

The Evolutionary Profile of Patients Operated for Peptic Ulcer Perforation in Bujumbura

Jean Claude Mbonicura^{1*}, Prudence Bukuru², Stanislas Harakandi³, Frank Ijenezza¹, Révérien Ndayirorere⁴, François Nduwimana¹, Astère Mbonicura⁵

¹Department of General and Gastro-Intestinal Surgery, Centre Universitaire de Recherche en Santé, Faculty of Medicine, University of Burundi, Bujumbura, Burundi

²Department of Anesthesia-Resuscitations, Faculty of Health Sciences, Hope Africa University, Bujumbura, Burundi

³Department of Anesthesia-Resuscitation, Centre Universitaire de Recherche en Santé, Faculty of Medicine, University of Burundi, Bujumbura, Burundi

⁴Department of Andro-Urology, Centre Universitaire de Recherche en Santé, Faculty of Medicine, University of Burundi, Bujumbura, Burundi

⁵Department of Multi-Purpose Medicine, Easter Grand Hospital Francilien, Meaux, France

Email: *jean-claude.mbonicura@ub.edu.bi

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Abstract

Background: The evolutionary profile of patients operated for peptic ulcer perforation in Bujumbura. Perforated peptic ulcer is a serious complication of peptic ulcer with potential risk of grave complications. **Aim:** To study the early morbidity and mortality of surgery for peptic ulcer perforation in Bujumbura City Hall hospitals: Kamenge University Hospital Center (CHUK), Kamenge Military Hospital (HMK) and Prince Louis Rwagasore Clinic (CPLR). **Patients and methods:** This is a retrospective, descriptive and analytical study carried out in the three hospitals of Bujumbura over a period of three years from January 1, 2020 to December 31, 2022. It involved 57 cases (n = 57) of peptic ulcer perforation. **Results:** The frequency of surgery for peptic ulcer perforation was 2.7% with a mean age of 43.6 years +/- 15.3 years and a male predominance with a sex ratio of 3.7. Eight percent of patients presented with shock, 24.5% were smokers, and 67.9% had taken non steroidal anti-inflammatory drugs. The mean hospital stay was 15.2 days with a standard deviation of 12.1. The morbidity rate was 30.2%, 32% were classified in grade IIIb of the Clavien-Dindo Surgical Complications Scale. There were 9 deaths (17%). Seven patients who underwent surgery and received late consultations died. **Conclusion:** Surgery for peptic ulcer perforation remains an intervention associated with a high rate of morbidity and mortality in Bujumbura. Surgery for peptic ulcer perforation remains a procedure associated with a high morbidity and mortality rate in Bujumbura. The time before consultation was the only factor associated with early morbidity and mortality of Surgery for peptic ulcer's perforations.

Keywords

Peritonitis, Peptic Ulcer Perforation, Complications

1. Introduction

Gastroduodenal perforation is one of the most common complications of ulcer disease. This is a serious medical-surgical emergency because it progresses to peritonitis. Self-medication and misuse of non-steroidal anti-inflammatory drugs (NSAIDs), “*Helicobacter pylori*” are the main causes of the occurrence of this complication (perforation) in developing countries [1]. Gastroduodenal disease is a cosmopolitan condition; it affects 5% to 10% of individuals in the United States. In Europe, in the study conducted by Lau *et al.* in 2011 about “Systematic review of the epidemiology of complicated peptic ulcer disease”, the prevalence of complications is estimated at 8% for duodenal ulcer and 2% for gastric ulcer [2]. But in Africa as well as in Togo, the data are patchy and variable depending on the series. Lawson-Ananissoh, L. *et al.* estimated the prevalence of peptic ulcer disease at 15.53% in their study instituted “Epidemiological profile of peptic ulcers at the Lomé Campus Hospital and University Center in Togo” [3].

