International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2022): 7.94

The Evaluation of Pulp Score (Peptic Ulcer Perforation Score) as a Predictor of Mortality following Peptic Ulcerperforation

Ravula Supraja Ram[1], Vishwanatha Santhoshi[2]

Abstract: ***Introduction**: Mortality and morbidity following perforated peptic ulcer (PPU) remains high, and mortality proportions of 25–30% have been reported in population - based studies. The aim of this study was to evaluate the efficacy of PULP SCORE in predicting 30 - day mortality. **Patients and methods**: A series of 52 patients were enrolled in the study. Patients who underwent surgical treatment for perforated peptic ulcer were allotted points according to the PULP scoring system and stratified into high and low risk groups. All the data was prospectively analyzed. Observations and results: 46 patients were in low risk and 6 patients were in high - risk category.5 patients were deceased in high - risk group but none in low - risk group. The PULP SCORE had a sensitivity of 83.33% and specificity of 97.83% in predicting mortality. In the ROC curve the AUC was 91.8%.4 variables out of 8 variables in the score were found to be most important in predicting mortality. They were Treatment delay >24 hrs. ', Shock on admission, High ASA score, and Age >65 years. **Conclusion**: The prognostic predictors included in the PULP score can be readily identified prior to surgery, easy to use and feasible in emergency. The PULP score can assist in accurate and early identification of high - risk patients, and thus assist in risk stratification and triage of patients.*

Keywords: Perforation, PULP score

1. Introduction

- Peptic ulcer disease includes both gastric and duodenal ulcers which posed a major threat to the world's population over the past two centuries with a high morbidity and mortality.
- The evolution of knowledge regarding etiopathogenesis of peptic acid disease from acid - driven disease to an infectious disease has led to various studies to find the best possible options for management of this disease.1
- Barry J. Marshall and Robin Warren laid the groundwork for a revolution in the medical and surgical arena by discovery of Helicobacter pylori[2].
- In addition, non - steroidal anti - inflammatory drugs (NSAIDs), low - dose aspirin, smoking, excessive alcohol use, emotional stress and psychosocial factors are increasingly important causes of ulcers and their complications.
- Mortality and morbidity following perforated peptic ulcer (PPU) is substantial, and mortality proportions of 25–30% have been reported in population - based studies[3].
- A large number of prognostic factors for morbidity and mortality following PPU have been reported, and several clinical prediction rules have been proposed for prognostic prediction like the Boey score, the American Society of Anesthesiologists (ASA) score, APACHE II score, and the sepsis score.
- The Peptic Ulcer Perforation (PULP) score was put forward by MH Muller in 2011, based on prospectively collected data from 35 hospitals in Denmark.
- The aim of this study was to stratify patients who undergo surgical treatment for perforated peptic ulcer into low risk and high risk groups according to PULP score and to predict the mortality within 30 days post - operatively in both risk categories

Patients and Methods

- A prospective study was conducted on patients presenting to kamineni General Hospital, Narketpally from October 2020 to September 2022.
- 52 patients with features of Hollow viscous perforation and per - operative findings suggestive of perforated peptic ulcer were taken for the study.

Inclusion Criteria:

1) All patients more than 18 years age presenting with features of Hollow viscous perforation with per operative finding suggestive of perforated peptic ulcer.
2) Patients who are willing to participate for the study.

Exclusion Criteria:

1) Histopathology suggestive of malignant ulcer.
2) Hollow viscous perforation cases which were not operated.
3) Patients with hollow viscous perforation who died before surgery.
4) Patients who were not ready to give informed written consent for the study.
5) Patients undergoing procedures other than primary closure with omentoplasty.

- Patients were resuscitated with fluids, O2 was given, foleys was kept to monitor urine output, cultures were sent and were started on broad spectrum antibiotics.
- After stabilization of patient detailed history was taken regarding age, onset of symptoms, previous use of steroids or NSAIDs, smoking, alcohol intake, any active malignant disease, and other associated illnesses.
- Patients of peptic ulcer perforation were operated as simple closure with Graham's Omental patch. Gastric biopsy was done to rule out perforations due to malignancy of stomach.
- Patients who underwent surgical treatment for perforated peptic ulcer were allotted points according to the PULP scoring system.

Licensed Under Creative Commons Attribution CC BY

- Other patients who underwent surgery for other hollow viscus perforation were not included in the study.
- Individual patient was classified into high - risk or low - risk category and continuous bedside monitoring was done.
- All the patients were followed - up after 1 month either directly in person or through telephonic conversation and again at 6 months interval.

PULP Score

Variables	Points
Age > 65 YRS	3
CO - Morbid Active Malignant Disease or Aids	1
CO - Morbid Liver Cirrhosis	2
Concomitant Use of Steroids	1
Shock on Admission (BP<100 & HR>100)	1
Time From Perforation to Admission >24HRS	1
Serum Creatinine >1.47 mg/dl or >130 µmol/l	2
ASA Score 2	1
ASA Score 3	3
ASA Score 4	5
ASA Score 5	7

- **Statistical Analysis:** Differences were considered statistically significant, if P < 0.05 using the Chi square test.
- IBM SPSS Statistics for Windows, version 24 (IBM Corp., Armonk, N. Y., USA) software program was used for statistical calculations.

