

**FACTORS ASSOCIATED OF COMPLICATION AND MORTALITY IN PATIENTS
WITH PERFORATED PEPTIC ULCER AT SAINT PAUL HOSPITAL
MILLENNIUM MEDICAL COLLEGE, ADDIS ABABA, ETHIOPIA**

BY –MEKBIB BIREGA (MD, SURGERY RESIDENT)

September 2018

Addis Ababa, Ethiopia

**FACTORS ASSOCIATED OF COMPLICATION AND MORTALITY IN PATIENTS
WITH PERFORATED PEPTIC ULCER AT SAINT PAUL HOSPITAL MILLENNIUM
MEDICAL COLLEGE, ADDIS ABABA, ETHIOPIA**

BY –MEKBIB BIREGA (MD, SURGERY RESIDENT)

**Advisor; Mekdim.T (MD, assistant professor of General Surgery, Renal
Transplant surgeon)**

Henok.T (MD, assistant professor of General Surgery)

September 2018

Addis Ababa , Ethiopia

Acknowledgment

My deepest gratitude goes to Dr. MekdimTadesse, Dr HenokTeshome and Dr EnyewBiru. Who principally invited me to have the chance of getting engaged in this research andtheir unlimited support during the preparation of this dissertation.I would like to thank all the Consultants, Specialists and Residents, at SPHMMC for all the invaluable assistance and support they accorded me during all the stages in the preparation of this work. They have been a wonderful lot to work with.

Contents

Acknowledgment	iii
List of tables and graphs	v
Abstract.....	vi
Acronym.....	vii
2 introduction	1
2.1 backgrounds.....	1
2.2 statement of the problem.....	2
2.3 Justification of the study	2
3 literature review	3
3 objectives	7
3.1. General objective	7
3.2. Specific objective	7
4. Methodology.....	8
4.1 Study area and period.....	8
4.2 Study design	8
4.3. Source population.....	8
4.4. Study population.....	8
4.5. Inclusion and exclusion criteria.....	8
4.6 sampling procedure and sample size calculation	9
4.7 study variables	9
4.8. Operational definition.....	9
4.9 Data collection and analysis procedures	10
4.9.1 Data collection instrument	10
4.9.2. Data collector	10
4.9.3 Data quality assurance.....	10
4.9.4 Data processing and analysis	10
4.10 Data dissemination procedure.....	10
4.11 Ethical clearance	10
5. RESULT	11
Gragh2 vital sign of patient PPU; operated at SPHMMC from January 1/2013- December 31/2017....	13
Gragh3; WBC count of patient PPU operated at SPHMMC from January 1/2013- December 31/2017	14
6. Discussion.....	18

7. Conclusion.....	20
8. Recommendation.....	20
9. References	21
10. ANNEXES	22
10.1Annex data extraction tools.....	22

List of tables and graphs

<u>graph1 ;age distribution of PPU operated at SPHMMC from January 1/2013- December 31/2017</u>	11
<u>Graph2; WBC count of patient PPU operated at SPHMMC from January 1/2013- December 31/2017</u>	14
<u>Table 1 risk factors and comorbidities of PPU operated at SPHMMC from January 1/2013-December 31/2017</u>	12
<u>Graph2; vital sign of patient PPU operated at SPHMMC from January 1/2013- December 31/2017....</u>	13
<u>Table 2 post-operative complications of PPU operated at SPHMMC from January 1/2013-December 31/2017</u>	15
<u>Table3 factors associated with complication of PPU operated at SPHMMC from January 1/2013-December 31/2017</u>	16
<u>Table4 factors associated with mortality of PPU operated at SPHMMC from January 1/2013-December 31/2017</u>	17

Abstract

Background

Peptic ulcer perforation is serious complication of peptic ulcer disease with significant morbidity and mortality.

Objective to identify factors associated for operative complication and mortality in patients operated for perforated peptic ulcer (PPU) at Saint Paul hospital millennium medical college.

Methodology: A retrospective analysis was used to conduct the study by revising a five years patient card registry data from January 2013 to December 2017 at SPHMMC and data was collected using data abstracting checklist. Basic descriptive analysis was used for describing the study population in relation to relevant variables. Chi square was used to assess the association between dependent and independent variables.

Result A total of 136 patients were studied. Males outnumbered females by a ratio of 5.5: 1. The mean age of patients was 36.05 ± 16.56 years. The median duration of illness was 1.75 days. Most perforations were located on the first part of duodenum (117, 86%). The majority of patients, 126 (92.6%) had Graham's omental patch of the perforations.

There were sixty six post-operative complications recorded in thirty one (22.8%) patients. Superficial surgical site infection (30.3%), wound dehiscence (15.15%), respiratory infections (24.24%), post-operative collections (18.18%), acute kidney injury (10.6%), repair site failure (3.7%) and ECF (2.2%) were the complications recorded. Post-operative complication was significantly associated with female gender, age more than 45 years, comorbidity, SBP < 90 mmHg and presentations after 24 hrs ($P < 0.05$).

A total of 9 patients (6.6%) died at the hospital postoperatively. Mortality was significantly associated with age more than 45 years, comorbid illness and hypotension ($P < 0.05$).

Conclusion Among the analyzed parameters female gender, old age, comorbidity, delayed presentation, and shock having comorbid disease were found to have an effect on morbidity. But only comorbid illness and hypotension were associated with mortality.

Budget Key words peptic ulcer, perforation, morbidity, mortality

Acronym

APACH Acute physiologic and chronic health evaluation

BLH black lion hospital

BP blood pressure

CT computed tomography

ECF enterocutaneous fistula

HX history

ICU intensive care unit

Mls milliliter

NSAID non-steroidal anti-inflammatory disease

PPUperforated peptic ulcer disease

PR pulse rate

PUD peptic ulcer disease

SPHMMC saint Paul hospital millennium medical college

ZES Zollinger Ellison syndrome

1 2 introduction

2.1 backgrounds

Perforated peptic ulcer (PPU) is a serious complication of PUD and patients with PPU often present with acute abdomen that carries high risk for morbidity and mortality. PPU carries a mortality ranging from 1.3% to 20%^{5, 6}. Thirty day mortality rate reaching 20% and 90-day mortality rate of up to 30% have been reported¹. The pattern of perforated PUD has been reported to vary from one geographical area to another depending on the prevailing socio-demographic and environmental factors⁶. In the developing world, the patient population is young with male predominance, patients present late, and there is a strong association with smoking⁶. In the west the patients tend to be elderly and there is a high incidence of ulcerogenic drug ingestion.¹ Patients with PPU may present with severe, sudden-onset epigastric pain, which can become generalized⁷. The peritonitis resulting from acid exposure may present as abdominal 'board-like rigidity'. The clinical picture may be less clear in the obese, the immunocompromised, patients on steroids, patients with a reduced level of consciousness, in the elderly, and in children. In these situations, the clinical history and examination may be non-specific prompting additional imaging and laboratory studies to rule out differential diagnoses. The presence of gas under the diaphragm on plain abdominal erect X-ray is diagnostic in 75% of the cases⁶.

