

# Peritonitis: Perioperative Care in Surgical Emergencies CHU Ignace Deen

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**How to cite this paper:** Touré, A., Camara, A.Y., Bangoura, A., Camara, M.L. and Okou, M.P.S. (2023) Peritonitis: Perioperative Care in Surgical Emergencies CHU Ignace Deen. *Open Journal of Anesthesiology*, 13, 85-94.

<https://doi.org/10.4236/ojanes.2023.134008>

**Received:** February 16, 2023

**Accepted:** April 27, 2023

**Published:** April 30, 2023

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## Abstract

**Objective:** Describe the perioperative management of peritonitis in surgical emergencies. **Methodology:** This was a prospective observational study of the descriptive type over a period of 12 months from January 01 to December 31, 2020 in the surgical emergency room at the CHU Ignace Deen. Included in the study were all patients admitted for peritonitis aged greater than or equal to 18 years. The parameters were epidemiological, clinical and anesthetic. **Results:** Of the 653 admissions to surgical emergencies in 2020, 185 cases presented with peritonitis, *i.e.* 29.3%. The average age was  $38.6 \pm 16.64$  years with extremes of 18 and 90 years. The sex ratio was 1.89. The comorbidities were dominated by gastritis and hypertension, *i.e.* 22%. The patients were classified as ASA 3U (52.4%), ASA2 U (39.5%) and ASA 4 U (8.1%). Preoperative resuscitation was provided only with 100% saline. 25.5% of patients had received a blood transfusion. The response time was less than 48 hours, *i.e.* 77.6%. General anesthesia was performed for all patients. Ketamine was the most used IV hypnotic (56.3%) combined with 100% halothane. The curares used were suxamethonium at (81.6%), Atracurium (81.6%) and rocuronium at (18.3%). Fentanyl was the only morphine used. Senior anesthesia technicians provided anesthesia in (63.2%). Intraoperative incidents were dominated by hypotension, difficult intubation, cardiac arrest, respectively 10.3%, 8% and 0.5%. The immediate postoperative incidents were arterial hypotension, nausea and desaturation, respectively 52.9%, 80% and 32.4%. Mortality was 3.4%. **Conclusion:** The perioperative management of peritonitis in the emergency room must be as early as possible in order to reduce morbidity and mortality.

## Keywords

Surgical Emergencies, Peritonitis, Anesthesia, Perioperative

## 1. Introduction

Peritonitis, inflammation mainly of infectious origin of the peritoneum, remains one of the most frequent digestive emergencies and one of the leading causes of septic shock (behind pneumonia) [1]. Despite the progress made in their treatment, their morbidity and mortality remain high [2]. In addition, care has become more complex in recent years, due to the aging of the population, the appearance of multi-resistant bacteria (BMR), including in the community [3]. The anesthetic management of peritonitis is one of the pillars of his therapy. It cannot be dissociated from surgery, which remains the only alternative for its management. Peritonitis is one of the digestive surgical emergencies requiring rapid treatment. This makes anesthetic management more complex [4]. Peritonitis occupies a significant place among acute abdominal emergencies in our current practice, the morbidity and mortality linked to this condition, which is not only frequent in addition, involves the vital prognosis by multi-visceral failure. The objective of this study was to write the anesthesiological management of peritonitis in the emergency room of the CHU Ignace Deen.

## 2. Material and Methods

This was a prospective observational, monocentric and descriptive study lasting 12 months from January 1 to December 31, 2020. All patients admitted to surgical emergencies for peritonitis were included. We conducted an exhaustive recruitment of all patients meeting the inclusion criteria. The parameters studied were epidemiological, sociodemographic (age, sex, origin, profession), clinical, paraclinical (complete: blood count, blood ionogram, urea, creatinine, blood grouping, prothrombin time, activated or incomplete partial thromboplastin time: rate of haemoglobin, hematocrit level, blood grouping, bleeding time, coagulation time), imaging and anesthetic (pre, per and postoperative) and evolution, the qualification of the various anesthesia providers. The statistical analysis was exclusively descriptive. The results were expressed in absolute value and in percentage. Data collection was confidential and anonymity respected.