2. Observations and Results

- 45 patients were<65 years age and 7 patients were >65 years ofage

Table I: Association of age with mortality. (P = 0.002)

Age Group	No. of Cases (N = 52)	No. of Deceased (N=5)
< 65 YRS	45	1
> 65 YRS	7	4

- 41 patients presented within 24 hours and 11 patients after 24 hours.

Table II: Association of time of presentation with mortality. (P = 0.0202)

Time of Presentation	No. of Cases (N = 52)	No. of Deceased (N=5)
<24 HRS	41	1
>24 HRS	11	4

- 46 patients presented with shock.

Table III: Association of shock and mortality. (P = 0.0012)

Shock on Admission	No. of Cases (N = 52)	No. of Deceased (N=5)
No Shock	46	1
Patient in Shock	6	4

- Creatinine levels were more than 1.47 mg/dl in 15 patients.

Table IV: Association of serum creatinine and mortality. (P = 0.0071)

Serum Creatinine	No. of Cases (N = 52)	No. of Deceased (N=5)
< 1.47 mg/dl	37	0
> 1.47 mg/dl	15	5

- Most of the patients were under ASA II AND III.

Table V: Number of patients with various ASA score categories

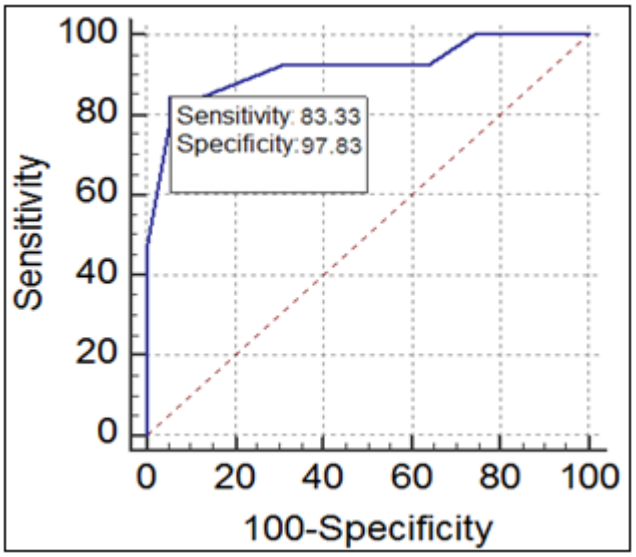
ASA Grade	No. of Cases (N = 52)
ASA I	1
ASA II	23
ASA III	24
ASA IV	4
ASA V	Nil

- None of the patients had AIDS, any malignancy, cirrhosis, and there was no concomitant use of steroids.
- Risk stratification of patients done into low risk (0 - 7) and high risk (>7) groups according to PULP SCORE.

Table VI: Significance of PULP score in predicting mortality. (P = <0.0001)

Risk Group	No. of Cases (N = 52)	No. of Deceased (N=5)
Low	46	0
High	6	5

- The association between risk groups and mortality is extremely statistically significant.



AUC of present study

3. Discussion

- Perforation is the most common complication of peptic ulcer disease. In spite of modern progress in the management, it is still a life - threatening catastrophe.
- Perforated gastric ulcers are potentially complicated surgical emergencies and appropriate early management is essential in order to avoid subsequent problems including unnecessary gastrectomy[6].

Licensed Under Creative Commons Attribution CC BY

- Complication rates continued to remain the same despite overall reduction in incidence of peptic ulcer disease in recent decades[6]
- Mean age was 47 years in the present study, which is similar to other studies [7, 8, 9].
- Sex ratio was 25: 1 which is similar to studies conducted in India by Sharma et al (2006) and Mishra et al (2001).
- 4 variables were found to be most important in the present study - treatment delay >24 hrs., shock on admission, high ASA score, age >65 years.
- The mortality rate in case of delayed surgery (after 24 hours) was 9.9%. This is similar to study done by Testini[10] and Dakubo[11].
- The mortality in patients presenting with shock at admission was 18.2 %. This matches with the study done by Dakubo[11]. In the absence of shock, the mortality was very less. It was 0.7, 4.7, and 6.4 in studies by Testini[10], Kocer[11] and Dakubo[12] respectively and 0.5 % in present study.
- In present study, there were 5 deaths and they belonged to ASA grade III and IV. Hence ASA grade is a highly important predictor of postoperative mortality. Results are similar to study done by Kocher where higher mortality was seen in ASA III, IV, and V.
- The age above 65 was found to have a significant influence on mortality. Out of 5 deceased patients 4 were above 65 years age. These results are similar to studies by Kocer[11] and Lohsiriwat[13].
- All the 5 patients who died had serum creatinine levels more than 1.47 mg/dl. Increased creatinine levels may be an indicator of several conditions, including chronic renal failure, the expression of pending renal failure (due to the current disease), but may also be due to dehydration or reflect shock or sepsis per se. Nevertheless, increased creatinine is a well - recognized risk factor for mortality in peptic ulcer perforation[14].
- 6 patients in present study were in the high - risk group and 46 patients were in the low - risk group after assigning the pulp score. Among the 6 patients 5 patients died. One patient survived in the high - risk group, which may be due to the intensive monitoring, resuscitation, and aggressive treatment.
- The mortality rate in present study was 26.3%. This rate correlates with mortality rate of study by Molleret al[15].
- The sensitivity of the PULP SCORE in predicting mortality was 83.33% whereas the specificity was 97.83%. The AUC in present study was 91.8%. This result is similar to study done by EbruMenekseet al[16] which was 95.5 %.
- The limitation of this study was its small size which was only 52. Further large prospective studies will be required for validation of PULP SCORE in predicting mortality.