The recent advances in antiulcer therapy have shown that simple closure of perforation with omental patch followed by eradication of *H. Pylori* is a simple and safe option in many centers and have changed the old trend of truncal vagotomy and drainage procedures¹⁻⁶. Delay in diagnosis and initiation of surgical treatment of perforated PUD has been reported to be associated with high morbidity and mortality after surgery for perforated PUD⁸.

The associated high short-term mortality reported at 10–30% and morbidity and complications in up to 50–60% of patients require a careful and structured therapeutic approach to improve outcomes⁷.

2.2 statement of the problem

PUD is associated with potentially life-threatening complications, including bleeding, perforation, penetration, and obstruction.⁴ Perforation is the second most frequent complication after bleeding⁴. Perforations due to peptic ulcer is a serious complication which affects an average 2-10% of peptic ulcer patients and having an overall mortality of 10%, although some authors report ranges between 1.3 and 20%⁶. Being a life threatening complication of PUD, it needs special attention with prompt resuscitation and appropriate surgical management if morbidity and mortality are to be avoided.⁶ In one study done at Black lion hospital 3.4% emergency surgery was done for perforated peptic ulcer disease². Delay in diagnosis was noted in 95% of the cases². Mortality rate 15% was reported in a study conducted from zewditu Memorial hospital³

2.3 Justification of the study

PPU is one of the most common surgical emergencies at SPHMMC. Though the problem is reported as so common and overwhelming there was no study conducted in the setup which would clearly show the actual burden of the disease previously. There were only two studies in the country at zewditu and black lion hospitals which are done six and thirteen years back which are long ago. On this study we will try to show complications of the disease, and factors associated with morbidity and mortality of patient. With these, the study may help all stakeholders particularly the college management, the department, all institution referring patients to the hospital and the ministry of health in general in formulating different strategies to decrease the burden of the disease and, improving patient outcome. In addition it could be used as a baseline study for wider geographical area studies and other interventional studies

3 literature review

As described by Kin Tong at, Singapore, Peptic ulcer disease (PUD) results from an imbalance between stomach acid-pepsin and mucosal defense barriers^{1,7} It was also described in the previously mentioned meta-analysis, it affects 4 million people worldwide annually^{1,4}. Perforated peptic ulcer (PPU) is one of the most deadly gastrointestinal complications as described .et.al and K. Anbalakan.et.al reported.As described,JasneetSingh, the post-operative complication and mortality can reach about 80% and 40% respectively in patients who had comorbidity.

The risk factors mentioned in studies done in Tanzania, Singapore they showed *H.pylori* infection, smoking, alcohol consumption but only 10% of patients reported history of NSAID use.

In developing world, patients tend to be young male smokers while in developed countries; patients tend to be elderly with multiple co-morbidities and associated use of non-steroidal anti-inflammatory drugs (NSAIDs) or steroid^{1,7}. NSAIDs,*Helicobacter pylori* (*H. pylori*), physiological stress, smoking, corticosteroids and previous history of PUD are risk factors for PPU as mentioned Phillip L Chalya et.al A prospective study done at Jaipur India showed the various risk factors, 15% patients used to take alcohol regularly, 30.6% were smokers and 19.4% used to take NSAID's regularly In the presence of risk factors, recurrence of ulcer is common despite initial successful treatment. A systematic review of 93 studies has shown that the average long-term recurrence of perforation was 12.2% (95%CI: 2.5-21.9)¹.

In a study by Horowitz⁹ it was found that 50% of patients with perforated duodenal ulcer had a prior history of NSAIDs use. In another study by Lanis¹⁰ it was found that use of aspirin was associated with 70% of upper gastrointestinal perforations versus 26.9% of controls .

Recent studies using histopathological methods of *H. pylori* detection have shown that *H. pylori* prevalence in patients with perforated duodenal ulcers ranges from 50%-80%¹. A randomized controlled trial in 2008 involving 65 patients who underwent simple closure of a perforated duodenal ulcer showed one year ulcer recurrence rate of 6.1% in *H. pylori* treated patients as opposed to 29.6% in the control groups^{1, 5}

Phillip L Chalya,et.al ,Tanzania, reported other risk factors included alcohol consumption and smoking in 72(85.7%) and 54 (64.3%) patients respectively. Most patients who smoked also took alcohol

As reported by a study done by Phillip L Chalya et.al the commonest presenting symptoms were sudden onset of severe epigastric pain in 82 (97.6%), abdominal distention in 64 (76.2%) and vomiting in 31(36.9%) patients. Abdominal tenderness and classical signs of peritonitis were demonstrable in 74 (88.1%) and 56(66.7%) patients respectively. Fifty-eight (69.0%) patients reported no previous history of treatment for peptic ulcer disease

A study done by Chalya PL et.al involving 84 patients with PPU reported that the commonest presenting symptoms were sudden onset of severe epigastric pain (97.6%), abdominal distention (76.2%) and vomiting (36.9%)^{2,8}. Abdominal tenderness and classical signs of peritonitis could be elicited in 88.1% and 66.7% of the patients with PPU in this study. Other symptoms also included nausea (35.7%), severe dyspepsia (33.3%), constipation (29.8%) and fever (21.4%)¹

As reported by G. Bas, R. Eryilmaz WBC count was normal in 18 patients (19%), between 10 000-15 000/mm³ in 47 patients (48%), and more than 15 000/mm³ in 32 (33%) patients (p = 0.502).

