

A PROSPECTIVE STUDY OF RISK FACTORS ASSOCIATED WITH POST OPERATIVE MORBIDITY AND MORTALITY IN PATIENTS WITH GASTRIC PERFORATION AT A TERTIARY CARE HOSPITAL

¹Parin. J. Vora, ²Subodh. P. Ugane

¹Junior Resident, ²Associate Professor
Department of General Surgery,
Government Medical College, Miraj, India

Abstract-

Introduction: Peptic ulcer disease is very common disease in developing countries and so are its complications. With dwindling rates of postoperative mortality in perforated peptic ulcer that is attributable to H2-receptor blocker usage, there is a need to shift the focus towards the prevention of postoperative morbidity. Surgery is the main treatment for gastric perforation. Prompt recognition of the condition is very important and only by early diagnosis and treatment it is possible to reduce the still relatively high mortality. The aim of this study is to assess the risk factors associated with post-operative morbidity and mortality in gastric perforation. Our objective was to assess the relation between pre-operative risk factors of the patient and the post-operative status of the patient, the relation between of post-operative mortality and the time between presentation to the hospital after the symptom onset and assess the post-operative complication in an operated case of gastric perforation patient.

Materials and methods: A prospective observational study was conducted over a period of 18 months. The data was collected from 25 Patients over the age of 18 years, admitted on emergency basis, diagnosed and operated as gastric perforations, till the time the patients were discharged from the hospital as per the hospital norms. The data obtained from the test was recorded for analysis. **Results:** The perforation was common between age group of 41-60 years. Perforation was more common in male patients. It was 84 percent in males and 16 percent in females. Mortality rate in our study series was 24 percent. The duration of pain-to-hospitalization more than 24 hours has increased morbidity and mortality. The most common post-operative complication was wound related, of which wound discharge was the most common.

Conclusions: Preoperative risk factors associated with higher morbidity and mortality included age more than 60 years (Geriatric age), hemodynamic instability (Shock upon admission, tachycardia, hypertension), severe abdominal signs, delayed presentation to hospital after onset of pain (more than 24 hours). The most frequent post-operative complication in the study was wound-related, with wound discharge as the most prevalent result. The second most frequent complications were pulmonary.

Index Terms—Gastric perforation, pre-operative, risk factors, post-operative, morbidity, mortality.

INTRODUCTION

Gastric perforation is one of the most serious and most overwhelming catastrophic that is affecting human being (Lord Moinihan). Among abdominal emergencies, perforations of peptic ulcer are third in frequencies, acute appendicitis and acute intestinal obstruction being more common. Prompt recognition of the condition is very important and only by early diagnosis and treatment it is possible to reduce the still relatively high mortality.¹

Gastric ulcer is one of the most common maladies that affect the mankind in India. Though lot of work had been done on the aetiology of this condition, one specific etiological agent cannot be incriminated in the causation of this particular disease especially in our part of country. Since, stress forms the most important single feature in causing gastric ulcer and today's modern life is full of stress and strain, this condition on the increase. Perforations due to gastric carcinoma were more frequent in stage III and IV, usually occur in advantage stages. The ingestion of alkalis primarily damages oesophagus, ingestion of strong acids usually involves distal part of stomach.²

Perforations due to Blunt trauma is due to Road Traffic Accidents, Penetrating trauma is due to stab injuries, Trichobezoars rarely perforates and during endoscopy procedures which is rare in nature. The perforation and resultant peritonitis are immediate threats to the life. The therapeutic priorities thus are treatment of peritonitis and securing the closure of perforation, which may be achieved with surgical procedure.^{3,4}

Although with effective resuscitation and prompt surgery under modern anaesthesia techniques, there is high morbidity and mortality. There are multiple factors influencing the progress of the disease. Therefore, in this study, we have tried to find out various preoperative factors that may contribute to post-operative morbidity and mortality in patients with gastric perforation.

MATERIALS AND METHODS

A prospective observational study was conducted over a period of 18 months. The data was collected from 25 Patients over the age of 18 years, admitted on emergency basis, diagnosed and operated as gastric perforations, till the time the patients were discharged from the hospital as per the hospital norms. The data obtained from the test was recorded for analysis.

