ORIGINAL ARTICLE

A Cross-sectional Study on Factors Associated With Perforated Peptic Ulcer Disease in Adults Presenting to UTH, Lusaka

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ABSTRACT

***Objective*:** To determine the various clinical and epidemiological factors associated with peptic ulcer perforation in adults at UTH.A pilot study for an impending broader controlled study.

Design: A hospital-based cross-sectional study
Participants: 35 adult patients all of whom were diagnosed at laparotomy as having perforated, benign peptic ulcers, confirmed histologically.

***Setting*:** University Teaching Hospital, Lusaka, Zambia.

Results: It was shown that there was a male preponderance (85.7%).The mean age was 39.9 years and the peak range to perforate was 16-45 years (68.6%). Most patients were Lusaka –based (82.8%), and came from a middle income background (62.8%). Clinically, the most frequent presenting complaint was abdominal pain (62.8%), and 57.2% of patients had symptoms lasting 24 hours or less. Furthermore, the commonest blood group was group O+(33.2%),with 40% confirming history of use of NSAIDs. 57% were regular alcohol drinkers and 34% were cigarette smokers. Also, a further 32% of patients were found to be HIV positive and 84.2% had no previous peptic ulcer history. Gastric perforations were by far the commonest anatomical site (82.8%) followed by duodenal (14.3%). Postoperative hospital stay prolonging 10 days was 51.4%, and 37% died after surgery.

Conclusion: Perforated peptic ulcers occur more in males below 45 years old, most of whom are middle income earners and Lusaka -based. A third of the study group tested positive for HIV and more than half confirmed being regular alcohol drinkers. About a third confirmed smoking cigarettes. The majority of patients denied history of previous peptic ulcer disease. Nearly half the group confirmed usage of NSAIDs and about a third were Blood groupO+. Gastric perforations were in the greater majority with half the patients prolonging hospital stay for more than 10 days. Mortality following surgery was high (37%).
A larger study group ought to be recruited for definitive conclusions to be made.

INTRODUCTION

Acute perforations of peptic ulcers continue as one of the real emergencies of surgery requiring immediate attention and prompt operation. Studies have shown that of patients presenting with

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perforated peptic ulcers nearly half have no history of the disease[10]. On endoscopy, unsuspected ulcers have been found in people who were taking non-steroidal anti-inflammatory drugs (NSAIDS)[22].

In elderly patients, signs and symptoms may be minimal. In one series that looked at perforated peptic ulcers in patients over 60 years, 84% had only mild abdominal pains [5]. Other reported symptoms were dyspepsia, anorexia, nausea and vomiting. Severe abdominal pain w as only present in 16%. Duration of symptoms ranged from 4 hours to 10 days. Also, most patients had abdominal tenderness, with 66% exhibiting the classical signs of peritonitis. About 6% had no abdominal findings.

Due to the effective medical management with H2 receptor blockers and proton pump inhibitors, and eradication of Helicobacter pylori, the incidence of peptic ulcers and hospitalization rate have decreased. However, the rate of complicated peptic ulcers remains the same. In recent years, patients presenting with perforated peptic ulcers have tended to be elderly, chronically ill and taking one or more ulcerogenic drugs. Several studies have shown the mean age to be more than 60 years (Christensen et al 2006) . A history of ulcer disease or symptoms of an ulcer is important .In one study, one-third of patients had history of peptic ulcers and 32% of patients who presented with perforation were taking H2 receptor blockers, anti acids or both. A significant percentage of patients had a history of smoking, alcohol abuse, and postoperative stress [20].

In most cases of perforation, gastric and duodenal content spills into the peritoneal cavity. This content includes gastric and duodenal secretions, bile, ingested food, and swallowed bacteria. The leakage results in peritonitis, with an increased risk of infection and abscess formation. Subsequent third-spacing of fluid in the peritoneal cavity due to perforation and peritonitis leads to inadequate circulatory volume, hypotension, and decreased urine output. In more severe cases, shock may ensue. Abdominal distention as a result of peritonitis and subsequent ileus may interfere with diaphragmatic movement, impairing expansion of lung bases. Eventually, atelectasis develops, which may compromise oxygenation of the blood, particularly in patients with co-existing lung disease.[20].

