

EFFECT OF PERIOPERATIVE RISK FACTORS AND CO-MORBID DISEASES ON POST OPERATIVE COMPLICATIONS IN PERFORATED PEPTIC ULCER PATIENTS

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ABSTRACT

Background: Perforated peptic ulcer is a serious complication of peptic ulcers. Emergency operations for perforated peptic ulcer are associated with a high incidence of postoperative complications. **Objective:** The objective of this study was to determine the effect of perioperative risk factors and co morbid diseases on postoperative morbidity in perforated peptic ulcer patients. **Patients and Methods:** This was a prospective study on 102 patients who were operated for perforated peptic ulcer in surgical ward of Bahawal Victoria Hospital, Bahawalpur, from 1st January, 2011 to 31st December, 2012. All patients of peptic ulcer perforation were included in this study. Perforations due to malignancy or marginal ulcers were excluded. Data was collected using a preformed questionnaire. Variables included in the questionnaire were; patient's demographic data (age, sex), duration of illness, previous history of Peptic Ulcer Disease, NSAID use, alcohol use and cigarette smoking, associated medical co morbid illness, preoperative shock status at admission, interval between ulcer perforation and operation, operating time, site of perforation, size of perforation, type of surgical procedure and postoperative complications. Data was analyzed using SPSS computer software version 16.0. **Results:** A total of 102 patients were included. Males to females ratio was 4.6:1. The incidence of disease was high in age group of 31-40 years 30.4% followed by age group of 41-50 years 28.4%. Analysis showed that age above 60 years (P=0.02), the presence of preoperative shock (p=0.00), history of smoking (p=0.038), interval between perforation and operation (P=0.00), spillage more than 500 ml (p=0.00), type of operation (p=0.022), an operating time over 120 minutes (p=0.00) were significantly associated with postoperative morbidity. The most frequent underlying diseases were chronic cough (pulmonary disease) which was present in 15% patients, hypertension 10%, diabetes mellitus 10% and heart disease 10%. **Conclusion:** Age more than 60 years, the presence of preoperative shock, smoking, H/O NSAID intake, operation after 24 hours of perforation, operation time more than 2 hours, size of perforation and spillage more than 500ml were significant risk factors for morbidity from a perforated peptic ulcer.

Keywords: Perforated peptic ulcers, Perioperative risk factor, Postoperative morbidity

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INTRODUCTION

Peptic ulcer disease (PUD) is one of the most common GI disorders in the United States with a prevalence of about 2%, and a lifetime cumulative prevalence of about 10%, peaking around age 70 years.¹ Peptic ulcer remains a common outpatient diagnosis, but the number of physician visits, hospital admissions, and elective operations for PUD have decreased steadily and dramatically over the past three decades. However, the incidence of emergency surgery and the death rate associated with peptic ulcers has not decreased nearly so dramatically.^{2,3,4} Despite recent advances in both diagnosis and management of peptic ulcer disease, namely the improvement in endoscopic facilities, eradication of *H. pylori* and the introduction of the proton pump inhibitors, complications such as peptic ulcer perforation

remain a substantial healthcare problem. This may be due to an increase in the risk factors for peptic ulcer complications.^{5,6} Peptic ulcer perforation is a serious complication which affects almost 2-10% of peptic ulcer patients.^{7,8} Peptic ulcer perforation presents with an overall mortality of 10%.⁹ Although some authors report ranges between 1.3% and 20%.^{10,11} Being a life threatening complication of peptic ulcer disease, it needs special attention with prompt resuscitation and appropriate surgical management if morbidity and mortality are to be avoided.³⁻¹¹ Perforation is the commonest and potentially fatal complication of peptic ulcer in patient who have chronic peptic ulcer symptoms with inadequate or no treatment.¹²

The pattern of perforated PUD has been reported to vary from one geographical area to another depending on the prevailing socio-demographic and environmental factors. In the developing world, the patient population is young with male predominance, patients present late, and there is a strong association with smoking.¹³ In the west the patients tend to be elderly and there is a high incidence of ulcerogenic drug ingestion.¹⁴

The etiology of the majority of ulcer perforations is

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not known. Current use of non-steroidal anti-inflammatory drugs (NSAIDs), *Helicobacter pylori* infection, smoking has been reported among patients with duodenal ulcer perforation.¹⁵⁻²⁰

As soon as diagnosis is made resuscitation is started with large volume crystalloids, nasogastric suction to empty the stomach and administration of broadspectrum antibiotics.^{21,22} Conservative treatment is known as the Taylor method and consists of nasogastric aspiration, antibiotics, intravenous fluids and nowadays *H. pylori* triple therapy.^{23,24} 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 centres and have changed the old trend of truncal vagotomy and drainage procedures.²⁵ Emergency surgery for perforated peptic ulcer is associated with a high rate of postoperative complications (between 21% and 43%).^{26,27} 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 PUD.^{28,29} Early recognition and prompt surgical treatment of perforated PUD is of paramount importance if morbidity and mortality associated with perforated PUD are to be avoided.^{11,25} At present, little is known about the relationship between perioperative risk factors and postoperative morbidity for perforated peptic ulcer. The aim of this study was to investigate the contribution of perioperative risk factors and comorbid diseases to morbidity following peptic ulcer perforation surgery.

