Clinical Presentation and Surgical Management of Peptic Ulcer Perforation in a Tertiary Hospital in Mogadishu- Somalia: A 5 Years Retrospective Study

Abdihamid Mohamed Ali (✉ abdihamidmohamed10@gmail.com)

Mogadishu Somali Turkey Recep Tayyip Erdoğan Training and Research Hospital

Abdulkadir Nor Mohamed

Mogadishu Somali Turkey Recep Tayyip Erdoğan Training and Research Hospital

Yahye Garad Mohamed

Mogadishu Somali Turkey Recep Tayyip Erdoğan Training and Research Hospital

Salim İdris Keleşoğlu

Mogadishu Somali Turkey Recep Tayyip Erdoğan Training and Research Hospital

Research Article

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Abstract

Background: Peptic ulcer perforation is a common surgical emergency condition worldwide, which is associated with significant morbidity and mortality if early diagnosis and immediate surgical management was not carried out. Perforation occurs in roughly 5% of PUD patients during their lifetime.

Methods: A 5 years Retrospective observational study on the clinical Presentation and Surgical Management of Peptic Ulcer Perforation in a Tertiary Hospital in Mogadishu- Somalia, department of General Surgery from January 2017 to December 2021. We included all patients undergoing operations with an intra-operative confirmed diagnosis of peptic ulcer perforation at the general surgery department. For operated patients, follow-up evaluation was performed in the outpatient department.

Results: Fifty-one patients underwent an emergency operation for peptic ulcer perforation during the study period. The socio-demographic distribution of patients was 45(88.2%) males and 6 (11.8%) females, giving a male to female ratio of 7.5:1.

The mean age of patients was 35.5 ± 16.8 years, and the peak frequency was in the third decade. The commonest presenting symptoms were sudden onset of severe epigastric pain in 42 (82.4%) patients. Patients who presented perforated peptic ulcer within 24 hours of initiation of symptoms were free from complications.

Age group and delayed presentation > 48 hours after onset of symptoms were linked to post-operative complications and were statistically significant ($P = 0.032$), ($P = 0.005$) respectively. Four patients died (mortality rate of 7.8%). Two patient was reoperated because of the failed primary repair and 4 patients had >5cm intra-abdominal abscess image-guided percutaneous drainage was performed and the rest antibiotic therapy according to peritoneal fluid culture and sensitivity results.

The most common microorganism isolated was *E. coli* 22% and *Klebsiella* 11%. Other rare microorganisms (*pseudomonas*, *Staphylococcus aureus*, and *Candida spp*) were identified. Half 51% of Peritoneal fluid culture no micro-organism growth was seen.

Conclusion: The distribution of peptic ulcer perforation is common in the young age group in the third decades of life. Delayed presentation of the disease is linked because most patients arrived from remote areas where proper facilities of health care and health education are not available and the patient might come to the hospital in an advanced stage of the disease. We suggest conducting further researches, health awareness related to complications over-the-counter drugs self-medication, and bad habit including smoking, and to improve health-seeking behaviors of society.

Background

Peptic ulcer perforation is a common surgical emergency condition worldwide, which is associated with significant morbidity and mortality if early diagnosis and immediate surgical management was not carried out. Perforation occurs in roughly 5% of PUD patients during their lifetime [1].

PUP is characterized by the classic triad of abrupt abdominal discomfort, tachycardia, and abdominal tenderness. "I hardly believe that anybody can fail in establishing a diagnosis," Edward Crisp mentioned in 1843 [2].

Young age group distribution is commonly seen in the developing world; which is mostly predisposed by smoking. While advanced age in developed countries, these patients tend to be elderly with multiple co-morbidities and associated use of NSAIDs, *Helicobacter pylori*, physiological stress, corticosteroids and previous history of PUD are risks factors for PPU[3,4].

Mortality Risk was associated with age more than 60 years, shock (systolic pressure <90 mmHg) at presentation, and delay presentation, (more than 24 hours before surgery). Early diagnosis, prompt resuscitation, and urgent surgical intervention are essential to improve outcomes [5].

According to the diagnostic value of radiological investigation, 75% of patients with peptic ulcer perforation free air under diaphragm was detected on erect chest/ Abdominal X-ray.

In comparison to Computed tomography scan which reveals superior diagnostic accuracy of 98%. Besides, a CT scan can help to distinguish other mimicking differential diagnoses of the acute abdomen like acute pancreatitis that would not require surgical intervention, the utility of this CT scan is justified when the clinical presentation is not specific to upper gastrointestinal pathology or malignancy is suspected and patients' hemodynamic is not deranged [6].

