

Anesthesiological Management of Acute Generalized Peritonitis at Chu Kara

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Abstract: The aim of our work was to make an inventory of the anesthesiological management of acute generalized peritonitis at the CHU-Kara. To determine the frequency of acute generalized peritonitis; to describe their treatment in pre, per and postoperative; to analyze the postoperative follow-up. This work was a retrospective descriptive study carried out on the files of patients operated for acute generalized peritonitis from November 1, 2019 to October 31, 2020. The study was performed in the surgical resuscitation department and in the operating room. Fifty-eight cases of generalized peritonitis were selected for the study. Peritonitis represented 27.8% of abdominal surgical emergencies. The patients were male dominated with a mean age of 29.6 years. The average consultation time was 3.5 days. Fever was the predominant clinical sign on admission (72.4%). The average duration of preoperative resuscitation was 17 hours and 18 minutes. The combination of Ceftriaxone and Metronidazole was the most used antibiotic therapy. General anesthesia was standard. Spinal anaesthesia was the second technique used. Preoxygenation was systematic for general anesthesia. Pancuronium (72.2%) was the most used curare. The average duration of anesthesia was 105 minutes. Laparotomy, peritoneal cleansing and drainage were performed in all patients, followed by excision-suture of the stomach (43.1%). Peritonitis due to peptic ulcer perforation predominated (43.1%) followed by typhoid perforation of the small intestine (24.1%). The morbidity rate was 41.4%, dominated by parietal suppurations (15.5%). The mortality rate was 8.6%. The average length of stay in intensive care was 8.7 days. The anesthesiological management of acute peritonitis remains a real challenge for anesthesiologists, given the major volume disturbances, the delay in diagnosis with its corollary of septic shock, and the lack of qualified personnel with which they are faced. Peritonitis is a real public health problem because of its still very high mortality. It was carried out with insufficiencies related to the poverty of the population, the inexistence of universal health insurance, the insufficiency of the technical platform and the insufficiency of organization.

Keywords: Anesthesiology, Acute Generalized Peritonitis, Treatment, CHU-Kara, Togo

1. Introduction

Peritonitis is an acute inflammation or infection of the peritoneal serosa, most often secondary to the perforation of a digestive organ and/or the spread of an intra-abdominal septic focus [1].

It remains a public health problem in Africa in terms of

morbidity and mortality [1].

It is the third most common emergency in digestive surgery in Africa after occlusions and acute appendicitis [2].

The management of this pathology combines standard resuscitation measures with systematic emergency surgical eradication of intraperitoneal infectious foci [1].

In Europe and the USA, progress has been made in the

anesthetic management of increasingly fragile patients with more severe lesions, with a significant reduction in deaths, thanks to measures and recommendations from learned health societies [3].

In Africa, where the countries have in common the scarcity of qualified anaesthetists, the shortage of structures, adapted drugs and materials and the insufficiency of equipment maintenance [2, 4], the management of acute peritonitis is still marked by a high morbidity and mortality.

In Togo, until now, there has been no study on the anesthesiological management of acute generalized peritonitis. This motivated this work whose aim was to assess the anesthesiological management of acute generalized peritonitis at the University Hospital of Kara by determining the frequency, describing the management and analyzing the operative follow-up.

2. Materials and Methods

2.1. Location of the Study

The study took place in the surgical resuscitation department of the Centre Hospitalier Universitaire de Kara (CHU-Kara), a national reference center in the northern part of Togo with more than one third of the population.

2.1.1. Surgical Resuscitation Service: Infrastructure, Equipment and Organization

The resuscitation department located east of the operating room, had 8 beds, equipped with two multiparametric monitors, one of which was functional, a respirator, a functional defibrillator. It employed one anesthesiologist, three paramedics in anesthesia and resuscitation, including one supervisor of the service, four (4) nurses, four (4) patient guards.

Four teams composed of a nurse, a paramedical in intensive care anaesthesia and a patient guard ensured all the care per day including weekends and holidays every 12 hours.