## 3. Results

In 2020, 653 patients were admitted to surgical emergencies for suspected surgical abdomen, we collected 185 cases of peritonitis, *i.e.* 28.3%. Men represented 65.4% of the workforce with a sex ratio of 1.89 (M/F). The average age was 18 and 90 years old. The age groups represented were: 21 to 40 years (51.4%), 41 to 60 years (26.5%) and greater than or equal to 61 years (12.4%). The patients were dominated by traders and those without professions in 26.5% and 25.4% respectively. The origin was rural 56.8% (**Table 1**). Comorbidities were dominated by arterial hypertension and gastritis (22%) respectively. On admission the clinical picture was dominated by an occlusive syndrome (abdominal pain, vomiting, cessation of transit and abdominal distension) at 100%, fever (100%), altered consciousness (52.4%), dehydration (94.6%), Oligo anuria was found in (47.6%),

**Table 1.** Sociodemographic characteristics of patients.

Variables	Workforce (n)	Percentage (%)
<b>Age range</b>		
18 - 20	18	9.7
21 - 40	95	51.4
41 - 60	49	26.5
≤60	23	12.4
<b>Sex</b>		
Male	121	65.4
Feminine	64	34.6
<b>Occupation</b>		
Trader	49	26.5
<b>Unemployed</b>		
Worker	21	11.4
<b>Farmer</b>		
Retired civil servant	22	11.9
Pupil/Student	12	6.5
<b>Origin</b>		
rural	105	56.8
Urban	80	43.2

arterial hypotension (81.6%), tachycardia (87.6%) and desaturation (71.4%). The evolution of symptoms was between 6 and 10 days or 54.5% in 101 patients before admission. The biological assessment was complete in 52.4% of patients against 47.6% of incomplete biological assessment. All patients had undergone a pre-anaesthetic evaluation. The duration of preoperative resuscitation was less than or equal to one day (77.8%). Restoration of blood volume and initial antibiotic therapy were provided with isotonic saline, ceftriaxone 1g associated with metronidazole 500 mg infusion at (100%), red blood cell transfusion was required preoperatively in (25.4%). The time before admission to the block was less than or equal to 24 hours. The patients were classified as ASA 3U (52.4%), ASA 2U (39.5%) and ASA 4U (8.1%). ASP was performed for all patients 100%. General anesthesia was performed at 100%. Anesthesia was provided in 63.2% by senior anesthesia technicians, 28.6% by nurse anesthetists in second- and third-year training and 8.1% by the anesthesiologist-resuscitator.

Ketamine was the most used intravenous hypnotic (56.2%), the most used muscle relaxants were succinylcholine (81.6%) for rapid sequence induction with Sellick maneuver and atracurium (81.6%) for muscle relaxation and rocuronium in 18.3%. Anesthesia was maintained by fentanyl as a morphine and halothane in all patients at 100% (**Table 2**), ventilation was manual at 100%. Intraoperative incidents and accidents were arterial hypotension (10.3%), difficult

**Table 2.** Distribution according to ASA class, function of practitioners and anesthetic products used.

	Workforce (n)	Percentage (%)
<b>Class ASA</b>		
ASA3U	97	52.4
ASA2U	73	39.5
ASA4U	15	8.1
<b>Function of practitioners</b>		
TSA*	117	63.2
IDE (information in anesthesia)	53	28.6
M.A.R**	15	8.1
<b>Hypnotics used</b>		
Kétamine	104	56.2
Propofol	56	30.3
Thiopental	25	13.5
<b>Curares used</b>		
Succinylcholine	151	81.6
Atracurium	151	81.6
Rocuronium	34	18.4
<b>Morphinics</b>		
Fentanyl	185	100
<b>Halogen</b>		
Halothane	185	100

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intubation (8%) and cardiopulmonary arrest (0.5%). Blood transfusion was required intraoperatively in (51.4%) of patients. Vasoactive amines were used such as ephedrine (74.1%) and norepinephrine (57.8%). The etiological diagnoses most frequently found intraoperatively were dominated by appendicular perforation (51.4%), gastric perforation (18.4%), perforation of a volvulus of the colon (8.9%), pelviperitonitis (5.9%), typhoid peritonitis (5.4%), perforation of a sigmoid tumor (4.9%). Intraoperatively, 100% of patients benefited from a sample of peritoneal fluid for bacteriological examination.