The development of peptic ulcer disease can cause complications; one of the most common of which is perforation. The incidence of this perforation is estimated between 4 and 14 cases per 100,000 inhabitants in the study conducted by Lau *et al.* and presented above [2]. In sub-Saharan Africa as well as in Benin (Cotonou), the frequency of gastroduodenal perforations is assessed differently. Vignon *et al.* in 2016 in their study named “Peptic ulcer perforations at the National University Hospital Center (CNHU) in Cotonou (Benin)” estimated 13.8% of acute generalized peritonitis due to peptic ulcer perforation [4]. For Ngo, N.B. *et al.* [5] in Cameroon in their study on “Etiologies of acute generalized peritonitis at Yaoundé University Hospital” and the same study of Dieng in Senegal [6], the first etiology of acute generalized peritonitis was represented respectively in 32% and 52.7% of cases. Their treatment remains burdened by heavy mortality at 10.7% of cases in the study of Chalya, P.L. *et al.* in Tanzania on “Clinical profile and outcome of surgical treatment of perforated peptic ulcers” [7]. In our local situation in Burundi, Mbonicura, J.C. *et al.* in 2021 in their study named “Non-Traumatic gastro-Intestinal Perforations in Bujumbura about 141 cases” found that peptic ulcer’s perforations represented 41.13% of non-traumatic digestive perforations [8]. Referring to the various studies done on the consequences of peptic perforations around the world, we thought it would be appropriate to study the morbidity and mortality associated with surgery for perforated peptic ulcers in three health facilities in Bujumbura, Burundi.

2. Material and Methods

This is a retrospective, descriptive and analytical study carried out in three hos-

pitals in Bujumbura (Kamenge University Hospital Center, Kamenge Military Hospital and Prince Louis Rwagasore Clinic) over a period of three years from January 1, 2020 to December 31, 2022. The aim of this study is to study the factors contributing to morbidity and mortality of surgery for peptic ulcer perforation in three Hospitals of Bujumbura, Burundi.

We included in our study all patients aged 18 years and older who underwent surgery for peptic perforations.

We excluded in our study all patients with stomach cancer, including those who were diagnosed during or after surgery. We also excluded patients with incomplete records.

We have developed a questionnaire of four parameters including demographic data, preoperative data, and surgical data up to the thirtieth postoperative day. The questionnaire has 21 items divided into four parameters (See the questionnaire in the **Appendix**).

Data were collected using a pre-established survey sheet. The collection was facilitated by the use of the KoboCollect application downloaded from the play store. The data was collected and analysed from the KoboToolbox server at the end of the study period. The data was extracted in Microsoft Excel. The data analysis was performed by SPSS VERSION 25; in two steps: calculation of descriptive statistics and chi-square test.

3. Results

During our study period, we recorded 57 cases of surgery for peptic ulcer's perforations out of 2122 procedures on the gastrointestinal tract *i.e.* a frequency of 2.7% (4 cases had incomplete records).

Table 1 shows that Kamenge University Hospital Center recorded a high frequency of peptic ulcer operations (3.4%) compared to the other two hospitals.

According to the gender, Male sex accounted for 79% (42 patients) versus 21% (11 patients) female, with a sex ratio of 3.8.

We found predominance in the age group between 20 and 49 years old, *i.e.* 62.4%. The ages of patients in our series ranged from 18 to 75 years, with a mean age of 43.6 years \pm 15.3. All procedures were performed laparotomously with a mean duration of 118.1 minutes with a standard deviation of 36.5.

The overall complication rate was 47.1% with a morbidity rate of 30.2%. The main postoperative complications observed are fistula (11.3%) and surgical site infections (7.5%). Eight patients were readmitted, a rate of 15.1%, including 6 for gastrointestinal fistula (11.3%) and 2 for surgical site infections, *i.e.* 3.7%. In our study, the mortality rate was 17.0%, *i.e.* 9 died patients.

In light of the data in this **Table 2**, we note that suture repair with epiploplasty was performed in 81.1% of cases and suture repair with pyloplasty was less represented in 1.9% of cases.

In our study, seven patients who underwent surgery and received late consultations after 72 hours and more were died (**Table 3**).