INCLUSION CRITERIA

1. Cases admitted on emergency basis and diagnosed as gastric perforations were included in the study.
2. All patients who had been operated for gastric perforation.
3. Patients of both sexes in the age group of 18 years and above.

EXCLUSION CRITERIA

1. All patients below the age of 18 years.
2. Pregnant females.
3. Cases diagnosed as gastric perforation who did not give consent.
4. Patients having perforations involving gastro-jejunal perforation, esophagogastric junction perforations; associated duodenal, jejunal, ileal, colonic perforations in trauma cases.
5. All HIV positive patients.
6. All cases of gastric perforation not operated.
7. All patients with malignancies.

The approval to conduct this study was obtained from the institutional review board. Informed consent was obtained from patients and confidentiality and anonymity of the data was maintained throughout the study. Investigations were carried out after consideration of clinical presentations so as to find predisposing factors, precipitating factors & etiology.

The data was collected till the time the patient was discharged from the hospital as per the hospital norms. The data obtained from the test was recorded for analysis. The associated factors like age, sex, alcohol, time interval from onset of pain to hospitalisation, size of perforation; which could affect the outcome were studied. These patients were treated as per routine treatment protocol for gastric perforation. The outcome of these patients i.e., morbidity and mortality were studied.

RESULTS

Present study was conducted in a tertiary care hospital in Department of General Surgery.

In present study, out of 25 patients 04(16%) were females and 21(84%) were males. A male preponderance as compared to female was observed in patients with gastric perforation in our study.

TABLE NO.01: DISTRIBUTION OF PATIENTS AS PER GENDER		
GENDER	NO. OF PATIENTS	%
Female	4	16
Male	21	84
Total	25	100

In our study the mean age of patients was 48.72 ± 16.14 years, Minimum age was 18 years and Maximum was 79 years. In our study, majority of the patients, 10(40%) belonged to 41-60 age group. Followed by 61-80 and 21-40 age groups with 7(28%) patients in each age group. Only 1(4%) patient was observed in less than 20 years age group.

TABLE NO.02: DISTRIBUTION OF PATIENTS AS PER AGE GROUP		
AGE GROUP	NO. OF PATIENTS	%
18-20	1	4
21-40	7	28
41-60	10	40
61-80	7	28
Total	25	100
Mean age	48.72±16.14	

In present study, out of 25 patients, 09 (36%) were smokers, out of whom 05(55.56%) gave history of chronic smoking, 03(33.33%) smoked occasionally and 01(11.11%) were former smokers. With regard to alcoholism 10(40%) gave history of alcohol intake, of whom 08(80%) were chronic alcoholic and 02(20%) consumed alcohol occasionally.

TABLE NO. 03: DISTRIBUTION OF PATIENTS AS PER ADDICTION HISTORY OF SMOKING		
HISTORY OF SMOKING	NO. OF PATIENTS	%
No	16	64
Chronic	5	20
Former	1	4
Occasional	3	12
Total	25	100

TABLE NO. 04: DISTRIBUTION OF PATIENTS AS PER ADDICTION HISTORY OF ALCOHOL		
HISTORY OF ALCOHOL	NO. OF PATIENTS	%
No	15	60
Chronic	8	32
Occasional	2	8
Total	25	100

From our study, it is observed that 02(8%) were hypertensive and 02(8%) were suffering from diabetes mellitus, from the total of 25 patients.

In our study, it is observed that out of 25 patients, 21(84%) patients were stable (general condition “Good” & “Average”) while 4(16%) patients had poor (Unstable) general condition at presentation at the hospital.

TABLE NO.05: DISTRIBUTION OF PATIENTS AS PER GENERAL CONDITION

General Condition	No. of Patients	%
Good	4	16
Average	17	68
Poor	4	16
Total	25	100

In present study, all patients were tachycardiac with mean pulse rate of 102.32 ± 9.55 bpm. And 12(48%) patients had normal blood pressure on admission while 8(32%) were hypotensive and rest 5(20%) had raised blood pressure on admission.

