common point. Antibiotic therapy, analgesia, and rehydration solutions are the basis, and the surgical procedure depends on the etiological diagnosis. Post-operative morbidity and mortality remain high throughout the literature, up to 8,9% with 0.98% respectively in our series.

Conflicts of Interest

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

References

- [1] Vally, N.T. (2013) Fréquence et prise en charge des abdomens aigus chirurgicaux dans le service de chirurgie de l'hôpital provincial de Kananga du 1^{er} Janvier 2010 au 31 Décembre 2012. [Mémoire de Médecine]. Université Nôtre Dame des Kasai RDC, Kananga.
- [2] Ducombier, A. (1996) Ethique de la chirurgie d'urgence en situation précaire. Edition Pradel, Paris, 174.
- [3] Harouna, Y., Ali, L., Seibou, A., Abdou, I., Gamatie, Y. and Rakotomalala, J. (2009) Deux ans de chirurgie digestive d'urgence à l'Hôpital National de Niamey (Niger). Etude analytique et pronostique. *Médecine d'Afrique Noire*, **48**, 50-54.
- [4] Brower (2004) Encyclopédie médico-chirurgicale et des urgences (Paris). Vol. 2, 24048B10.
- [5] Ahmed, M., Ali Shah, M., Luby, S., Drago-Johnson, P. and Wali, S. (1999) Survey of Surgical Emergencies in a Rural Population in the Northern Areas of Pakistan. *Tropical Medicine & International Health*, **12**, 846-857.
<https://doi.org/10.1046/j.1365-3156.1999.00490.x>
- [6] Arnaud, J.P. and Turbelin, J.M. (1982) Conduite à tenir devant un abdomen aigu. Encyclopédie Médico-Chirurgicale, Paris, 24939, 10.
- [7] Etienne, *et al.* (1994) Diagnostic des douleurs abdominales aiguës. *Encyclopédie*

Médico-Chirurgicale, **27**, Article ID: 24039010.

- [8] Courbil, J.L. (1996) Chirurgie d'urgence en situation précaire. édition Pradel, Paris, 848 p.
- [9] Pandonou, N., Diagne, B., N'diaye, M., Cherbonnel, G.M. and Noussaume, O. (1979) Les urgences abdominales chirurgicales non traumatiques au C.H.U de Dakar. Statistique de 04 ans (1973-1978). *Dakar Medical*, **24**, 190-197.
- [10] Kassegne, I., Kanassoua, K., Sewa, E.V., *et al.* (2015) Prise en charge des urgences abdominales chirurgicales au centre hospitalier universitaire de Kara (Togo): Etude rétrospective à propos de 594 cas sur une période de dix ans. *Médecine et Santé Tropicales*, **25**, 39-43.
- [11] Keita, S. (1996) Problème diagnostique et thérapeutique des abdomens aigus en chirurgie. Thèse Med Faculté de Médecine de Pharmacie et d'Ondostomatologie, Bamako, 13.
- [12] Konaté, M. (2005) Urgences chirurgicales à propos de 382 cas au CHU Gabriel Touré. Thèse Médecine, Faculté de Médecine, Université de Bamako, Mali, No. 31.
- [13] Ngowe, N.M., Mboudou, E., Ngo-Nonga, B., Mouafo Tambo, F., Ze Minkande, J., Bahebeck, J. and Sosso, A.M. (2009) éditeurs. Yaoundé. La mortalité hospitalière des urgences chirurgicales de l'adulte à Yaoundé. *Revue Africaine de Chirurgie et Spécialités*, **3**, 5-8
- [14] Population Data.net (Page consultée le 10/05/19) Cameroun. [en ligne] <https://www.populationdata.net/pays/cameroun/>
- [15] Magagi, I.A., Adamou, H., Habou, O., Halidou, M. and Ganiou, K. (2016) Urgences chirurgicales digestives en Afrique subsaharienne: Etude prospective d'une série de 622 patients à l'Hôpital national de Zinder, Niger. *Bulletin de la Société de pathologie exotique*, **110**, 191-197. <https://doi.org/10.1007/s13149-016-0499-9>
- [16] Coulibaly, M., Traoré, D., Togola, B., Sanogo, S., Bengaly, B., Kanté, A., *et al.* (2019) Diagnosis and Treatment of Acute Surgical Abdomen in Koutiala. *Mali Medical*, **34**, 11-14.
- [17] Konaté, M. (2005) Les urgences chirurgicales au CHU Gabriel Touré. Thèse médecine Bamako, No. 05M238, Faculté de Médecine, de Pharmacie et d'Ondostomatologie, Bamako, 13-33.
- [18] Gaye, I., Leye, P.A., Traoré, M.M., Ndiaye, P.I., Ba, E.H., Bah, M.D., Fall, M.L. and Diouf, E. (2016) Perioperative Management of Emergency Abdominal Surgery in Adult Patients at the Aristide Le Dantec University Hospital. *Pan African Medical Journal*, **24**, Article No. 190. <https://doi.org/10.11604/pamj.2016.24.190.9929>
- [19] Karim, A. (2017) [Bilan d'activité des urgences chirurgicales digestives de l'hôpital préfectoral d'Inezgane sur 2 ans 2014-2015]. Faculté de Médecine et de Pharmacie, Université Cadi Ayyad, Marrakech.
- [20] Cassina, M. (1996) Die effizienz der chirurgischen grunddiagnostik beim adominalschmerz. *Der chirurg*, **67**, 245-260.
- [21] Saunders, I.D., Murray, D., Pichel, C.A., Varley, S., Peden, C.J., *et al.* (2012) Variations in Mortality after Emergency Laparotomy: The First Report of the UK Emergency Laparotomy Network. *British Journal of Anaesthesia*, **109**, 368-375. <https://doi.org/10.1093/bja/aes165>
- [22] Vester-Andersen, M., Lundstrøm, H.L., Møller, H.M., Waldau, T., Rosenberg, J., *et al.* (2014) Mortality and Postoperative Care Pathways after Emergency Gastrointestinal Surgery in 2904 Patients: A Population-Based Cohort Study. *British Journal of Anaesthesia*, **112**, 860-870. <https://doi.org/10.1093/bja/aet487>

