Acta Scientific Surgical Research (ASSR)

Volume 3 Issue 2 November 2025

Research Article

Complicated Post Operative in Abdominal Surgery. Study About 123 Cases Treated At University Hospital Center of Sino-Central African Friendship of Bangui

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Received: September 16, 2025

Published: October 26, 2025

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Abstract

Objective: To determine the frequency of postoperative complications (POCs) in hospital and identify the risk factors for POCs in the department.

Patients and Methods: This was a retrospective study covering the period from 1 January 2021 to 31 December 2023. It included patients aged 18 and over who underwent emergency or elective surgery and presented with a postoperative complication.

Results: A total of 123 (7.6%) of the 1,615 patients who underwent surgery during the period presented with a CPO. The mean age of the patients was 37.3 years (extremes: 18 and 80 years). Of the complicated patients, 51.2% were women. The main CPOs recorded were surgical site infection (32.6%), peritonitis (19.6%), occlusion (13%), ventration (11.3%) and enterocutaneous fistula (10.6%). The complication rate was high among patients classified as ASA II (65%) and Altémeier II (56.9%). Surgical site infection predominated after appendectomies, and other complications after intestinal anastomosis resections. Patients undergoing emergency surgery were at greater risk than those undergoing controlled surgery (P = 0.00000001 OR = 3.3). The mean time to onset of CPO was 10.7 days. In surgical site infections (N = 40), the germs identified were staphylococcus aureus (37.1%), Enterococcus faecalis (22.2%) and Klebsiella pneumoniae (12.9%). Re-operation was necessary in 65% of cases. The mortality rate was 9% and the average length of hospital stay was 25.5 days.

Conclusion: The CPO observed could be avoided by applying hygiene and asepsis measures and rigorously observing the principles of emergency surgery in order to improve the quality of surgical care.

Keywords: Postoperative complications (POC); Anesthesiologists (ASA); Patients; Surgery

Introduction

Postoperative complications (POC) are undesirable events that may occur after surgery. These complications are said to be early when they occur within the first seven days following the operation and late when they appear after the first seven days [1-3]. Despite the progress made in surgical techniques, modern means of sterilising surgical instruments and materials, and the application of universal principles of asepsis in operating theatres, the frequency of postoperative complications is still high [4,5].

When CPO occurs, it can lead to a critical situation for a recently operated patient, or to emergency situations requiring repeat surgery [4,6,7].

Method

This was a retrospective descriptive study of the records of patients operated on and followed up in the general and visceral surgery department of the CHU de l'Amitié Sino Centrafricaine in Bangui from 1 January 2021 to 31 December 2023. The study population consisted of patients admitted to the department and operated on for emergency or cold abdominal surgery. The target population consisted of adult subjects of both sexes who had undergone postoperative care. Not included were patients who had undergone surgery in the department but had been lost to follow-up, patients who had undergone surgery for other conditions not related to abdominal surgery, patients under 18 years of age, and patients treated outside the study period. Patient medical records, hospitalisation registers, operative report registers, anaesthesia records and results of paraclinical investigations were used. The variables studied were age, sex, initial indications for surgery, duration and nature of complications, perioperative risk factors, in particular surgical procedures performed, presence of co-morbidity, type of surgery, ASA risk and outcome after treatment. Perioperative risk factors were assessed according to the American Society of Anesthesiologists (ASA) classification, the Altémeier classification and the presence of comorbidities.

ASA classification :

- **ASA I:** No condition other than that requiring surgery
- **ASA II:** Patient with moderate impairment of a major function
- **ASA III:** Patient with severe impairment of a major function
- **ASA IV:** Patient with imminent vital risk
- **ASA V:** Moribund patient

Type of surgery (Altémeier classification):

- **Clean surgery:** No opening of hollow viscera or notion of trauma
- **Contaminated clean surgery:** Rupture of a hollow viscera or minimal asepsis
- **Contaminated surgery:** Frank breach of asepsis, significant contamination, recent traumatic wound less than 4 hours old, breach of the genitourinary or biliary system.
- **Dirty surgery:** Traumatic wound more than 4 hours old, foreign body, perforation of a viscera.

The severity of complications was assessed according to the Dindo-Clavien classification **[13]**:

- **Grade I:** Any undesirable postoperative event not requiring medical, surgical, endoscopic or radiological treatment. The only authorised treatments are antiemetics, antipyretics, analgesics, diuretics, electrolytes and physiotherapy.
- **Grade II**: Complication requiring medical treatment not authorised in Grade 1
- **Grade III:** Complication requiring surgical, endoscopic or radiological treatment (IIIa without general anaesthesia and IIIb with general anaesthesia)
- **Grade IV:** Life-threatening complication requiring intensive care (Iva, single organ failure and IVb, multivisceral failure)
- **Grade V:** Death.