TABLE NO.06: DISTRIBUTION OF PATIENTS AS PER PULSE RATE AND BLOOD PRESSURE

BLOOD PRESSURE	NO. OF PATIENTS	%
<110/70	8	32
110/70 to 120/80	12	48
>120/80	5	20
Total	25	100
Mean Pulse rate	102.32 ± 9.55 bpm	

In the present study, tenderness was present in all patients with abdominal distension present in 7(28%) patients, 21(84%) having generalized guarding and 1(04%) patient having abdominal rigidity with bowel sounds present in all patients on auscultation. Pneumoperitoneum was present in all patients on X-rays (Chest -PA and erect abdomen).

TABLE NO. 07: DISTRIBUTION OF PATIENTS AS PER PER-ABDOMEN EXAMINATION

PER ABDOMEN EXAMINATION	NO. OF PATIENTS	%
Abdominal distension	7	28
Tenderness	25	100
Guarding	21	84
Rigidity	1	04
Bowel sounds	25	100
Pneumoperitoneum	25	100

From our study it was observed that about 20% (05) patients presented to the hospital within 12 hours of onset of pain, 28% (07) patients presented between 12 to 24 hrs., 12% (03) patients presented between 24-48 hrs. while majority of patients, 40% (10) patients presented to the hospital more than 48 hrs. after onset of pain.

TABLE NO.08: DISTRIBUTION OF PATIENTS AS PER TIME INTERVAL BETWEEN ONSET OF PAIN TO HOSPITALIZATION		
TIME INTERVAL BETWEEN ONSET OF PAIN TO HOSPITALISATION	NO. OF PATIENTS	%
<12 Hours	5	20
12 to 24 hours	7	28
24 to 48 hours	3	12
>48 Hours	10	40
Total	25	100

Perforation of size <1 cm was noted in 19(76%) patients while 6(24%) had perforation of size >1cm, in the current study.

TABLE NO. 09: DISTRIBUTION OF PATIENTS AS PER SIZE OF PERFORATION		
SIZE OF PERFORATION	NO. OF PATIENTS	%
<1 cm	19	76
>1 cm	6	24
Total	25	100

It is observed in our study that majority of patients [15(60%)] were admitted to the hospital between 11 to 20 days, with mean duration of stay of 14.56 days with a standard deviation of 8.66. The maximum duration of hospital stay noted in our study was 42 days.

TABLE NO. 10: DISTRIBUTION OF PATIENTS AS PER DURATION OF HOSPITAL STAY		
DURATION OF HOSPITAL STAY	NO. OF PATIENTS	%
<10	6	24
11-20	15	60
21-30	3	12
41-50	1	4
Total	25	16
Mean Duration	14.56±8.66 days	

In present study, the most common post operative complication was wound related, noted in 13(52%) patients wherein all the patients had wound discharged and 4(16%) patients amongst them also had associated wound dehiscence.

TABLE NO. 11: DISTRIBUTION OF PATIENTS AS PER POST OPERATIVE COMPLICATIONS		
COMPLICATIONS	NO. OF PATIENTS	%
Wound Complication	13	52
Pulmonary Complications	06	24
Acute Renal Failure	05	20
Leakage	03	12
Intra-Abdominal Fluid Collection	03	12
Intestinal Obstruction	01	4
Paralytic Ileus	01	4
Mortality	06	24
Others	02	8

TABLE NO. 12: DISTRIBUTION OF PATIENTS AS PER MORTALITY WITH OTHER PARAMETERS	
PARAMETER	MORTALITY
AGE GROUP	
18-20	1
21-40	0
41-60	1
61-80	4
GENDER	
Female	1
Male	5
ALCOHOL	
No	4
Yes	2
SMOKING	
No	5
Yes	1
HYPERTENSION	
Present	5
Absent	1
DIABETES MELLITUS	
Present	0
Absent	6
GENERAL CONDITION	
Good	0
Average	3
Poor	3
BLOOD PRESSURE	
<110/70	4
110/70 to 120/80	1
>120/80	1
GUARDING	
Present	5
Absent	1
RIGIDITY	
Present	1