2.1.2. Operating Room: Infrastructure, Equipment and Organization

It had 3 operating rooms with anesthesia equipment; it employed four anesthesia paramedics, including an operating room supervisor and 6 patient guards, 4 instrument technicians and about ten surgeons for scheduled activities and emergencies. Organizationally, three paramedical anesthetists worked every 72 hours and the OR supervisor every working day.

2.2. Study Method

This was a retrospective descriptive and analytical study carried out on the records of patients managed for acute generalized peritonitis. Data collection was carried out from February 23 to March 8, 2021 (two weeks).

2.2.1. Sample

It concerned the records of patients treated for generalized acute peritonitis at CHU-Kara from November 1, 2019 to

October 31, 2020.

(i). Inclusion Criteria

Were included the records of patients of any age and both sexes operated on for acute generalized peritonitis from November 1, 2019 to October 31, 2020.

(ii). Non-Inclusion Criteria

All patients with localized peritonitis or acute generalized peritonitis not operated on (patients who discharged due to lack of financial means or death before surgical management) were not included in the study. Records of patients operated for acute generalized peritonitis without an anesthesia record were not included.

2.2.2. Data Collection

(i). Collection Method

The supervisors of the intensive care and general surgery units made patient records available to us.

We observed and described the structures of the surgical resuscitation and the operating room after authorization from the supervisors of two services.

We selected the anesthesia records, the anesthesia charts, the ICU and OR registers of patients operated on for generalized peritonitis with the help of the supervisors and student trainees.

(ii). Means Used

The means used for the collection of data were: the registers of the surgical resuscitation and the operating room, the files of patients from the surgical resuscitation and general surgery, the treatment and monitoring sheets and an individual survey sheet used as a support.

(iii). Studied Parameters

The parameters studied were the following:

Socio-demographic aspects, surgical and anesthesiological aspects, postoperative care and postoperative follow-up.

2.2.3. Data Processing and Analysis

The data collected were entered into a database using EPI Data software version 3.1. The statistical analysis was done with Microsoft office Excel version 2013.

2.2.4. Ethical Considerations

An official authorization note was obtained from the management of the CHU-KARA allowing access to medical records. The anonymity of the medical records was respected.

3. Results

3.1. Socio-Demographic Data

3.1.1. Frequency of Acute Generalized Peritonitis

During the study period, 209 surgical abdominal emergencies were recorded, including 58 generalized peritonitis (27.8%).

3.1.2. Age of the Patients

The average age was 29.6 years with extremes of 6 and 67 years.

3.1.3. Sex of the Patients

Thirty-seven (37) patients (63.8%) were men and 21 patients (36.2%) were women with a sex ratio of 1.8.

3.1.4. Main Activities of Patients

Farmer 13 cases (22.4%); Schoolboy 10 cases (17.2%); Farmer 7 cases (12.1%); Housewife 7 cases (12.1%); Shopkeeper 6 cases (10.3%); Civil servant 4 cases (6.9%); Worker 3 cases (5.2%); Other individuals 8 cases (13.8%).

3.1.5. Origin of the Patients

Rural area 35 (60.3%); urban area 21 (36.2%); other country 2 (3.5%).

3.1.6. Hour to Admission

The average admission time was 84 hours (3.5 days) with extremes of 9 hours and 6 days.

3.1.7. Mode of Admission

Referred 39 cases (67.2%); received in consultation 17 cases (29.3%); referred 2 cases (3.5%).

3.1.8. Treatment Received Before Admission

Analgesics 24 cases (41.4%); antimalarials 18 cases (31%); antibiotics 13 cases (22.4%); 13 cases ignored; 8 cases with herbal infusion (13.8%).

3.2. Diagnostic Aspects

3.2.1. Clinical Signs

Table 1. Distribution of patients according to clinical examination signs on admission.

	Number	Percentage
Hyperthermia	42	72.4
Tachycardia	34	58.6
Polypnea	26	44.8
Oliguria	18	31
Pale conjunctiva	16	27.6
Altered consciousness	10	17.2
Hypotension	4	6.9

3.2.2. Paraclinical Examinations

Table 2. Distribution of patients according to paraclinical examinations performed.