Data processing and analysis

The variables recorded on a pre-established form were entered into an Excel file and exported for analysis using Epi-info version 7.1 software.

Ethical considerations

This study can be recorded as an audit of our practices. It is an observational study requiring no interaction with the patient, no intervention, and no change in usual care.

The data collected were used solely for the purposes of the study, and the records were returned to the department archives.

The study forms were anonymous. All identifying information was removed from the records. All procedures performed as part of this study complied with the ethical standards of the institutional and/or national research committee and the 1964 Declaration of Helsinki and its subsequent amendments or comparable ethical standards.

Results

We recorded 1615 patients who underwent abdominal surgery. 123 cases (7.6%) presented with a postoperative complication.

Of the patients, 51.2% were female and 48.8% male. The sex ratio was 0.95. The mean age of the patients was 37.3 years (extremes 18 and 80 years). The 18-29 and 30-40 age groups were more numerous than the other age groups.

Students (27%), shopkeepers and civil servants (13.8%), farmers (13.8%), housewives (9.8%), drivers (8.1%) and labourers (4.1%) were the main socio-professional categories of patients. The patients lived mainly in the 4th arrondissement (22.8%), the 8th arrondissement (19.5%), the 5th arrondissement (13.8%) and the 9th arrondissement (11.4%) of Bangui and in the provinces (7.1%). Very few patients came from other arrondissements in the city of Bangui, notably the 1st (00%), 2nd (6.5%), 3rd (4.9%), 6th (5.7%), 7th (5.7%) and 10th (2.4%).

Table I: Breakdown of OPC cases by age and sex.

Ages groups (in year)	Gender				Total	
	Male		Female			
	Number	(%)	Number	(%)	Number	(%)
[18-29]	20	16,3	23	18,7	43	35,0
[30-44]	19	15,4	26	21,1	45	36,5
[45-59]	16	13,0	08	06,5	24	19,5
[60-79]	04	03,3	05	04,1	09	07,4
[≥80]	01	00,8	01	00,8	02	01,6
Total	60	48,8	63	51,2	123	100

Clinical aspects

Circumstances and nature of initial surgical procedures

The most frequent surgical history was laparotomy (37%), hernia repair (29%), appendectomy (17%) and caesarean section (17%). The most frequent initial indications for surgery were generalised peritonitis (32.5%), strangulated hernias (21.9%), acute intestinal obstruction (14.6%), uncomplicated hernias (13.8%) and acute appendicitis (10.5%).

Surgical procedures performed

Intestinal resection followed by anastomosis in the same operation (46.3%) and appendectomy (39.1%) were the main surgical procedures performed. Single-stage intestinal anastomoses (36.6%) and appendectomies (26.8%) were the second most common. These procedures were performed in cases of acute intestinal obstruction with intestinal necrosis, acute peritonitis of appendicular origin and acute appendicitis.

Table II: Frequency of initial indications for surgery.

Initial indications	Number	Percentage
Acute generalised peritonitis	40	32,5%
Uncomplicated hernia	17	13,8%
Strangulated hernia	27	21,9%
Bowel obstruction	18	14,6%
Acute appendicitis	13	10,5%
Ventration	2	1,6%
Evisceration	1	0,8%
Splenomégaly	5	4,0%
Total	123	100

Table III: Frequency of surgical procedures performed during the initial operation.

Surgical gestures	Effective	Percentage
Appendicectomie	48	39,1%
Hernioraphie	13	10 ,6%
Gastrectomy	1	0 ,8%
Intestinal resection-anastomosis	57	46,3%
Abdominal wall repair (eventration)	2	1,6%
Splenectomy	2	1,6%
Total	123	100,0%

Types of complications

The average time to onset of postoperative complications was 10.7 days. Post-operative complications occurred mainly between days 6 and 10 (43.1%) and between days 1 and 5 (38.3%). The other cases occurred between the 11th and 35th postoperative day (13.8%). The main CPOs were surgical site infection (32.6%), peritonitis (19.6%), occlusion (13%), ventration (11.3%) and enterocutaneous fistula (10.6%).

Table IV: Breakdown of patients by type of complication.

Types of complications	Number	Percentage
Surgical site infection	40	32,6%
Enterocutaneous fistula	13	10,6%
Post-operative peritonitis	24	19,6%
Post-operative bowel obstruction	16	13%
Haemorrhag	03	02,4%
Evisceration	07	05,6%
Eventration	14	11,3%
Wall loosening	04	03,3%
Sepsis and anemia	02	01,6%
Total	123	100,0%

Surgical site infections predominated following appendectomy (17.8%) and intestinal resection-anastomosis (8.9%). On the other hand, most other complications were frequent in the case of intestinal anastomosis resections.