Sepsis is frequently present and a leading cause of death in patients with PPU. An estimated 30–35% of patients with PPU have sepsis on arrival at the operating theatre, and sepsis is believed to account for 40–50% of fatalities. Within 30 days of surgery more than 25% of the patients develop septic shock,⁷ which carries a mortality rate of 50–60%. Accordingly, investigation and interventions aimed at preventing, detecting, and treating sepsis in PPU patients may reduce mortality and morbidity. This can be accomplished by systematically assessing for signs of sepsis and treating according to the principles of the Surviving Sepsis Campaign, including fluid resuscitation, cultures, empirical broad-spectrum antibiotics, and source control⁷.

Studies have shown that about 40%-80% of PPU will seal spontaneously with conservative management and overall morbidity and mortality are comparable^{1,7}

Conservative management “Taylor method” consists of nasogastric suction, intravenous drip, antibiotics and repeated clinical assessment. A gastrograffin dye study is essential to confirm absence of leakage in patients selected for non-operative management. If patients are clinically stable and improving, especially with a sealed perforation, surgery may not be warranted. However, if they deteriorate, regardless of the presence and size of the leak, urgent operation is indicated. A Randomized controlled trial involving 83 patients compared the outcome of non-operative treatment with that of operative intervention in patients with PPU⁷. Cefuroxime, ampicillin and metronidazole were administered to all patients. Seventy-two point five percent

(29/40) of patients in conservative group showed clinical improvement and were successfully managed without surgery. Another study looking at 82 patients who were treated conservatively also showed that 54% of the patients (44/82) showed clinical improvement and did not require a surgical intervention. The advantages of conservative management include avoidance of surgery, risks of general anesthesia and post-operative complications.

A delay to surgery has been a consistent factor related to mortality⁷ Laparotomy with closure of the perforation using interrupted sutures with or without an omental pedicle on top of the closure has been the main approach for decades. Laparoscopic repair of perforated ulcers is increasingly used, reaching 30–45% in recent series.⁷ A recent US study reported <3% of PPU patients treated by laparoscopy⁷

Sometimes a perforation may be too large (i.e. >2 cm) or the inflamed tissues too friable to allow for a safe primary suture. Also, if a leak follows an attempt at primary repair, a second repair may not be feasible. In these instances, resection may be a safer option. Notably, large gastric ulcers or persistent leaks should raise the suspicion of malignancy, which may be encountered in up to 30% in this situation.⁷ The surgical strategy may then involve resection (distal gastrectomy for gastric ulcer or, formal gastric resections if malignancy is suspected), gastric partition with a diverting gastrojejunostomy (if located in the pyloric region), or placement of a T-drain if located in duodenum.⁷ In Japan, some report a higher number (up to 60%) of PPU patients treated by gastric resections rather than primary suture,⁷ possibly based on tradition and the much higher incidence of gastric neoplasia in Japan.

Age more than 60 years old, delayed treatment greater than 24 h, shock at presentation with systolic blood pressure less than 100 mmHg and concomitant diseases are the main risk factors influencing outcome¹⁻¹⁰ A study done at Jaipur, India, showed preoperative shock was seen in 53(29.4%) patients and 118(65.6%) patients presented to the hospital after 24 hours of onset of acute abdominal pain. Associated chronic medical illness was seen in 27(15%) patients¹⁴

Post-operative complications have been reported at around 30%¹. Complications after surgical closure of PPU include surgical site infection, pneumonia, intraabdominal collection/abscess, wound dehiscence, enterocutaneous fistula, peritonitis, incisional hernia and ileus. In same study mentioned above Postoperative complications were seen in 79(43.9%) patients. The most common complications were chest infection and wound infection. It was noted that occurrence of postoperative complications was significantly associated with age > 60 years, delayed

presentation in the hospital, preoperative shock and presence of concomitant illness¹⁴. A study has shown the commonest post-operative complications were surgical site infections (48%) and pneumonia (28%)¹. Another study done at Singapore showed Intra-abdominal collection, leakage and reoperation rates were 8.1%, 2.1% and 1.2% respectively¹⁵. A more recent study involving 726 PPU patients between 2011 and 2013 in Denmark indicated the most common postoperative complications were post-operative leak (5.9%) and wound dehiscence (4.7%)¹. Another study assessing postoperative complications in 96 patients reported that a total of 29 patients developed a total of 50 events of postoperative complications.¹ The most common complications were surgical site infection (32%), respiratory complications (30%), wound dehiscence (12%) and postoperative fistula (8%). Each additional complication was estimated to prolong hospital stay by 1.25 d¹

As reported K. Anbalagan and Jasneet Singh the mortality of patients for PPU reaches to 7% and 40%.

As mentioned in Tanzanian, Singapore, India factors that lead to death are presence of shock at admission, co-morbidities, resection surgery, female, elderly patients, a delay presentation of more than 24 h, metabolic acidosis, acute renal failure, hypoalbuminemia, being underweight and smokers^{1,7,5}

The mortality rate is as high as 12%-47% in elderly patients undergoing PPU surgery^{1,7} Patients older than 65 year-old were associated with higher mortality rate when compared to younger patients (37.7% vs 1.4%)¹ A study involving 96 patients with PPU also showed that there was a nine fold increase in postoperative complications in patients with comorbidities¹ In another large population study, patients with diabetes had significantly increased 30-day mortality from PPU^{1,7}

3 objectives

3.1. General objective

To determine complications and mortality of PPU with factors affecting it at SPHMMC

3.2. Specific objective

1. To determine complications of patient operated for perforated peptic ulcer disease
2. To identify factors associated with operative complication of patient with perforated peptic ulcer disease
3. To identify factors associated with operative mortality of patient operated for perforated peptic ulcer

4. Methodology

4.1 Study area and period

The study was conducted in St. Paul's Hospital Millennium Medical College, which is found in Addis Ababa city, the capital of Ethiopia. St' Paul's hospital was built in 1969 by Emperor Haile Selassie in collaboration with German evangelical church, as a source of medical care for underserved population. SPHMMC is a teaching tertiary referral hospital with approximately 392 in-patient beds of which more than 100 beds are in surgical wards with an annual average of 200,000 patients and catchment population of more than five million. There are over 1300 clinical and non-clinical staffs in over 13 departments.

The study was conducted from January/ 2018 to August /2018 by revising a five year data of patient card registry from January 2013 to December 2017.

4.2 Study design

Retrospective study design was used to assess factors determining management outcome of patients operated for perforated PUD at SPHMMC

4.3. Source population

All adult emergency laparotomy performed for PPUD in the department of surgery at SPHMMC in the study period.

