

**Original research article****Comparative study between pulp score and pompp score to predict morbidity and mortality in peptic perforation peritonitis****<sup>1</sup>Dr. Arjun R, <sup>2</sup>Dr. Niyaz Ahmed, <sup>3</sup>Dr. Bhanuprakash KR**<sup>1</sup>Post Graduate, Department of General Surgery, Bangalore Medical College and Research Institute, Bangalore, Karnataka, India<sup>2</sup>Assistant Professor, Department of General Surgery, Bangalore Medical College and Research Institute, Bangalore, Karnataka, India<sup>3</sup>Professor, Department of General Surgery, Bangalore Medical College and Research Institute, Bangalore, Karnataka, India**Corresponding Author:**

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**Abstract**

Peptic ulcers are erosions that extend through the muscularis mucosae in the stomach or duodenal mucosa. They may be acute or chronic, and eventually result from an imbalance between mucosal defences and acid/peptic damage. Surgery is nearly generally necessary for ulcer perforation, while occasionally nonsurgical treatment may be used in the stable patient without peritonitis whose radiologic scans show a sealed off perforation. The patients who undergo surgical treatment for perforated peptic ulcer are allotted points according to the POMPP and PULP scoring system after history taking, physical examination, basic pre-operative investigations and radiological imaging. The patients will be allotted points according to both scoring systems which are then compared. The patients will be classified into high risk or low risk categories and followed up accurately to predict the mortality and morbidity within 30 days post operatively. Out of 42 low POMPP risk categorized patients no one died which constituted for 0.0% of mortality among low POMPP risk patients and 42(70.0%) of them got discharged, whereas 4 out of 18 High POMPP risk categorised patient died which constituted for 30.0% of mortality among High POMPP risk patients and only 18(30.0%) of them got discharged. This correlation between POMPP RISK Score and outcome was found to be statistically significant.

**Keywords:** Pulp score, pompp score, peptic perforation peritonitis**Introduction**

An imbalance between mucosal defence barriers and stomach acid-pepsin causes peptic ulcer disease. Every year, 4 million people throughout the world are impacted. According to estimates, peptic ulcer disease affects 1.5% to 3% of people. Although 10%-20% of people with peptic ulcer disease will develop problems, only 2%-14% of the ulcers will perforate and result in an acute sickness <sup>[1]</sup>.

Peptic ulcers are erosions that extend through the muscularis mucosae in the stomach or duodenal mucosa. They may be acute or chronic, and eventually result from an imbalance between mucosal defences and acid/peptic damage. Surgery is nearly generally necessary for ulcer perforation, while occasionally nonsurgical treatment may be used in the stable patient without peritonitis whose radiologic scans show a sealed off perforation. Peptic ulcer perforation is still a medical condition that requires urgent surgical treatment. Comparing all ulcer disease complications, perforation has the highest fatality rate. In the western population, the estimated prevalence of peptic ulcer disease ranges from 5 to 15%, with a lifetime incidence of just under 10%. The prevalence of elective surgery for peptic ulcer disease (PU) has declined with the development of H2 receptor antagonists and proton pump inhibitors, however PUD consequences including bleeding and perforation have mostly remained consistent. 2 One of the most frequent surgical emergencies globally is peritonitis caused by a perforated peptic ulcer, which has a high rate of morbidity and mortality.

This is a result of a number of risk factors, such as the persistence of Helicobacter pylori infection, long-term NSAID usage, excessive alcohol consumption, smoking, and steroid use among the general population. Mucosal bicarbonate secretion, mucus production, healthy blood flow, growth factors, cell renewal, and endogenous prostaglandins are examples of protective (or defensive) factors.

A grading system is essential to classify patients as low risk or high risk and treat them accordingly in cases of peptic ulcer perforation peritonitis, which typically necessitates an immediate surgical intervention. Patients with perforated ulcers should be managed more easily and have higher survival rates thanks to risk classification <sup>[3]</sup>.

Perforated peptic ulcer (PPU) is associated with significant mortality and morbidity; fatality proportions

of 25-30% have been recorded in population-based studies. Numerous clinical prediction rules have been proposed for prognostic prediction and research purposes, and many prognostic factors for morbidity and mortality following PPU have been reported. These rules include the POMPP score, Peptic Ulcer Perforation (PULP) score, BOEY score Mannheim Peritonitis Index (MPI), American Society of Anaesthesiologists (ASA) score, Acute Physiology and Chronic Health Evaluation (APACHE) II score, Hacettepe Score, Simplified Acute Physiology Score II (SAPS II) and the Sepsis Score.