In cases of surgical site infection, the main germs identified were staphylococcus aureus in 20 patients (37.1%), *Enterococci faecalis* in 12 patients (22.2%), *Klebsiella pneumoniae* in 7 patients (12.9%) and *Escherichia coli* in 3 patients (5.5%).

Table V: Breakdown of post operative complications by surgical procedure.

Procedures	Type of complications				Total
	Surgical site infection	Peritonitis	Bowel struction	Digestive fistula	
Appendicectomy	22(17,8%)	7(5,7%)	2(1,6%)	2(1,6%)	33(26,8%)
Intestinal resection and anastomosis	11(8,9%)	10(8,1%)	14(11,4%)	10(8,1%)	45(36,6%)
Simple hernioraphy	2(1,6%)	0(0)	0(0)	0(0)	2(1,6%)
Stomass	2(1,6%)	0(0)	0(0)	0(0)	2(1,6%)

Perioperative risk factors

Patients who underwent emergency surgery (5.1%) were more likely to develop OPC than those who underwent cold surgery (2.5%) (Chi2 = 40.8, P = 0.00000001 OR = 3.3).

The comorbidities found in the patients were arterial hypertension (43%), diabetes (41%), HIV infection (8%) and tuberculosis (8%). According to ASA score, we recorded many ASA II (65%) and ASA II (31.7%) patients. Very few patients were ASA III (3.3%) and ASA IV (0.0%). According to the type of surgery, the majority of patients (56.9%) were classified as Altémeier II and 28.5% as Altémeier I. Very few patients were type III (13.8%) and type IV (0.8%).

Therapeutic aspects

All patients presenting with a postoperative complication had received medical treatment. This included pain relief with novalgin (96.7%) and/or tramadol (3.3%).

Anti-infective treatment included a double course of antibiotics with rocephine and metronidazole in 45.5% of cases, a single course of rocephine in 25.2% of cases and a triple course of antibiotics with ampicillin, gentamycin and metronidazole in 29.3% of cases.

Post-operative management was straightforward in 70 patients (57%). In the 53 (43%) other cases, the follow-up was marked by secondary SSI (43%).

The average hospital stay was 25.5 days. Patients stayed in hospital between 06 and 20 days.

We recorded 11 cases of death after management of complications, a frequency of 9%. The most frequent cause of death was septic shock. Patients with a comorbidity were more likely to die than others (OR = 4.1; Chi 2 = 5.03, p = 0.002). In terms of the severity of complications, patients were classified as grade II (N = 47) and grade III (N = 41) according to the Clavien DINDO.

Table VI: Types of complications according to the Clavien DINDO classification.

Classifications		Number	Percentage
Grade I	Fluid and electrolyte disorders	13	10,5%
	Post operative ileus	16	13%
Grade II	Surgical site Infection	40	32,5%
	LâWall loosening	4	3,2%
	Anaemia	3	2,4%
Grade III	Foreign bodies	1	0,8%
	Evisceration	7	5,7%
	Post operative fistula	13	10,5%
	post operative peritonitis	23	18,7%
Grades IV	Septic shock	4	3,2%
	Hypovolaemic shock	2	1,6%
Grade V	Death	11	8,9%

Discussion

Post-operative complications are still frequent in developing countries. Their frequency varies in different regions of the world. In Canada and the USA, the prevalence of postoperative complications was 39% and 32% respectively [4,8]. In Europe, Renggli and Colen Suisse. [6] and Markus and Colen Germany. [13] reported rates of post-operative complications of 23.3% and 29.5% in 2003 and 2005 respectively. In Asia, In Singapore, in a series of 231 patients undergoing appendectomy, SO reported a rate of 26% [14]. In Africa, the rate of postoperative complications was 11.6% in Senegal [15] and 20.9% in Benin [16]. In Cameroon, a study of early postoperative complications in Yaoundé district hospitals by Tonye., *et al*. [17] reported a rate of 14.3% in 2015. In Africa, post-operative complications occur in young patients. The average age of our patients was 37.3 years. Other African studies have reported an average age varying between 32 and 39 years [16-18]. On the other hand, in some Western studies [19,20], the mean age of patients was around 60.9 years. However, according to these studies, the occurrence of OPC is not related to age or sex [21].

