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The Epidemiological Profile of Acute Peritonitis and Sensitivity to Antibiotics, about 167 Cases, in the General Surgery Department of the Amissa Bongo Regional Hospital Center in Franceville, Gabon

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Abstract

The objective of this study is to determine the epidemiological, clinical, paraclinical, therapeutic aspects, and the sensitivity to antibiotics for acute peritonitis at CHRAB Franceville. This was a prospective, descriptive and analytical study, between September 2015 and December 2021. Generalized acute peritonitis was one of the digestive surgical emergencies. There were 167 patients operated on for acute peritonitis, including 116 men (69.46%) and 51 women (30.34%). The majority of patients came from Franceville (n = 62) 37.12%. The average age was 33.4 years (extreme 4 years and 75 years). The admission time was on average +6.15 or −6.54 hours. The main etiology was acute appendicitis with (n = 122) 73.05%, followed by gastric perforations (n = 26) 15.56%, bowel perforations (n = 5) 2.99%. Some post-surgical cases (n = 4) 2.39%. Biological examinations found: hyperleukocytosis in 64.67% of cases, anemia in 52.9% of cases, and hematocrit down in 28.3% of cases. Ultrasounds found 17.36% peritoneal effusions and 12.57% acute appendicitis. The abdomen without preparation revealed 13.17% cases of pneumoperitoneum. Anatomy pathology found acute appendicitis, gastroduodenal ulcers, peritoneal tuberculosis, and peritoneal carcinomatosis. Biliary drainage choledotomy with Kher drain, supernumerary spleen splenectomy, hysterectomy. The average duration in intensive care was 6.5 days with extremes of 5 to 10 days.

The average stay in inpatient surgery was 10.8 days. Isolated or combined antibiotic therapy was the rule. Postoperative follow-up at 1 month was systematic. Parietal suppuration was the main complication. We had recorded 2 cases of fistula and 4.19% of deaths.

Keywords

Peritonitis, Etiologies, Laparotomy, Germs, Susceptibility Antibiotics

1. Introduction

Acute generalized peritonitis is defined as a sudden and diffuse inflammation of the peritoneal serosa of bacterial or chemical origin. Peritonitis is classified as primary or primitive, secondary and tertiary, with secondary peritonitis being by far the most common [1]. It is a life-threatening emergency requiring hospitalization and rapid therapeutic management [2]. In our region, few studies have been carried out on acute peritonitis, hence the interest of this work. The objectives were to determine the clinical, epidemiological, paraclinical therapeutic aspects, and the susceptibility to antibiotics of acute peritonitis at CHRAB Franceville.

2. Materials and Methods

This study took place in the general surgery department of the Amissa Bongo regional hospital center in Franceville and the biochemistry research laboratory of the University of Technical Sciences of Masuku. It is located in the city of Franceville, capital of the province of Haut Ogooué, in the South East of Gabon (675 km from Libreville). This was a prospective, descriptive and analytical study of acute peritonitis operated on in our department (between September 2015 and December 2021). Patients were informed that participation is completely voluntary, and written consent was obtained from each participant before being subjected to the questionnaire and after discussing the objective with the participants. No names were recorded on the questionnaires. Adequate training of data collectors took place to ensure the protection of confidentiality, and all questionnaires were kept safe. Patient information included demographic information (names, age, sex), general clinical data on admission pathologies, and clinical history. A total of 167 were operated in this study. We have collected each patient, the epidemiological profile, the clinical particularities, biological, radiological, and therapeutic. The inclusion criteria were data collected from registers, complete files and patients operated on for acute peritonitis during this period. The criteria for non-inclusion were incomplete records and patients not hospitalized, not operated on, open abdominal trauma, deceased arrivals, and those who refused to participate in this study. Data collection and processing: medical data, registers, operating reports, individual survey sheets, Word and Excel software. Data analysis was performed using Epi info version 6.0 software. The probability

test: we used the Chi2 test with a significance level of $p < 0$. The following data were collected: epidemiological, clinical, surgical data, determined from the operating reports. Evolutionary data: duration of follow-up, short- and long-term complications.

