Research Article

Clinical study of peptic ulcer perforation in eastern India: An tertiary institution-based study

Nishith M Paul Ekka, Shital Malua

Department of Surgery, Rajendra Institute of Medical Sciences, Ranchi, Jharkhand, India.
Correspondence to: Nishith M Paul Ekka, E-mail: drnmpekka@gmail.com

Received May 18, 2016. Accepted June6, 2016

Abstract

Background: Every year peptic ulcer disease affects 4 million people around the world. Perforation is the second most common ulcer-related complication. Ulcer perforation was a lethal disease until surgical treatment was introduced.

Objectives: This study was performed to assess the demographic distribution of peptic ulcer, to assess the clinical presentations of peptic ulcer perforation, to evaluate the site of perforation and effective method of treatment, and to study the complication of peptic ulcer perforation and its management.

Material and Methods: This is a cross-sectional study, which was conducted from May 2013 until April 2016 at RIMS, Ranchi. A detailed history was taken and clinical examination of the patient was carried out at the time of admission. X-ray abdomen erect posture, leukocyte count, serum amylase were performed along with other investigations. After surgery, site of perforation type of surgery along with any complications and outcome of treatment were recorded. Patients were followed-up for 30 days.

Results: A total of 91 patients were studied with men and women ratio of 3.55:1. Most common age group was the 4th decade with mean age being 36 years, while most common symptom was abdominal pain. X-ray abdomen erect showed gas under diaphragm in 75 (82.41%) patients and leukocytosis was present in 91.21% of cases. Duodenal perforations (*n* = 77, i.e., 84.62%) were more common than gastric perforations (*n* = 14, i.e., 15.38%). Simple closure with omental patch (*n* = 74, i.e., 81.32%) was the most common surgical method employed. Wound sepsis (*n* = 45, 49.4%) was the most common complication.

Conclusion: Perforation of peptic ulcer is one of the most common causes which require emergency laparotomy. Duodenum and pylorus are commonly involved and simple closure with omental patch was effective. Early operation is the key to successful treatment and minimizes mortality.

KEY WORDS: Perforated peptic ulcers, duodenal ulcer, gastric ulcer, perforation, clinical study

Introduction

Every year peptic ulcer disease affects 4 million people around the world.[1] It is widely prevalent in India and is more common among the population of south India than north India.[2,3] Complications are encountered in 10–20% of these patients and 2–14% of the ulcers will perforate.[4,5] Perforation is the second most common ulcer-related complication. During the early decades of the twentieth century ulcer perforation incidence increased greatly, and there was an epidemic of ulcer perforations situated in the duodenum of middle-aged men.[6,7] Today ulcer perforation incidence is stable or tends to decline, and most patients with ulcer perforations are elderly men and women, with perforations in the prepyloric and pyloric areas as frequent as perforations in the duodenum.[7,8] While older age, comorbidity, and use of NSAIDs or steroids are associated with mortality. Shock upon admission, preoperative metabolic acidosis, tachycardia, acute renal failure, low serum albumin level, high American Society of Anaesthesiologists score, and preoperative delay >24 h were associated with poor prognosis.[9] Ulcer perforation was a lethal disease until surgical treatment

Access this article online	
Website: http://www.ijmsph.com	Quick Response Code:
DOI: 10.5455/ijmsph.2016.18052016521	

was introduced. Mikulicz was the first to suture a perforated gastric ulcer in 1880,[10] and suture is still the most common treatment for ulcer perforation.

This study was performed to assess the demographic distribution of peptic ulcer, to assess the clinical presentations of peptic ulcer perforation, to evaluate the site of perforation and effective method of treatment, and to study the complications of peptic ulcer perforation and its management.

Material and Methods

This is a cross-sectional study, which was conducted from May 2013 until April 2016 at RIMS, Ranchi. The patients who were treated for peptic ulcer perforation at Rajendra Institute of Medical Sciences, Ranchi formed the pool for the present study. Patients who were diagnosed as peptic ulcer perforation, both gastric and duodenal, and were negative for malignancy were only included in the present study. A detailed history was taken and clinical examination of the patient was carried out at the time of admission with special references to demographic characteristics, disease chronology, history of NSAID or alcohol abuse, etc. X-ray abdomen erect posture, leukocyte count, and serum amylase were performed along with other investigations. After surgery site of perforation type of surgery along with any complications and outcome of treatment were recorded. Patients were followed-up for 30 days.