4.4. Study population

All adult emergency laparotomy performed for PPU in the department of surgery at SPHMMC in the study period.

4.5. Inclusion and exclusion criteria

The inclusion criteria for the study includes

1. Patients operated for perforated PUD in the specified period with complete documentation

Exclusion criteria

1. Perforations caused by other than PUD (tumor, trauma)
2. Patients with incomplete documentation
3. Patient age <15 years (considering age <15 as pediatrics)

4.6 sampling procedure and sample size calculation

All patients operated for perforated PUD on the time period specified with complete documentation was analyzed

4.7 study variables

Dependent variable

Surgical site infection

Wound dehiscence

Post-operative collection

Death

Independent variables

- Age
- Sex
- History of alcohol ingestion
- History of smoking
- History of NSAID use
- History of dyspepsia
- Duration of medical illness
- Comorbid illness
- Shock at presentation
- site of perforation
- Type of procedure done
- Use of drain
- Amount of fluid sucked
- Size of perforation

4.8. Operational definition

Early admission patients admitted operated within 24 hours

Late admissions patients operated after 24 hours

The duration of symptom the time span between the initial pain perception due to perforation and visit to hospital

4.9 Data collection and analysis procedures

4.9.1 Data collection instrument

Patients' card number was retrieved from operation room (OR) log book and computer system registration. The patients' card was collected from record office and information was gathered using data abstracting checklist from the information recorded on the card.

4.9.2. Data collector

Data was collected by four final year medical student after they were provided with a one day training on how consistently fill the checklist appropriately by the principal investigator and they were supervised by the principal investigator throughout the data collection period.

4.9.3 Data quality assurance. Various precautions and appropriate data quality control mechanism was mainstreamed in all data management process to assure quality of data. These include pre testing data collection tool, intensive training of data collector, close supervision of data collection process, verification of completeness, and double entry of data

4.9.4 Data processing and analysis

After checking data for completeness and consistency, it was entered into Epi Data software. The entered data was cleaned and exported to SPSS version 23 for analysis. Different frequency tables, graphs and descriptive summaries were used to describe the study variables. Chi square analysis was carried out to identify possible association between dependent and independent variables.

4.10 Data dissemination procedure

The final outcome of this study will be disseminated to all stake holders including the department of surgery, to the college management and the college community, to ministry of health and any interested party using written form and oral presentation. In addition it will be presented to different scientific conferences nationally and internationally and an attempt will be made to publish on reputable journal to address the scientific community world wide

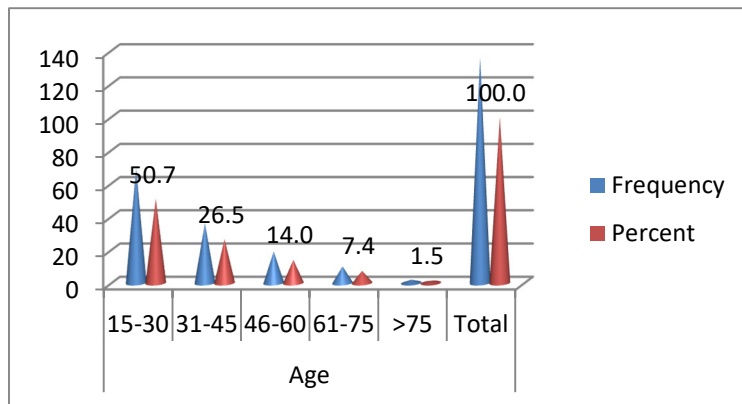
4.11 Ethical clearance

Ethical clearance was obtained from SPHMMC, IRB (Institutional Review Board) permission and written consent was taken from the college management and oral consent was taken from record office department to collect the patient cards. Confidentiality was assured by coding the patient card upon collection of the cards using the codes throughout the study.

5. RESULT

During the study period, 146 patients underwent emergency laparotomy for perforated peptic ulcers. Of these, 10 patients were excluded from the study due to incomplete data and failure to meet the inclusion criteria with this response rate was 93%. Thus, 136 patients were enrolled in the study

A total of 136 patients, 115 (84.6) men and 21 (15.4) women were enrolled in the study. There was a male preponderance with a ratio of 5.5 to 1. The mean and median age of patients was 36.05 ± 16.56 and 30 years respectively. The peak incidence was in the 15-30 years. The majority of patients, 105 (77.2%) were younger than 45 years. Eighty two (60.0%) patients reported previous history of dyspepsia or history of treatment for peptic ulcer disease. Twenty four (47.05%) patients reported history of recent ingestion of alcohol other risk factors recorded included chewing chat and smoking in 12/25 (48%) and 16/46 (34.7%) patients respectively. Five patients had comorbidities these includes diabetes mellitus, bronchial asthma, chronic liver disease, congestive heart failure and RVI Half (50.7) of the patients were from Addis Ababa the rest were from out of Addis.



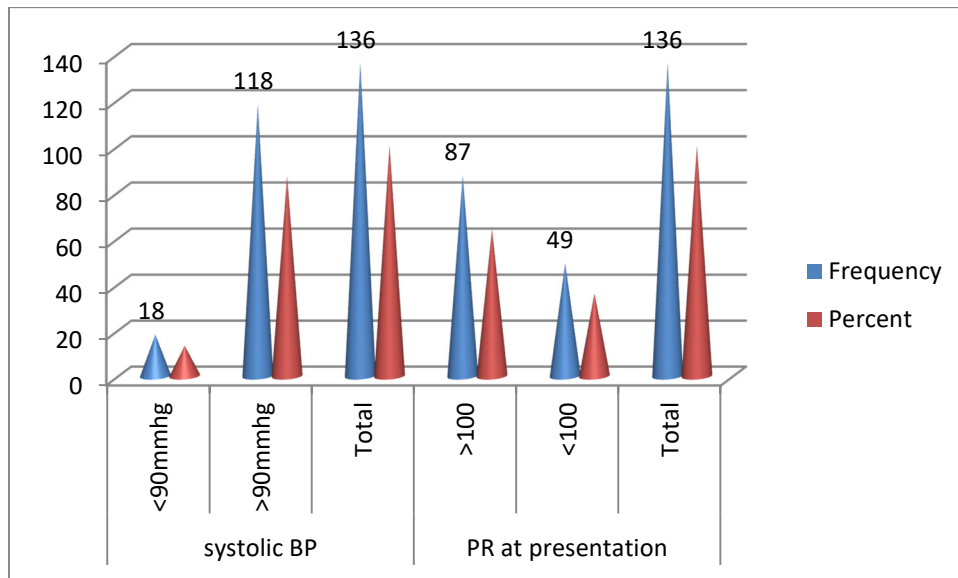
graph1 ;agedistribution of PPU operated at SPHMMC from January 1/2013- December 31/2017

