



Surgery

THE EVALUATION OF PULP SCORE (PEPTIC ULCER PERFORATION SCORE) AS A PREDICTOR OF MORTALITY FOLLOWING PEPTIC ULCER PERFORATION.

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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 : **1. Treatment delay >24 hrs, 2. Shock on admission, 3. High ASA score, 4. 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 : Perforated peptic ulcer, PULP SCORE, mortality prediction.

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 .

Barry J. Marshall and Robin Warren laid the groundwork for a revolution in the medical and surgical arena by discovery of *Helicobacter pylori* . 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 studies³. A large number of prognostic factors for morbidity and mortality following PPU have been reported, and a number of 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 Møller 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 Mamata General Hospital, Khammam from October 2015 to September 2017. Patients with features of Hollow viscous perforation and per-operative findings suggestive of perforated peptic ulcer were taken for the study. 52 patients were enrolled in this study during this period.

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 were ready to give informed written consent 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.

For diagnosis of hollow viscus perforation, after a quick general and abdominal examination, an X-ray abdomen erect view was obtained for the presence of free gas under diaphragm. If pneumoperitoneum could not be found on X-ray, a CT scan was done to confirm the diagnosis. Patient was resuscitated with fluids, O₂ was given, foleys was kept to monitor urine output, cultures were sent and patient was started on broad spectrum antibiotics. After stabilization of patient a 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.

The PULP SCORE is depicted in the following table.

Table 1- 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 Mmol/l	2
Asa Score 2	1
Asa Score 3	3
Asa Score 4	5
Asa Score 5	7

Patients who underwent surgical treatment for perforated peptic ulcer were allotted points according to the PULP scoring system. 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. Continuous bedside monitoring was done. After satisfactory improvement, patients were discharged from the hospital with counseling regarding diet, anti-ulcer drugs and quitting of smoking/alcohol etc. All the patients were followed-up after 1 month either directly in person or through telephonic conversation and again at 6 months interval.

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.

OBSERVATIONS AND RESULTS:

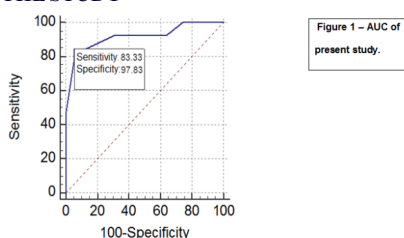
The highest incidence of PPU was seen in 30-50 years of age. There were 50 males and 2 females.

The association of all variables with mortality, ASA score and PULPSCORE are depicted in table 2.

ASSOCIATION OF AGE WITH MORTALITY.			
AGE GROUP	NO. OF CASES N=52	DECEASED N=05	χ^2 - 9.047 P=0.002
<65 YEARS	45	1	
>65 YEARS	7	4	
ASSOCIATION OF TIME OF PRESENTATION WITH MORTALITY.			
TIME OF PRESENTATION	NO. OF CASES N=52	DECEASED N=05	χ^2 - 5.394 P=0.0202
<24 HRS	41	1	
>24 HRS	11	4	
ASSOCIATION OF SHOCK AND MORTALITY.			
SHOCK ON ADMISSION	NO. OF CASES N=52	DECEASED N=05	χ^2 - 10.425 P=0.0012
No shock	46	1	
Patient in shock	6	4	
ASSOCIATION OF SERUM CREATININE AND MORTALITY.			
SERUM CREATININE	NO. OF CASES N=52	DECEASED N=05	χ^2 - 7.256 P=0.0071
<1.47 mg/dl	37	0	
>1.47 mg/dl	15	5	
ASA SCORES			
ASA SCORE	NUMBER OF PATIENTS		
ASA I	1		
ASA II	23		
ASA III	24		
ASA IV	4		
ASA V	NIL		
SIGNIFICANCE OF PULP SCORE IN PREDICTING MORTALITY			
Risk group	NO. OF CASES N=52	MORTALITY N=05	χ^2 - 17.591 P<0.0001
low	46	0	
high	6	5	

Table 2 - Association between variables and mortality is statistically significant. The association between risk groups and mortality is extremely statistically significant.

ROC CURVE OF THE STUDY



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. Perforation may occur in a patient with previous history of ulcer disease or it may happen without any prior symptoms⁵.

Perforated gastric ulcers are potentially complicated surgical emergencies and appropriate early management is essential in order to avoid subsequent problems including unnecessary gastrectomy⁶.

Complication rates continued to remain the same despite overall reduction in incidence of peptic ulcer disease in recent decades⁶. The role of surgery in the treatment of ulcer disease has also decreased, primarily caused by a marked decline in elective surgical therapy for chronic disease and also because the percentage of patients who require emergent surgery for complicated disease has remained constant.

Mean age was 47 years in the present study, which is similar to other studies^{7,9}. 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 Testini¹⁰ and Dakubo¹¹. The mortality in patients presenting with shock at admission was 18.2 %. This matches with the study done by Dakubo¹¹. In the absence of shock, the mortality was very less. It was 0.7, 4.7, and 6.4 in studies by Testini¹⁰, Kocer¹² and Dakubo¹² 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 Kocer 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 Kocer¹² and Lohsiriwat¹³. 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 (known or unknown before diagnosis), 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 perforation¹⁴.

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 Møller et al¹⁵.

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 Ebru Menekse et 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 PULPSCORE in predicting mortality.

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.

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