Results

Out of the total of 91 patients studied, 71 were men, i.e., 78.02% while 20 were women, i.e., 21.98%, with a men and women ratio of 3.55:1 (Figure 1).

The majority of our patients were in the age group 31–40 (*n* = 32, i.e., 35.16%) followed by age group 21–30 (*n* = 22, i.e., 24.17%), and age group 41–50 (*n* = 15, i.e., 16.48%), respectively, with mean age being 36 years (Table 1).

A majority of patients (*n* = 35, i.e., 38.46%) presented between 24 and 48 h of onset of symptoms. 30 (32.97%) patients presented within 24 h of onset of symptoms while 26 (28.57%) presented after 48 h of onset.

Majority of patients (*n* = 64, i.e., 70.33%) had history of dyspepsia or were a known cases of peptic ulcer disease while 27 (29.67%) of the patients had no previous history of peptic ulcer disease or any history of dyspepsia. A majority of patients (*n* = 42, i.e., 46.15%) had a history of NSAID abuse, 60 (65.73%) were known smokers while 39 (42.86%) patients were admittedly alcoholics (Table 2).

The most common presenting complains were abdominal pain (100%), abdominal distension (93.4%), and nausea and vomiting (85.71%). Absolute constipation was present in 60.44% of the patients while 21.98% of the patients presented with oliguria (Table 3).

As for clinical signs 97.8% of the patients in this study had abdominal rigidity or guarding. Rebound tenderness could

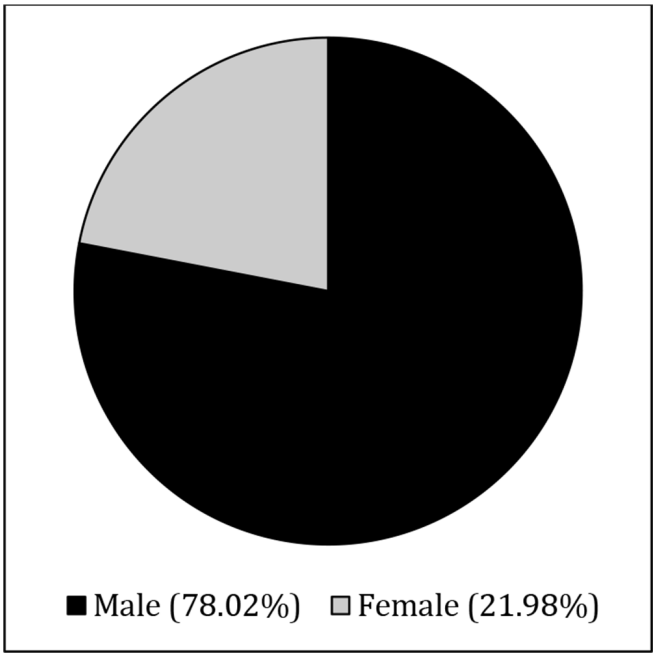

Figure 1: Showing gender distribution

Table 1: Age distribution

Age in years	Duodenal ulcer	Gastric ulcer	Total
Less than 10 years	1	0	1 (1.09%)
11–20	4	0	4 (4.39%)
21–30 years	20	2	22 (24.17%)
31–40 years	28	4	32 (35.16%)
41–50 years	10	5	15 (16.48%)
51–60 years	6	1	7 (7.7%)
61 years and above	8	2	10 (10.99%)

Table 2: Time of presentation after onset of symptoms

Time of presentation	Frequency	Percentage
Within 6 h	9	9.89
6–24 h	21	23.08
24–48 h	35	38.46
After 48 h	26	28.57

Table 3: History of peptic ulcer/dyspepsia

History of dyspepsia/pepticulcer disease	Incidence
Yes	64 (70.33%)
No	27 (29.67 %)

be elicited in 89.01% of the patients while 81.32% had elevated temperature. Obliteration of liver dullness was present in 78.02% of the patients whereas digital rectal examination demonstrated intra-abdominal collection in 54.94% of patients. In total, 83 (91.21%) patients had leukocytosis (> 10×10^9 per liter). All of the patients were subjected to erect X-ray abdomen erect posture out of these 75 (82.41%) patients showed radiological sign of gas under diaphragm while 16 (17.58%) patient did not show any radiological signs of perforation. Briefly, 3 (3.3%) patients showed elevated amylase levels (Table 4).