Table 1. Frequency of peptic ulcer’s perforations surgery compared to digestive and visceral surgery procedures by health facilities.

Health facilities	Frequency	%
CHUK	36/1042	3.4
HMK	18/778	2.3
CPLR	3/302	1

Table 2. Distribution of patients according to surgical procedure.

Surgical procedure	Frequency	Percentage
Suture repair without epiploplasty	9	17
Suture repair with epiploplasty	43	81.1
Pyloroplasty suture repair	1	1.9
Total	53	100

Table 3. Distribution of patients according to mortality due to the duration of symptomatology before the first consultation.

		Did the patient die within the first 30 days after surgery?		Total
		Yes	No	
Length of time before first consultation	<48 hours	1	18	19
	48 - 72 hours	1	7	8
	72 hours and more	7	19	26
Total		9	44	53

The data in **Table 4** show that risk factors for peptic ulcer disease and mortality were related to sociodemographic factors and patient condition. These factors are patient age, gender, patient history, and patient in shock.

Regarding age, many complications were found in patients over 60 years of age (6 complications with a percentage of 24%). For gender, males had more complications than females with a rate of 72%.

In our series, **Table 5** shows the frequency of complications by surgical and disease-related factors. These complications are also part of the morbidity and mortality factors of the peptic ulcers found in our study. It should be noted that many complications have been found in the absence of vagotomy with a rate of 100% of cases. The second complications were found in 90.9% of cases in cases of suture + epiploplasty. Regarding the disease, we noted a lot of complications in case of a perforation diameter of 1 to 2 in 68% of cases.

4. Discussion

During our study period, peptic ulcer perforation involved 57 cases out of 2122 digestive and visceral surgery procedures, or 2.7% of cases. Our results are close

Table 4. Frequency of complications by social and demographic factors and patient condition.

Variable	Complications (-)	Complications (+)	P-value
Age			
<20	2 (7.1)	1 (4.0)	0.34
20 - 29	7 (25.0)	4 (16.0)	
30 - 39	5 (17.9)	6 (24.0)	
40 - 49	6 (21.4)	5 (20.0)	
50 - 59	5 (17.9)	3 (12.0)	
60 years and older	3 (10.7)	6 (24.0)	
Gender:			
Female	4 (14.3)	7 (28)	0.12
Male	24 (85.7)	18 (72)	
ASA			
1	21 (75.0)	13 (52)	0.067
2	7 (25.0)	10 (40)	
3	0 (0)	1 (4.0)	
5	0 (0)	1 (4.0)	
Patient's history			
Hypertension	0 (0)	3 (12.0)	0.64
OCPD	0 (0)	1 (4.0)	
Diabetes	0 (0)	1 (4.0)	
Epileptic patient	0 (0)	1 (4.0)	
33 weeks pregnant	0 (0)	1 (4.0)	
Laparotomy	1 (3.6)	0 (0)	
No history	27 (96.4)	18 (72.0)	
State of shock			
Yes	4 (14.3)	4 (16.0)	0.92
No	24 (85.7)	21 (84.0)	

Table 5. Frequency of complications by surgical and disease-related factors.

Variable	Complications (-)	Complications (+)	P-value
Surgical technique Closing			
Simple suture	5 (12.5)	4 (9.1)	0.58
Suture + epiploplasty	22 (83.3)	21 (90.9)	
Pyloroplasty suture	1 (4.2)	0 (0)	
Vagotomy			
No vagotomy	27 (95.8)	25 (100)	0.34
Truncular vagotomy	1 (4.2)	0 (0)	
Hours before consultation			
<48	15 (53.6)	4 (16.0)	0.022
[48 - 72[3 (10.7)	5 (20.0)	
72 hours and more	10 (35.7)	16 (64.0)	
Location of Ulcer			
Gastric	14 (50.0)	10 (40.0)	0.12
Pylorus	2 (7.0)	10 (40.0)	
Duodenum	12 (43.0)	5 (20.0)	

Continued

Diameter of the perforation			
<1	6 (21.4)	3 (12.0)	0.21
1 to 2	19 (67.9)	17 (68.0)	
>2	3 (10.7)	5 (20.0)	

to those of Jean Claude Mbonicura *et al.* in Burundi [8] and Camara and al. in Togo [6] who found respectively 4.51% and 8.26% of cases.

