Original Research Article

Study of factors affecting mortality and morbidity in patients with peritonitis due to duodenal ulcer perforation at a tertiary center

Umesh Ramachandra Kakade

Assistant Professor, Department of General Surgery, Bharati Hospital and Medical College, Sangli, Bharati Vidyapeeth Deemed to be University, Sangli, Maharashtra, INDIA.
Email: umeshkakade66@rediffmail.com

Abstract

Background: Peritonitis due to peptic ulcer perforation constitutes one of the most common surgical emergencies worldwide and is associated with a high rate of morbidity and mortality. The incidence of duodenal perforation is 7–10 cases/100,000 adults per year. Present study aims to evaluate the association between various preoperative factors with postoperative mortality and morbidity in patients operated for peptic ulcer perforation in a tertiary care center. **Material and Methods:** Present study was hospital based, retrospective study conducted with case records of patients of either gender, age > 18 years, admitted, diagnosed with duodenal ulcer perforation and surgically treated at our hospital from last 5 years. **Results:** 89 case records were studied. Majority were male (95.51 %), most common age group was 51-60 years (37.08 %) followed by 41-50 years (24.72%). Common clinical features at the time of admission were tachycardia (97.75 %), abdominal rigidity (93.26 %), abdominal tenderness (91.01 %), absence of bowel sound (79.78 %), dehydration (62.92 %), abdominal distention (59.55 %), anemia (32.58 %), fever (24.72 %), manifestations of shock (16.85 %), Duration from onset of symptoms to admission was 12-24 hours (31.46 %) in majority of patients. Associated risk factors noted were smoking (52.81 %), alcoholism (50.56 %), previous history of PUD (17.98 %), diabetes mellites (15.73 %), use of NSAIDs (15.73 %) and stress (12.36 %). Intra-operatively, perforation diameter was 1–5 mm in majority of cases (62.92 %) followed by 6–10 mm (20.22 %). Peritoneal contamination was < 1 litre in majority of cases (77.53 %). Major postoperative complications in present study were respiratory complication (25.84 %), paralytic ileus (19.10 %), septicaemia (16.85 %), wound infections (14.61 %), burst abdomen (5.62 %). Mortality in 6 months was noted in 13 cases (14.61 %). In present study factors significantly associated with mortality were age > 60 years, septicemic shock on admission, size of perforation > 1 cm, delayed presentation > 24 hours, smoking, diabetes mellites and peritoneal contamination > 2 litre. **Conclusion:** In present study factors significantly associated with mortality in patients with peritonitis due to duodenal ulcer perforation were age > 60 years, septicemic shock on admission, size of perforation > 1 cm, delayed presentation > 24 hours, smoking, diabetes mellites and peritoneal contamination > 2 litre.

Keywords: peritonitis, duodenal ulcer perforation, septicemic shock, peritoneal contamination

***Address for Correspondence:**
Dr Umesh Ramachandra Kakade, Assistant Professor, Department of General Surgery, Bharati Hospital and Medical College, Sangli, Bharati Vidyapeeth Deemed to be University, Sangli, Maharashtra, INDIA.
Email: umeshkakade66@rediffmail.com

Received Date: 21/06/2021 Revised Date: 16/07/2021 Accepted Date: 23/08/2021
DOI: https://doi.org/10.26611/1062016

Access this article online

Quick Response Code:

Website: www.medpulse.in

Accessed Date: 16 October 2021

INTRODUCTION

Peritonitis due to peptic ulcer perforation constitutes one of the most common surgical emergencies worldwide and is associated with a high rate of morbidity and mortality.[1] Perforation was the cause of death in 70% of the patients with peptic ulcer and rate of mortality due to PPU is 10-fold higher than other acute abdominal factors such as acute appendicitis and acute cholecystitis.[2] The incidence of duodenal perforation is 7–10 cases/100,000 adults per year. The perforation site usually involves the anterior wall

How to cite this article: Umesh Ramachandra Kakade. Study of factors affecting mortality and morbidity in patients with peritonitis due to duodenal ulcer perforation at a tertiary center. *MedPulse International Journal of Surgery.* October 2021; 20(1): 24-28. https://www.medpulse.in/Surgery/

of the duodenum (60%), although it might occur in antral (20%) and lesser-curvature gastric ulcers (20%).[3] Despite better understanding of pathophysiology and medical therapy of acid peptic disease, duodenal ulcer perforation remains one of the major cause of peritonitis.[1,2] Factors, such as concomitant diseases, shock on admission, delayed surgery (>24 h), resection surgery, and postoperative abdominal and wound infections, have been associated with increased morbidity and mortality in perforated ulcer patients.[4] Many advances have been made in the management of perforation peritonitis with regards to antimicrobial therapy, surgical therapy and intensive care but it still continues to be a very difficult, complex and challenging problem. Present study aims to evaluate the association between various preoperative factors with postoperative mortality and morbidity in patients operated for peptic ulcer perforation in a tertiary care center.