3. Results

3.1. Epidemiological Aspects

From September 2015 to December 2021, acute peritonitis accounted for 167 cases. All the patients had been operated on. They were 116 men (69.47%) and 51 women (30.53%) (Figure 1). The majority of patients came from Franceville (n = 62) 37.12% followed by Moanda-Sucaf (n = 53) 31.73%, Akiéni-Ngouoni (n = 11) 6.58%, Okondja (n = 6) 3.59%, KoulaMoutou-Lastourville (n = 14) 3.61%, Léconi (n = 11) 6.58%, Bakoumba (n = 2) 1.19%, Bongoville (n = 3) 1.79%, Mounana (n = 2.99) 1.19%, In our series 37.72% (n = 63) were aged between (0 - 19 years), 36.53% (n = 61) were aged between (20 - 39 years old), 23.95% (n = 40) were between (40 - 59), 1.8% n = 3 were between (60 - 79) and the average age was 33.4 years (extremes between 4 years and 75 years) (Figure 2). The insured patients represented CNAMGS (n = 122) 73.05%, the uninsured and others (n = 45) 26.95%. Some had a history of peptic ulcers, taking anti-inflammatory drugs, taking poisonous medicinal plants.

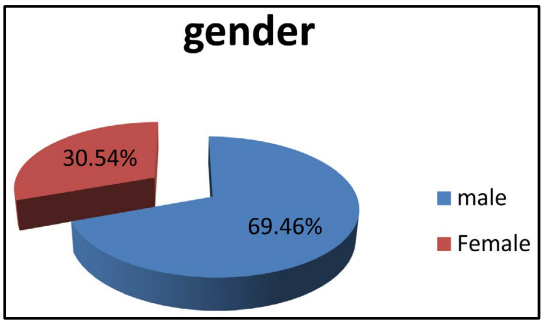

Figure 1. Gender distribution.

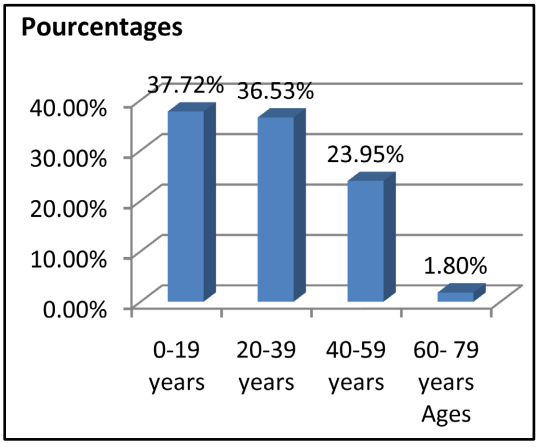

Figure 2. Breakdown by age.

3.2. Diagnostic Aspects

Patients were referred by medical transport (ambulances, Samu, firefighters) 23%, and non-medical transport 87%. Admission time was on average 6.15+ or −6.54 hours (extremes of 1 hour to 7 days). Abdominal pain was the constant sign found in all our patients (88% generalized pain and 12% localized pain. Vomiting was found in 56 patients (33.53%), 11 presented transit disorders (6.58%), 15 patients (8.98%) were in shock, 23 patients (13.77%) with anemic syndrome. Fever was found in 119 patients (71.25%), and 24 patients presented with a deterioration in general condition (14.37%). Abdominal contracture was found n = 132 (79.04%), abdominal defense n = 32 (19.16%), normal abdominal palpation n = 3 (1.79%) The main etiology was acute appendicitis with (n = 122) 73.05%, followed by gastric perforations (n = 23) 13.77%, small colon perforations (n = 8) 4.79%, pelviperitonitis (n = 6) 3.59% (Figure 3), traumatic rupture of spleen n = 3 (1.79%) and postoperative (wound of the common bile duct, strangulated hernia, caesarean section and others) (n = 5) 2.99% (Table 1). Other lesions had been found in particular: occlusions, pleurisy, parietal suppuration. Patients in an unstable hemodynamic state represented (n = 76) 45.50% and in a stable hemodynamic state (n = 91) 54.49%. It had been found certain grounds, in particular diabetics, sickle cells, AIDS.