During surgery it was observed that duodenal and pyloric ulcer perforations (*n* = 77, i.e., 84.62%) surpassed prepyloric and gastric perforations (*n* = 14, i.e., 15.38%) by a huge margin. Simple closure with omental patch (*n* = 74, i.e., 81.32%) was the most common surgical method employed especially for duodenal perforation repair. Also, 3 (3.3%) patients of duodenal ulcer perforation had giant perforations which warranted gastrojejunostomy. All 14 patients with gastric perforations were repaired primarily with two layered sutures (Tables 5–7).

Wound sepsis (*n* = 45, 49.4%) was the most common complication followed by wound dehiscence (*n* = 23, 25.27%). In total, 21 (23.08%) patients developed chest infection, 11 (12.09%) complicated with enterocutaneous fistula, 7 (7.6%) patients developed septicemia in the post operative period, and 5 patients ultimately died, mortality rate being 5.49% (Table 8).

Table 4: Abuses

Abuses	Incidence
Alcoholic	39 (42.86%)
NSAID abuse	42 (46.15%)
Smoker	60 (65.73%)

Table 5: Clinical features and investigations

Symptom	Frequency	Percentage
Abdominal pain	91	100
Abdominal distension	85	93.4
Nausea/vomiting	78	85.71
Absolute constipation	55	60.44
Oliguria	20	21.98
Signs		
Abdominal rigidity	89	97.8
Rebound tenderness	81	89.01
Elevated temperature	74	81.32
Obliteration of liver dullness	71	78.02
Collection in DRE	50	54.94
Investigations		
Leukocytosis	83	91.21
Gas under diaphragm in X-ray abdomen erect	75	82.41
Elevated serum amylase	3	3.3

Table 6: Site of perforation

Duodenal ulcer/pyloric	Gastric ulcer	Total
77 (84.62%)	14 (15.38%)	91

Table 7: Type of repair

Type of repair	Site	Incidence
Simple closure with omental patch	Duodenum	74 (81.32%)
Gastrojejunostomy	Duodenum	3 (3.3%)
Two layered closure	Pyloric/pre-pyloric	14 (15.38%)

Table 8: Postoperative complications

Complication	Frequency	Percentage
Wound infection	45	49.4
Wound dehiscence	23	25.27
Chest infection	21	23.08
Enterocutaneous fistula	11	12.09
Septicemia	7	7.6
Death	5	5.49

Discussion

In the present study it was observed that out of the total of 91 patients studied, 71 were men, i.e., 78.02% while 20 were women, i.e., 21.98%, with a men and women ratio of 3.55:1. Everett et al[11] in their study of 136 patients observed sex ratio of 6.5:1 with only 18 women patients. This study agrees with the result of our study of men predominance in perforated peptic ulcer cases. Svanes[12] was of the view that in men, ulcer perforation incidence increased until about 1950 and declined thereafter. In women the incidence was low and fairly stable until about 1950, from which time it slowly increased. Increasing age among ulcer perforation patients has been observed during this time span, with declining incidence among the young and increasing incidence among the elderly. Most of this temporal variation could be attributed to changing rates of duodenal ulcer in men, whereas rates of gastric ulcer perforation appear to have been fairly stable. Thorsen et al[13] in their study found a men and women ratio of 1:1.42 with a slight women predominance which is contradictory to our and other authors findings of men predominance. It was concluded that this may be due to regional variations.

