Original Research Article

Perforated peptic ulcer: a clinical study at Shri. Shankaracharya institute of medical sciences Bhilai, Chhattisgarh

Sangeeta Sengupta, K. H. Ramesh, Satender Malik, Rajeshwari Bisen, M. Jawed Akther*

Department of General Surgery, Shri Shankaracharya Institute of Medical Sciences, Bhilai, Chhattisgarh, India

*Correspondence:
Dr. Md. Jawed Akther,
E-mail: dr.mdjawedakhter973@gmail.com

ABSTRACT

Background: Perforation is a serious complication of PUD and patients with perforated peptic ulcer often carries high risk for morbidity and mortality. Acute perforated peptic ulcer is a leading cause of generalized peritonitis and its management has continued to be a challenging task in moderate resource setting environment. Aim and objective was to evaluate the different pattern of risk factors, clinical presentations, management and clinical outcome of patients with acute perforated peptic ulcer.

Methods: This was a hospital based prospective observational study conducted in the Department of general surgery at Shri Shankaracharya Institute of Medical Sciences, Bhilai, Chhattisgarh. Total of 79 cases with diagnosis of perforated peptic ulcer treated were taken as sample size. A specially designed proforma was used to collect information on patients' demographics, symptoms, complications, duration of hospital stay and treatment outcome.

Results: In present study male predominance was seen in peptic perforation cases 68.75% and M:F ratio was 2.2:1. Mortality rate was 17.71%. Mean hospital stay among survivors was 11.8 days and among non survivors 5.5±3.73 days. Most common risk factor seen was alcohol, smoking, peptic ulcer disease and NSAIDs ingestion. Whereas the most common presentation was abdominal pain, signs of peritonitis, abdominal distension. Cases with APCHE 2 score >21 had 90% mortality.

Conclusions: The present study conclude that perforated PUD is a life-threatening disease with high morbidities and mortalities. Male predominance, smoking and alcohol consumption and pain in abdomen were the common characteristics. APACHE 2 score was useful in assessing the risk of mortality.

Keywords: Peptic ulcer disease, Perforated, APCHE 2 score, Abdominal pain, Smoking

INTRODUCTION

Peptic ulcer disease (PUD) results from an imbalance between stomach acid-pepsin and mucosal defence barriers. It affects 4 million people worldwide annually.[1] The incidence of PUD has been estimated at around 1.5% to 3%.[2] Although 10%-20% of patients with PUD will experience complications, only 2%-14% of the ulcers will perforate causing an acute illness.[3,4] Perforation is a serious complication of PUD and patients with perforated peptic ulcer (PPU) often carries high risk for morbidity and mortality.[5] The lifetime prevalence of perforation in patients with PUD is about 5%.[6] Treatment includes use of proton pump inhibitors and Helicobacter pylori eradication therapies. In spite of all these peptic ulcer perforation rates have remained unchanged and therefore remains a major health challenge. In developing world, patients tend to be young male smokers while in developed countries; patients tend to be elderly with multiple co-morbidities and associated use of non-steroidal anti-inflammatory drugs (NSAIDs) or steroid.[7,8] Along with NSAIDs, *Helicobacter pylori* (*H. pylori*), physiological stress, smoking, corticosteroids and previous history of PUD are risks factors for PPU.[1,9-11] In the presence of risk factors,

recurrence of ulcer is common despite initial successful treatment. The diagnosis of perforated PUD could pose a diagnostic challenge in most cases especially in patients with no previous history of PUD. Symptoms of PUD include epigastric pain, upper abdominal discomfort, bloatedness and feeling of fullness. Sudden onset of abdominal pain or acute deterioration of the ongoing abdominal pain is typical of PPU leading to chemical peritonitis. Delays in diagnosis and prompt initiation of surgical management of perforated PUD have clearly been shown to be associated with high morbidity and mortality after surgery for perforated peptic ulcer disease.[12,13] Mortality rates after surgery for PUD range from 0% to 20%. Acute perforated peptic ulcer is a leading cause of generalized peritonitis and its management has continued to be a challenging task in moderate resource setting environment. Therefore, the present study was conducted to evaluate the different pattern of risk factors, clinical presentations, management and clinical outcome of patients with acute perforated peptic ulcer and to highlight the factors that continue to account for the mortality and morbidity.