In our study, the mean age of our patients was 43.6 years \pm 15.3 years with extremes from 18 to 75 years. Our results are close to those found by Begovic, G. and al. [9] and Camara and al. in Guinea [6] who found an average age of 41 and 43.16 years respectively but discordant with those of Lawson, A. in Togo [3] and Belhadj, H. and al. in Morocco [10] who found 37.2 years and 34.2 years respectively.

The most represented age group was from 20 to 50 years old with 62.4%. This result shows that peptic ulcer's perforation is a condition of young adults due to *Helicobacter pylori* infection. This bacterium colonizes the gastric lumen from early childhood [11].

We found a male predominance with a rate of 79%. The sex ratio M/F = 3.7 was close to that of Ohene-Yeboah [12] which was 3.3.

This male predominance can be explained by the fact that men are exposed to predisposing factors that promote the occurrence of ulcers (tobacco, alcohol, stress, etc.).

About frequency of peptic ulcer's perforations surgery compared to digestive and visceral procedures by health facilities, Kamenge University Hospital Center recorded a high frequency (3.4%) compared to the other two hospitals. These data could be explained by the fact that CHUK has high material and human resources different from these two other hospitals. As a result, patients are transferred to well-equipped health facilities with adequate human resources. A study conducted by Abdihamid, M.A. *et al.* on Clinical presentation and surgical management of perforated peptic ulcer in a tertiary hospital in Mogadishu, Somalia shows that patients with advanced disease are transferred to hospitals with adequate health care and health education facilities [13].

According to surgical procedure, we note that suture repair with epiploplasty was performed in 81.1% of cases and suture repair with pyloplasty was less represented in 1.9% of cases.

The surgical technique for peptic ulcer perforation depends on the characteristics of the perforation. Simple suture plus epiploplasty was the most widely used surgical technique in our context (81.1%), which was not the case in the study of Anouar, E.G. in Morocco [14] and Siddaye, A. [15]. The wide use of this surgical method can be explained by the good results it achieves and its ease of execution [16].

Regarding the distribution of patients according to mortality due to the duration of symptomatology before the first consultation, we have found seven pa-

tients who underwent surgery and received late consultations after 72 hours and more were died.

In our study, we found that patients who consulted more than 72 hours after the onset of abdominal pain had five times the risk of developing complications than those who consulted before 48 hours. In our series, the average consultation time was 62.5 hours. This long delay in our study could be explained by the fact that the majority of our patients were seen late. Self-medication but also diagnostic confusion (acute pancreatitis) would explain the delay in treatment.

In the literature, the duration varies relatively from one country to another. In Mali, Coulibaly, I. [17] found 18 h at the Gabriel Touré University Hospital in 2005. In France, Cougarden, P. [18] reported an average duration of 13.4 hours.

The morbidity rate was 30.2% in our series. The mortality rate was 17% in our study. The morbidity rate of our series is superimposed on that of Taş and al. in Turkey [19] and that of Kim in Korea [20] but different from that of Sivaram, P. and *et al.* [15] and that of Montalvo-Javé and al. [19]. This could be explained by the presence of many comorbidities in their series than in ours.

In the literature, overall mortality ranges from 1 to 20% [21] [22]. Our rate of 17% is comparable to that found in the literature. In our series, the early postoperative follow-up was simple in 52.9% of cases; and the fistula rate was 11.3%. These results are slightly different from those of the other authors, which could be explained by the delay in management and the use of laparotomy in our context.

As for the frequency of complications by surgical and disease-related factors. These complications are also part of the morbidity and mortality factors of the peptic ulcers found in our study. It should be noted that many complications have been found in the absence of vagotomy with a rate of 100% of cases. The second complications were found in 90.9% of cases in cases of suture + epiploplasty. Regarding the disease, we noted a lot of complications in case of a perforation diameter of 1 to 2 in 68% of cases.