	Number	Percentage
Rhesus grouping	58	100
Uremia + Blood glucose + Creatinine	58	100
CBC*	58	100
ASP**	54	91.4
Abdominal ultrasound	16	27.6
Blood ionogram	6	10.3
Hemostasis workup	4	6.9

CT was not performed*: Blood cell count; **: X-ray of the abdomen without preparation.

3.2.3. Etiological Aspects

Table 3. Distribution of patients according to the etiology of the peritonitis.

	Number	Percentage
Gastric ulcer perforation	25	43.1
Typhoid perforation	14	24.1
Appendicular	10	17.2
Genital	7	12.1
Diverticular	2	3.4
Total	58	100

3.3. Preoperative Resuscitation

3.3.1. Fluid and Energy Intake

ISS 0.9% 58 cases (100%); LR 35 cases (60.3%); SGH 10% 27 cases (46.6%); SGI 5% 10 cases (17.2%).

3.3.2. Oxygenation

The percentage of patients oxygenated preoperatively was 19%.

3.3.3. Transfusion

Two (3.4%) patients received a transfusion of two bags of packed red blood cells each.

3.3.4. Probabilistic Antibiotic Therapy

51 patients (87.9%) received Ceftriaxone + Metronidazole; 4 patients (6.9%) Ceftriaxone + Metronidazole + gentamycin; 3 patients (5.2%) Ciprofloxacin + Metronidazole.

3.3.5. Duration of Preoperative Resuscitation

The average duration of preoperative resuscitation was 17 hours and 18 minutes with extremes of 4 and 50 hours.

3.4. Perioperative Period

3.4.1. Type of Anesthesia

General anesthesia plus orotracheal intubation was performed in 54 (93.1%) patients. Four (6.9%) patients had received spinal anesthesia.

(i). Preoxygenation

Preoxygenation was systematic. It was performed in all patients (100%).

(ii). Premedication

Atropine + Diazepam + Fentanyl 21 (36.2%); Atropine + Fentanyl 19 (32.8%); Atropine + Diazepam 11 (19.0%); Atropine 5 (8.6%); Fentanyl 2 (3.4%).

(iii). General Anesthesia Induction Protocol

Pancuronium 39 cases (67.2%); Propofol 31 cases (53.4%); Fentanyl 30 cases (51.7%); Ketamine 23 cases (39.7%); Forene 10 cases (17.2%); Rocuronium 5 cases (8.6%).

(iv). General Anesthesia Maintenance Protocol

Fentanyl 39 cases (67.2%); Propofol 32 cases (55.2%); Forene 10 cases (17.2%); Ketamine 7 cases (12.1%); Rocuronium 2 cases (3.4%).

3.4.2. Protocol of Locoregional Anesthesia (Rachianesthesia)

Bupivacaine was administered in two (3.4%) patients and

the combination of Bupivacaine and Morphine in two other (3.4%) patients.

3.4.3. Duration of Anesthesia

The average duration of anesthesia was 1 hour 45 minutes with extremes of 1 hour and 3 hours 45 minutes.

3.4.4. Intraoperative Complications

There were no intraoperative complications.

3.4.5. Surgical Treatment

Table 4. Distribution of patients by surgical treatment.

	Number	Percentage
Excision + suture of the stomach	25	43.1
Excision + suture of the small intestine	11	19
Appendectomy + lavage + drainage	10	17.2
Laparotomy + washing + drainage	6	10.3
Resection + ileal anastomosis	3	5.2
Resection + colonic anastomosis	2	3.5
Hysterectomy	1	1.7
Total	58	100

3.5. Postoperative Care

3.5.1. Hydroelectrolyte and Energy Intake

SSI 0.9% 58 cases (100%); Nacl + Kcl 58 cases (100%); SGH 10% 54 (93.1%); RL 10 cases (17.2%).

3.5.2. Antibiotic Therapy

Ceftriaxone+Metronidazole 38 cases (65.5%); Ceftriaxone+Metronidazole+Gentamycin 11 cases (19%); Ceftriaxone+Métronidazole+Ciprofloxacin 6 cases (10.3%); Metronidazole+ Ciprofloxacin 3 cas (5.2%).