Waking up from anesthesia was immediate on the table in 103 patients, *i.e.* (55.5%), 24.3% of patients were admitted to intensive care (all ASA 4U patients, *i.e.* 8.1% and 16.2% of ASA 3U patients). The immediate postoperative incidents and accidents were arterial hypotension (53%), desaturation (32.4%) and delayed awakening 20%. The average duration of anesthesia was 110 min with extremes of 45- and 150-min. Postoperative analgesia was provided by the combination of paracetamol 1 g and tramadol 100 mg 100% injectable. The mortality rate was (3.2%). Among the patients who died three were ASA 4U, two ASA 3U

and cardiac arrest at block.

#### 4. Discussion

This study allowed us to write the anesthesiological management of peritonitis in the surgical emergencies of the CHU Ignace Deen. The prevalence of peritonitis in surgical emergencies in our study was 28.3%. Some authors have reported a higher frequency: 35.2% in 2014 in Chad [5] and Almeimoune A *et al.* 61% in 2018 in Mali [6], Mensah E *et al.* 55% in Benin in 2011 [7]. On the other hand, our results are close to that of Harouna Y *et al.* [8] which is 28.8%. It is lower than that of Gbessi DG and col [9] which is 18.34%. This disparity is linked, on the one hand, to the duration of the study and, on the other hand, to the frequentation of the health structure concerned. More than half of the patients (45.9%) came from rural areas. The average age of our patients was 38.6 years. This result reflects the young age of our population.

All our patients have benefited from a pre-anesthesia evaluation. This result is similar to those of Djanken T *et al.* at the Cocody University Hospital in Ivory Coast [10]. This observation is in accordance with the rules of safety in anesthesia which confers on the pre-anaesthesia examination which is a medico-legal act, obligatory essential before any anesthetic act, as well in the context of emergency as in regulated surgery.

In our study, the occlusive syndrome was found. This result corroborates with those reported by Andrea *et al.* who attest that the diagnosis of peritonitis is essentially clinical and is based on symptoms and clinical signs (spontaneous abdominal pain, abdominal contracture, arrest of intestinal peristalsis and fever) which vary according to etiology and duration of evolution of peritonitis [11].

The majority of our patients were classified as ASA 3U 52.4% and ASA 2U 39.5%. Our results are different from those found by Djankeu *et al.* at the Cocody University Hospital in the Ivory Coast [10] which was 74% patients classified as ASA 1 and 22% ASA 2. It is superimposable to those Mbaye Diaw *et al.* [12] who had found the ASA 2U and ASA 3U patients (42% and 26%).

The management of peritonitis is that of severe sepsis or septic shock. It is based on rapid restoration, within 3 hours, of satisfactory blood pressure ( $MAP \geq 65$  mm Hg). This involves initial vascular filling and the rapid use of vasopressors, with norepinephrine as the first line [13].

In our study, all patients benefited from preoperative volume restoration. This observation was also made by Sartelli M *et al.* [14].

In our study, general anesthesia was the only 100% anesthetic technique. This could be explained by the fact that it is a digestive emergency with a full stomach in hypovolemic and septic patients. In our study, all the inductions were performed in rapid sequence (Crush induction). This result is in accordance with the recommendations of the French society of anesthesia-resuscitation 2002 [15] which consisted in the administration of a hypnotic and a curare of short action. This practice of induction is also the one recommended by the literature for the

practice of general anesthesia in the management of these types of emergencies [16] [17]. This result could be explained by an upgrading of senior anesthesia technicians by the arrival of anesthetist-resuscitators.

In our study, ketamine was the most used hypnotic because of the septic state and instability of our patients. This result was corroborated by data from the literature [18]. The most commonly used curare for induction in this indication was succinylcholine. Succinylcholine remains the only muscle relaxant meeting these specifications and was recommended at the last two consensus conferences devoted to curarization [19] and intubation [20]. Rocuronium was used at 18.3% in our study as an alternative to succinylcholine.

In our study, preoperative isotonic saline was administered to correct hypovolemia. Vascular filling is absolutely essential in these patients, hypovolaemic due to a large third sector and sepsis itself with its microcirculatory impairment [14]. The anesthetic management of abdominal emergencies is well codified [21]. The correction of blood volume undertaken in the preoperative period must be continued. Hemodynamic instability is frequently observed during manipulation of infected territories or retrograde emptying of the hail, linked to the systemic passage of bacteria, endotoxins or inflammatory mediators [22]. These observations justified the use of filling solutions.