Absent	5
TIME INTERVAL BETWEEN ONSET OF PAIN TO HOSPITALISATION	
<12 Hours	0
12 to 24 hours	0
24 to 48 hours	1
>48 Hours	5
SIZE OF PERFORATION	
<1 cm	3
>1 cm	3

DISCUSSION

In present study, out of 25 patients 04(16%) were females and 21(84%) were males. A male preponderance as compared to female was observed in patients with gastric perforation in our study. Similar result was observed in a study conducted by Singh, et al. where they found that out of 350 patients, 80 (22.85%) were females and 270 (77.14%) were males. They also observed A male preponderance as compared to female in their study.⁵

In our study the mean age of patients was 48.72 ± 16.14 years, Minimum age was 18 years and Maximum was 79 years. In our study, majority of the patients, 10(40%) belonged to 41-60 age group. Followed by 61-80 and 21-40 age groups with 7(28%) patients in each age group. Only 1(4%) patient was observed in less than 20 years age group. Similarly, a study conducted by Talapula S. et al., observed that maximum patients from the total 50 patients, fall under the category of 40 to 70 years of age group with 35(70%), with the highest in the age group of 61 to 70 years of age group with 15(30%). Whereas in the age group of 20 to 30 years, the percentage was 6 (3 patients) and 31 to 40 and 71 and above years of age, it was 12 percent (6 patients) respectively.⁶ A similar result has been observed in a study conducted by Byakodi KG et al., where the highest incidence was observed in the third decade of life (n=12). The youngest patient was 17 years old and oldest was 75 years old. The mean age (SD) of patient was 39.88 years.⁷

In present study, out of 25 patients, 09 (36%) were smokers, out of whom 05(55.56%) gave history of chronic smoking, 03(33.33%) smoked occasionally and 01(11.11%) were former smokers. With regard to alcoholism 10(40%) gave history of alcohol intake, of whom 08(80%) were chronic alcoholic and 02(20%) consumed alcohol occasionally. A study conducted by Byakodi KG et al. also found that prevalence of Addiction was in similar range, where out of 43 patients, history of alcohol consumption was present in 15 (34.9%) patients and history of regular smoking was present in 14(32.6%).⁷

From our study, it is observed that 02(8%) were hypertensive and 02(8%) were suffering from diabetes mellitus, from the total of 25 patients. Singh A et al., also observed similar results with respect to co-morbidities in patients of perforation; wherein out of 350 patients, 49(14%) patients suffered from Hypertension and 37(10.5%) patients suffered from diabetes mellitus. 62 In the study conducted by Gona S K et al., they found that patients suffering from hypertension were 8.6% (14 patients) and Diabetes mellitus were 6.7% (11 patients) which is in concurrence with our study.⁸

In our study, it is observed that out of 25 patients, 21(84%) patients were stable (general condition "Good" & "Average") while 4(16%) patients had poor (Unstable) general condition at presentation at the hospital. Similar study conducted by Talapula S. et al., also observed that 34(68%) patients were stable and 16 (32%) patients were unstable out of total 50 patients.⁶

In the present study, tenderness was present in all patients with abdominal distension present in 7(28%) patients, 21(84%) having generalized guarding and 1(04%) patient having abdominal rigidity with bowel sounds present in all patients on auscultation. Pneumoperitoneum was present in all patients on X-rays (Chest -PA and erect abdomen). Similarly in a study conducted by Singh, et al. Generalized guarding, rigidity, and tenderness were found in all the patients. Pneumoperitoneum were present in 100% of the patients who underwent standing X-ray tests.⁵

From our study it was observed that about 20% (05) patients presented to the hospital within 12 hours of onset of pain, 28% (07) patients presented between 12 to 24 hrs., 12% (03) patients presented between 24-48 hrs. while majority of patients, 40% (10) patients presented to the hospital more than 48 hrs. after onset of pain. Similarly, a study conducted by Gona S K et al., observed that about 73(45.3%) patients presented to the hospital within 24 hours of onset of pain, 50(31.1%) patients presented between 24-48 hrs. whereas 38(33.6%) patients, presented to the hospital more than 48 hrs. after onset of pain.⁸