In our series, it was observed that the majority of our patients were in the age group 31–40 (*n* = 32, i.e., 35.16%) followed by age group 21–30 (*n* = 22, i.e., 24.17%), and age group 41–50 (*n* = 15, i.e., 16.48%), respectively, with mean age being 36 years. Everett et al[11] in their study of 136 patients observed that two-third of patients in the study belonged to

age group 30–60 which is in concordance with the findings of our study. Bansod et al[14] also had similar observations with huge majority of patients falling in between 21 and 50 years of age. Hannan et al[15] in 2005, in their study of peptic perforation, reported that the mean age was 41 years, the highest incidence 34% was in the age group of 30–40 years. Our findings are similar to the findings of other studies.

In our study a majority of patients (*n* = 35, i.e., 38.46%) presented between 24 and 48 h of onset of symptoms. In total, 30 (32.97%) patients presented within 24 h of onset of symptoms while 26 (28.57%) presented after 48 h of onset. Everett et al[11] in their study observed that majority of patients (68%) presented within 24 h of onset of symptoms. Limiting surgical delay is of paramount importance in treating patients with PPU. In fact from the Danish Clinical Register of Emergency Surgery, a cohort study including 2668 patients showed that every hour of delay from admission to surgery was associated with an adjusted 2.4 per cent decreased probability of survival compared with the previous hour.[16] In our study patients presented late which is contradictory to what was observed by Everett et al[11] is probably because of lack of awareness and education among our population. Also the fact that the first medical personnel these poor people come across are usually quakes or paramedical staff which leads to delay in diagnosis and proper referral.

In our series majority of patients (*n* = 64, i.e., 70.33%) had history of dyspepsia or were a known cases of peptic ulcer disease while 27 (29.67%) of the patients had no previous history of peptic ulcer disease or any history of dyspepsia. A majority of patients (*n* = 42, i.e., 46.15%) had a history of NSAID abuse, 60 (65.73%) were known smokers while 39 (42.86%) patients were admittedly alcoholics. Svanes[12] was of the opinion that Smoking seem to be a risk factor of major importance for ulcer perforation. The risk was increased by a factor of 10 in smokers among both men and women. It was estimated that smoking might account for 77% of all ulcer perforations in the age group younger than 75 years.

NSAIDs are another well-known risk factor for peptic ulcer perforation. Five to eight times increased ulcer perforation risk has been reported for NSAID users.[17,18]

Everett et al[11] observed that 43% of patients of peptic ulcer perforation were alcoholics. In our series it was observed that most of the patients were either smokers or alcoholics or both and a fair number had a history of NSAID abuse. These were in agreement with other authors that smoking, alcoholism, and NSAID abuse are important etiological factors.

The most common presenting complains were abdominal pain (100%), abdominal distension (93.4%) and nausea and vomiting (85.71%) while abdominal rigidity or guarding were the most common clinical sign present (97.8%). Rebound tenderness could be elicited in 89.01% of the patients while 81.32% had elevated temperature. Everett et al[11] in their study of 136 patients observed that the most constant manifestation of perforation was the abrupt onset of agonizing and disabling abdominal pain (90 %) while vomiting was present in 43% cases. Bansod et al[14] also observed that 100% of patients presented with abdominal pain and all of them had abdominal guarding and rigidity. Our finding is in concordance with the findings of other authors.

In our study 83 (91.21%) patients had leukocytosis. All of the patients were subjected to erect X-ray abdomen, out of these 75 (82.41%) patients showed radiological sign of gas under diaphragm. Briefly, 3 (3.3%) patients showed elevated amylase levels. Everett et al[11] observed that 65% patients had leukocyte count of more than 10,000. They observed elevated amylase levels in 2.2% of cases. Mehboob et al were of the opinion that the presence of gas under the diaphragm on plain abdominal erect X-ray is present in 75% of the cases.[19] Phillipo et al[20] in their study of 84 patients observed that pneumoperitoneum was present on X-ray abdomen erect view in 65.8% of cases. Salomone Di Saverio et al[21] opined that free air under the diaphragm found on an upright chest X-ray is indicative of hollow organ perforation and mandates further work-up and/or exploration. In the setting of an appropriate history and peritonitis on examination, free air on X-ray is sufficient to justify exploration. Patients without pneumoperitoneum at admission on plain chest radiograph should be evaluated further by computed tomography (CT) scanning with oral contrast. Our findings are in concordance with that of other authors and it was agreed that plain X-ray abdomen erect view is mainstay of diagnosis of peptic ulcer perforation. Patients of hollow viscera perforation who do not show gas under diaphragm will require CT scan.