Figure 3. Pelviperitonitis of appendicular origin (image Offobo).

Table 1. Breakdown by etiology.

Etiology	Numbers	Percentages
Acute appendicitis	122	73.05%
Gastric perforations	23	13.77%
Perforation of hailstone-colon	8	4.79%
Pelvi peritonitis	6	3.6%
Secondary spleen rupture	3	1.80%
Biliary peritonitis	1	0.6%
Postoperative peritonitis	4	2.39%
Total	167	100%

Biological examinations found: hyper leukocytosis in 64.67% of cases, anemia in 52.9% of cases, hematocrit down in 28.3% of cases. The blood groups found A negative (n = 14), A positive (n = 21), O positive (n = 79), B positive (n = 30), O negative (n = 2), and AB positive (n = 21). He had found functional renal insufficiency, hepatic insufficiency, disorders of blood crasis. The germs isolated in our study were: 17 bacterial species were isolated and identified from the peritonitis of our patients, 14 Gram-negative bacteria and 3 Gram-positive strains. For Gram-negative bacteria, the species isolated were Escherichia coli (n = 2), *Enterobacter aerogenesa* (n = 2), *Enterobacter cloacae*, *Yersinia enterolitica*, *Citrobacter kosei*, *Proteus penneri*, *Klebsiellaoxytoca*, *Klebsiella pneumonia* ssp, *Serratia odorifera*, *Stenotrophomonas maltophilia*, *Pseudomonas* spp and *Acinetobacter baumani*. On the other hand, Gram-positive bacteria, *Staphylococcus aureus* (n = 2) and *Streptococcus* ssp are the two isolated strains. The main bacterial species isolated were Escherichia coli, *Staphylococcus aureus*, *Enterobacter aerogenesa* (Table 2).

Ultrasounds found 17.36% peritoneal effusions and 12.57% rosette images. The abdomen without preparation revealed 13.17% cases of pneumoperitoneum. Anatomy pathology found appendicitis, gastrointestinal duodenal glands, peritoneal tuberculosis, and peritoneal carcinomatosis.

Table 2. Families, genera, species and Gram strain of bacteria isolated from wound suppuration.

Families	Genera	Species s	Gram
	Citrobacter	*Citrobacter koseri*	–
	Yersinia	*Yersinia enterolitica*	–
Enterobacteriaceae	*Enterobacter*	*Enterobacter aerogenesa* (n = 2)	–
		Enterobacter cloacae	–
	Escherichia	*E coli* 2	–
		E coli 1	–
	Proteus	*Proteus penneri*	–
	Klebsiella	*Klebsiella oxytoca*	–
		Klebsiella pneumonia ssp *pneumoniae*	–
	Serratia	*Serratia odorifera*	–
Xanthomonadaceae	*Stenotrophomonas*	*Stenotrophomonas maltophilia*	–
Pseudomonadaceae	*Pseudomonas*	*Pseudomonas* spp	–
Moraxellaceae	*Acinetobacter*	*Acinetobacter baumanii*	–
Staphylococcaceae	*Staphylococcus*	*Staphylococcus aureus* (n = 2)	+
Streptococcaceae	*Streptococcus*	*Streptococcus* spp	+

3.3. Therapeutic Aspects

We had undertaken initial hydro-electrolytic resuscitation measures. In our series, 83.1% of patients had been transfused intraoperatively with an average of 1.2 blood bags. In our study, all peritonitis had been treated with ciprofloxacin, ofloxacin, gentamycin, metronidazole alone or with combinations (Table 3). Midline laparotomy was performed in all cases, followed by treatment of the cause and drainage systematic. We recorded 2 cases of white laparotomy with peritoneal carcinomatosis and one case of peritoneal tuberculosis. The following organs were affected: appendages, stomach, hail, colon, ovaries, and spleen. We performed: appendectomies, splenectomies, gastric sutures and biopsies, Bouilly Wolkman ileostomy, colostomy, small bowel and colon suture, bile duct drainage

Table 3. Sensitivity of antibiotics.