METHODOLOGY

A snapshot cross-sectional study was done on patient medical records for the period covering the period 01st January to December 30th, 2009. Thirty five (35) patients were enrolled in the study. The study is to serve as a pilot study as it is an analysis of initial data collected for a larger case-control study to be undertaken in due course.

RESULTS

Relevant data was retrieved from standardized collection sheets and entered into an Excel spread-sheet then imported in SPSS Statistics 17.0 for analysis. The data was categorized into three groups (i).Rate of perforation at UTH (ii). Demographic variables representing socio- demographic factors and (iii). Clinical variables that represented clinical presentation ,history and laboratory findings.

Rate of perforation

Of 118 patients operated for peritonitis between January to December 2009,thirty-five(35) had benign, perforated peptic ulcers accounting for 29.7% of emergency surgery.

Demographic variables (see table 1)

- *Gender* - Of 35 patients, thirty(30) were male(85.7%),and five(5)were female(14.3%).The male/female ratio being 5.9:1
- *Age* - a continuous variable representing patient age distribution. The mean age was 39.9 years while the age range was 16-82 years.
- *Province* of origin - UTH being a referral hospital caters for the entire country.Majority of patients were Lusaka-based(82.8%).

- *Occupation* - Stress is directly linked to occupation and is thus a known cause of peptic ulcer disease. Self-employed patients accounted for 40%,business people were 28.6%.
- *Monthly income*- a surrogate variable used to grossly categorize the study patients into social demographic strata. Most patients fell in the middle income bracket (34.2%)

Table 1. Distribution of the patients' demographic variables thought to be associated with perforation, *n = 35*

Variable	*f*	*% of total*
? *Gender*		
Female	05	14.3
Male	30	85.7
? *Subject Age*		
16 – 30yrs	12	34.3
31 – 45yrs	12	34.3
46 - 60yrs	07	20.0
>60yrs	04	12.4
? *Pt.[1] province of origin*		
C/B	02	05.7
Central	03	08.6
Lusaka	29	82.8
Southern	01	02.9
? *Pt[1]. occupation*		
Business	10	28.6
Civil service	03	08.5
Retired	01	02.9
Self-employed	14	40.0
Unemployed	07	20.0
? *pt.[1] Income*		
<0.5m	05	14.3
500 – 1.5m	12	34.2
1.5 – 2m	10	28.6
N/A	08	22.9

Pt.[1]=patient, Income recorded in millions of ZMK

Clinical variables

These were subdivided into signs and symptoms, medical history and laboratory findings.

SIGNS AND SYMPTOMS-commonest presenting complaint was abdominal pain only (62.8%), duration of symptoms ranging 25-48 hours (42.8%). Preoperative Hb ranged 10-13g/dl (57.2%). See table 2

MEDICAL HISTORY-Included socio-behavioural history, and concurrent illness. 57% of patients confirmed drinking alcohol regularly, 34% smoked cigarettes, 40% of patients used NSAIDs on a regular of patients had no history of prior peptic ulcer disease. See figure1&2

LABORATORY FINDINGS
The commonest blood group subtype was O +(33.2%),and 32% of patients tested positive for HIV. See figure 1& 3.

Gastric perforations were in the greater majority (82.8%), whereas duodenal perforations accounted for 17.2%, (see figure 4). Of thirty-nine (39) perforations during the study period, thirty-five (35) were histologically classified as benign, chronic ulcerative lesions, two (2) were gastric carcinoma and two (2) were indeterminate. Thus 89.7% of perforated ulcers were due to benign, chronic lesions and 5.1% were as a result of cancer.

