# POMPP Score and Boey Score: To Predict Mortality in Peptic Ulcer Perforation

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## ABSTRACT

**Introduction:** Peptic ulcer is an insult to the mucosa of the upper digestive tract. Helicobacter pylori infection, long term use of non-steroidal anti-inflammatory drugs or steroids, excessive alcohol ingestion and smoking are common etiological factors. A number of scoring systems for prediction of outcomes in perforated peptic ulcer patients have been developed such as Predictive score of mortality in perforated peptic ulcer score and Boey score. **Aims:** To evaluate Predictive score of mortality in perforated peptic ulcer score and Boey Score in predicting accuracy of mortality in patients with peptic ulcer perforation. **Methods**: A hospital based study was conducted from June 2021 to May 2022 in the department of Surgery, Nepalgunj Medical College, Kohalpur. The Predictive score of mortality in perforated peptic ulcer and Boey score were recorded after history taking, physical examination, basic pre-operative investigations and radiological imaging. The patients were classified into high risk and low risk categories based on scores and followed up to predict the mortality within 30 days post operatively. **Results:** 80 patients were included in the study. 53 were male and 27 female. Peptic ulcer perforation was seen more in age groups of 45 to 60 years. In Boey score 8 patients out of 27 high risk patients died whereas in Predictive score of mortality in perforated peptic ulcer score 8 patients died out of 12 high risk patients. When compared, predictive score of mortality in perforated peptic ulcer was found to be more accurate than Boey score (p-<0.05) score. **Conclusion:** Predictive score of mortality in perforated peptic ulcer is easy to use and more accurate in predicting mortality in peptic ulcer perforation than Boey score.

*Keywords:* Boey score, Mortality, Peptic Ulcer Perforation, Predictive score of mortality in perforated peptic ulcer score Score

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## INTRODUCTION

Peptic ulcer disease (PUD) is defined as digestive tract injury that results in a mucosal break greater than 3-5 mm, with a visible depth reaching sub-mucosa.[1] It commonly occurs in the first part of duodenum and lesser curvature of stomach but can also occur in oesophagus and Meckel's diverticulum.[2] The prevalence of PUD is 8.4% worldwide[3] and in Nepal it is considered 7th commonest cause of morbidity.[4] Helicobacter pylori infection, abuse of NSAIDs or steroids, excessive alcohol ingestion and smoking are risk factors for PUD.[5] More than half of the world's population has chronic H. pylori infection and among them 5-10% develop PUD.[6] The lifetime prevalence of perforated peptic ulcer (PPU) is about 5%. PPU is commonly encountered surgical emergency with high risk of morbidity and mortality. Mortality ranges from 8.5-30%.[7] Patient presents with sudden severe epigastric pain and features of peritonitis in about 2/3rd of cases. Plain X-ray chest in erect position showing free gas under the diaphragm is the first diagnostic investigation in upto 85% of cases. Definitive management of PPU is exploratory laparotomy with omental patch repair while few cases with sealed perforation can be managed conservatively.[8] Scoring systems like POMPP(Predictive score of mortality in perforated peptic ulcer) score, Boey score, PULP(Peptic Ulcer Perforation) score, Mannheim Peritonitis Index(MPI) and APACHE II score have been developed to predict outcomes in PPU patients. POMPP score[9] and Boey score[8] are specifically devised to predict mortality in PPU. Several studies have been conducted to validate their good predicting accuracy.

## METHODS

This study was a hospital based study conducted over a period of one year between June 2021 to May 2022 in Department of Surgery, Nepalgunj Medical College, Kohalpur. The detail history was taken and patients were examined. All the routine blood investigations were done. X-ray chest PA view was done to diagnose the hollow viscus perforation and peptic ulcer perforation was confirmed at laparotomy.

The inclusion criterias were patients with age 18 years and above and all patients with perforated peptic ulcer. The

exclusion criterias were hollow viscus perforation other than gastro-duodenal perforation found during surgery, gastro-duodenal perforation due to malignant tumor, trauma or iatrogenic causes and patients with sealed perforation managed conservatively. Informed consent was obtained from all the patients and their relatives.

The POMPP and Boey scoring systems were recorded after history taking, physical examination, basic pre-operative investigations and radiological imaging. The patients were classified into high risk or low risk categories. Both POMPP and Boey score have a total of 3 variables each and a maximum score of 3. Patients with a score of more than 1 were categorized as high risk and those with a score of less than or equal to 1 were categorized as low risk. Exploratory laparotomy with Graham Patch Repair was performed for perforated peptic ulcer and followed up accurately to predict the mortality within 30 days post operatively.

Data analysis was done using Statistical Package for Social Sciences (SPSS) version 26.0. Chi square test was used to measure the association of the POMPP and Boey score with mortality and these were expressed as frequency and percentage and were used to see the significant difference between groups.