		Frequency	Percent
Comorbid Illness	Yes	5	3.7
	NO	131	96.3
	Total	136	100.0
Smoking History	yes	16	11.8
	No	30	22.1
	Unknown	90	66.2
	Total	136	100.0
history of chewing chat	yes	12	8.8
	no	13	9.6
	unknown	111	81.6
	Total	136	100.0
hx alcohol ingestion	yes	24	17.6
	no	27	19.9
	unknown	85	62.5
	Total	136	100.0
HX of NSAIDS use	yes	2	1.5
	no	13	9.6
	unknown	121	89.0
	Total	136	100.0
hx of dyspepsia	yes	82	60.3
	no	18	13.2
	unknown	36	26.5
	Total	136	100.0
hx of dyspepsia treatment	yes	68	50.0
	no	29	21.3
	unknown	39	28.7
	Total	136	100.0

Table 1risk factorsand comorbidities of PPU operated at SPHMMC from January 1/2013-December 31/2017

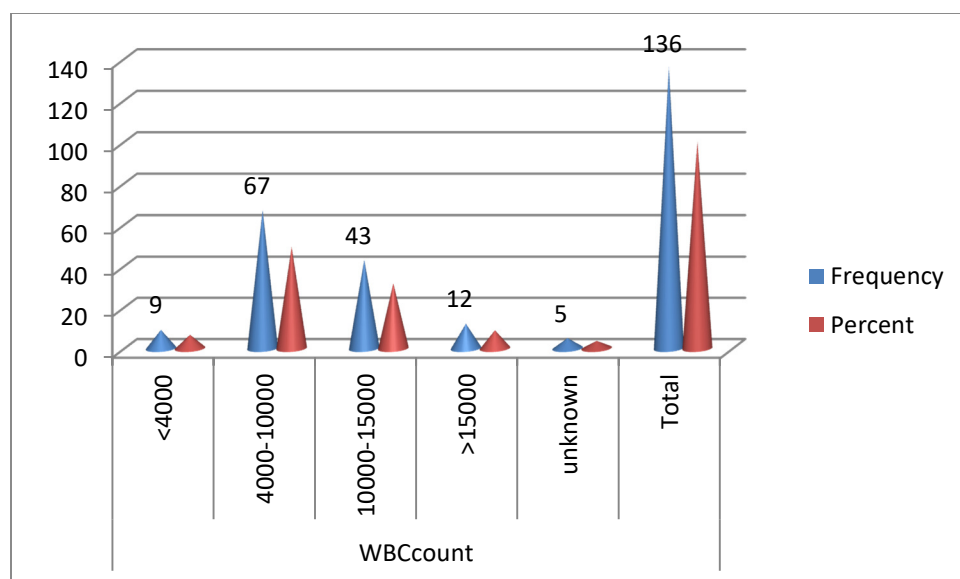
The duration of symptoms ranged from 1 to 8 days with a mean duration of 2.11 ± 1.67 days.

The median duration of their illness at presentation was 1.75 days. 71 (52.2%) of patients presented after twenty-four hours of onset of symptom, the rest 65 (48.7%) of patients present within 24 hours of onset of symptoms. All the 136 (100%) of patients presented with sudden onset of severe abdominal pain, nausea and vomiting. Eighteen (13%), eighty seven (64%) of patients present with shock with systolic BP < 90 mmHg and tachycardia with PR > 100 beats/minute respectively. Abdominal tenderness was demonstrable in 136 (100%) patients.



Graph 2 vital sign of patient PPU; operated at SPHMMC from January 1/2013- December 31/2017

WBC count was normal in 67 patients (49.3%), fifty five (40.3%) of patients had leukocytosis of WBC > 10000 /mm³, nine (6.6%) patients had leucopenia of WBC less than 4000/mm³ and the rest five patients (3.7%) their WBC count not known.



Gragh3; WBC count of patient PPU operated at SPHMMC from January 1/2013- December 31/2017

Most perforations were located on the duodenum (117, 86%), whereas in the fifteen (11%) patients had their ulcers located on the stomach. The remaining four patients had spontaneously sealed duodenal perforation. The duodenal to gastric ulcers ratio was 8.06: 1. The median size of the ulcer was 5 mm. Four (3.6%) of the perforations were found to be sealed. Eighty-eighth (64.7%) of the perforations were of minimal size (≤ 5 mm), eight (5.9%) were massive (>10 mm) and the rest thirty five (25.7) patients had perforation of size between 0.5-1cm. The amount of peritoneal fluid varied from 10 to 6000 mls with a mean and median of 1293 and 1000 mls respectively.

The majority of patients, 126 (92.6%) had Graham's omental patch of the perforations with either a pedicled omental patch or a free graft of omentum. Four patients with sealed perforations had peritoneal lavage with warm saline and closure of the abdomen. Another four patient had simple closure with G-J the rest two patients had simple closure of the perforation. Sub hepatic drain was left eight four (61.8%) patients.

Sixty six post-operative complications were recorded in thirty one (22.8%) of the patients. Of these, superficial surgical site infection (30.3%) was the most common post-operative complications. The other complications recorded in the patients were wound dehiscence (15.15%), respiratory infections (24.24%), post-operative collections (18.18%), acute kidney injury (10.6%), repair site failure (3.7%) and ECF (2.2%). The mean age of patients who developed complications was 40.18 ± 17 years, whereas the mean age of patients without complications was 34.7 ± 16.2 years. This age difference was statistically significant ($P= 0.027$). The details of postoperative morbidities are shown in Table 2.