3.5.3. Treatment of Postoperative Pain

Paracetamol + Nefopam 39 cases (67.2%); Paracetamol + NSAIDs 9 cases (15.5%); Paracetamol + Nefopam + Morphine 4 cases (6.9%); Paracetamol + Tramadol 3 cases (5.2%).

3.5.4. Antiulcer Treatment

For the prevention of stress ulcers, antiulcer drugs were administered to 27 (46.6%). The most commonly used drug was a proton pump inhibitor (Omeprazole).

3.5.5. Anticoagulant Treatment

Two (2) patients received anticoagulation.

3.5.6. Monitoring

Clinical monitoring included temperature, blood pressure, heart rate, respiratory rate, oxygen saturation, diuresis, nasogastric tube, drain, and the state of the surgical wound, the resumption of transit, the lungs and the heart. This monitoring was performed postoperatively in all patients (100%).

Paraclinical monitoring: this was based on clinical signs. A CBC was performed in 27 (46.6%) patients; a renal assessment in 9 (15.5%) patients; an ionogram in 3 (5.2%) patients.

3.6. Evolution

3.6.1. Early Complications

The postoperative course was complicated in 24 (41.4%) patients with 5 (8.6%) deaths.

3.6.2. Types of Postoperative Complications and Traitement

The seven (12.1%) patients who developed anemia received a packed red blood cell transfusion.

The 9 (15.5%) patients with parietal suppuration received daily dressing.

For the two (3.2%) postoperative peritonitis and the digestive fistula associated with the evisceration, a repeat operation was performed under general anesthesia.

The patient in respiratory distress was oxygenated (6l/min), with a combination of furosemide (80mg) and Betametasone 4mg.

3.6.3. Causes of Death

Two patients died of septic shock associated with anemia.

Other causes of death were hypotension plus respiratory distress, altered consciousness, parietal suppuration plus digestive fistula and evisceration were found in one patient each.

3.6.4. Morbidity and Mortality

The perioperative morbidity rate was 41.4%.

The perioperative mortality rate was 8.6%.

3.6.5. Length of Stay in the Intensive Care Unit

The average length of stay in the intensive care unit was 8.7 days, with extremes of 4 and 64 days.

4. Discussion

4.1. Epidemiological Aspects

4.1.1. Frequency of Peritonitis

Peritonitis was the first cause of abdominal surgical emergencies at CHU-Kara with a percentage of 27.8%. This can be explained by the precarious hygiene conditions in our environment, self-medication, delay in consultation at the CHU-Kara and the high frequency of infectious pathologies in surgery. Traoré, Ouangré and Dissa [5-7] made the same observation with 34.9%, 31.2% and 21.14% respectively. This frequency could be linked to the high frequency of infectious diseases (typhoid fever, peptic ulcer) resulting from poor food hygiene and lack of vaccination on the one hand, and a delay in consultation, diagnosis and upstream management of the main diseases involved on the other.

A respect of elementary rules of hygiene and an early consultation would make it possible to considerably reduce this frequency.

4.1.2. Sex

The male sex was the most represented, with a sex ratio of 1.8. This result can be explained by the risk factors to which men are more exposed (smoking, alcohol, non-steroidal anti-inflammatory drugs). The same male predominance was

noted in the studies of Harouna [2], Traoré [5], Dissa [7] and Yacouba [8] with sex ratios of 1.96, 2.1, 2.70 and 3.2 respectively.

4.1.3. Age

The mean age was 29.6 years. This juvenile predominance is characteristic of developing countries. It was similar to those of Dissa [7], Ouangré [6] and Ramachandran [9] with respectively 24, 24.3 and 32 years. However, this age was lower than the 48 years of Cougard [10] in France in 2000.

This disparity is linked to the ageing of the population in France and to the high frequency of pathologies such as complications of appendicitis, perforated gastro-duodenal ulcer and typhoid fever in young subjects in Africa and Asia [7].