METHODS

Study design, location, duration and population

This was a hospital based prospective observational study conducted in the Department of general surgery at Shri Shankaracharya Institute of Medical Sciences, Bhilai, Chhattisgarh. Study was conducted from 1 May 2021 to 1 May 2023. All the patients presenting Shri Shankaracharya institute of medical sciences, Bhilai with symptoms and signs suggestive of Perforation peritonitis, confirmed to be perforated peptic ulcer intraoperatively were taken as study subjects. Cases of peptic perforation with associated trauma were excluded from the study.

Sample size

Total of seventy-nine cases with diagnosis of perforated peptic ulcer treated between this period in our hospital were taken as sample size in this study.

Procedure

The diagnosis of generalized peritonitis was made from history and physical examinations alone, but in some cases, plain abdominal, chest radiographs as well as ultrasound scans of abdomen and pelvis was used as ancillary support to clinical findings. Diagnosis was confirmed on laparotomy.

Patient management

Preoperatively, blood samples were routinely taken for full blood count, electrolyte, urea and creatinine, grouping, ABG analysis, urinalysis and cross-matching and chest radiographs was also done. On admission, after confirmation of perforative peritonitis, adequate resuscitation was achieved with intravenous fluids, intravenous antibiotics (third generation cephalosporin plus metronidazole) and nasogastric tube suction to decompress the stomach. Urinary output of >30 ml/h indicated adequate hydration and resuscitation. After adequate resuscitation, laparotomy was performed utilizing a midline incision. Exploration was carried out to identify the site of perforation, to estimate the size and also the volume and nature of peritoneal exudate. In case of gastric perforation, Graham's omentopexy done and The duodenal perforation was closed with interrupted 2/0 vicyrl sutures tied over pedicled omentum (Graham's omentopexy). Liberal peritoneal wash out was done with copious volumes of warm normal saline. Intra-abdominal drain was left in-situ and abdomen closed with mass suture utilizing No 2 Nylon sutures. Most of the surgical operations were performed by consultant surgeons, and others by senior Residents under the supervision of the consultant surgeons. All patients received intravenous fluids, continued nasogastric tube suction until bowel sounds returned and oral feeding commenced. In addition, all patients received intravenous antibiotics utilizing third generation cephalosporin and metronidazole infusion for a period ranging from four to six days postoperatively Patients were discharged home on omeprazole, metronidazole and amoxicillin in all H. pylori positive patients for 14 days. Patients were followed up for 3weeks.

Data collection

A specially designed proforma was used to collect information on patients' demographics, pattern of presentation which include duration of abdominal pain at presentation and other associated symptoms, previous history of dyspepsia, medical comorbidity, risk factors like cigarette smoking, alcohol intake and non-steroidal anti-inflammatory drugs (NSAIDs) use. The outcome measures included the duration of hospital stay, number of postoperative complications, number of patients discharged and mortalities.

Statistical analysis

The data collected were analyzed using statistical package for social sciences (SPSS) version 20. Data was presented in frequency and percentages. Continuous and categorical variables were analyzed by student t test and chi-Square respectively. A p value <0.05 was considered statistically significant.

RESULTS

Total seventy-nine patients were included in this study. Among study subjects the mortality rate was 17.72% (14 cases) and 65 (82.28%) were survivors (Table 1). The mean age of study subjects with perforated peptic ulcer was 50.67±17.50 years. The mean age of survivors was 46.84±15.56 years and for non survivors it was 69.64±13.69 years (p<0.01).

Table 1: Age wise distribution among study outcomes.