- [23] Soumah, S., Ba, P., Diallo-Owo, N.O. and Toure, C. (2011) Surgical Acute Abdominal Emergencies in an African Area: Study of 88 Cases at Saint Jean de Dieu Hospital in Thiès Senegal. *Bulletin Médical d'Owendo*, **13**, 13-16.
- [24] Kambire, J.L., Oueddraogo, S., Ouedraogo, S. and Bere, B. (2020) Results of the Management of Colonic Surgical Emergencies at the Regional University Hospital Center of Ouahigouya, Burkina Faso. *European Scientific Journal*, **16**, 173-182.
- [25] Moulaye, O. (2009) [Urgences chirurgicales digestives non traumatiques à l'hôpital de Sikasso] Thèse médecine, Faculté de Médecine, de Pharmacie et d'odontostomatologie, Université de Bamako, Mali.
- [26] Zué, A.S., Josseaume, A., Nsafu, D.N., Galois-Guibal, L. and Carpentier, J.P. (2003) Les urgences chirurgicales au centre hospitalier de Libreville. *Annales Françaises d'Anesthésie et de Réanimation*, **22**, 189-195.
[https://doi.org/10.1016/S0750-7658\(03\)00008-X](https://doi.org/10.1016/S0750-7658(03)00008-X)
- [27] Leppäniemi, A. (2013) What Is Acceptable Delay in Emergency Abdominal Surgery? *Scandinavian Journal of Surgery*, **102**, 54.
<https://doi.org/10.1177%2F1457496913490615>
- [28] Diaz Jr., J.J., Bokhari, F., Mowery, N.T., Acosta, J.A., Block, E.F., Bromberg, W.J., *et al.* (2008) Guidelines for Management of Small Bowel Obstruction. *Journal of Trauma: Injury, Infection, and Critical Care*, **64**, 1651-1664.
<https://doi.org/10.1097/TA.0b013e31816f709e>
- [29] Fevang, B.T., Jensen, D., Svanes, K. and Viste, A. (2002) Early Operation or Conservative Management of Patients with Small Bowel Obstruction. *European Journal of Surgery*, **168**, 475-481. <https://doi.org/10.1080/110241502321116488>
- [30] Fevang, B.T., Fevang, J., Stangeland, L., Soreide, O., Svanes, K. and Viste, A. (2000) Complications and Death after Surgical Treatment of Small Bowel Obstruction: A 35-Year Institutional Experience. *Annals of Surgery*, **231**, 529-537.
<https://doi.org/10.1097/0000658-200004000-00012>
- [31] Ngowe, N.M., Mahop, J.B., Atangana, R., Eyenga, V.C. and Sosso, A.M. (2008) Aspects cliniques actuels des appendicites aiguës de l'adulte à Yaoundé, Cameroun. *Bulletin de la Société de Pathologie Exotique*, **101**, 398-399.
- [32] Sambo, T.B., Hodonou, M.A., Allode, S.A., Mensah, E., Youssouf, M. and Menhinto, D. (2016) Aspects Épidémiologiques, Diagnostiques Et Thérapeutiques Des Traumatismes Abdominaux À Bembéréké-Nord Bénin. *European Scientific Journal*, **12**, 395-405. <https://doi.org/10.19044/esj.2016.v12n9p395>
- [33] Diabaté, A. (2002) Traumatismes Ouverts de l'abdomen dans le service de chirurgie générale et pédiatrique du CHU Gabriel Touré. Thèse de Med, Faculté de Médecine de Pharmacie et d'Odonto Stomatologie, Bamako.
- [34] Rasamoelina, N., Rajaobelison, T., Ralahy, M.F., *et al.* (2010) Risk Factors of Mortality by Urgent Digestive Affections in the Intensive Care Unit of the Teaching Hospital of Fianarantsoa Madagascar. *Revue d'Anesthésie-Réanimation et de Médecine d'Urgence*, **2**, 10-11.