Exploratory laparotomy and omental patch repair remain the gold standard. Laparoscopic surgery should be preserved in the early presentation of disease and diminished associated complications. definitive surgery is significantly associated with fatal outcomes in these patients, Gastrectomy is recommended in patients with a large or malignant ulcer [7].

Methods Study

Design and study area

A 5 years Retrospective observational study on the clinical Presentation and Surgical Management of Peptic Ulcer Perforation in a Tertiary Hospital in Mogadishu- Somalia, department of General Surgery from January 2017 to December 2021.

Mogadishu Somali Turkey Training and Research Hospital is a tertiary teaching hospital situated in Mogadishu; the Capital City of Somalia.

The patients were identified and extracted from hospital electronic medical records, fifty-one patients operated on perforated Peptic Ulcer for Emergency Surgery were reviewed, where patient clinical information including patient demographic characteristics, diagnoses, investigative (laboratory and radiological) workup, performed surgical procedure, complications, hospital stay, pathology results, peritoneal fluid culture and sensitivity, and mortality. were reviewed.

We included all patients undergoing operations with an intra-operative confirmed diagnosis of peptic ulcer perforation at the general surgery department.

Those who operated in another hospital and were later referred to our hospital and those who operated in the pediatric surgery department were excluded from the study.

For all operated patients, follow-up evaluation was performed in the outpatient department.

Data analysis

We used the Stata version 15 (StataCorp, College Station, TX) statistical program to perform statistical data analysis. Data were presented in proportions and frequency tables for categorical variables. To summarize the data for continuous variables, we utilized ranges, medians, and inter-quartile ranges (IQRs). We computed P-values for categorical variables using the odds ratio (OR) and its 95% confidence interval (CI). We determined the variables associated with the outcome using logistic regression, to adjust for confounding variables, we used multivariate logistic regression and direct standardization techniques. Significant was defined as a P-value of 0.05 or less.

Results

Fifty-one patients underwent an emergency operation for peptic ulcer perforation during the study period. The socio-demographic distribution of patients was 45(88.2%) males and 6 (11.8%) females, giving a male to female ratio of 7.5:1.

According to the age group of the study population, they were ranged from 18 – 70 years, with a mean age of 35.5 ± 16.8 years. The peak frequency was in the third decade (20–30 years)

The duration of symptoms ranged from 1 to 10 days with a mean duration of 3.8 ± 1.9 days, the median was 4 days.

A hospital stay of the patients was ranged minimum of 4 days to a maximum of 20 days; the mean average admission day was 8.7 ± 3.4 days.

Majority of patients 22(43.1%) presented after 2-3 days of onset of symptoms, More than one-third of patients 19(37.3%) between present 4-5 days of onset of symptoms, 7(13.7%) presented beyond 5 days after symptoms started, only 3(5.8%) presented within 24 hours of initiation symptoms.

The commonest presenting symptoms were sudden onset of severe epigastric pain in 42 (82.4%), abdominal tenderness in 41 (80.4%), abdominal distention in 36 (70.6%), and vomiting in 31(60.8) clinical signs of peritonitis was seen 38(74.5) and <90 mmHg systolic pressure was observed 15(29.4%) patients. (Table 1)

The most common complication seen in these patients is pleural effusion which accounts for 29 (56.9%), second foremost complication noticed in this study was an acute renal failure which is about half 23 (45%) of the patients. surgical site infection was noted in nearly one-third 16 (31.4%) of the patients, only two patients encountered repair site leak. (Table 2)

Two-third of the patients 34 (66.7%) was aged <40 years, There was a positive previous history of peptic dyspepsia disease in nearly half of the patients 25 (49%). 23 patients (45.1%) had a positive history of ingestion of painkillers including non-steroidal anti-inflammatory drugs (NSAIDS). 24 patients (47.1%) gave a history of cigarette smoking. (Table 3)

Pleural effusion was significantly high in those patients with a delayed presentation in twenty out of twenty-nine patients with pleural effusion was seen in the patients that came beyond 72 hours of the onset of symptoms.(P-Value 0.013).

Patients who presented perforated peptic ulcer within 24 hours of initiation of symptoms were free from complications.

Four patients died (mortality rate of 7.8 %) (Table 4).