Most patients prolonged hospital stay for more than 10 days (51.4%) after surgery. (figure 5)

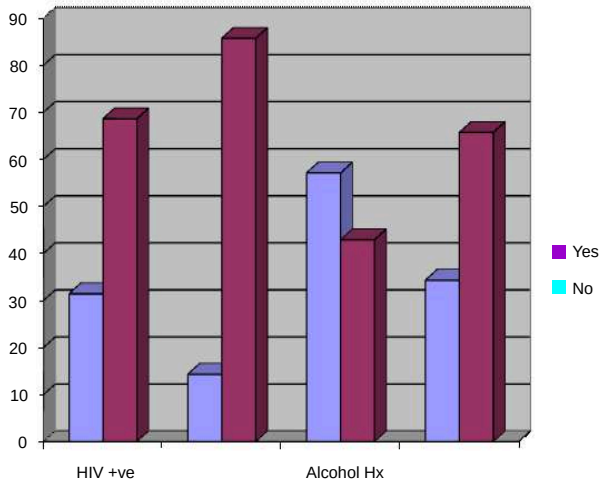
The variables representing clinical signs and symptoms captured from patient files included the following.

Table 2: Distribution of the patients' signs and symptoms, *n = 35*

Variable		Freq.	%
Presenting Complaint	Abdominal Pain	22	62.8
	Abd. Distension + Vomiting	01	02.9
	Abd. Pain + Distension	07	20.0
	Abd. Pain + Vomiting	05	14.3
Duration of presenting symptoms	6 – 12hrs	10	28.6
	13 – 24hrs	10	28.6
	25 – 48hrs	15	42.8
Pre-Op Hb	<10.0g/dl	13	37.1
	10.0 – 13.0g/dl	20	57.2

Pre-Op Hb	<10.0g/dl	13	37.1
	10.0 – 13.0g/dl	20	57.2
	> 13.0g/dl	02	05.7

Figure 1: Distribution of (a) Medical History – HIV status & previous peptic ulcer history (b) Social/behavioural History – Alcohol intake & Smoking.



Non Steroidal Anti Inflammatory Drugs (NSAIDs) are over the counter medication in Zambia commonly bought by patients without a doctor's prescription to self medicate against pain which is a common symptom in peptic ulcer disease. Patients suffering from peptic ulcer disease in both medical and surgical wards including clinics are commonly prescribed non-steroidal-anti-inflammatory drugs for pain. Chronic use of NSAIDs is said to cause peptic ulcer disease especially in states of under nutrition and alcohol abuse both of which are common in Zambia.

The diagram below shows the distribution NSAIDs use among the all the study patients who also had perforated peptic ulcer disease.

Figure 2: Distribution of history of NSAIDs use among patients with perforated peptic ulcers

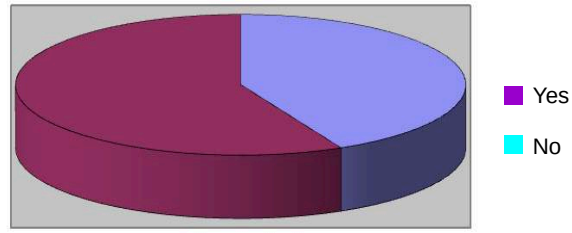


Figure 3: Distribution of Blood Group types among patients with perforated ulcers