Age (years)		Non survivor	Survivor	Total	P value
20-30	N	0	11	11	0.097
	%	0	16.92	13.92	
31-40	N	1	14	15	0.21
	%	7.14	21.54	18.99	
41-50	N	0	12	12	0.08
	%	0.00	18.46	15.19	
51-60	N	2	16	18	0.4
	%	14.29	24.62	22.78	
61-70	N	2	6	8	0.56
	%	14.29	9.23	10.13	
>70	N	9	6	15	<0.001
	%	64.29	9.23	18.99	
Total	N	14	65	79	0.031
	%	100.00	100.00	100.00	

Table 2: Sex wise distribution among study outcomes.

Sex		Non-Survivor	Survivor	Total	P value
Male	N	9	45	54	0.042
	%	64.29	69.23	68.35	
Female	N	5	20	25	
	%	35.71	30.77	31.65	
Total	N	14	65	79	
	%	100	100	100	

Mortality rate is highest in age group with >70 years which is 64.29%. Most common age group in our study is 51 to 60 years with 18 patients (Table 1). Among study subjects 54 were males and 25 were female which constitutes 2.2:1 ratio (Table 2). Among non-survivors male constitute 64.29% and 35.71% are females. Whereas among survivors 69.23% were males and 30.77% were females (Table 2).
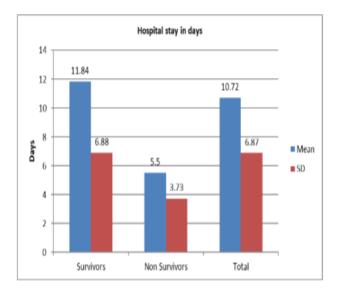

Figure 1: Duration of hospital stay and outcome among study subjects.

Table 3: Risk factors, clinical presentations and post operative complications among study subjects.

Parameters	N	%
Risk factors		
Peptic ulcer disease	29	36.71
NSAIDs	24	30.38
Alcohol	55	69.62
Smoking	41	51.90
Clinical presentation		
Abdominal pain	79	100.00
Severe nausea	38	48.10
Vomiting	20	25.32
Abdominal distension	66	83.54
Signs of peritonitis	70	88.61
Post operative complication		
None	39	49.37
SSI	32	40.51
Pulmonary infection	11	13.92
Post operative sepsis	8	10.13
Fistula formation	1	1.27
Burst abdomen/wound dehiscence	4	5.06

Among study subjects the most common risk factor seen was alcohol (68.75%) followed by smoking, peptic ulcer disease and NSAIDs ingestion (table 3). Whereas the most common presentation was abdominal pain (100%) followed by signs of peritonitis (87.5%), abdominal distension (82.5%), severe nausea (47.5%) and vomiting

(25%) (Table 3). In present study among cases most common Post operative complication was SSI (40%) followed by pulmonary infection (13.75%), post operative

sepsis (10%), burst abdomen/wound dehiscence (5%) and fistula formation (1.25%) (Table 3).

Table 4: APACHE 2 score and mortality assessment among study subjects.

APACHE II	N	APACHE 2 score Mean±SD	Predicted death/mortality	Observed death/mortality, N (%)	Relative Risk (95% CI)	P value
0-10	49	4.71±2.94	3.5/11.5	0 (0)	0.032 (0.002-0.51)	0.015
11-20	20	14.76±2.95	5.008/31.3	5 (23.8)	1.8 (0.67-4.78)	0.37
≥21	10	27.6±6.06	1.8/60	9 (90)	12.42 (5.64-32.27)	<0.01

Table 5: APACHE 2 score and mortality assessment among study subjects.