Perforation of size <1 cm was noted in 19(76%) patients while 6(24%) had perforation of size >1cm, in the current study. Similar result was noted in a study conducted by Talapula S. et al., where they found that 68 percent (34 patients) had perforation of size < 1 cm and 32 percent (16 patients) having > 1 cm of perforation. The mean size of the perforation was 0.5 cm. In stab injury cases, it was observed that the size was > 2 cm and it was in antrum and body.⁶

It is observed in our study that majority of patients [15(60%)] were admitted to the hospital between 11 to 20 days, with mean duration of stay of 14.56 days with a standard deviation of 8.66. The maximum duration of hospital stay noted in our study was 42 days. Similar findings were reported in a study conducted by Sivaram P. and Sreekumar A. where the mean duration of postoperative hospital stay was 11.6 days with a standard deviation of 7.3. The maximum duration of hospital stay was 46 days.⁹

In present study, the most common post operative complication was wound related, noted in 13(52%) patients wherein all the patients had wound discharged and 4(30.77%) patients amongst them also had associated wound dehiscence. Pulmonary Complications was noted in 06(24%) patients, Acute Renal Failure was noted in 05(20%), leakage from the perforation and Intra-Abdominal Fluid Collection were noted in 03(12%) patients each. 01(4%) patients were found to suffering from Intestinal obstruction and paralytic Ileus each in the study. Similarly, patients were noted to have nonspecific post operative complication like Alcohol Withdrawal and post operative hypertension in 4% patients. Similar study conducted by Talapula S. et al., observed that 26 percent (13 patients)

having wound complication and 12 percent (6) having pulmonary complication respectively. Complications were observed after 48 hours. of onset of symptoms to hospital and in unstable patients.⁶

In present study, the percentages of postoperative mortality in 25 patients were 24% (6 patients). According to our results, out of 6 patients who expired 4 (66.67%) belonged to 61 – 80 years age group, while 1 (16.67%) patient expired belonged to 18-20 and 41-60-years age group each; while comparing the gender distribution majority [5 (83.33%)] were male and remaining 1(16.67%) was female. No association was noted between mortality and Diabetes Mellitus, Alcohol Intake and Smoking; While there seems to be an association in patients with hypertension 5 (83.33%). Patients presenting to the hospital with poor (75%) general condition were noted to have significant mortality postoperatively; with similar results were observed in patients with low blood pressure (<110/70 mm Hg), noted in 4 (66.67%) of the total patients that expired. Patients having severe signs on per abdominal examination at presentation, of guarding and rigidity, were associated with higher mortality rate; wherein 5 out of the 6 patients that passed away had guarding and 1 out of 1 having rigidity expired. Patients presenting to hospital after 24 hrs. of onset of pain were found to have higher mortality where those presenting beyond 48 hrs. after onset had a mortality rate of 50% (5 out of 10) and those presenting between 24 to 48 hrs. of onset were found to have 33.33% mortality rate (1 out of 3). It is also noted that size of perforation is not significant variable in context to mortality; wherein 3 patients expired each group of perforation size less than or more than 1cm, each. However, 50% (3 out of 6) patients having perforation of size of more than 1cm expired while only 3 out of 19 patients (15.79%) expired having perforation of size of less than 1cm. In a study by Testini et al, mortality was 9.8% in case of delayed surgery, also 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.¹⁰ In the study by Kocer et al, 75 mortality was 1.4% below the age of 65, while it was 37.3% above 65 years of age, it was 20% in case of delayed surgery. whereas and in the study by Dakubo JC et al, it was 11.8% in case of delayed surgery.¹¹ In a study conducted by Byakodi KG et al., post-operative mortality was seen in 4 (9.3%) patients., All the four patients who expired were >60 years of age, out of 5 female patients 2(40%) patients expired, three patients (16.3%) had associated comorbid conditions. Hypertension and left ventricular hypertrophy in 1 patient, ischemic heart disease (IHD) in 1 patient. Both patients expired in the postoperative period. At the time of admission shock (systolic BP less than 90) was present in 6(14%) patients. Out of 6 and other 5 developed postoperative complications and 2 patients expired in postoperative period. Thirty-one (72.1%) patients had pre-pyloric perforation and 12(27.9%) patients had duodenal perforation. All the 4 patients who expired in postoperative period had pre-pyloric perforation, but site of perforation had no effect on outcome of the patient. Seventeen (39.5) patients underwent surgery after 24 hours of perforation, the rest were seen before 24 hours. All the patients 17(100%) who underwent surgery after 24 hours developed postoperative complications and 2 (11.8%) expired in postoperative period. Size of perforation had no significance on mortality. As per their results mortality analysis following risk factors are significant i.e., age \geq 60 years, Female gender, presence of co-morbidities, preoperative shock, higher ASA grade, perforation-surgery interval >24 hours, purulent intraperitoneal collection. All these factors are inter-related.⁷