In the present study it was observed that duodenal and pyloric ulcer perforations (*n* = 77, i.e., 84.62%) were much more common than prepyloric and gastric perforations (*n* = 14, i.e., 15.38%). Svanes et al[7] also agree to our findings of duodenal and pyloric region as most common site for peptic ulcer perforation. Kenneth et al[22] in their study of 172 patients observed that gastric ulcer were more common. They had included pyloric ulcers as gastric ulcers while in the present study pyloric ulcers were included along with duodenal ulcers.[22] Ulcer site definition may be confusing, since some classify prepyloric and pyloric ulcers as duodenal,[23] while others classify those ulcers as part of the stomach and hence gastric ulcers.[24] Further, extensive perioperative and inflammatory tissue changes may make it difficult to distinguish between the duodenum and the pyloric area during the operation, hence clinical misclassification can obviously occur. Thus there is no doubt that duodenum and pylorus taken together is the most common site of peptic ulcer perforation as observed by us and other authors.

In our series simple closure with omental patch (*n* = 74, i.e., 81.32%)was the most common surgical method employed especially for duodenal perforation repair. In total, 3 (3.3%) patients of duodenal ulcer perforation had giant perforations which warranted gastrojejunostomy. All 14 patients with gastric perforations were repaired primarily with two layered sutures.

Mikulicz[10] was the first to suture a perforated gastric ulcer. The current treatment of perforated peptic ulcer is primary closure, covered by omentoplasty. The classical Graham patch

technique, described by Graham in 1937 can be applied.[25] The idea in closing the perforation not only by sutures but also with an omental plug is the sealing and tamponade effect of the plug. Other authors also used Grahams patch as treatment of choice.[11,20] Joshi et al[26] in their study concluded that laparoscopic repair of perforated peptic ulcer is a safe and reliable procedure and it reveals lesser morbidity and complication rate when compared with open group. In our study laparoscopy was not used as a treatment modality.

Wound sepsis (n = 45, 49.4%) was the most common complications followed by wound dehiscence (n = 23, 25.27%). In total, 21 (23.08%) patients developed chest infection, 11 (12.09%) complicated with enterocutaneous fistula, 7 (7.6%) patients developed septicemia in the post-operative period, and 5 patients ultimately died. Mortality rate was found to be 5.49%. Everett et al[11] observed chest infection in 27%, wound infection in 16%, wound dehiscence in 11%, leak in 12%, and a mortality rate of 23.5%. SeungJin et al[27] found an overall 30-day mortality rate to be 3.17%, while Kenneth et al[22] observed a mortality rate of 16.3%. Our mortality rate is similar to that of SeungJin et al but lower than that of Kenneth et al and Everett et al.