MATERIAL AND METHODS

Present study was hospital based, retrospective study conducted in Department of General Surgery, Bharati Hospital and Medical College, Sangli, India. Present study was approved by institutional ethical committee. Case records of patients of either gender, age > 18 years, admitted, diagnosed with duodenal ulcer perforation and surgically treated at our hospital from last 5 years (January 2016 to December 2020) were evaluated. Intraoperative patients diagnosed as gastric ulcer perforation were excluded. Patient details (age, sex, occupation, clinical presentation, duration of symptoms), clinical findings, paracentesis (if done), radiological investigations (plain X-ray of erect abdomen, ultrasonography, CT scan), laboratory investigations (CBC, LFT, RFT, urine microscopy, ABG, etc.) were noted in study proforma. Intraoperative details (site and size of perforation, amount of peritoneal contamination, complications) were noted. All cases were managed surgically by Graham's omentoplasty. Treatment, clinical course and postoperative complications were duly noted. Follow-up details till 6 months, if any upper GI endoscopy was done to rule out chronic duodenal ulcer were noted. Data was collected and analysed using Microsoft Excel. Statistical analysis was done using descriptive statistics. Difference of proportions between qualitative variables were tested using chi- square test or Fisher exact test as applicable. P value less than 0.5 was considered as statistically significant.

RESULTS

89 case records were studied. Majority were male (95.51 %), most common age group was 51-60 years (37.08 %) followed by 41-50 years (24.72%).

Table 1: Age wise distribution

Age (years)	male	female	Total
19-30	1 (1.12 %)	0	1 (1.12 %)
31-40	4 (4.49 %)	0	4 (4.49 %)
41-50	21 (23.60 %)	1 (1.12 %)	22 (24.72 %)
51-60	31 (34.83 %)	2 (2.25 %)	33 (37.08 %)
61-70	17 (19.10 %)	1 (1.12 %)	18 (20.22 %)
≥ 71	11 (12.36 %)	0	11 (12.36 %)
	85 (95.51 %)	4 (4.49 %)	89

Common clinical features at the time of admission were tachycardia (97.75 %), abdominal rigidity (93.26 %), abdominal tenderness (91.01 %), absence of bowel sound (79.78 %), dehydration (62.92 %), abdominal distention (59.55 %), anemia (32.58 %), fever (24.72 %), manifestations of shock (16.85 %),

Table 2: Signs and symptoms on admission

Signs and symptoms on admission	No. of Patients	Percentage (%)
Tachycardia	87	97.75
Abdominal rigidity	83	93.26
Abdominal tenderness	81	91.01
Absence of bowel sound	71	79.78
Dehydration	56	62.92
Abdominal distention	53	59.55
Anemia	29	32.58
Fever	22	24.72
Manifestations of shock	15	16.85

Duration from onset of symptoms to admission was 12-24 hours (31.46 %) in majority of patients. Associated risk factors noted were smoking (52.81 %), alcoholism (50.56 %), previous history of PUD (17.98 %), diabetes mellites (15.73 %), use of NSAIDs (15.73 %) and stress (12.36 %). Intra-operatively, perforation diameter was 1–5 mm in majority of cases

(62.92 %) followed by 6–10 mm (20.22 %). Peritoneal contamination was < 1 litre in majority of cases (77.53 %). Major postoperative complications in present study were respiratory complication (25.84 %), paralytic ileus (19.10 %), septicaemia (16.85 %), wound infections (14.61 %), burst abdomen (5.62 %). Mortality in 6 months was noted in 13 cases (14.61 %).

Table 3: General characteristics

Characteristics	No. of Patients	Percentage (%)
Duration from onset of symptoms to admission (in hours)		
0-6	15	16.85
6-12	26	29.21
12-24	28	31.46
>24	20	22.47
Associated risk factors		
Smoking	47	52.81
Alcoholism	45	50.56
Previous history of PUD	16	17.98
Diabetes mellites	14	15.73
Use of NSAIDs	14	15.73
Stress	11	12.36
Fasting	9	10.11
Steroids	7	7.87
Family history	7	7.87
Intraoperative findings		0.00
Perforation diameter in mm		
1–5	56	62.92
6–10	18	20.22
11–15	7	7.87
16–20	6	6.74
>20mm	2	2.25
Peritoneal contamination		
< 1 litre	69	77.53
1–2 litre	12	13.48
> 2 litre	8	8.99
Postoperative complications.		
Respiratory complication	23	25.84
Paralytic ileus	17	19.10
Septicaemia	15	16.85
Wound infections	13	14.61
Burst abdomen	5	5.62
Urinary tract infection	4	4.49
Renal failure	3	3.37
Intestinal obstruction	1	1.12
Mortality in 6 months	13	14.61

In present study factors significantly associated with mortality were age > 60 years, septicemic shock on admission, size of perforation > 1 cm, delayed presentation > 24 hours, smoking, diabetes mellites and peritoneal contamination > 2 litre.