4.1.4. Main Activities of the Patients

The majority of patients were farmers (22.4%), followed by schoolchildren (17.2%). This predominance of peasants is linked to their low socio-economic level, the lack of respect for hygiene measures and the absence of health coverage, all of which contribute to delays in consultation and treatment. The same observation was made by Yacouba [8] and Ouangré [6] with 35.7% and 38.5% respectively. While Makita, Traoré and Dissa [11, 5, 7] had a predominance of schoolchildren and farmers in second place. The extension of health insurance to this socio-professional class would reduce the frequency of this disease or its complications.

4.1.5. Origin

The residence and/or origin of the patients was 87.9% in the Kara region. This would be related to the fact that most of the regions of Togo were equipped with a surgical technical platform and qualified personnel capable of effectively managing peritonitis. Few (10.1%) peritonitis cases were referred from other health regions.

4.1.6. Hour to Admission

The average time to consultation for patients was 84 hours (3.5 days). The usual delay in consultation was attributable to cultural and especially economic factors. The lack of knowledge of the seriousness of the disease, self-medication, non-adapted treatments, and the absence of social security coverage in case of illness for the majority of the population were other factors contributing to this delay.

Delayed consultation and insufficient financial resources were the main causes of high morbidity and mortality in health facilities according to Traoré, Dissa and Dembélé [5, 7, 12].

4.1.7. Mode of Admission

The majority of patients received in the emergency room (67.2%) were referred from a peripheral health center to Kara University Hospital. This high rate of referral really testifies to the fact that Kara University Hospital was the reference center because of its technical facilities and qualified personnel for the management of this disease.

This high rate in our context can be explained by the fact that the majority of patients came from peripheral health facilities without surgical branches.

4.1.8. Treatment Received Before Admission

Analgesics (41.4%) and antimalarials (31%) were the main treatments received by patients before admission. This treatment could be explained by the fact that the main symptoms of the disease were fever, pain and asthenia. An additional factor would be the insufficient qualification of the peripheral staff in relation to this pathology.

4.2. Diagnostic Aspects

4.2.1. Clinical Status (Table 1)

Fever, usually high at the onset of symptoms (except in gastric perforations), was the most frequent general sign in our context (72.4% of cases). It is a sign of bacterial contamination. This was similar to the data of Dissa [7] and Yacouba [8] with respectively 81% and 93% of cases.

4.2.2. Para Clinical Evaluation (Table 2)

All patients (100%) had undergone a minimal preoperative workup including Rhesus grouping, uremia, blood glucose, creatinine and a CBC. In emergency, only the white blood cell count and the hemoglobin level were performed.

For etiology, paraclinical examinations were performed: ASP and abdominal ultrasound respectively 91.4% and 27.6%. This disparity observed between the two examinations would be related to the fact that the ASP was the only imaging examination always available in emergency. Dembélé [12], Cougard [10] in France had similar results for the ASP with respectively 88% and 86.8%. For ultrasound Sakhrri [13] and Dissa [7] found higher rates than ours with 75% and 88%.

These results confirm the lack of radiologists at the CHU-Kara on call to perform an emergency ultrasound.

No CT scan was performed because of its non-existence at CHU-Kara, nor in the northern region of the country.

4.2.3. Etiological Aspects (Table 3)

Acute generalized peritonitis due to peptic ulcer perforation was the most common cause of infection (43.1%), followed by ileal perforation of typhoid origin (24.1%) and appendicular peritonitis (17.2%). The high predominance of peptic ulcer perforations could be explained by the lack of knowledge of the population of peptic ulcer and its complications, self-medication with the abusive use of non-steroidal anti-inflammatory drugs.

This predominance of peptic ulcer perforations was also reported in the study by Sarah El A [14]. On the other hand, Ouangré [6] found, in decreasing order of frequency, typhoid perforations of the small intestine, followed by appendicular peritonitis and peptic ulcer perforation.

The high frequency of infectious origins found in the African series testifies to the precarious food hygiene conditions in African populations.