4. Conclusion

- The prognostic predictors included in the PULP score can be readily identified prior to surgery, easy to use and feasible in emergency.
- The PULP score can assist in accurate and early identification of high - risk patients, and thus assist in risk stratification and triage of patients with PPU, e. g., timely referral of high - risk cases from peripheral centers with limited resources, selection and timing of pre - operative respiratory and circulatory stabilization, the level and extent of monitoring, and provide adequate postoperative care to decrease mortality.

References

[1] Prabhu V, Shivani A. An Overview of History, Pathogenesis and Treatment of Perforated Peptic Ulcer Disease with Evaluation of Prognostic Scoring in Adults. Annals of Medical and Health Sciences Research.2014; 4 (1): 22 - 9.
[2] Bashinskaya B, Nahed BV, Redjal N, Kahle KT, Walcott BP. Trends in Peptic Ulcer Disease and the Identification of Helicobacter Pylori as a Causative Organism: Population - based Estimates from the US Nationwide Inpatient Sample. Journal of Global Infectious Diseases.2011; 3 (4): 366 - 70.
[3] Møller M, Shah K, Bendix J, Jensen A, Zimmermann - Nielsen E, Adamsen S, et al. Risk factors in patients surgically treated for peptic ulcer perforation2008.145 - 52, 2 p following 52 p.
[4] Moller MH, Engebjerg MC, Adamsen S, Bendix J, Thomsen RW. The Peptic Ulcer Perforation (PULP) score: a predictor of mortality following peptic ulcer perforation. A cohort study. Acta anaesthesiologica Scandinavica.2012; 56 (5): 655 - 62.
[5] B Goudar ST, Y Lamani, S Shirbur, U Ambi, V Hosalli. Perforated Peptic Ulcer Disease: Factors Predicting the Mortality and Morbidity In A Tertiary Care Centre In Southern India. The Internet Journal of Surgery.2010; 27 (2).
[6] Leeman MF, Skouras C, Paterson - Brown S. The management of perforated gastric ulcers. International Journal of Surgery.11 (4): 322 - 4.
[7] Moller MH, Shah K, Bendix J, Jensen AG, Zimmermann - Nielsen E, Adamsen S, et al. Risk factors in patients surgically treated for peptic ulcer perforation. Scandinavian journal of gastroenterology.2009; 44.
[8] Thorsen K, Glomsaker TB, von Meer A, Soreide K, Soreide JA. Trends in diagnosis and surgical management of patients with perforated peptic ulcer. Journal of gastrointestinal surgery: official journal of the Society for Surgery of the Alimentary Tract.2011; 15 (8): 1329 - 35.
[9] Mishra A, Sharma D, Raina VK. A simplified prognostic scoring system for peptic ulcer perforation in developing countries. Indian journal of gastroenterology: official journal of the Indian Society of Gastroenterology.2003; 22 (2): 49 - 53.
[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 Journal of Gastroenterology: WJG.2003; 9 (10): 2338 - 40.
[11] 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. Journal of gastroenterology and hepatology.2007; 22 (4): 565 - 70.

Licensed Under Creative Commons Attribution CC BY

[12] Dakubo JC, Naaeder SB, Clegg - Lamptey JN. Gastro - duodenal peptic ulcer perforation. East Afr Med J.2009; 86 (3): 100 - 9.
[13] Lohsiriwat V, Prapasrivorakul S, Lohsiriwat D. Perforated Peptic Ulcer: Clinical Presentation, Surgical Outcomes, and the Accuracy of the Boey Scoring System in Predicting Postoperative Morbidity and Mortality2008; 33 (1) 80 - 5.
[14] Thorsen K, Søreide JA, Søreide K. What is the best predictor of mortality in perforated peptic ulcer disease? A population - based, multivariable regression analysis including three clinical scoring systems. Journal of gastrointestinal surgery: official journal of the Society for Surgery of the Alimentary Tract.2014; 18 (7): 1261 - 8.
[15] Moller MH, Adamsen S, Thomsen RW, Moller AM. Preoperative prognostic factors for mortality in peptic ulcer perforation: a systematic review. Scand J Gastroenterol.2010; 45 (7 - 8): 785 - 805.
[16] Menekse E, Kocer B, Topcu R, Olmez A, Tez M, Kayaalp C. A practical scoring system to predict mortality in patients with perforated peptic ulcer. World Journal of Emergency Surgery: WJES.2015; 10 (7).

Licensed Under Creative Commons Attribution CC BY