The abdomen without preparation (ASP) was the only imaging examination performed in all our patients. According to Merret ND *et al.* [22] PSA has no place in the diagnosis of peritonitis in general because it does not make it possible to specify the etiology of peritonitis, nor to detect low abundance pneumoperitoneum, especially in patients lying down, and is therefore not a great help in guiding surgical procedures, its diagnostic profitability in postoperative peritonitis is only 10% - 15%. For Montravers P and col [23] in the event of suspected peritonitis by perforation of a peptic ulcer, the existence of pneumoperitoneum on the standard radiograph (ASP or chest radiograph) may be sufficient to establish the indication for surgery. Our results could be explained by the unavailability of these examinations (ultrasound and scanner) in the emergency room, which makes their performance outside the CHU difficult due to the difficulty of transporting our patients.

In our study, the etiological diagnosis found was peritonitis by appendicular perforation (51.4%) followed by gastric perforation (14.6%). Similar results were reported by Harouna Y *et al.* in Niger that appendicular perforation was the main etiology [8]. Similarly, Kante *et al.* [24], in Mali, found the same etiology in 42.5% of patients. Several other Africans, including Katungu S.N *et al.* in the Democratic Republic of Congo, reported only jejuno-ileal perforation, followed by gastric perforation and then appendicular perforation [25]. In our study, analgesia and intraoperative maintenance were provided by 100% fentanyl and halothane. Our results can be superimposed on those of Boulay *et al.* who had shown that in most rapid induction protocols, opioids are administered only after protection of the airways due to the emetogenic effects [15]. Postoperative

complications in our study were dominated by hypotension (53%), desaturation (32.4%) and delayed awakening (20%).

Intraoperative incidents and accidents in our study were dominated by hypotension (10%), difficult intubation (8%) and cardiac arrest (0.5%). In a study by Ibrahima Gaye *et al.* [26] in 2016, similar incidents were reported. Our incident and accident rates are much lower than that observed in Diop FNM *et al.* [27]. This is due to the fact that our patients are in a state of severe hypovolemia on admission on the one hand, and on the other hand, to the quality of the preoperative preparation. In our study, the vasoactive amines ephedrine and norepinephrine were used alone or in combination to correct arterial hypotension. Blood transfusion was required intraoperatively in 51.4% of patients. According to Gérard *et al.*, emergency transfusion, which must follow a protocol based solely on an arbitrary hemoglobin value, cannot be recommended. It is the physiological context of the patient that makes it possible to specify the indication [28].

All patients received postoperatively a combination of paracetamol 1g and tramadol 100 mg intravenously. This result could be explained by the availability and accessibility of these drugs easily.

Overall mortality in our study was 3.2% of patients. This mortality involved three ASA 4U patients, two ASA 3U patients and one cardiac arrest in the operating room. Several authors [6] [26] report similar mortality [24] [29] found high mortality, respectively 17.5% and 12%. This agrees with the results of Solomkin *et al.* who had shown that the main issue in the initial management of peritonitis is the control of the infectious source, that any delay in surgical management as well as incomplete control of the source of infection, inappropriate antibiotic therapy would lead to complications and worsen the prognosis or even death [30]. This mortality rate in our study could be explained by the delay in consultation and therefore diagnosis on the one hand, and on the other hand, by the infectious state which leads to multiple visceral failures. Our study presents weaknesses in the initial management of peritonitis in the emergency room and limits. These weaknesses related to the absence of carrying out complete biological assessments, the use of ultrasound and CT as less diagnostic, limit insofar as it did not evaluate the long-term complications and the prognosis. Also the absence of bacteriological results from intraoperative samples which could have modified the therapy.

## 5. Conclusion

Peritonitis is a medico-surgical emergency. Anesthetic care is complex and provided mostly by senior anesthesia technicians. The delay in consultation and therefore in diagnosis are the factors of poor prognosis. Appendicular perforation peritonitis remains the leading cause. Raising awareness could improve morbidity and mortality.

## Conflicts of Interest

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

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