Table 4: Factors related to mortality

Factors	Survived (n=76)	Died (n=13)	p value
Male gender	72 (94.74 %)	13 (100 %)	0.43
Age > 60 years	18 (23.68 %)	11 (84.62 %)	<0.001
Septicemic shock on admission	4 (5.26 %)	11 (84.62 %)	<0.001
Size of perforation > 1 cm	5 (6.58 %)	10 (76.92 %)	<0.001
Delayed presentation > 24 hours,	11 (14.47 %)	9 (69.23 %)	<0.001
Smoking	38 (50 %)	9 (69.23 %)	<0.001
Diabetes mellites	6 (7.89 %)	8 (61.54 %)	<0.001
Peritoneal contamination > 2 litre	2 (2.63 %)	6 (46.15 %)	<0.001

DISCUSSION

Perforated peptic ulcer allows entry of gastric and duodenal contents into the peritoneal cavity resulting in chemical peritonitis and further bacterial contamination which leads to suppurative peritonitis. The clinical presentation of gastroduodenal perforation is usually sudden onset of abdominal pain. Localized or generalized peritonitis is typical of perforated peptic ulcer, but may be present in only two-thirds of the patients.[5] G Bas *et al.* stated in their study that recognition of symptoms was significantly later in elderly patients thereby therapeutic delay increasing the mortality rate from 0–20%.[6] Similar findings were noted in present study. The diagnosis is made clinically and confirmed by presence of gas under diaphragm on radiograph, but absence does not exclude the presence of perforation. When chest x-ray does not show pneumoperitoneum, or a relatively well-patient with a sealed perforation and uncertain diagnosis, a contrast enhanced computed tomography scan (CECT) of the abdomen is useful as it has a high diagnostic accuracy of 98%.[7] H. pylori infection can be held responsible in more than 90% of duodenal ulcers and in up to 80% of gastric ulcers.[8] H. pylori infection and the accompanying inflammation disrupts the inhibitory control of gastrin release by decreasing antral somatostatin, and this is more marked if the infecting organism is a cag A-positive strain. Cigarrete smoking is also a major contributor for DU pathology. It is known that smoking inhibits pancreatic bicarbonate secretions, which tend to neutralize acid secretion, thus predisposing to increased acidity in the duodenal bulb. It also causes a delay in duodenal ulcer healing. Smoking prevalence of 84% have been reported among patients with duodenal ulcer perforation and smoker have three-fold higher mortality from peptic ulcer perforation than non-smoker.[9] In a study by Kishore Babu,[10] most common age group was 60–70 years and male to female ratio was 7:1. Common precipitating factors were smoking, alcohol, NSAIDS. Among 110 patients 12 presented in shock, with mortality of 66%. Delayed presentation > 24 hours, Size of perforation > 1 cm, peritoneal contamination > liter were associated with increased mortality. Common postop complications were wound infection, Pneumonia. Mortality was more in elderly age group that is in patients more than 60 years of age. Early presentation, prompt diagnosis, adequate resuscitation, emergency surgery and postoperative monitoring are useful for successful management and good outcome of perforated peptic ulcer. Similar findings were noted in present study Laishram OS[11] studied 110 patients, 96.3% were males and 41-50 years was the most common age group. Majority (80%) belong to laborious workers commonly associated with alcohol intake and smoking. Pain was the most consistent symptom while guarding (89.1%), tenderness (81.8%) and obliteration of liver dullness(76.4%)were the most important signs present. Gas under the diaphragm was present in 97.3% of patients. Mortality rate was 6.4%. Pre-operative shock, old age, longer duration of perforation, concurrent medical illness and higher grade of peritoneal contamination are the main factors affecting the morbidity and mortality in duodenal ulcer perforation. In study by Sharma PC,[12] all cases were male, most common age group was 51-60 years (37.5%), duration from onset of symptoms to admission was >24 hours (30.36%). Associated risk factors were previous history of PUD (41.07%), Alcohol use (64.29%), Cigarette smoking (51.79%) and Use of NSAIDs (12.5%). Presence of free gas under diaphragm was noted in 83.93% patients. Intraoperatively duodenal perforation diameter was 1–5 mm (60.71%) in most of patients. Common postoperative complications were wound infection (37.5%) and pulmonary infection (21.43%). Mortality within 1 month was noted in 13 patients (23.21%). Most common factors related to mortality were delayed presentation > 24 hours (61.54%), age > 60 years (46.15%), diabetes mellites (38.46%), Size of perforation > 1 cm (38.46%) and septicaemic shock (23.08%). In study by Kassim Trayem[13], of the 100 cases, 96% were males and 4% were females with mean age of 43.13 years. The disease was more common in rural areas (58%), 55 % of patients had previous history of duodenal ulcer and 45% had no previous history of duodenal ulcer. The most common risk factors are smoking (32%) and NSIADs (25%). Most patients admitted to hospital between 19–24 hours (21%), (8%) admitted during 6 hours and (2%) admitted after 120 hours. Regarding the complications occurs in this study, wound infections, chest infections and paralytic ileus were the most common complications. Mortality rate was 2%. Age ≥60 years, female gender, presence of co-morbidities, preoperative shock, higher ASA grade, perforation-surgery interval >24 hours, Purulent intraperitoneal collection are inter-related statistically significant predictors of mortality.[14] Larger sized perforation, late presentation to hospital, associated co-morbid medical illness and presence of preoperative shock; all have negative impact on outcome.[15] Thorough peritoneal toil*et al.*ong with adequate fluid and electrolyte replacement, improvement in critical care and ICCU facilities are some of the factors which have improved the prognosis of duodenal ulcer perforation. Identifying variables which influence the outcome of patients with peritonitis is an important initial step. Once these factors have been identified, the outcome of patients can be correctly predicted and better management can be instituted to those patients in need.