APACHE score	Not survived		Survived		Relative risk (95% CI)	P value
	N	%	N	%		
0-5	0	0	29	44.62	0.06 (0.003-0.966)	0.047
6-10	0	0	20	30.30	0.83 (0.005-1.34)	0.08
11-15	1	7.14	12	18.46	0.39 (0.056-2.77)	0.35
16-20	4	28.57	4	6.15	3.6 (1.46-8.86)	0.0053
21-25	5	35.71	1	1.54	6.85 (3.37-13.92)	<0.01
>25	4	28.57	0	0	7.6 (4.26-13.54)	<0.01
Total	14	100	65	100	-	-

Maximum mortality (90%) was seen in group with APACHE 2 score >21 followed by (23.8%) with those having APACHE 2 score 11-20 (Table 4). Mean APACHE 2 SCORE among study subjects was 10.21±8.61. Among survivors was 7.27±5.28 and among non survivors it was 24.07±7.78 (p<0.01). The (Table 5) shows that relative risk is maximum in APACHE 2 score >25 (7.6) followed by in group with APACHE 2 score 21-25 (6.85), APACHE 2 score 16-20 (3.6), APACHE 2 score 6-10 (0.83), APACHE 2 score 11-15 (0.39), APACHE 2 score 0-5 (0.06). Among study subjects the mean duration of hospital stay among survivors was 11.84±6.88 days and among non survivors it was 5.5±3.73 days (Figure 1). Whereas mean duration of hospital stay among total study subjects was 10.72±6.87 days (Figure 1).

DISCUSSION

Peritonitis due to perforation commonly encountered in surgical practice, is commonly caused due to introduction of infection and bile. Peptic ulcer perforation is the most common cause for perforation peritonitis. In present study male predominance was seen in peptic perforation cases 68.75%; M:F ratio being 2.2:1. Similar picture is seen in other studies done on other populations, such as Dongo et al reported M:F ratio of 3.5:1, Afuwape et al reported 4.7:1 and Chalya et al reported M:F ratio of 1.3:1.[14-16] This similarity may be due to higher presence of risk factors in young male population like Smoking and alcoholism. The high incidence of perforated PUD amongst young males may be due to smoking and alcohol consumption. Most patients who smoked also abused alcohol. It also causes delay in duodenal ulcer healing.[17] Alcohol on the other hand predisposes to gastric ulceration, stimulates gastric acid secretion as well as enhancing gastrin release.[18] In

present study the mortality rate was 17.71%. In similar studies, it ranges from 5.90% to 21.10%.[19,20] In this study, Overall Mean hospital stay is 10.72±6.87 days; mean hospital stay among survivors 11.84±6.88 days; mean hospital stay among non survivors 5.5±3.73 days.

In present study the mean age group in this study is 50.67±17.50 years. In this study, Peptic Ulcer Perforation most commonly seen in age group 51- 60 years (22.5%). In present study mortality is highest in age group >70 years (6.29%), which is statistically significant (p<0.001). In study done by Kocer et al patients older than 65 years had a higher mortality rate when compared to younger patients (37.7% vs. 1.4%) (p<0.001).[21] This may be due to increased co morbidities with age. In present study, mean age group of survivors is 46.84±15.56 years and non survivors was 69.64±13.69 years (p<0.0001) which is significant, thus proving higher age is a risk factor for mortality.[21] As per certain studies, Older age is an important risk factor for mortality in univariate analysis.[22] In present study the most common presentation is at 24 to 36 hrs from appearance of symptom which is comparable with studies done by Rohit et al and Ugochukwu et al.[20,23] Highest mortality was seen in patients who presented at interval of 60-72 hrs which was statistically significant (p=0.029). Thus, late presentation and initiation of treatment increases risk of mortality. In present study among study subjects the most common risk factor seen was alcohol followed by smoking, peptic ulcer disease and NSAIDs ingestion. Whereas the most common presentation was abdominal pain followed by signs of peritonitis, abdominal distension. A study in a tertiary hospital in Tanzania 85.7% use alcohol and 64.3% were smokers. A study from eastern India by Ekka et al also reported 65.73% were known smokers while 42.86% patients were admittedly alcoholics.[16,24] In present study,