PATIENTS AND METHODS

This was a prospective study which was conducted in surgical department of Bahawalpur Victoria Hospital, Bahawalpur, from 1st January, 2011 to 31st December, 2012. All patients of peptic ulcer perforation were included in this study. Perforations due to malignancy or marginal ulcers were excluded. Data was collected using a preformed questionnaire. Variables included in the questionnaire were; patient's demographic data (age, sex), duration of illness, previous history of PUD, NSAID use, alcohol use and cigarette smoking, associated medical co morbid illnesses, preoperative shock status at admission, interval between ulcer perforation and operation,

operating time, site of perforation, size of perforation, type of surgical procedure and postoperative complications. A detailed history and thorough physical examination was followed by investigations like full blood count, blood grouping, serum urea, serum creatinine and random blood sugar. Radiological investigations like X-ray abdomen erect and chest X-ray were done in all patients on the suspicion of diagnosis of perforated PUD. The diagnosis of perforated PUD was made from history, clinical examination, plain abdominal and chest radiographs including diaphragm, and confirmed at Laparotomy. Patients were put on intravenous fluids, nasogastric suction, intravenous antibiotics and intravenous anti-ulcer drugs; adequate hydration was indicated by an hourly urine output of 30 ml/hour. After adequate resuscitation, Laparotomy was done through midline incision and identified the perforation site. Simple closure of the perforation and reinforcement with pedicled omental patch (Graham's omentopexy) was done. Thorough peritoneal lavage with 3 to 4 liters of normal saline was followed by placement of intraperitoneal drain. All PPU operations during the stated time span were performed by open repair technique only. Other types of operation (e.g resection and truncal vagotomy) were performed according to the patient and ulcer characteristics. Since gastric ulcers are more prone to malignancy, a biopsy was performed in the case of suspicion. Peri-operative complications details and the results of follow-up data were obtained postoperatively.

We assessed the association of different factors that could potentially influence the postoperative morbidity and mortality measured on admission and during surgery. The predictors measured on admission were age, sex, previous history of PUD, NSAID use, alcohol use and cigarette smoking, preoperative shock status at admission, comorbid illness, interval between ulcer perforation and operation. The predictors measured during operation were the amount of peritoneal spillage, the site of perforation, the size of perforation, operating time and type of surgical procedure. We assessed the influence of the predictor variables on the risk of developing a complication. Preoperative shock status was defined as persistent hypotension: systolic blood pressure <90 mmHg, mean arterial pressure <60 mmHg, or a reduction in systolic blood pressure >40 mmHg from baseline.

The following definitions were used to assess the

complications.⁹

1. Wound infection, defined as the presence of pus at the incision site that led to delayed suture removal or wound resuturing.
2. Burst abdomen, dehiscence of wound and presence of serosanguinous discharge.
3. Intestinal obstruction, defined as a mechanical obstruction with an air-fluid level.
4. Paralytic ileus, defined as the postoperative absence of bowel motility, as demonstrated by gaseous distension without an air-fluid level on a plain radiograph.
5. Postoperative bleeding, defined as a condition requiring transfusion and confirmed by gastrofiberscopy or intervention procedures.
6. Fluid collection (intraperitoneal abscess) defined as the presence of septic fluid in the abdominal cavity that resulted in a pyrexia of 38 and was confirmed by ultrasonography.
7. Pulmonary complication, defined as the presence of acute bronchitis, atelectasis, pleural effusion, empyema, pneumonia, or pneumothorax on plain chest radiograph.
8. Cardiac complication, defined as the postoperative presence of a symptom, a laboratory test result and an electrocardiogram that were indicative of myocardial infarction, angina, or arrhythmia.
9. Renal complication, defined as the presence of symptoms or laboratory blood test results that were indicative of acute renal failure;

The association between risk factors and postoperative complications was assessed using the chi-square test. A P-value <0.05 was considered to be statistically significant. SPSS version 16.0 was used for statistical analysis.