Bacteria	amoxycilline	ceftriaxone	ciprofloxacine	Métronidazole	ofloxacine
Citrobacter koseri	R	R	R	R	R
Acinetobacter baumanii	R	R	S	R	S
Yersinia enterolitica	R	R	S	R	S
Enterobacter aerogenes	R	R	R	R	S
E. coli 2	R	R	S	R	S
Staphylococcus aureus	R	R	S	R	S
Proteus penneri	R	R	S	R	R
Klebsiella oxytoca	R	R	S	R	S
Serratia odorifera	R	R	S	R	S
Sténotrophomonas maltophilia	R	R	S	R	S
Enterobacter cloacae	R	R	R	R	R
E. coli 1	R	R	R	R	R
Pseudomonas spp	R	R	S	R	S
Streptococcus	R	R	R	R	R
klebsiella pneumonia ssp *pneumoniae*	R	S	S	R	S
Staphylococcus aureus	R	R	S	R	S
Resistance rate	100%	93.75%	31.25%	100%	31.25%

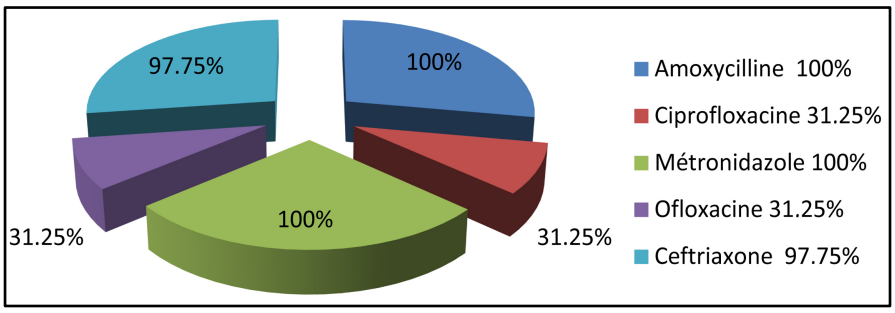

Figure 4. Frequency of resistance of isolated strains.

with Kher drain, supernumerary spleen splenectomy, hysterectomy. All patients were admitted to intensive care postoperatively. The average duration in intensive care was 6.5 days with extremes of 5 to 10 days. The stay in hospitalization surgery was on average 10.8 days with a case of covid 19 of 45 days of hospitalization. All patients had received antibiotic therapy: ciprofloxacin, ofloxacin, gentamycin, metronidazole isolated or with combinations (**Figure 4**). Postoperative follow-up at 1 month was systematic. Parietal suppuration was the main complication. We had recorded 2 cases of fistula and 4.19% of deaths.

4. Discussion

This prospective study was carried out from September 2015 to December 2021 and highlighted difficulties in data collection. Secondary peritonitis is by far the most frequent [1]. It constitutes a life-threatening emergency requiring hospitalization and rapid therapeutic management [2]. In our serie, there was a male predominance of young adults whose average age was 33.4 years. We deduce that our results agree with those of the literature and that acute peritonitis essentially affects young subjects [3]. In our serie, 64.08% of our patients come from a socio-economic level low, with the notion of taking anti-inflammatories, tobacco and alcohol, which matches the data from the Sikasso Hospital in Mali [4].

The diagnosis of acute peritonitis is essentially clinical and is based on clinical signs (abdominal pain, vomiting, transit disorders, abdominal contracture, and abdominal defense) which vary according to the etiology and duration of evolution of peritonitis [5]. The paraclinical examinations contribute to the management by specifying the cause and the repercussions of the peritonitis. But their absence does not eliminate the diagnosis, as demonstrated by these authors [6]. CT scan and abdominal ultrasound are of diagnostic interest in doubtful cases by showing an intraperitoneal effusion, and by specifying the etiology as demonstrated by these authors [7] [8]. In our series, appendicular peritonitis was the first etiology and a low rate of genital peritonitis. For some authors, ileal perforation comes first, followed by appendicular perforation [9] [10].