CONCLUSION

In present study factors significantly associated with mortality in patients with peritonitis due to duodenal ulcer perforation were age > 60 years, septicemic shock on admission, size of perforation > 1 cm, delayed presentation > 24 hours, smoking, diabetes mellites and peritoneal contamination > 2 litre.

REFERENCES

1. Sabiston DC, Townsend CM, Beauchamp RD, Evers BM, Mattox KL, editors. Sabiston Textbook of Surgery: The Biological Basis of Modern Surgical Practice. 20th edition. Philadelphia, PA: Elsevier; 2017:1197-1211.
2. Søreide K, Thorsen K, Søreide JA. Strategies to improve the outcome of emergency surgery for perforated peptic ulcer. Br J Surg. 2014;101:e51–64.
3. Zittel TT, Jehle EC, Becker HD: Surgical management of peptic ulcer disease today: indication, technique and outcome. Langenbecks Arch Surg 2000; 385: 84–96.
4. Moller MH, Adamsen S, Thomsen RW, et al. Multicentre trial of a perioperative protocol to reduce mortality in patients with peptic ulcer perforation. Br J Surg. 2011;98(6):802–10.
5. Thorsen K, Glomsaker TB, von Meer A, Soreide K, Soreide JA. Trends in diagnosis and surgical management of patients with perforated peptic ulcer. Gastrointest Surg. 2011;15:1329–35.
6. Bas G, Eryilmaz R, Okan I, et al. Risk factors of morbidity and mortality in patients with perforated peptic ulcer. Acta Chir Belg 2008;108:424–27.
7. Kim HC, Yang DM, Kim SW, Park SJ. Gastrointestinal tract perforation evaluation of MDCT according to perforation site and elapsed time. Eur Radiol. (2014) 24:1386–93.
8. Ahmed N: 23 years of the discovery of Helicobacter pylori : is the debate over? Ann Clin Microbiol Antimicrob 2005; 4: 17.
9. Smedley F, Hickish T, Taube M, Yale C. Perforated duodenal ulcer and cigarette smoking. JR Soc Med. 1988;81:92-4.
10. G Kishore Babu, Gowthami Penumur. A study on Factors Affecting Mortality and Morbidity in Patients Presenting with peritonitis Due to Duodenal Ulcer Perforation. New Indian J Surg. 2019;10(6):567-572.
11. Dr. Laishram Oken Singh, et. al. "A Clinical Study of Duodenal Ulcer Perforation." IOSR Journal of Dental and Medical Sciences (IOSR-JDMS), 19(8), 2020, pp. 07-29.
12. Pradeep Chandra Sharma, Ankit Jain. Study of factors affecting mortality and morbidity in patients presenting with peritonitis due to duodenal ulcer perforation. MedPulse International Journal of Surgery. August 2021; 19(2): 35-39.
13. Kassim Trayem Hayef, Adnan Yassin Abdul-Wahab, Factors affecting morbidity and mortality In perforated duodenal ulcer, Basrah Journal Of Surgery, March, 17, 2011
14. Byakodi KG, Harini BS, Teggimani V, Kabade N, Hiregoudar A, Vishwas MR. Factors affecting morbidity and mortality in peptic ulcer perforation. Int Surg J 2018;5:1335-40.
15. Pavan Kumar. V. Koliwad, Naveen. N, Vikrant Mahajan, A clinico-pathological study of duodenal ulcer perforation and its management in a rural area in Karnataka, International Journal Of Medical And Applied Sciences, 2 (4), 2013.

Source of Support: None Declared
Conflict of Interest: None Declared