RESULTS

A total of 102 patients presented with perforated peptic ulcers. Of these, 84 were males (82.6%). The frequency of disease was high (30%) in age group of 31-40 years. There were 21 cases (20.6%) who presented with preoperative shock status. History of peptic ulcer disease was positive in 22 patients (21.6%), smoking in 61 patients (59.8%), NSAID intake in 25 (24.5%) and alcoholism in 3 patients (2.9%). Co morbid diseases were present in 51(51%) patients. (Table: I).

Table I: Frequency of risk factors among patients of perforated peptic ulcer

Risk Factors	Years	Patients (no)	% age
Age	21-30	3	2.9%
	31-40	31	30.4%
	41-50	29	28.4%
	51-60	17	16.7%
	60	22	21.7%
Sex	Male	84	82.4%
	Female	18	17.6%
Preoperative Shock	Yes	21	20.6%
	No	81	79.4%
Interval B/N Perf. N Operation	<24 hours	45	44.1%
	>24 hours	57	55.1%
H/O PUD	Yes	22	21.6%
	No	80	78.4%
H/O Smoking	Yes	61	59.8%
	No	42	40.2%
H/O of Alcoholism	Yes	3	2.9%
	No	99	97.2%
H/O NSAID Intake	Yes	25	24.5%
	No	77	75.5%
Operation Time	<2 hours	57	55.9%
	>2 hours	45	44.1%
Site of Perforation	Duodenum	62	60.8%
	Stomach	40	39.2%
Size of Perforation	<1 cm	84	82.4%
	>1 cm	18	17.6%
Spillage	>500ml	56	54.9%
	< 500 ml	46	45.1%
Type of Procedure	Omentoplasty	98	96.1%
	Others	4	3.9%
Co Morbid Diseases	Yes	51	51%
	No	51	48%

Table II: Frequency of postoperative complications

Complications	No	%age
Wound infection	15	33.3%
Burst abdomen	6	13.3%
Intra abdominal abscess	5	11.5%
Leakage	4	8.9%
Paralytic ileus	1	2.2%
Pulmonary complications	11	24.4%
Cardiac complication	1	2.2%
Acute renal failure	1	2.2%
Post op bleeding	1	2.2%
Total	45	100%

The overall postoperative complication rate was 44.1%. The most frequent postoperative complications were: wound problem (15 cases, 33.0%), pulmonary complication (11 cases, 24.4%) and burst abdomen (6 cases 13.3%) (Table II).

The overall comorbidity rate was 51%. The most frequent underlying diseases were chronic cough 15%, hypertension 10%, diabetes mellitus 10%, heart disease 10% and tuberculosis 2%. (Table III)

Chi square test was performed to identify the risk factors of postoperative complications. An age above

60 years ($P=0.02$), the presence of preoperative shock ($P=0.00$) history of smoking ($P=.038$), interval between perforation and operation ($P=0.00$), size of perforation ($P=0.021$), spillage more than 500ml ($p=0.00$), type of operation ($p=0.022$), an operating time over 120 minutes ($P=0.00$) were associated significantly with postoperative morbidity. (Table IV)

Table III: Comorbidity Rate Among Patients.

Disease		No of patients	No of cx	Rate of cx	P. value
HTN	Yes	11	6	42.9%	0.919
	No	91	40	43%	
Heart disease	Yes	11	9	81.8%	0.014
	No	91	45	49%	
DM	Yes	11	10	81.8%	0.001
	No	91	43	47%	
Chronic liver disease	Yes	3	2	66.7%	0.425
	No	99	50	51%	
Pulmonary disease	Yes	15	8	53.3%	0.436
	No	87	42	48%	
TB	Yes	2	2	100%	0.275
	No	100	50	50%	

Table IV: Association of risk factors with postoperative complications

Factor		No of patients	No of cx	Rate of cx	P. Value
Age	<60 years	81	31	38.35	.07
	>60years	21	14	66.7	
Sex	Male	84	36	42.9%	0.580
	Female	18	9	50%	
Interval B/N perforation n operation	<24 hours	45	11	24.4	.000
	>24 hours	57	34	59.6	
Site of perforation	Duodenum	62	28	45.16	.65
	Stomach	40	17	42.5	
Size of perforation	<1cm	62	33	53.2	.000
	>1cm	40	12	30.0%	
Spillage	<500ml	56	12	21.4%	0.000
	>500ml	46	33	71.4%	
Type of operation	Primary repair with OP	98	41	41.8%	0.000
	Others	4	4	100%	
Operation time	<2 hours	57	10	17.5%	0.000
	>2 hours	45	35	77.8%	
Comorbidity	Yes	51	39	76%	0.000
	No	51	6	12%	
Preoperative shock	Yes	21	21	100%	.000
	No	81	24	29.6	
H/O pud	Yes	22	12	54.5%	.266
	No	80	33	41.2%	
H/O smoking	Yes	61	32	52.5	.038
	no	41	13	31.7	
H/O alcoholism	Yes	3	2	66.6	.068
	No	99	42	42.4%	
H/O nsaid	Yes	25	7	28.0	.062
	No	75	38	49.4	

Patients with heart diseases ($p=0.04$) and diabetes mellitus ($p=0.001$) were associated significantly with overall postoperative complications.. However, hypertension ($P=0.919$), chronic liver disease ($P=0.425$), pulmonary disease ($P=0.436$) and TB ($P=0.275$) were not associated significantly with postoperative complication.