The CPO observed in our study occurred in patients operated on for emergency digestive surgery. Several authors have made similar observations [17,18,22]. In fact, emergency surgery is more prone to CPO than regular surgery. According to Gaudeuille., *et al*. [7], inadequate preparation of the patient and the operating theatre, and outdated surgical equipment could explain these complications. We also noted that intestinal resection followed by anastomosis and appendectomy were the procedures most frequently performed during initial operations. These procedures were performed in cases of strangulated hernia, intestinal necrosis or digestive perforation. Appendectomies were also the surgical procedures reported by Koundouno., *et al*. [23] and Cyprien., *et al*. [24] with a frequency of 23.1% and 26.3% respectively. Depending on the nature of the CPO observed, infection of the surgical site was frequent. It was found in 32.5% of cases. The high rate of surgical wound infection is evidence of inadequate compliance with hospital hygiene and asepsis measures in the operating theatre. However, surgical site infection is multifactorial, and may be linked to the patient, his or her co-morbidities, the operating conditions, and the surgical procedure itself, as reported in several studies [25-28].

In cases of surgical site infection, several germs were identified, with a predominance of Staphylococcus aureus (37.1%). The results reported in other studies are more or less similar, with a predominance of this germ [7,29].

In our study, the presence of one or more co-morbidities, the ASA anaesthetic risk, the type of surgery and the surgical procedures were factors likely to influence the course of surgery, whether performed as an emergency or cold operation. In our study, 30% of patients had an associated comorbidity at the time of CPO. According to Nghario., *et al*. [11], the physiological disturbances associated with these comorbidities very often prevent these patients from effectively combating post-operative complications. We have also observed a high number of CPOs in patients classified as ASA II and Altémeier II. In other studies, the authors recorded more CPOs among patients classified as ASA III and IV, and Altémeier III and IV [17,18,30,31]. Our results reflect the inadequate application of hygiene and asepsis measures, the sterilisation of surgical instruments and the lack of rigour in surgical techniques, in particular anastomotic resections in a septic environment, and poor protection of the abdominal wall during laparotomies performed for septic operations. Using the Clavien Dindo classification [32], 35.7% of our patients with CPO were Grade II and Grade III. Our frequencies remain very high compared with those reported by other authors. Ahmedou Moulaye Idriss., *et al*. in Mauritania [33] with 17.91% of patients in Grade II and Dindo., *et al*. [32].

According to Clavien Dindo, post-operative complications need to be managed by medical and surgical means without delay in order to improve the prognosis. Post-operative monitoring is a key stage in the management of OPC. It enables complications to be detected early and appropriate solutions to be proposed [17] In our study, OPC was detected between D1 and D10 post-op.

The measures instituted to deal with these complications included a medical component based mainly on the administration of antibiotics. The combination of Ceftriaxone + Imidazole reduces the risk of infection from 70% to less than 10%, as reported by Cluzel R., *et al*. [34]. In our study, this combination was used in 45.5% of cases. The surgical treatment of postoperative complications depended on the type of complication. In our study, wall repair following SSI was the most common surgical procedure (30.9%).

Overall, 70% of patients with post-operative complications have a simple post-operative course. According to Bang., *et al*. [35]. The post-operative morbidity and mortality rates ranged from 10% to 33.3% respectively. The rate of death following post-operative complications was 9% in our study. These deaths occurred in the context of septic shock. For Bwelle Motto G.R., *et al*. [36] 13.82% is the death rate following postoperative complications. They also note that the main causes of death are septic and hypovolaemic shock. Post-operative hospital stays are often prolonged in the event of complications. The length of hospital stay was 14 days in the Clavien Dindo., *et al*. study [32]. In our study, the length of stay for complicated patients was twice as long in cases of CPO.

Conclusion

OPCs are common in general surgery departments. They are more frequent in emergency surgery than in regular surgery and affect a young population. Surgical site infection, peritonitis, occlusion and post-operative ventration were the main complications recorded. These complications were frequent following bowel resection followed by anastomosis during the same operation, and appendectomies during peritonitis. The existence of co-morbidity, particularly diabetes, and a history of laparotomies are all factors likely to contribute to the occurrence of CPO. These are indicators of the quality of post-operative care. Whatever the cause of these complications, their prognosis can be improved by early diagnosis, good patient preparation, compliance with hygiene and asepsis measures, rigorous surgical techniques and the use of antibiotics. The management of patients requiring surgery requires a multidisciplinary approach involving the intensive care anaesthetist, the surgeon, the radiologist and the microbiologist, as well as qualified paramedical staff.

Conflict of Interest

The authors declare that they have no conflict of interest in relation to this publication project.

Sources of Funding

This study is presented as an evaluation of our practices. We received no funding other than our respective contributions, in particular our IT and office equipment.

Author's Contributions

- Dr. NDIRA Hubert Jonathan contributed to collecte data, corrected the format, and approved the final version of the manuscript prior to submission.
- Dr. Ngboko Mirotiga Petula Annicette collected the data and drafted the manuscript for submission to the other co-authors. She validated the final version of the manuscript.

Professor DOUI DOUMGBA Antoine. Developed the manuscript outline, revised the manuscript, and approved the final version of the manuscript prior to submission.

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