CONCLUSION

Peptic ulcer perforation remains a serious surgical problem with significant mortality and morbidity in spite of the better understanding of disease, effective resuscitation, and prompt surgery under modern anesthesia techniques.

Preoperative risk factors associated with higher morbidity and mortality included

- Age more than 60 years (Geriatric age)
- Hemodynamic instability (Shock upon admission, tachycardia, hypertension).
- Severe abdominal signs.
- Delayed presentation to hospital after onset of pain (>24 hours).

The most frequent post-operative complication in the current investigation was wound-related, with wound discharge as the most prevalent result. The second most frequent complications were pulmonary, followed in decreasing order by acute renal failure, perforation leakage, and intra-abdominal fluid collection. The least frequent conditions in the study were intestinal obstruction and paralytic ileus.

REFERENCES:

1. Isenberg JI, McQuaid KR, Laine L, Rubin W. In: Textbook of Gastroenterology. Yamada T, editor. J.B Lippincott comp., Philadelphia; 1991. Acid-peptic disorders; pp. 1241–98. ch.61.
2. Elnagib E, Mahadi SE, Mohamed E, Ahmed ME. Perforated peptic ulcer in Khartoum. Khartoum Medical Journal. 2008;6:62–64.
3. Khan SH, Aziz SA, Ul-Haq MI. Perforated peptic ulcers: A review of 36 cases. Professional Med J. 2011;6:124–127.
4. Bharti RC, Marwaha DC. Immediate definitive surgery in perforated duodenal ulcer: A comparative study, between surgery and simple closure. Indian J Surg. 1996;275-9.
5. Singh A, Porwal R, Gupta HP, Sharma AK, Kumawat G. Determinants of outcome in gastrointestinal perforations with special reference to clavien–dindo classification of surgical complications: Experience of a Single Institute in Central Rajasthan. Archives of International Surgery. 2016 Jul 1;6(3):170.
6. Talapula S., T. Badrinath. Clinical Study and Management of Gastric Perforation. International Journal of Contemporary Medical Research 2018;5(2):B5-B8.
7. Byakodi KG, Harini BS, Teggimani V, Kabade N, Hiregoudar A, Vishwas MR. Factors affecting morbidity and mortality in peptic ulcer perforation. International Surgery Journal. 2018 Mar 23;5(4):1335-40.

8. Gona SK, Alassan MK, Marcellin KG, Henriette KY, Adama C, Toussaint A, Manuela EA, Sylvain SG, Anthony AA, Francis ES. Postoperative morbidity and mortality of perforated peptic ulcer: retrospective cohort study of risk factors among Black Africans in Côte d'Ivoire. *Gastroenterology Research and Practice*. 2016 Jan 26;2016.
9. Sivaram P, Sreekumar A. Preoperative factors influencing mortality and morbidity in peptic ulcer perforation. *European Journal of Trauma and Emergency Surgery*. 2018 Apr;44(2):251-7.
10. Testini M, Portincasa P, Piccinni G, Lissidini G, Pellegrini F, Greco L. Significant factors associated with fatal outcome in emergency open surgery for perforated peptic ulcer. *World J Gastroenterol*. 2003;9(10):2338-40.
11. Dakubo JC, Naaeder SB, Clegg-Lampsey JN. Gastro-duodenal peptic ulcer perforation. *East African medical journal*. 2009 Mar;86(3):100-9.