4.3. Therapeutical Aspects

4.3.1. Preoperative Period

(i). Preoperative Resuscitation

In our context, all patients had undergone preoperative

resuscitation. Crystalloids were used for filling and energy supply.

Two patients were transfused with packed red blood cells. Oxygen was administered to eleven (19%) patients.

(ii). Antibiotic Therapy

The combination of Ceftriaxone 100mg/kg/day and Metronidazole 30mg/kg/day was administered in 51 (87.9%) patients, tripled with Gentamycin 5mg/kg/day in 4 (6.9%) patients. The adoption of this antibiotic therapy was due to its efficacy on aerobic and anaerobic germs in generalized peritonitis and to its good intraperitoneal penetration. These same associations were used in the studies by Ouangré [6], Disa [7] and Yacouba [8].

(iii). Average Duration of Preoperative Resuscitation

It was 17h 18 minutes. This result can be explained by the arrangements made by the different anesthetic and surgical teams for the rapid management of surgical emergencies. This delay was lower than the 24 and 25 hours found respectively in the studies of Makita-Ngadi [11] and Sarah [14] but similar to the 16 hours of Disa [7].

Atypical presentations (frustrated forms and asthenic forms), financial problems, delay in referral, and poor clinical condition of patients on admission were factors that increased the duration of resuscitation.

Continuous training of front-line staff in peripheral health facilities would help reduce the duration of preoperative resuscitation.

4.3.2. Perioperative Period

(i). General Anesthesia

General anesthesia plus orotracheal intubation was used in 93.1% of cases.

Premedication was done mainly with Diazepam, Atropine and Fentanyl. These drugs were used alone or in combination. The combination (Diazepam + Atropine + Fentanyl) was administered in 21 (36.2%) patients, followed by the combination (Atropine + Fentanyl) in 32.8%. The premedication performed in our study corresponded well to the standard measures.

Preoxygenation was performed in all patients who received general anesthesia, a practice that is appropriate for all general anesthesia. It was also systematic in the study carried out by Ongoungou [15] and that of Gaye [16].

a. Induction

Pancuronium was the most used drug for induction of anesthesia in 67.2% of patients, followed by Propofol in 53.4% and Fentanyl in 51.7%. Pancuronium was the most used curare due to its availability and affordability in our setting.

Rapid sequence induction was not used at any time. This would be due to the increasing trend to abandon it.

b. Maintenance

Maintenance of general anaesthesia was achieved by administration of Fentanyl in 39 (67.2%) patients, followed by Propofol in 32 (55.2%) and Forene in 10 (17.2%) patients.

In a study carried out by Timbo [17] the anesthesia was

maintained with Fluothane (100%). There are no contraindications to the use of an anesthetic agent, and all can be used. The choice is based more on the patient's comorbidities (cardiac or renal insufficiency).

(ii). Spinal Anesthesia

a. Premedication

One of the four patients who underwent spinal anesthesia was premedicated with Atropine and Diazepam.

b. Spinal Anesthesia Protocol

Bupivacaine alone was administered in two (3.5%) patients as well as the combination of Bupivacaine + Morphine. Bupivacaine is the real local anesthetic while morphine is only an adjuvant. The use of spinal anesthesia in cases of acute generalized peritonitis is a bad practice and should be banned.

(iii). Average Duration of Anesthesia

It was 105 minutes with extremes of one hour and 3 hours 45 minutes. It was a function of the duration of the surgery. This duration can be explained by the short duration of the surgical procedures. Ongoungou [15] and Gaye [16] had found average durations higher than ours with respectively 158 minutes and 147 minutes. This short duration of anaesthesia compared to the two previous ones would be related to the competence and the surgical speed.

(iv). Intraoperative Complications

No intraoperative complications were found. This was due to the fact that these complications were not reported on the anesthesia charts. This bad practice is the responsibility of the paramedics who omitted to notify them after anesthesia and interventions.