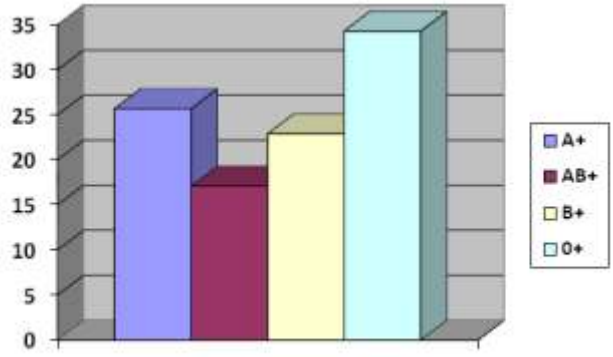
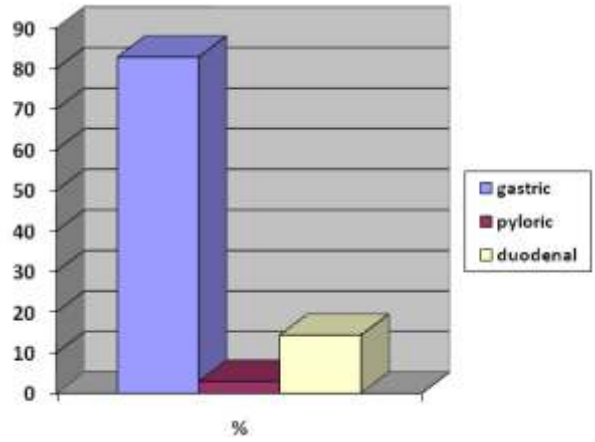


Figure 4: Distribution of anatomical site of perforation of study patients



Gastric perforations were by far the commonest mode of ulcer perforation.

Figure 5: Postoperative hospital length of stay

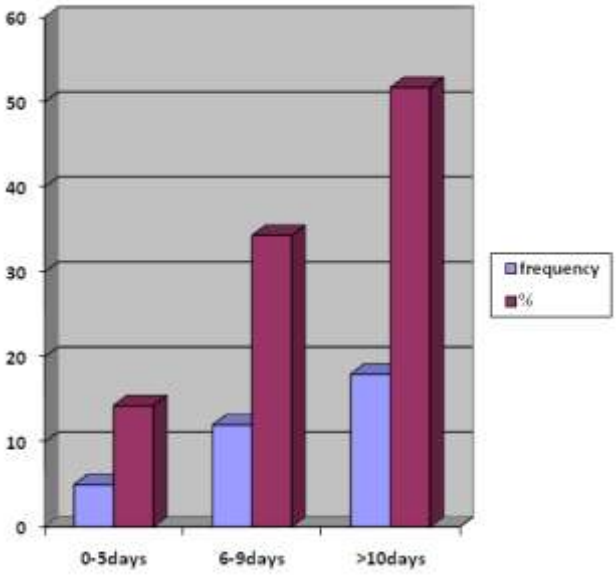
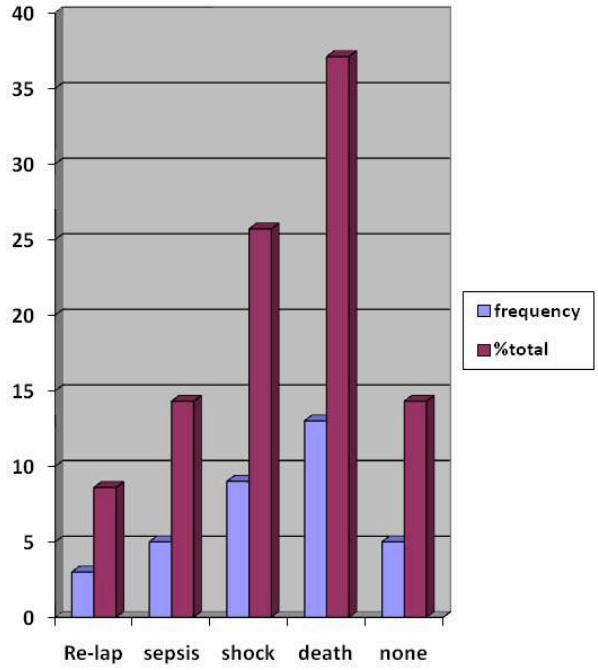


Figure 6; Complications arising after surgical operation.



DISCUSSION

This study aimed at identifying socio- demographic features as well as clinical presentation and /or findings associated with patients found with perforation of peptic ulcers on surgery. It is a cross-sectional analysis of initial data comprising only cases for an impending larger case-control study. It will thus help in subject selection for controls and cases.