percentage of Patients with previous history of peptic ulcer disease is 36.25% which is comparable with studies done by Al-Marsoumi et al and Ugochukwu et al.[19,20] In present study patient who had history of NSAIDs intake constitute 30% of total population under study. The data is similar to study done by Dongo et al.[19] The difference may be due to availability of NSAIDs in population. In present study the most common Presenting symptom in our study Pain in abdomen (100%) followed by abdominal distension. which is comparable with studies done by Rohit et al and Ugochukwu et al.[20,23] Post operative complication are important in evaluating the outcome of the surgery done. Most common post operative complication seen in our study is surgical site infection (SSI) (40%). This data is similar to studies done by Ugochukwu et al and Rohit et al.[20,23] The difference from other studies tabulated below may be due to difference in procedure done or environmental factors. Next most common postoperative complication in our study was pulmonary infection i.e., 13.75% which is comparable with other similar studies. APACHE 2 score system was used to assess the mortality. The score between 0-10 shows no mortality in present study which was comparable with similar studies done by Kulkarni et al and Schein et al. The mortality rate in group with APACHE 2 score 11 to 20 is comparable to study done by Schein et al (23.80%) and (32.6%) by Kulkarni et al.[25,26] Group with APACHE score >21 was comparable to both studies 90% and 100%. The mean APACHE 2 score of present study in population was and among survivors and among non survivors was comparable with similar studies. In present study low risk group (0-10), the relative risk is 0.032 (p=0.015). This shows the lower mortality in this group which is statistically significant. Survivors in present study has lower mean score than that of study done by Kulkarni et al (9.88) and schein et al (8.75) whereas mean APACHE 2 score of non survivors of our study (24.07) much higher than that of studies done by Kulkarni et al (19.25) and Schein et al (14.5).[25,26] Statistically, mean values are highly significant (p<0.0001) thus showing that higher APACHE 2 scores are associated with mortality. In present study patient with APACHE2 score >25 did not survive. When compared to other studies, Kulkarni et al study, patients above score 21 did not survive; Schein et al, patients above 21 did not survive. These scores may be cited as criterion to decide whether to operate or not operate. But, it has to be noted that APACHE 2 scoring system can be effectively used in assessment of outcome in similar type population but does not provides enough confidence to predict individual outcome.[27]

CONCLUSION

The present study conclude that perforated PUD is a life-threatening disease with high morbidities and mortalities. Male predominance was seen due to smoking and alcohol consumption. Pain in abdomen and abdominal distention were the common symptoms. Hospitalization stay was high among survivors. Mortality was higher as the age increases and late presentation and initiation of treatment increases risk of mortality. Higher APACHE 2 score was useful in assessing the risk of mortality.

REFERENCES

1. Zelickson MS, Bronder CM, Johnson BL, Camunas JA, Smith DE, Rawlinson D, et al. Helicobacter pylori is not the predominant etiology for peptic ulcers requiring operation. Am Surg. 2011;**77**:1054-60.
2. Zittel TT, Jehle EC, Becker HD. Surgical management of peptic ulcer disease today--indication, technique and outcome. Langenbecks Arch Surg. 2000;385:84-96.
3. Bertleff MJ, Lange JF. Perforated peptic ulcer disease: a review of history and treatment. Dig Surg. 2010;27: 161-9.
4. Lau JY, Sung J, Hill C, Henderson C, Howden CW, Metz DC. Systematic review of the epidemiology of complicated peptic ulcer disease: incidence, recurrence, risk factors and mortality. Digestion. 2011;84:102-13.
5. Bas G, Eryilmaz R, Okan I, Sahin M. Risk factors of morbidity and mortality in patients with perforated peptic ulcer. Acta Chir Belg. 2008;108:424-7.
6. Vaira D, Menegatti M, Miglioli M. What is the role of Helicobacter pylori in complicated ulcer disease? Gastroenterology. 1997;113:S78-84.
7. Windsor JA, Hill AG. The management of perforated duodenal ulcer. Nz Med J. 1995;108:47-8.
8. Kang JY, Elders A, Majeed A, Maxwell JD, Bardhan KD. Recent trends in hospital admissions and mortality rates for peptic ulcer in Scotland 1982-2002. Aliment Pharmacol Ther. 2006;24:65-79.
9. Schubert ML, Peura DA. Control of gastric acid secretion in health and disease. Gastroenterology. 2008;134:1842-60.
10. Sonnenberg A, Müller-Lissner SA, Vogel E, Schmid P, Gonvers JJ, Peter P, et al. Predictors of duodenal ulcer healing and relapse. Gastroenterology. 1981;81: 1061-7.
11. Vergara M, Catalán M, Gisbert JP, Calvet X. Meta-analysis: role of Helicobacter pylori eradication in the prevention of peptic ulcer in NSAID users. Aliment Pharmacol Ther. 2005;21:1411-8.
12. Obonna GC, Obonna MC. Peptic ulcer perforation: experience in the riverine south western Nigeria. Trop J Med Med Sci. 2020;1(1):1-7.
13. Dongo AE, Uhunmwagho O, Kesieme EB, Eluehike SU, Alufohai EF. A Five-year review of perforated peptic ulcer disease in Irrua, Nigeria. Int Schol Res. 2017.
14. Dongo AE, Uhunmwagho O, Kesieme EB, Eluehike SU, Alufohai EF. A Five-Year Review of Perforated Peptic Ulcer Disease in Irrua, Nigeria. Int Sch Res Notices. 2017;2017:8375398.