In the present study, we sought to identify possible risk factors associated with early morbidity and mortality in patients undergoing surgery for peptic ulcer perforation. The prevalence of complications was high (47.1%) according to global statistics [23] [24]. The mortality rate was high (17%) but can be superimposed on the literature [19] [25] [26].

The severity of complications was assessed using the ClavienDindo (CDC) classification. In our study, 25 cases of postoperative complications were identified, of which 7 were classified as Grade II (28%), 8 cases classified as Grade IIIb (32%), 1 case classified as Grade IV (4%), 9 cases classified as Grade V (36%) by CDC. ASA I and II scores were represented at 40% each in patients who experienced complications. The literature reports that comorbidities, shock on admission, delay in management, perforation size (>0.5 cm), surgical technique are related to high morbidity and mortality in patients with peptic ulcer perforation [19] [23] [27].

In our study, only late consultation was identified as a risk factor for early morbidity and mortality of surgery for peptic ulcer's perforations [28]. Our results are different from those of other authors. This could be explained by the fact that our sample size was small. Therefore, our sample did not allow us to conclude on the risk factors for early morbidity and mortality of peptic ulcer's perforations surgery.

5. Conclusion

Our study provides an update on the early morbidity and mortality of surgery for peptic ulcer perforation. At the end of this study, we conclude that peritonitis due to peptic ulcer's perforations remains a common condition in digestive surgery. Surgery for peptic ulcer perforation remains a procedure associated with a high morbidity and mortality rate at Bujumbura. The time before consultation was the only factor associated with the early morbidity and mortality of surgery for peptic ulcer perforation.

Limitations of the Study

The study could be extended to several health facilities, but with limited financial resources, the study was conducted in only three health facilities.

However, we would like to conduct our research on several health facilities in order to be able to compare the results. In addition, some of the objectives of our study may become research topics to be exploited. We were considering doing so if financial conditions permitted, and to this end we encourage further work on the extension of our study.

Conflicts of Interest

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

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Appendix: Questionnaire

A. Socio-demographic data

- ✓ Patient ID:
- ✓ Age:
- ✓ Gender: Male Female

B. Preoperative data

- ✓ Shock patient in admission: Yes No
- ✓ Smoking history: Current smoker Former smoker Never smoked
- ✓ History of NSAID use: Yes No
- ✓ Time interval between onset of symptoms and presentation to hospital (hours):...H
- ✓ Comorbidities:
 - Diabetes: Yes No
 - Ischaemic heart disease: Yes No
 - Hypertension: Yes No
 - IR: Yes No
 - COPD: Yes No
 - Other comorbidities:.....
- ✓ ASA score: 1 2 3 4 5

C. Surgical data:

- ✓ Time interval between presentation and surgery (hours):...H
- ✓ Approach:
 - Laparoscopic:
 - Laparotomy:
 - Laparoscopic converted to open:
- ✓ Location:
 - Duodenal:
 - Gastric:
 - Pyloric:
- ✓ Perforation diameter (cm):cm
- ✓ Surgical technique for closure: Simple suture without epiplasty:
 - Suture with epiplasty:
 - Other:
- ✓ Operating time (minutes):.....min

D. Surgical data up to the thirtieth postoperative day

- ✓ Hospital stay in days:.....days
- ✓ Did the patient die during the first 30 days after surgery:
 - Yes No
- ✓ Did the patient have any complications during the first 30 days after surgery:
 - Yes No
- ✓ What was the nature of the complication?
 - Wound-related Haemorrhage Fistula MI
 - Stroke Other:.....

- ✓ Re-operation within 30 days:
Yes No
- ✓ Did the patient suffer a symptomatic SARS-Cov-2 (COVID-19) infection after the operation?
Yes No
- ✓ What was the Clavien-Dindo grade of this complication?
0 1 2 3a 3b 4a 4b 5