Incidence

It was shown that perforated ulcers are on the increase at UTH, thus the purpose for the study. Bem in 1991 at UTH, found 16% incidence for perforated ulcers among operated cases for peritonitis. However, our study shows the incidence to be 29.7% indicating an increase in number of cases over the years.

Socio-demographic variables

From our study, it was shown that ulcer perforation had a male preponderance (85.6%) (table1), however, studies done in the west suggest perforation is irrespective of gender [22]. A plausible explanation would be that in Zambia, men are mostly the breadwinners and providers in the family and thus are more prone to stress and alcohol/cigarette abuse. The average age at presentation was 39.9 years, with an age range of 16 to 82 years. In the west, the mean age is 65 years [5]. This could be attributed to environmental, dietary and genetic variations. A good majority of the patients were self-refered from within Lusaka province, most of whom were self-employed (40%) and acquired an above average income (34.2%).

Also, it was found that a younger age group of patients (<45years) were in the majority (68,6%) to perforate. Western literature suggests ulcer perforation mostly affects elderly (>65years) patients [22]. In the west, life expectancy is generally longer than in Africa, More elderly patients are thus captured than in Zambia where the bulk of the population is youthful. Also, It is assumed that peptic ulcer disease is diagnosed earlier and treated promptly and effectively in the west rather than in Zambia where inadequacies in health service delivery are more prone leading to complications like perforation.

Clinical variables

The commonest presenting symptom was abdominal pain alone(62.8%),(Table2).This is in agreement with a study done in Norway(Christensen P,2007) where only abdominal pain was the presenting complaint(84%). Duration of symptoms ranged from 6-48 hours, with most patients presenting 24-48 hours after onset of symptoms(42.8%).Patient delay has a bearing on precipitation to perforate as well as poor outcome postoperatively [10].

Furthermore, it was shown that 57.2% of patients had a preoperative Hb ranging 10-13g/dl, whereas anaemic patients(Hb <10g/dl) accounted for 37.1%, implying perforation does occur at a relatively normal Hb although this is bound to drop due to intrabdominal bleeding if surgery is delayed.

Furthermore, it was found that blood group O+ was commonest(33.2%) seconded by groupA+(24.3%), (seeTable2). This is in agreement with one study done in Nigeria where blood group O+ was found in 69.2% of patients with perforated peptic ulcers [1].

Figure 2 shows the use of NSAIDs in relation to perforation where 60% of patients denied usage and 40% confirmed taking some NSAIDs regularly.

NSAIDs have clearly been shown to predispose to peptic ulcer disease. A study done in Japan showed NSAIDs to be a risk factor for perforation in 24% of cases [9]. In our study the sample size may not be large enough for this finding to be conclusive. However, other factors like alcohol abuse with poor nutrition commonly found in a 39 year old Zambian male could be looked at.

HIV was a factor of interest to us. In Figure 3 the study relates past medical and/or social history to perforation of peptic ulcers. Here it was found that 32% of patients tested positive for HIV whereas 68% were negative.HIV infected adults show reduced levels of gastric acid production in the stomach, this may offer a physiological protection against peptic ulcer formation. This was shown in a study done at UTH where it was seen that HIV infection may actually curtail peptic ulcer formation due to acchlorhydria [8]. Thus it would be expected that the rate of HIV in this study should be low, however a 32% infection rate is quite significant. This could squarely be as a result of the pre-existing high prevalence if HIV in the general population, or else a larger, controlled study ought to be employed to draw meaningful conclusions.

Most patients presenting with perforation had no history at all of previous ulcer disease (84.2%) making clinical diagnosis at presentation difficult. This is in agreement with a study done in Europe (Kocer B,2006) where half of cases had no history of ulcer disease.