### POMPP score

| Variables | Points |
|---|---|
| Age >65 years | 1 |
| BUN >45 mg/dl | 1 |
| Serum Albumin <1.5g/dl | 1 |

*Total score - 3; High Risk - >1*

### Boey score

| Variables | Points |
|---|---|
| Concomitant medical illness | 1 |
| Pre-operative shock (Systolic BP <90 mm Hg) | 1 |
| Duration of perforation >24 hours | 1 |

*Total score - 3; High Risk - >1*

### RESULTS

80 patients were included in this study between the ages 18 to 72 years. The average age group of PPU was 45 years. Peptic ulcer perforation was seen more in patients between 45 to 60 years.  Out of 80 patient, 53(66.25%) were males and 27(33.75%) females with a male: female ratio of 1.96:1.

In our study 8 patients out of 27(29.6%) high risk patients, as defined by Boey score, died while 1 out of 53(1.89%) patients falling in the low risk category died. The Boey score is based on concomitant medical illness, preoperative shock and duration of perforation. The correlation of death in relation to Low and High Risk categories is shown in Table I.

| Outcome | Boey's score | | Total (%) | P-value |
|---|---|---|---|---|
| | Low risk (%) | High risk (%) | | |
| Death | 1 (1.25) | 8 (10) | 9 (11.25) | <0.05 |
| Discharge | 52 (65) | 19 (23.75) | 71 (88.75) | |
| Total | 53 (66.25) | 27 (33.75) | 80 (100) | |

*Table I: Correlation of Boey's score and outcome*

In POMPP scoring system, 8 out of 12(66.66%) high risk patients died while only 1 out of 68 (1.47%) low risk patients died. The POMPP score was calculated based on the cut-off values of Age, BUN and Serum Albumin. The result is shown in Table II.

| Outcome | POMPP score | | Total (%) | P-value |
|---|---|---|---|---|
| | Low risk (%) | High risk (%) | | |
| Death | 1 (1.25) | 8 (10) | 9 (11.25) | <0.05 |
| Discharge | 67 (83.75) | 4 (5) | 71 (88.75) | |
| Total | 68 (85) | 12 (15) | 80 (100) | |

*Table II: Correlation of POMPP score and outcome*

| Age | >65 Yrs | <65 Yrs |
|---|---|---|
| | 13 | 67 |
| Concomitant Medical Illness | Yes | No |
| | 17 | 63 |
| Duration of Perforation | >24 hours | <24 hours |
| | 23 | 53 |
| Preoperative shock | Yes | No |
| | 21 | 59 |
| Serum albumin | <1.5mg/dl | >1.5 mg/dl |
| | 5 | 75 |
| BUN (Blood Urea Nitrogen) | >45mg/dl | <45mg/dl |
| | 4 | 76 |

*Table III: Number of pateints in various variable of POMPP and Boey scores*

### DISCUSSION

Peptic ulcer disease had a tremendous effect on morbidity and mortality until the last decades of the 20th century. Fall in its incidence in recent years is mainly due to the discovery of effective and potent acid suppressants and treatment of H. pylori. But the percentage of patients who require surgery for PPU still remains constant with substantial morbidity and mortality associated with it.[7] Peptic ulcer disease (PUD) results from an imbalance between gastric acid-pepsin and mucosal defense barriers.[5] There are two scoring systems (Boey and POMPP) applied to describe the prediction of postoperative mortality rate in patients with PPU. These scoring systems are simply based on age and routinely measured simple laboratory tests (albumin, BUN) in POMPP and concomitant medical

illness, pre-operative shock and duration of perforation in Boey score. The prevalence of mortality of this study is 11.25% which is comparable to study done by Kocer B (8.55%).[11] Results of both Boey and POMPP scoring systems in this study were statistically significant to predict mortality risk of the patients.

The comparison between Boey and POMPP scoring systems revealed outcome of POMPP scoring system to be better in predicting mortality than Boey scoring system in this study. Out of the 12 patients falling in the high risk category according to POMPP score, 8 patients died (66.66%). While in Boey score, only 8 out of 27 patients falling under high risk group died (29.6%).

A study was conducted involving 100 patients concluded that POMPP scoring system is a simple and applicable system with an accuracy rate of up to 80% which is similar to our study.[12]

The prognostic predictors included in the Boey score and POMPP score can be easily obtained and applied and can assist in accurate and early identification of high-risk patients. Thus, these scoring systems help in risk stratification and timely management of high-risk patients of PPU significantly improving the morbidity and mortality associated with it.

## CONCLUSION

Peptic ulcer perforation is one of the most common surgical emergencies encountered in our region associated with significant morbidity, mortality and economic burden. PPU was found to be more common between the ages 40 to 65 years. Males were more commonly affected than females with a ratio of 1.96:1. Post operative mortality in our study was 11.25%. Both Boey and POMPP scores were effective in predicting the mortality in patients with PPU, the latter being more accurate. Death was significant in patients above 65ys of age. A low serum albumin level (<1.5 mg/dl) and a high BUN value (> 45mg/dl) at the time of admission were directly proportional to the mortality rate. Thus, both these scoring systems can assist in accurate and early identification of high-risk patients and are important in risk stratification and predicting mortality and morbidity in patients with PPU.

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