The being female, presence of comorbidity, hypotension with SBP <90 mmHg, tachycardia, and delayed presentation >24 hrs were significant associated with post-operative morbidity ($P < 0.05$). Of the six patients with comorbid illness five of them developed post-operative complications ($p < 0.02$). The first patient with diabetes developed SSSI, wound dehiscence, post-operative collection and repair site leak the patient died after four days of hospital stay. The other patients with RVI and CLD developed post-operative collection, wound dehiscence and HAP both of them

died at nine and eleven days of hospital stay. The other two patients were having B.astma and congestive heart failure, the patient with asthma developed SSSI he was discharged improved after nine days of hospital stay. Only patient with CHF discharged without complications. 35% of patients presented after 24 hours of their illness developed post-operative complications as compared to only 9% of patients presented within the first 24 hours , which has significant association (p0.001).The other factors that significantly related with morbidity was presence of hypotension.44% of patients with hypotension developed complications as compare to only19% of patients without hypotension(p 0.024)

		Frequency	Percent
superficial surgical site infection	yes	20	14.7
	no	116	85.3
	Total	136	100.0
wound dehiscence	yes	10	7.4
	no	126	92.6
	Total	136	100.0
post-operative collection	yes	12	8.8
	no	124	91.2
	Total	136	100.0
ECF	yes	3	2.2
	no	133	97.8
	Total	136	100.0
hospital acquired pneumonia	yes	16	11.8
	no	120	88.2
	Total	136	100.0
Repair site leak	yes	5	3.7
	no	131	96.3
	Total	136	100.0

Table 2post-operative complications of PPU operated at SPHMMC from January 1/2013-December 31/2017

Post-operative complications with associated factors					
		complications		Total	P value
		yes	no		
gender	M	21	94	115	.005
	F	10	11	21	
total		31	105	136	
Comorbid Illness	Yes	4	1	5	0.016
	NO	27	104	131	
Total		31	105	136	
length of pre op stay	<24 hrs	6	59	65	0.001
	>24 hrs	25	46	71	
Total		31	105	136	
PR	>100b/min	28	59		0.002
	<100b/mi	3	46	49	
total		31	105	136	
systolic BP	<90mmhg	8	10	18	0.024
	>90mmhg	23	95	118	
Total		31	105	136	

Table3 factors associated with complication of PPU operated at SPHMMC from January 1/2013- December 31/2017

A total of 9 patients (6.6%) died at the hospital postoperatively. MOF secondary to sever sepsis was the most common causes of mortality. The mean age of the mortality group was 52±14.2 years and was higher than the living group (mean 34.9 ±16years). The average age of patient with mortality group was significantly higher (P,0.005).

Among the patients who died postoperatively, 3 patients (33.3%) had comorbidities. Having acomorbid disease increased the risk of mortality (P, 0.001). Late presentation (>24hrs) and hypotension had no statistically significant effect on mortality (P,0.06). Development of post-operative complications significantly increase the mortality rate (p0.001)

The post-operative hospital stay of patient with complication is 24.16 ± 26 days significantly high as compared to without complication 6.7±22 days (p, 0.001)

		was the patient died		Total	P value
		yes	no		
age	<45	3	101	104	0.005
	>45	6	26	32	
total		9	121367		
Comorbid Illness	Yes	3	2	5	0.001
	NO	6	125	131	
Total		9	127	136	
length of pre op stay	<24 hrs	3	62	65	0.36
	>24 hrs	6	65	71	
Total		9	127	136	
systolic BP	<90mmhg	3	15	18	0.083
	>90mmhg	6	112	118	
Total		9	127	136	
number of morbidities	yes	8	23	31	0.001
	no	1	104	105	
Total		9	127	136	

Table4 factors associated with mortality of PPU operated at SPHMMC from January 1/2013-December 31/2017

6. Discussion

In this study a total of one hundred thirty six patients were operated on for gastroduodenal perforations. This gives an average of almost twenty-seven cases annually. This figure is slightly higher in incidence than those described in Irrua Nigeria and Tanzania ^{8, 13}

These differences reflect differences in the rate of risk factors for perforated peptic ulcer disease from one country to another. The figures in our study may actually be an underestimatethe magnitude of the problem.

We find that peptic ulcer perforation is predominantly a male affliction as males outnumbered females by a ratio of 5.5 to 1. This finding is consistent with several others studies from BLH and Africa which confirm a male preponderance from a low 1.3: 1 in Bugando, Tanzania⁸ to a high ratio of 9 : 1, Muhimbili , Nigeria.⁵ It is contrary to the common depiction in western series as a disease of the elderly female

It was also observed that PPU was commonly occurred in much younger age group which is in conformity with studies done Côte d'Ivoire¹², Nigeria¹³ with a median age of 34 and 48 years respectively. In this study 77.2% of patients are younger than 45 years. This may be attributed to demographic profile of high H.pylori infection, smoking, alcoholic beverages in younger age group in men thus increasing the risk of PPU in young adults.

In agreement with other studies ^{3,13}, Ersumo Tet al ethiop, Nuhu et al in Nigeria who reported that 78% and 71% of cases had previous history of peptic ulcer disease, more than sixty percent of patients had past history suggestive of peptic ulcer disease and those with a known history of PUD were on treatment.

In studies done at turkey¹⁸ Singapore¹⁵ and ivory¹² coast showed delayed presentation after 24 hrs increase both post-operative complication and mortality. In our study most of patients presented late more than 24 hours from the start of symptoms. This is in agreement with studies done at BLH³, Tanzania⁸ where more than 95% and 35% of patients present after 48 hrs onset of their illness respectively. Late presentation in our study may be attributed to lack of accessibility to health care facilities and lack of awareness of the disease. Patients may take medications in the pre-hospital period with hope that the symptom will abate. It is also possible that some clinicians managing the patients initially may not have considered perforation as a possible diagnosis

Most of our patients had classical presentation with sudden onset of sharp epigastric pain, nausea, vomiting, abdominal tenderness; this finding is consistent with study done at zewditu² hospital where 100% of patient presents with abdominal pain. But the finding is higher as compared to studies done in Tanzania where they found abdominal pain 97%, vomiting 37%, tenderness on 88% of patients.

In contrary to studies done in Côte d'Ivoire¹² Singapore¹⁵ were the reported associated co morbid illness of 73%, 16% , the number of comorbid illness in our study is only 3.7%. This value has

consistency in a study done at Tanzania⁸ where they reported 7% associated comorbid illness. We couldn't explain this disparity.

In our study, duodenal ulcer perforation was the most common type of perforation with a duodenal to gastric ulcer ratio of 10.6:1. This is comparable to a study in zewditu memorial, Tanzania, Singapore which reported a duodenal to gastric ulcer ratio of 8.5:1, 12.7:1, 7.7:^{18,1,2} respectively. A study done Iru Nigeria reported high incidence of gastric ulcer perforations than duodenal ulcer perforation with 2:1¹³. There was no obvious explanation to account for these duodenal to gastric ulcer ratio difference.