(v). Interventions Performed (Table 4)

Peritoneal cleansing and drainage were performed in all patients, followed by excision-suture of the stomach which was the most performed surgical procedure with 43.1%, followed by excision-suture of the small intestine 19%. This was related to the fact that peritonitis due to peptic ulcer perforation was in the majority in our context. This treatment is similar to that of Dembélé [12] and Sarah [14] in whom suture of the stomach was also the first line of treatment with respectively 45% and 51.4%. The therapeutic attitude to acute peritonitis depends on the surgeon's intraoperative assessment. Excision-suture of the stomach would be particularly effective for perforations of peptic ulcers.

4.3.3. Post-Operative Care

(i). Fluid and Energy Intake

Postoperative fluid and electrolyte intake consisted of 0.9% saline in combination with NaCl and KCl in all patients (100%), lactated Ringer's in 17.2% of cases. For energy intake, 10% glucose was administered in 54 (93.1%) patients. These intakes were well adapted to the classical regimens.

Postoperative pain management was ensured with analgesics (level I, level II, level III) and NSAIDs. Paracetamol + Nefopam was the most commonly used

combination in 39 (67.2%) patients, followed by Paracetamol + NSAID (15.5%). Postoperative analgesia was analgesia was provided by Paracetamol, Nefopam and/or Tramadol in the series of Gaye [16]. In Touré, on the other hand, Morphine was used with or without Paracetamol for patients hospitalized in the ICU. Postoperative analgesia was multimodal.

(ii). Antiulcer Treatment

Treatment of peptic ulcer (peptic perforation) was performed as well as prevention of stress ulcer in 27 (46.6%) patients. Antiulcer treatment was performed in all patients in the studies conducted by Cougard [10] and Kafih [18]. Antiulcer treatment is systematic in the management of peptic ulcer perforation peritonitis.

(iii). Surveillance

It was clinical and paraclinical. Postoperative clinical monitoring was based on temperature, blood pressure, heart rate, respiratory rate, oxygen saturation, diuresis, nasogastric tube, drain, status of the surgical wound, resumption of transit, lungs and heart. This monitoring was performed in all patients.

The paraclinics were based on the clinical signs of appeal. It was mainly made of blood count, renal assessment and blood ionogram.

(iv). Anticoagulant Treatment

The prevention of venous thromboembolic complications was ensured by low molecular weight heparins in two (3.4%) patients with risk factors. Gaye [16] in 2016 had found 27.9%.

(v). Antibiotic Therapy

Postoperative antibiotic therapy was identical to that administered preoperatively. It was modified in only 13 (22.4%) patients by adding Gentamycin to the initial regimen. There was no culture of peritoneal fluid. This same observation was made by most African authors such as de Ngatcha [19], Cissé [20] and Harouna [2]. Antibiotic therapy combining Ceftriaxone, Metronidazole and Gentamycin was used in these African series according to its efficacy on the aerobic and anaerobic bacteria frequently encountered in these environments.

The insufficiency of the technical platform had made it impossible to culture the peritoneal fluid for the isolation of germs and the establishment of an antibiogram.

4.4. Evolution

4.4.1. Postoperative Complications

(i). Parietal Suppuration

This was the most frequent complication with a rate of 15.5%. The low frequency of parietal suppuration in our context could be explained by the aseptic conditions observed intraoperatively and during postoperative care and the systematic antibiotic therapy. This finding was similar to most African series, such as those of Harouna, Traoré and

Dembélé [2, 5, 12] with rates varying from 18% to 23%. Early consultation and management under better aseptic conditions would contribute to further reduce the frequency of parietal suppuration.

(ii). Postoperative Peritonitis

It represented 3.4% of cases. Postoperative peritonitis was related to suture release and uterine perforation. This rate was similar to that of Sambo [21] and Ouangré [6] who found 3.8% and 4.1% respectively. They are rare but dreadful because of their poor prognosis with a mortality rate of around 70% [22], hence the need for good postoperative monitoring for diagnosis and early management.

(iii). Respiratory Distress

In one of the patients, multivisceral failure was related to sepsis.

4.4.2. Treatment of Postoperative Complications

The seven (12.1%) patients who developed anemia each received adult bags of packed red blood cells.

The 9 (15.5%) patients with parietal suppuration received a daily dressing.