15. Afuwape O, Irabor DO, Ayandipo O. An audit of perforated peptic ulcer disease in a tropical teaching hospital. East Central Afr J Surg. 2013;18(3):40-4.
16. Chalya PL, Mabula JB, Koy M, Mchembe MD, Jaka HM, Kabangila R, et al. Clinical profile and outcome of surgical treatment of perforated peptic ulcers in Northwestern Tanzania: A tertiary hospital experience. World J Emerg Surg. 2011;6:31.
17. Stabile BE, Passaro Jr E. Duodenal ulcer: a disease in evolution. Curr Surg. 1984;21(1):4-79.
18. Türkdoğan MK, Hekim H, Tuncer I, Aksoy H. The epidemiological and endoscopic aspects of peptic ulcer disease in Van region. East J Med. 1999;4(1):6-9.
19. Al-Marsoumi AM, Jabbo NS. Risk factors in perforated peptic ulcer disease: Incidence and relation to morbidity and mortality. Must Med J. 2013; 12(1):32-8.
20. Ugochukwu AI, Amu OC, Nzegwu MA, Dilibe UC. Acute perforated peptic ulcer: on clinical experience in an urban tertiary hospital in south east Nigeria. Int J Surg. 2013;11(3):223-7.
21. Kocer B, Surmeli S, Solak C, Unal B, Bozkurt B, Yildirim O, et al. Factors affecting mortality and morbidity in patients with peptic ulcer perforation. J Gastroenterol Hepatol. 2007;22(4):565-70.
22. Arveen S, Jagdish S, Kadambari D. Perforated peptic ulcer in South India: an institutional perspective. World J Surg. 2009;33(8):1600-4.
23. Rohit DK, Verma RS, Pandey G. Clinical study and management of peritonitis secondary to perforated peptic ulcer. Int Surg J. 2017;4:2721-6.
24. Ekka NMP, Malua S. Clinical study of peptic ulcer perforation in eastern India : an tertiary institution-based study. Int J Med Sci Public Heal. 2016;5(12): 2540-4.
25. Schein M, Saadia R, Jamieson J, Decker GA. Perforated gastric ulcers. A retrospective study of 32 patients. Am Surg. 1986;52(10):551-4.
26. Kulkarni P, Bhavimani G, Javalgikar A and Mahurkar N. Evaluation of melatonin and coenzyme Q10 for gastroprotective effect in aspirin and ibuprofen induced gastric ulcers in rats. Int J Pharm Sci Res. 2020;11(4):1802-7.
27. Singh R, Madan HK, Tayade SH. A prospective study of prediction of outcomes in perforative peritonitis using apache II scoring system. Int Surg J. 2017; 4(8):2648-52.