Graham omental repair was done nearly all the cases and only two cases of sealed perforation underwent peritoneal lavage. Two patient was reoperated because of the failed primary repair and 4 patients >5cm intraabdominal abscess image-guided percutaneous drainage was performed and the rest antibiotic therapy according to peritoneal fluid culture and sensitivity results.

The total number of patients who performed Chest/ erect abdominal x-ray was 43 patients, among this air under diaphragm were detected 27(62.8%) patients. And 45 patients performed abdominal CT scan perforation signs was observed 44(97.7%). Benign tissue inflammation was come out in performed pathology samples.

Half 51% of Peritoneal fluid culture no micro-organism growth was seen, Most common microorganism isolated was E. coli 22 % and Klebsiella 11%. other rare microorganisms (pseudomonas, Staphylococcus aureus, and Candida spp). (Figure 1).

Table 5 Demonstrates predictors of complications according to bivariate and multivariate logistic regression analysis. In keeping in mind majority of our study population was Patients less than forty years of age, complications associated with this group were statistically significant (P 0.032).

Alongside this age group, also delayed presentation > 48 hours after onset of symptoms was linked to post operative complications and it is statistically significant (P0.005).

Discussion

The distribution of peptic ulcer perforation is common in the young age group in the third decades of life similar studies in Africa and around the globe demonstrated comparable results [8-11].

Our study demonstrated a male predominance of peptic ulcer disease, where the majority of the patients were 45(88.2%) males, giving a male to female ratio of 7.5:1. related to other studies where the male: female ratio ranged from 3.3:1 and 4.5 in west Africa 5.5 in Ethiopia 9:1 in India, respectively [10,12-14].

This study revealed enormous patients with delayed presentation of the disease, this linked most patients arrived from remote areas where proper facilities of health care and health education are not available and the patient might come to the hospital in an advanced stage of the disease, related studies agreed these findings [15,16].

Long-term hospital stay was discovered as long as 20days which correlates late presentation of cases superimposed by consequence complications related to perforated peptic ulcer.

The comparable outcome was documented in various studies in the region and around the globe concluding that hospital stay and related complications of PPU including death increased in delayed(>24hours) presentation of the disease [17,18].

Positive previous history of peptic dyspepsia was observed in nearly half 25 (49%) of the patients with peptic ulcer, this might explain the inaccessibility of good health facilities and most of them may encounter non-professional health workers and traditional healers in many parts of the regions and patient will seek proper health care facility when condition get worse and patient develops severe abdominal pain and peritonism. This finding is common in developing countries as several reports stated [8,9,13].

The two Most common microorganism isolated was E. coli 22 % and Klebsiella 11%, comparable result was found in a study done in India [19].

Age less than forty years and delayed presentation was disease was found positive Predictors of complications with statistically significant according to bivariate and multivariate logistic regression analysis with p-value (0.032)(0.005) respectively. In a similar study, Both factors were observed a positive association with postoperative complications in Tanzania.⁹ There was no significant association between complications and other above-examined factors.

The mortality rate of 7.8 % of patients with perforated peptic ulcer was shown in our study, this substantial rate was worldwide reported in numerous studies 8.8%, 14%, 16.7% [20-22].

Conclusion

Peptic ulcer Perforation is still a common surgical emergency problem in our country predominantly affecting young males and associated substantial morbidity and mortality in delayed disease presentation. Early diagnosis, immediate resuscitation, and urgent surgical intervention are warranted.

Simple primary repair with an omental patch is the most appropriate and effective surgical approach in the management of perforated peptic ulcer.

Implementation of endoscopic assessment in chronic and intractable dyspepsia will improve the early detection and management of non-complicated peptic ulcer disease.

We suggest further researches, preferable a multi-center study, to determine the epidemiology, associated risk factors, and prognostic factors of the disease in our context. And to conduct health awareness related to

complications over-the-counter drugs self-medication and bad habit including smoking and to improve health-seeking behaviors of society.

Abbreviations

PUD: Peptic Ulcer Disease

PUP: Peptic Ulcer Perforation

ARF: Acute Renal Failure

NSAIDs: Non steroidal Anti Inflammatory Drugs

Declarations

Ethical approval:

Ethical approval for the study was obtained from the Hospital Ethical Committee (**MSTH/8136**).

Consent for publication:

All of the patients whose radiological and intra-operative pictures were used gave written informed consent for their anonymized data to be published in the form of a case series.