In this study, Graham's omental patch of the perforations with either a pedicled omental patch or a free graft of omentum was the operation of choice in our center. Similar surgical treatment pattern was reported in Tanzania, Jaipur India^{8, 14}

Overall complications rate in this series was 22.8% which is comparable to what was reported by SoroKountele, Côte d'Ivoire, Phillip L Chalya, and Tanzania 27.5% and 29.8% complications respectively.

In our study respiratory infection (24%) and SSSI (30%) wound dehiscence (15%) and leak (3.7%) were the commonest complications, which is in consistency with a study done by Jasneet, New Delhi, India, where he reported superficial Surgical site infection (28%) and pneumonia (30%), wound dehiscence (20%) leak (6%).

Inconsistency with studies mentioned previously in Tanzania and Côte d'Ivoire, this study showed morbidity rate was high in patients who had, delayed presentation (>24 hrs), shock at admission (systolic BP < 90 mmHg), and concomitant diseases.

In contrary to studies done at New Delhi, India (14%), Tanzania (10.7%), Iru, Nigeria (17.3%) the mortality rate in our study is low (6.6%). We couldn't explain except possibility of low comorbid disease in our patients.

And mortality was high in patients who had age ≥45 years and concomitant diseases, which is in agreement with study done by Phillip L Chalya Tanzania

The average hospital stay of the patients was 10.7 days which has slight improvement as compared with perforated peptic ulcer disease at zewditu hospital 14.5 days. The development of post-operative complications significantly increase hospital stay (24) days as compared with a patient without complications (6.7) days

The limitation of this study include many patients was excluded from the study

7. Conclusion

Mortality and complication rate of the study was 6.6 and 24.8% respectively

Surgical site infection, pneumonia, post-operative collection, wound dehiscence, AKI, leak were common complications detected

Advanced age, comorbidities, late presentation and hypotension are the most important factors affecting patient outcome in PPU.

8. Recommendation

Increasing patient awareness on importance of early presentation to the health facility is paramount important in reducing post-operative complications

Post-operative analgesic chest physiotherapy and appropriate wound care may decrease post-operative complications.

9. References

1. Kin Tong Chung, Vishalkumar G Shelat. Perforated peptic ulcer - an update. *World J Gastrointest Surg* 2017 January 27; 9(1): 1-12
2. Ersemo Tetal. perforated peptic ulcer in tikur Anbesa Hospital: a review of 74 cases. *Ethiop Med J*. 2005
3. Asefa Z, et al perforated peptic ulcer disease in Zewditu Hospital. *Ethiop Med J* 2012
4. Mutlu Unver¹, O'zgu' r Fırat², O'mer Vedat U'nalp², Alper U'guz², Tufan G'um' us², Taylan O'zgu' r Sezer², Sxafak O'ztu' rk², Tayfun Yoldas², Sinan Ersin², Adem G'uler². Prognostic Factors in Peptic Ulcer Perforations: A Retrospective 14-Year Study. *Int Surg* 2015; 100: 942–948
5. NGERAGEZA J. G, MD. FACTORS ASSOCIATED WITH PEPTIC GASTRODUODENAL ULCER PERFORATIONS IN ADULT PATIENTS AT MUHIMBILI NATIONAL HOSPITAL
6. İlhan Taş¹, Burak Veli Ülger², Akın Önder², Murat Kapan², Zübeyir Bozdağ². Risk factors influencing morbidity and mortality in perforated peptic ulcer disease. *Ulusal Cer Derg* 2015; 31: 20-5
7. **Prof. Kjetil Søreide, MDa,b,* , Mr. Kenneth Thorsen, MDa, Mr. Ewen M. Harrison, MB, ChBc, Prof. Juliane Bingener, MDd, Mr. Morten H. Møller, MDe, Prof. Michael Ohene-Yeboah, MBChBf, and Prof. Jon Arne Søreide, MDa,b. Perforated peptic ulcer.** *Lancet*. 2015 September 26; 386(10000): 1288–1298. doi:10.1016/S0140-6736(15)00276-7.
8. Phillipo L Chalya^{1*}, Joseph B Mabula^{1†}, Mheta Koy^{2†}, Mabula D Mchembe^{3†}, Hyasinta M Jaka^{2†}, Rodrick Kabangila^{2†}, Alphonse B Chandika^{1†} and Japhet M Gilyoma^{1†}. Clinical profile and outcome of surgical treatment of perforated peptic ulcers in Northwestern Tanzania: A tertiary hospital experience. *World Journal of Emergency Surgery* 2011, 6:31
9. **Jasneet Singh Gulzar*, Shivani B. Paruthy, Satya Vrat Arya. Improving outcome in perforated peptic ulcer emergency surgery by Boey scoring.** *International Surgery Journal Gulzar JS et al. Int Surg J*. 2016 Nov; 3(4): 2120-2128
10. Kenneth Thorsen^{1,2}, Jon Arne Søreide^{1,2} and Kjetil Søreide^{1,2*} Scoring systems for outcome prediction in patients with perforated peptic ulcer *Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine* 2013, 21:25
11. Kenneth Thorsen & Jon Arne Søreide & Kjetil Søreide. What Is the Best Predictor of Mortality in Perforated Peptic Ulcer Disease? A Population-Based, Multivariable Regression Analysis Including Three Clinical Scoring Systems *J Gastrointest Surg* (2014) 18:1261–1268
12. Soro Kountele Gona,¹ Mahassadi Kouamé Alassan,² Koffi Gnangoran Marcellin,¹ Kissi Ya Henriette,² Coulibaly Adama,¹ Assouhoun Toussaint,¹ Ehua Adjoba Manuela,¹ Seu Gagon Sylvain,¹ Afum-Adjei Awuah Anthony,³ and Ehua Somian Francis⁴ Postoperative Morbidity and Mortality of Perforated Peptic Ulcer: Retrospective Cohort Study of Risk Factors among Black Africans in Côte d'Ivoire *Hindawi Publishing Corporation Gastroenterology Research and Practice* Volume 2016, Article ID 2640730, 7 pages