On social history, 57% reported to have been regular alcohol drinkers whereas 43% denied alcohol intake. Cigarette smokers accounted for 34% against 66% of non-smokers .Alcohol and smoking have been shown to predispose to peptic ulcer perforation, as seen in Japan where 34% was the population attributable risk to smoking and alcohol [9].

Gastric perforations were the commonest anatomical site(82.8%) followed by duodenal(14.3%) and only one(1) pyloric perforation. Most studies done in the west suggest a predilection to duodenal perforations. In one study 52% of duodenal and 10% gastric perforations were recorded [22]. The high numbers of gastric perforations in Zambia may be due to dietary or genetic factors, but other factors may be at play and this ought to be researched further.

Further it was shown that 51.4% of patients had stayed more than 10 days on the ward postoperatively for peptic ulcer perforation (Figure5).This clearly has implications on clinical and administrative costs due to associated morbidity.

Death was the commonest complication arising postoperatively accounting for37%.This high mortality rate could be attributed to diagnostic and treatment delay, as well as concomitant underlying medical illness, as noted with high rate of HIV infection in the study group.

CONCLUSIONS

The rate of peptic ulcer perforation at UTH is increasing as noted from the study where 29.7% incidence was noted compared to 16% incidence seen at UTH between 1988 to 1990 (Bem,1991).

The mean age for peptic ulcer perforation at UTH is 39.9 years, the peak age range for perforation is 16 to 45 years(68.6%). In Europe, the mean age remains above 62 years [22]. A younger population is mostly affected in Zambia, whether this is due to dietary, environmental or genetic factors remains to be known.

A male preponderance for the disease has been shown accounting for 85.7% compared to 14.3% of females. The male to female ratio is 5.9:1. Most literature from Europe suggests perforation is irrespective of age. A Study done in Norway showed the male /female ratio as 1.2:1 [22].

The commonest presenting complaint remains abdominal pain only as seen in 62.8% of cases, this ties in with a study done in Norway where 84% of cases presented with abdominal pain only(Christensen P ,2007).

84.2% of patients had no prior history of peptic ulcer disease. This is comparable to one study where about 50% of cases reported the same [10]

Patient delay has a bearing on diagnostic and treatment delay as is shown in our study where 42.8% of patients presented 24-48 hours after onset of symptoms. This has a bearing on morbidity and mortality [10].

Blood group subtype seems to favour ulcer perforation as shown where Group O+ accounts for 33.2% of cases. In a study done in Nigeria, it was shown that 69.2% of patients with perforated ulcers had blood Group O+. [1].

The use of NSAIDs appears to have an effect on tendency to ulcerate and perforate as shown where 40% of patients confirmed their usage. In one study, summary risk and exposure values were computed for the general population. General population attributable risk percentage for ulceration and perforation due to NSAIDs alone was 24% [9].

The relationship between HIV and peptic ulcer perforation still remains unclear.32% of patients tested positive for HIV indicating that the rates are high among patients who perforate.However,HIV has been shown to offer a protective effect on the gastric mucosa as it limits production of gastric acid[8]. This is one aspect of the study that ought to be expanded to a broader, well- controlled study for meaningful conclusions to be made especially that review of literature is quite limited in this regard.

Regular alcohol use and cigarette smoking are linked to perforation of peptic ulcers as shown where 57% and 34% of patients confirmed use of alcohol and cigarette smoking respectively. A study done in Japan gave the calculated population attributable risk percentage to ulcerate and perforate due to alcohol and cigarettes as 34% [9].

Gastric perforations are commoner at UTH (82.8%), duodenal perforations are less likely (14.3%).This is

contrary to a study done in Norway where 52% of duodenal and 10% of gastric perforations were observed. There may be various factors at play including genetic, dietary and environmental. This scope of the study will need to be broadened.

Most patients prolong post-operative hospital stay for more than 10 days (51.4%) indicating the high morbidity associated with the disease. Also the mortality rate stands at 37% postoperatively and this may be due to various factors such as underlying medical illnesses and patient delay translating to diagnostic and treatment delay.

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