Availability of data and materials:

The data that support the findings of this study are available in Mogadishu Somali Turkey, Recep Tayyip Erdogan Training and Research Hospital information system. Data are however allowed to the authors upon reasonable request and with permission of the education and research committee.

Competing interests: authors declare that they have no competing interests.

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Authors' contributions: AMA, ANM participated in sequence alignment, study design, and data collection. AMA, YGM helped to draft the manuscript and data analysis. AMA, SIK participated in revising and data interpretation. All authors read and approved the final manuscript.

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Tables

TABLE 1: Clinical Presentation

CLINICAL PRESENTATION	FREQUENCY	PERCENTAGE
Severe abdominal pain	42	82.4
Abdominal tenderness	41	80.4
Abdominal distention	36	70.6
Vomiting	31	60.8
Classical signs of peritonitis	38	74.5
Shock on admission (SBP < 90 mmHg)	15	29.4

TABLE 2: Complications Associated With Perforated Peptic Ulcer.

COMPLICATION	FREQUENCY	PERCENTAGE
Atelectasis / pleural effusion	29	56.9
Acute renal failure	23	45.1
Surgical site infections	16	31.4
Intra-abdominal abscess	12	23.5
Incisional hernia	3	5.9
Leak	2	3.9

TABLE 3: Associated Risk Factors and Their Frequencies.

ASSOCIATED RISK FACTORS	FREQUENCY	PERCENTAGE
Age <40	34	66.7
Cigarette Smoking	24	47.1
Use of NSAIDS	23	45.1
Previous History of Peptic Dyspepsia	25	49

TABLE 4: Relationship between Duration of Perforation and Post-Operative Complication

Duration of Perforation Days	Complications						
	ARF	Atelectasis / pleural effusion	SSI	Intra- Abdominal Abscess	Leak	Incisional Hernia	Death
1	0	0	0	0	0	0	0
2-3	9	9	6	7	0	1	1
4-5	8	14	7	9	1	1	3
>5	6	6	3	1	1	1	1
P_Value	0.061	0.013	0.5249	0.2261	0.3755	0.7615	0.5844

Table 5: Predictors of complications according to Bivariate and multivariate logistic regression analysis

Predictor(independent) variable	Complication N (%)	No Complications N (%)	Bivariate Analysis COR 95%CI	P- Value	Multivariate Analysis AOR 95%CI	P- value
Age						
<40	13(38.24)	21(61.76)	1			
≥40	1(5.88)	16(94.12)	9.9(0.99- 98.2)	0.015	25.0(1.31- 476.65)	0.032
Gender						
Male	13(28.89)	32(71.11)	1.000			
Female	1(16.67)	5(83.33)	2.031	0.209	1.84(.11- 29.44)	0.665
Cigarette smoking						
YES	4(16.67)	20(83.33)	1.000			
NO	10(37.04)	17(62.96)	0.340	0.086	.22(.04- 1.21)	.083
Use of NSAIDS						
YES	7(30.43)	16(69.57)	1.000			
NO	7(25.00)	21(75.00)	1.313	0.377	3.97(.70- 22.51)	.119
Hxdyspepsia						
YES	6(24.00)	19(76.00)	1.000			
NO	8(30.77)	18(69.23)	0.711	0.202	.54(.10- 2.77)	.461
Duration of perforation						
<48	6(42.86)	8(57.14)	1			
>48	31(83.78)	6(16.22)	6.9(1.50- 31.48)	0.0038	16.03(2.34- 109.5)	0.005
CRP count						
<150	9(25.71)	26(74.29)	1.000			
≥150	5(31.25)	11(68.75)	0.762	0.204	.89(.18- 4.27)	.893
Site of perforation						
Gastric	10(24.39)	31(75.61)	1.000			

Duodenal	4(44.44)	5(55.56)	0.403	0.087	.12(.014-1.13)	.065
Combined	0(0.00)	1(100.00)				

Figures

Figure 1

Microorganism detected in culture fluid analysis of peritoneal fluid.

Figure 2

chest x-ray shows a large volume of free sub-diaphragmatic gas with air-fluid levels under both hemidiaphragm (arrows).

Figure 3

An axial abdominal CT shows free sub-diaphragmatic with air-fluid levels under right hemidiaphragm (Yellow arrow), extensive free intraperitoneal fluid (Blue arrow), and Left pleural effusion (Red arrow).

Figure 4

Intraoperative: Perforated peptic ulcer on the anterior wall of the pyloric region in 3 different patients (arrows).