A brand-new and simple to use scoring system called POMPP (Predictive Score of Death in Perforated Peptic Ulcer) has been developed to predict mortality in PPU patients. They thought that three simple markers (age, albumin, and BUN) may be used to predict surgical mortality in PPU patients in clinical settings<sup>[4]</sup>.

The necessity for this study to stratify patients with peptic ulcers into low and high risk groups and to examine the POMPP and PULP scores as predictors of morbidity and mortality in patients with peptic perforation peritonitis.

### Methodology

A prospective observational study was conducted on patients presenting to the hospitals with features suggestive of hollow viscus perforation and intraoperative findings suggestive of peptic ulcer perforation.

### Inclusion criteria

1. Patients willing to give informed consent.
2. Patients of either sex aged between 18 and 80 years.
3. All patients presenting with features of hollow viscus perforation with per operative finding suggestive of perforated peptic ulcer

### Exclusion criteria

1. Patient not willing to give informed consent.
2. Patient less than 18 or more than 80 years of age.
3. Histopathology suggestive of malignant ulcer.

### Study methodology

- After obtaining approval and clearance from the institutional ethics committee, the patients fulfilling the inclusion criteria will be enrolled for the study after obtaining informed consent.
- The patients who undergo surgical treatment for perforated peptic ulcer are allotted points according to the POMPP and PULP scoring system after history taking, physical examination, basic pre-operative investigations and radiological imaging. The patients will be allotted points according to both scoring systems which are then compared. The patients will be classified into high risk or low risk categories and followed up accurately to predict the mortality and morbidity within 30 days post operatively.

### Statistical Methods

Data was examined using descriptive statistical methods, and all information is presented as Mean, Median, SD, Interquartile Range, Percentages, Tables, and Graphs as needed.

POMPP and PULP scores were used to divide the population into high- and low-risk categories. The chi square test was used to assess the gender, serum albumin levels, BUN levels, POMPP, and PULP scores' associations with mortality and morbidity. These associations are expressed as frequencies and percentages, and the test is used to determine whether there is a statistically significant difference between groups.

### Significant Figures

- a) Suggestive significance (P value:  $0.05 < P < 0.10$ )
- b) Moderately significance (P value:  $0.01 < P \leq 0.05$ )
- c) Strongly significance (P value:  $P \leq 0.01$ ).

### Results

**Total Pulp Score:** Based on PULP scoring system, 60 (93.8%) study participants were belonging to low risk category defined as interval between scores 0-7 and the remaining 4 (6.3%) were categorized as high risk category defined as interval between scores 8-18.

**Table 1:** Distribution of the Subjects based on Total Pulp Score

Total Pulp Score	Frequency	Percent
> 7	4	6.3
0 to 7	60	93.8
Total	64	100.0

**Table 2:** Risk Stratification in Pulp Score

Pulp Score	Frequency	Percent
0	2	3.1%
1	11	17.2%
2	19	29.7%
3	6	9.4%
4	10	15.6%
5	8	12.5%
7	4	6.3%
8	1	1.6%
9	1	1.6%
10	1	1.6%
11	1	1.6%
Total	64	100.0%

**Total POMPP Score:** In this study, out of 64 patients, 42(65.6%) patients were categorised as low risk of the POMPP scoring system defined as interval between scores 0-1 and the remaining 22(34.4%) were categorized as high risk that is interval between scores 2-3.

**Table 3:** Distribution of the Subjects Based on Total POMPP Score

Total POMPP Score	Frequency	Percent
< 1	42	65.6
> 1	22	34.4
Total	64	100.0

**Table 4:** Risk Stratification in POMPP Score

Total POMPP Score	Frequency	Percent
0	42	65.6%
1	19	29.7%
2	3	4.7%
3	0	0%
Total	64	100.0%

**Based on Outcome:** Our study included with 64 patients with peptic ulcer disease, 60(93.8%) patients got discharged from the hospital, whereas 4(6.3%) patients died and the mortality due to peptic ulcer disease is 6.3%.

**Table 5:** Distribution of the Subjects based on Outcome

Outcome	Frequency	Percent
Death	4	6.3
Discharged	60	93.8
Total	64	100.0

**Outcome and Total Pulp Score:** In current study, out of 60 low PULP risk categorised patients 1 died which constituted for 1.66% of mortality among low PULP risk patients and 59(98.33%) of them got discharged, whereas 3 out of 4 High PULP risk categorised patients died which constituted for 75% of mortality among High PULP risk patients and only 1(25%) of them got discharged. This correlation between PULP RISK Score and outcome was found to be highly significant statistically with a P value of 0.001 determined by Chi-square test with Pearson Chi-square value of 34.418 at 1 degree of freedom.