The two (3.2%) postoperative peritonitis and the digestive fistula associated with the evisceration were reoperated in the OR under general anesthesia. The evolution after recovery was favorable for the two cases of postoperative peritonitis, but the fistula led to death.

The patient in respiratory distress had benefited from the administration of oxygen, diuretic and corticoid with an unfavorable outcome marked by death.

4.4.3. Morbidity and Mortality

(i). Morbidity

The postoperative course was complicated in 24 (41.4%) patients. This high morbidity was associated with the high morbidity of acute generalized peritonitis of typhoid origin and gastroduodenal ulcer perforation, and the hypovolemic and septic shock states associated with these conditions. These data were comparable to the 46% and 40.2% of Harouna [2] and Ouangré [6]. Lower morbidities were reported by Dembélé [12] and Dissa [7] 13.5% and 21%. The management of patients at an advanced stage of the disease, associated with insufficient financial resources of the parents, were the main factors favoring the disease.

(ii). Mortality

Perioperative mortality was 8.6%. It was related to the delay in consultation and management, the lack of qualified personnel and the insufficient financial resources of the parents. The mortality rate was not different from those of Kassegné [23] in Kara and Traoré [5] in Mali. It was higher than 1% in Cougard [10] in France. The factors associated with death were septic shock, hypovolemic shock and polyvisceral failure reported by other authors such as Harouna and Yacouba [2, 8]. Laparotomy surgery practiced in most of our African contexts should be progressively

replaced by laparoscopic surgery because of its low morbidity and mortality rate [7].

(iii). Length of Stay in Intensive Care

The average length of stay in the intensive care unit was 8.7 days with extremes of 4 days and 64 days. This duration was influenced by postoperative complications such as parietal suppuration, digestive fistula, evisceration, postoperative peritonitis and sepsis. It varied according to the etiologies. It was 6.8 days for appendicular peritonitis; 14.8 days for gynecological peritonitis; 7.4 days for peptic ulcer perforation; 9.5 days for diverticular perforation; and 9.2 days for typhoid perforation. This means that the etiology has a significant impact on the duration of postoperative resuscitation. The higher the degree of sepsis of the peritonitis, the longer the postoperative resuscitation. Because of their severity, peritonitis should not suffer from a delay in management, which contributes to reducing the length of hospitalization. This was similar to that of Dissa [7] and Mabewa [24] who found 9 days and 7 days respectively. On the other hand, Adesunkanmi [25] and Mehinto [26] found higher figures of 11.6 days and 12 days respectively.

5. Conclusion

The anesthesiological management of acute generalized peritonitis at CHU-Kara from November 1, 2019 to October 31, 2020 revealed:

- 1) The hospital frequency of acute generalized peritonitis of 27.8% in relation to operated surgical emergencies. It was the first cause of surgical emergencies in digestive surgery.
- 2) Young subjects were more affected, with a male predominance.
- 3) Peptic ulcer perforation was the main etiology, followed by typhoid perforation.
- 4) Preoperative resuscitation was performed in all patients and contributed to correct the hydroelectrolytic and energetic disorders, to a probabilistic antibiotic therapy combining Ceftriaxone and Metronidazole.
- 5) Anesthesia for surgery was associated with general anesthesia plus orotracheal intubation, which was the most common, followed by spinal anesthesia.
- 6) Preoxygenation was performed in all patients who received general anesthesia.
- 7) Premedication was combined with Diazepam, Atropine and/or Fentanyl.
- 8) Pancuronium was the most commonly used curare for induction of general anesthesia.
- 9) Bupivacaine was the only local anesthetic used for spinal anesthesia.
- 10) Excision-suture of the stomach was the most common operative technique followed by excision-suture of the small intestine.
- 11) The postoperative care had associated multimodal analgesia, continuation of antibiotic therapy,

administration of antiulcer drugs, vascular filling and energy supply.

12) Postoperative morbidity was 41.4%, dominated by parietal suppurations. Mortality was 8.6%.

13) The main factors of poor prognosis were delayed referral and insufficient financial resources of the parents.

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