Conclusion

Perforation of peptic ulcer is one of the more common causes which require emergency laparotomy. Men are more commonly affected with peak incidence in the thirties. Duodenum and pylorus are the most common sites of perforation. Simple closure with omental patch was effective with excellent results in majority of cases despite patients' late presentation. Mortality remained low at 5.49%. Early operation is the key to successful treatment and minimizes 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: 1054–1060.
2. Dogra JR. Incidence of peptic ulcer in India with special reference to South India. Indian J Med Res 1941;29:665–76.
3. Malhotra SL. Peptic ulcer in India and its etiology. Gut 1964;5:412–6.
4. Bertleff MJ, Lange JF. Perforated peptic ulcer disease: A review of history and treatment. Dig Surg 2010;27:161–9.
5. 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: 102–113.
6. Jennings D. Perforated peptic ulcer. Lancet 1940;1:444.
7. Svanes C, Lie RT, Kvåle G, Svanes K., Søreide O. Incidence of perforated ulcer in western Norway 1935–1990: Cohort or period dependent time trends? Am J Epidemiol 1995;141:836.
8. Horowitz J, Kukora JS, Ritchie WP. All perforated ulcers are not alike. Ann Surg 1989;209:693.
9. Møller MH, Adamsen S, Wojdemann M, Møller AM. Perforated peptic ulcer: How to improve outcome? Scand J Gastroenterol 2009;44(1):15–22.
10. Mikulicz J. Ueber Laparotomiebei Magen und Darmperforation. Samml Klin Vort Leipzig 1885;262:2307.
11. Everett JS, Harkins HN, Olson HH, Moore HG(Jr), Merendino KA. Perforated Peptic Ulcer: A Study of 136 Cases in a County Hospital. Ann Surg. 1953 Nov; 138(5): 689–697.
12. Svanes C. Trends in perforated peptic ulcer: Incidence, etiology, treatment, and prognosis. World J Surg 2000;24(3):277–83.
13. Kenneth T, Glomsaker TB, von Meer A, Søreide K and Søreide JA. Trends in diagnosis and surgical management of patients with perforated peptic ulcer. J Gastrointest Surg 2011;15(8):1329–35.
14. Bansod A, Bansod SA, Galande AB. Study of incidence of peptic ulcer perforation in young adults. Int Surg J 2014;1(3):144–7.
15. Hannan A, Islam B, Hussain M, Haque MM, Kudrat-E-Khuda MI. Early complications of suture closure of perforated duodenal ulcer: A study of 100 cases. Teach Assoc J. 2005;18(2):122–6.
16. Buck DL, Vester-Andersen M, Moller MH. Danish clinical register of emergency surgery surgical delay is a critical determinant of survival in perforated peptic ulcer. Br J Surg 2013;100(8):1045–9.
17. Rodriguez LAG, Jick H. Risk of upper gastrointestinal bleeding and perforation associated with individual non-steroidal anti-inflammatory drugs. Lancet 1994;343:769.
18. Evans JMM, McMahon AD, McGilchrist MM, White G, Murray FE, McDevitt DG, et al. Topical non-steroidal anti-inflammatory drugs and admission to hospital for upper gastrointestinal bleeding and perforation: A record linkage case–control study. BMJ. 1995 Jul 1; 311(6996):22–6.
19. Mehboob M, Khan JA, Shafiq-ur R, Saleem SM, Qayyum AA. Peptic duodenal perfo¬ration – An audit. JCPSP 2000;6:101–3.
20. 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.
21. Di Saverio S, Bassi M, Smerieri N, Masetti M, Ferrara F, Fabbri C et al. Diagnosis and treatment of perforated or bleeding peptic ulcers: 2013 WSES position paper. World Journal of Emergency Surgery 2014;9:45.
22. Thorsen K, Søreide JA, Kvaløy JT, Glomsaker T, Søreide K. Epidemiology of perforated peptic ulcer: Age- and gender-adjusted analysis of incidence and mortality. World J Gastroenterol 2013;19(3):347–54.
23. Janik J, Chwirot P. Perforated peptic ulcer–time trends and patterns over 20 years. Med Sci Monit 2000;6:369–72.
24. Christensen A, Bousfield R, Christiansen J. Incidence of perforated and bleeding peptic ulcers before and after the introduction of H2-receptor antagonists. Ann Surg 1988;207:4–6.
25. Graham RR. The treatment of perforated duodenal ulcers. Surg Gynecol Obstet 1937;(64):235–8.
26. Joshi AH, Vyas PH, Jayswal J. Role of laparoscopic surgery for management of duodenal ulcer perforation. Int J Med Sci Public Health 2016;5(4):807–9.
27. Bae S, Shim KN, Kim N, Kang JM, Kim DS, Kim KM, et al. Incidence and short-term mortality from perforated peptic ulcer in Korea: A population-based study. J Epidemiol 2012;22(6):508–16.

How to cite this article: Paul Ekka NM, Malua S. Clinical study of peptic ulcer perforation in eastern India: An tertiary institution-based study. Int J Med Sci Public Health 2016;5:2540-2544

Source of Support: Nil, **Conflict of Interest:** None declared.