In our serie, the main bacterial species isolated were Escherichia coli, *Staphylococcus aureus*, *Enterobacter aerogenesa*. The other authors had found strains of enterobacteriaceae (*Enterobacter*, *Serratia*, *Citrobacter*) or *Acinetobacter* sp. use of broad-spectrum molecules. Other authors demonstrate the increased frequency of methicillin-resistant *Staphylococcus aureus* infections [11] tertiary level university in Sindh [12]. It is a common cause of infectious bowel perforation in our countries, favored among other things by unfavorable socio-economic conditions. Jejuno-ileal perforations are relatively rare as a source of peritonitis in the Western world compared to African and Asian countries [13]. Biliary and pancreatic pathology and colonic perforations (sigmoiditis or complicated cancer), the main etiologies of peritonitis in Europe, are only rarely encountered in the tropics [14].

The medical treatment before the surgery was the first resuscitation (analge-

sia, antibiotic therapy, rehydration, and antibiotic therapy) must start at the phasepreoperative. It is based on knowledge of the germs in question according to the anatomical site of the peritonitis. The number and type of germs gradually increase from the stomach to the colon [15]. In our study, all peritonitis had been treated with ciprofloxacin, ofloxacin, gentamycin, metronidazole alone or with combinations. This is different from the consensus established by the French Consensus Conference where the bacterial ecology is different. It may then be justified to have recourse to other molecules, in particular: Piperacillin/tazocillin, Cefixime + imidazole, Imipenem, variable according to the severity of the initial picture and the patient's condition [16]. Probabilistic antifungal treatment could therefore be started in subjects whose direct examination of the peritoneal fluid finds the presence of yeasts, in the event of prior antibiotic therapy, and in the event of postoperative infection [17]. Indeed, the surgical act should not be delayed by preoperative resuscitation. The long preoperative resuscitation delay leads to a delay in surgical management, which favors the aggravation of pre-existing multi-visceral failures [18]. Despite the great progress of resuscitation and intensive care, antibiotic therapy and surgical techniques, the management of peritonitis remains very complex and represents a challenge for clinicians [17]. With a mortality rate of 20%, peritonitis represents a dominant cause of death due to postoperative infection [19]. Post-operative complications can occur, including wall abscess, evisceration, post-operative peritonitis, fistulas, gastroduodenal stenosis, digestive bleeding, and septic shock. It is close to that found by Tchaou B.A *et al*. in a study carried out at the University Hospital of Parakou in Benin 19% [10]. In Africa, this rate varies between 13.5% and 46% [20] [21]. The value we found is close to that found by Harouna YD *et al*. at the Niamey hospital in Niger: 46% [6], whereas Dieng M *et al*. found 31.4% [22]. Mortality in our series of peritonitis remains high at 4.19% for all etiologies. Age and cardiac, pulmonary, diabetic, hepatic, renal, neoplastic, and immune history are also important prognostic factors. Biological disorders have a poor prognosis. Antibiotic therapy was probabilistic at the start in our environment, the culture and antibiogram of the peritoneal fluid would be essential to properly conduct antibiotic therapy according to the sensitivity of the isolated germs. This would reduce the occurrence of complications as much as possible and improve the outcome of treatment. This examination has become ideal in our practice. The alternative would be to further isolate the common germs involved in our environment.

5. Conclusion

Acute peritonitis is a life-threatening and severe emergency. They remain a public health problem due to their high frequency. The etiologies are multiple and varied, the prognosis depends on the etiology, the precocity of the treatment, the terrain, and the age. Surgery is the rule, associated with specific anti-biotherapy. Acute peritonitis requires hospitalization and rapid multidisciplinary therapeutic

management. The study focused on the bacteria frequently identified and isolated from peritonitis in our service and showed a high frequency and a predominance of *Escherichia coli*, *Enterobacter aerogenes*, and *Staphylococcus aureus*. The sensitivity of the bacteria to tested antibiotics showed a high level of resistance to aminopenicillins, but good sensitivity was observed with Ciprofloxacin and Ofloxacin. The emergence of multiresistant bacteria is a public health problem. The rationalization of prescriptions, rigor in community pharmacies, and the rational use of antibiotics are essential to avoid the appearance of resistance phenomena.

Conflicts of Interest

The authors declare that they have no conflicts of interest in relation to this article.

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