**Table 6:** Cross-Tabulation of Outcome and Total Pulp Score

Total Pulp Score		Outcome		Total
		Death	Discharged	
> 7	Count	3	1	4
	%	75.0%	1.7%	6.3%
0 to 7	Count	1	59	60
	%	25.0%	98.3%	93.8%
Total	Count	4	60	64
	%	100.0%	100.0%	100.0%
Chi-square value- 34.41				
p value-0.001*				
*significant				

**Outcome and Total POMPP Score:** Out of 42 low POMPP risk categorised patients no one died which constituted for 0.0% of mortality among low POMPP risk patients and 42(70.0%) of them got discharged, whereas 4 out of 18High POMPP risk categorised patient died which constituted for 30.0% of mortality among High POMPP risk patients and only 18(30.0%) of them got discharged. This correlation between POMPP RISK Score and outcome was found to be statistically significant with a P value of 0.004 determined by Chi-square test with Pearson Chi-square value of 8.14t1 degree of freedom

**Table 7:** Cross-Tabulation of Outcome and Total POMPP Score

Total POMPP Score		Outcome		Total
		Death	Discharged	
< 1	Count	0	42	42
	%	0.0%	70.0%	65.6%
>1	Count	4	18	22
	%	100.0%	30.0%	34.4%
Total	Count	4	60	64
	%	100.0%	100.0%	100.0%
Chi-square value- 8.14				
p value-0.004*				
*significant				

**Discussion**

The POMPP Score is a recent scoring system developed to predict the morbidity and mortality in peptic ulcer perforation patients. The results of some these studies are as below:

**Table 8:** POMPP Score Affecting Mortality in Patients with PPU in Various Studies

Study	Mortality Rate			
	POMPP 0	POMPP 1	POMPP 2	POMPP 3
Menekse (2015) 4	0	7%	34.4%	88.9%
Kumar (2017) 5	0	0	0	100%
Our Study	0	2.1%	65%	-

For evaluating patient risks of death and morbidity during a peritonitis incident, numerous scoring systems have been developed [6]. In order to:

1. Validate the efficacy of various treatment plans.
2. Scientifically utilise surgical intensive care units.
3. Help indicate individual risk to select patients who may need a more aggressive surgical approach, and be able to inform patient's relatives with greater objectivity. Reproducible scoring systems that allow a surgeon to assess the severity of the intra-abdominal infection are essential.

In order to identify the factors that are most strongly associated with result, statistical studies were used to construct the majority of surgical risk scores. When a patient arrives at the hospital in need of an emergency procedure, the surgeon and anaesthetist have a responsibility to weigh the risks of anaesthesia and surgery against the likelihood that the procedure will be successful. To do this, they must first determine the patient's pre-morbid condition, quality of life (QOL), and prognosis [7].

If there is a low likelihood of success and doing surgery might increase the likelihood of a deadly outcome, it may not be advised. Numerous scoring methods have been developed to help make these challenging judgements more objective [8].

**PULP Score**

The Peptic Ulcer Perforation (PULP) score comprises eight variables and is found to accurately predict 30-day mortality in patients operated for PPU and can assist in risk stratification and triage [9].

**POMPP Score**

In order to predict the postoperative mortality rate in patients with perforated peptic ulcers, researchers developed the Predictive Score of Mortality in Perforated Peptic Ulcer (POMPP Score). With its construction based on objective data, POMPP is a very straightforward and useful scoring system for clinical practise that may enable surgeon to make a quick analysis and may help in forecasting mortality rate in PPU [10].

**Conclusion**

It is possible to use the prognostic predictors included in the PULP score and POMPP score in the Indian healthcare system since they are accessible and easy to use. Both POMPP and PULP score can help with the precise and prompt identification of high- risk patients, which can then help with risk stratification

and triage of patients with peptic ulcer perforation. They can also help with the timely referral of high-risk cases from peripheral centres with limited resources, admission to the ICU, the level and extent of monitoring, and inclusion in particular peri-operative care protocols.

Our study's mortality rate was 6.3%, and a mortality analysis identified five critical factors that had a significant impact on patient outcomes: treatment delay of more than 24 hours, hypotension or shock at the time of presentation, high serum creatinine levels, high ASA score, and age greater than 65 years. All of these factors were included in PULP, with the exception of serum albumin value and BUN LEVELS, which were included in POMPP. Although the total mortality rate for blood creatinine levels was just 25.5%, it served as a substitute sign for impending sepsis.

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