DISCUSSION

Emergency operations for perforated peptic ulcer are associated with high morbidity and mortality rates. Studies that identify independent prognostic risk factors for postoperative morbidity in perforated peptic ulcer are warranted. The aim of this study was to investigate possible associations between postoperative morbidity and underlying disease and perioperative risk factors in perforated peptic ulcer. We found that age more than 60 years, the presence of preoperative shock, smoking, NSAID intake, operation after 24 hours of perforation, operation time more than 2 hours, size of perforation and spillage more than 500ml were risk factors for morbidity from a perforated peptic ulcer and there was association between postoperative morbidity from a perforated peptic ulcer and co morbid diseases, like DM and heart disease.

Age more than 60 years is significantly associated with postoperative morbidity in our study. 21 patients were more than 60 years and 14 patients (66.7%) developed complications. Age is reported an established prognostic factor after surgery for PPU for many authors.^{9,27}

Testini et al,⁷ revealed that patients over 65 years have a significantly higher mortality rate after surgery for perforated peptic ulcer than younger patients because of the more frequent presence of comorbid diseases. Boey et al¹¹ reported that preoperative shock and a long-standing perforation (=24 hours) were important risk factors for postoperative morbidity and mortality following a perforated peptic ulcer. In the present study, 21 patients (20.6%) had a preoperative shock status and 57 patients (55.1%) had a long-standing perforation (=24 hours). The patients with preoperative shock were associated with more postoperative morbidity than patients with a stable blood pressure. Moreover, analysis revealed that preoperative shock was an independent prognostic factor for postoperative morbidity. The present study showed that the risk of morbidity was statistically significant when the patient was submitted to surgery with a perforation later than 24 hours, in agreement with literature which emphasises the importance of early surgical intervention to improve the outcome.²⁸ A possible explanation for our findings of a higher incidence of perforations in young men 34 (33.3%) of patients were less than 40 years is that smoking among young people is common, which was earlier shown to be associated with an increased risk of perforation

(41). In our study, history of smoking was present in 61 patients. Complications were found in 32 patients (52.5%) which was significant. (p-value =0.038)

It has been reported that the operating time influences postoperative morbidity.²⁹⁻³² Hwang et al,²⁹ found that an operating time exceeding 3 hours was associated with a higher morbidity rate than shorter operating times. In our study, 45 patients had operation time more than 2 hours. 35 (77.8%) patients developed post operative complications which is significant (p value =0.00). Spillage also significantly affect the post operative morbidity. In our study, 46 had spillage more than 500ml 33 (71.4%) out of 46 developed complications. In a study, conducted by Samita S Sharma, et al, showed that peritoneal spillage (p = 0.0079) significantly influenced the rate of postoperative complication.³⁰ About 11.5% - 40.9% of patients with peptic ulcer disease have comorbid diseases. Ko et al³³ reported that pulmonary disease was the most frequent comorbid disease, followed by hypertension and diabetes mellitus. Nogueira et al³¹ reported that hypertension was the most frequent co morbid disease, followed by pulmonary disease. In the present study, the most frequent co morbid diseases were pulmonary disease (15%), hypertension (10%), and diabetes mellitus (10%), heart disease (10%). The patients with comorbid diseases had higher postoperative morbidities. In addition, analysis found that diabetes mellitus and heart disease were significantly associated with a higher rate of postoperative morbidity. Jeong et al,³² reported that patients with heart disease had high morbidity rates after radical surgery for gastric cancer. This could be one of the reasons why patients with hypertension have a higher postoperative morbidity rate than normotensive patients. Schiff and Welsh²⁴ reported that patients with diabetes mellitus are at particularly high risk of infection, including wound, skin, and urinary tract infections and pneumonia, and that their mortality rate is about 20%.

CONCLUSION

In conclusion, age more than 60 years, the presence of preoperative shock, smoking, H/O NSAID intake, operation after 24 hours of perforation, operation time more than 2 hours, size

of perforation and spillage more than 500ml, DM and heart disease were risk factors for post operative complications from a perforated peptic ulcer.

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