13. A. E. Dongo,^{1,2} O. Uhumwagho,^{1,2} E. B. Kesieme,^{1,2} S. U. Eluehike,^{2,3} and E. F. Alufohai^{1,2} A Five-Year Review of Perforated Peptic Ulcer Disease in Irrua, Nigeria *Hindawi International Scholarly Research Notices* Volume 2017, Article ID 8375398, 6 pages
14. Abhishek Agarwal, Sanchit Jain, LN Meena, Sumita A Jain, Lakshman Agarwal. A Five-Year Review of Perforated Peptic Ulcer Disease in Irrua, Nigeria. *Hindawi International Scholarly Research Notices* Volume 2017, Article ID 8375398, 6 pages
15. K. Anbalakan a, D. Chua a, G.J. Pandya a, V.G. Shelat a, b, *. Five year experience in management of perforated peptic ulcer and validation of common mortality risk prediction models e Are existing models sufficient? A retrospective cohort study *International Journal of Surgery* 14 (2015) 38e44J.
16. Fallah Moses a,*, Christopher D. Hughes b,c,d, Pratik B. Patel b,c, Tiffany E. Chao b,c,e, Solomane A. Konneha, Torsou Y. Jallabah a, Michael Kiiza Kikubaire a, John G. Mearab,c, Lars E. Hagander b,c,f Surgical outcomes for perforated peptic ulcer: A prospective case series at an academic hospital in Monrovia, Liberia. *African Journal of Emergency Medicine* (2015) 5, 60–65
17. Carlos Nogueira, M.D.,¹ Ant6nio Se'rgio Silva, M.D.,¹ Jorge Nunes Santos, M.D.,¹ Ant6nio Gomes Silva, M.D.,¹ Joaquim Ferreira, M.D.,¹ Eduarda Matos, H.S.T.,² Hernani Vilac,a, M.D.¹ Perforated Peptic Ulcer: Main Factors of Morbidity and Mortality *World J. Surg.* 27, 782–787, 2003.
18. G. Bas, R. Eryilmaz, I. Okan, M. Sahin. Risk Factors of Morbidity and Mortality in Patients with Perforated Peptic Ulcer. *Acta Chir Belg*, 2008, **108**, 424–427
19. Abebe Bekele, Seyoum Kassa, Mulat Teye. The Jejunal Serosal Patch Procedure: A Successful Technique for Managing Difficult Peptic Ulcer Perforation *ISSN 2073-9990 East Cent. Afr. J. surg.* 17 October 2017.

10. ANNEXES

10.1 Annex data extraction tools

Data extraction tools for assessment of clinical presentation risk factor morbidity and mortality of patients operated for perforated PUD retrospective study from January 2013 to 2018

1

Ser.no	Part one Socio demographic characteristics		Remark
1	Medical registration number	.....	
2	date of presentation	.....	
3	Age in years	.....	
4	Sex	1. Male 2. Female	
5	Region	1. Addis Ababa 2. Oromia 3. SNNP 4. OTHERS	
6	Place of residence	1. urban 2. rural	
7	Religion	1. Orthodox 2. Muslim	

		3. Protestant 4. Others.....	
8	Level of education	1.uneducated 2.elementary 3.high school 4 college completed	
9	Occupation	1.unemployed 2.farmer 3.gov"employee 4. self-employee 5.Other specifies	
10	Comorbid illness	1. Hypertension 2. Diabetes mellitus 3. RVI 4. Cardiac disease 5. Respiratory illness 6. Others.....	
11	History of smoking	1. Yes 2. No	
12	HX OF CHEWING CHA	1.YES 2.NO	
13	history of chronic alcohol injection	1.yes 2.no	
14	Hx of NSAID USE	1. YES 2. NO	
14	History of dyspepsia	1 yes 2 no	
13	History of previous dyspepsia treatment	1. YES 2. NO	
	Part two Clinical presentation		
201	Duration of illness	.....	
202	Abdominal pain	1. Yes 2. No	
203	Vomiting	1. Yes 2. no	
204	Nausea	1. yes 2. no	
205	Abdominal tenderness	1. yes 2. no	
206	Systolic BP at presentation	.....	
207	pulse rate at presentation	.....	
207	Fever	1. Yes 2. No	

208	Abdominal distension	1. Yes 2. No	
	Part three intra operative finding		
301	Site of perforation	1. first part of duodenum 2. antral part of the stomach 3. body of the stomach 4. second part of duodenum 5. other	
302	Amount of GI content sucked out	LT	
303	Drain left	1. YES 2. NO	
304	If yes for Q303 where	.....	
305	Type of procedure done	1. Grams omental patch 2. Direct closure 3. TV and drainage 4. Other (specify)	
306	Size of perforation	.....	
307	Type of fluid sucked out	1. GI CONTENT 2. Purulent 3. Pus mixed with GI content	
	PART FOUR LABORATORY STUDYS		
401	BLOOD GROUP	.....	
402	WBC count	.....	
404	HGB	.....	
405	Creatinine BUN	..... .....	
406	ALT AST	..... .....	
407	WHAT TYPE ANTIBIOTICS received	1.CETRIAXONE 2.METRONIDAZOLE 3. OTHERS SPECIFY.....	
	Part 5 post-operative complications		
501	Superficial SSI	1. Yes 2. No	
502	Wound dehiscence	1. Yes 2. No	
503	Sepsis	1. YES 2. NO	
504	ECF	1. YES 2. NO	
505	intra-abdominal abscess	1.YES 2.NO	
506	ARF	1.YES 2 .NO	
507	respiratory infection(ARDS)	1. YES 2. NO	

508	Generalized peritonitis	1.yes 2.no	
509	Post-operative ileus	1.yes 2.no	
510	Was the patient transferred to ICU	1.yes 2.no	
511	If yes for Q 510 what was the reason	1 ARF 2 SEVER SEPSIS 4. SEPTIC SHOCK 5 OTHER SPESFEY	
512	LENGTH OF HOSPITAL STEY IN DAYS	DAYS	
513	IF THE PATEINT DEID CAUSE OF DEATH	.....	
514	WHEN WASE THE DEATH	.....	

Declaration

I undersigned declared that this research paper is my original work and all the materials used for this study have been fully acknowledged

Name of student Dr. Mekbib Birega (MD, General surgery resident)

Signature.....date.....

The student research paper has been submitted for examination with our approval

Advisor 1 Dr Mekdim Tadesse (G.Surgeon, renal transplant surgeon)

Signature.....Date.....

2 Dr Henok Teshome (assistant professor of G.surgery)

Signature.....Date.....