Comparison of Effectiveness of Boey Score and Pulp Score in Assessment of Severity in Peptic Ulcer Perforations: Prospective Study

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Abstract
Introduction
The mortality rate of perforated peptic ulcer is still high particularly for aged patients and all the existing scoring systems to predict mortality are complicated or based on history taking which is not always reliable for elderly patients. Despite the introduction of PPIs, the percentage of perforation (2-14%) as complication of peptic ulcer disease has remained static in several regions of the world. The mortality from perforated peptic ulcer (PPU) is 20% and the complications are reported in 20–50 % of the patients . This study's aim was to compare the effectiveness of Boey score and PULP score in assessment of severity in peptic ulcer perforations.
Methods
Total 31 patients presenting with peptic ulcer perforation were included. All data were prospectively analysed.
Results
In our study; n was 31 and mean age – 43.19 years. The overall Mortality rate in our study was– 12.9% (4 patients).There was no mortality in low risk group predicted by PULP score, whereas 4.76% mortality in Boey's score.The AUC for PULP score was (0.991) greater than Boey's score (0.861).Sensitivity and specificity of PULP score was significant with100% and 92.6%. Most common complication encountered was SSI followed by UTI.
Conclusion
PULP score is a better prognostic scoring system in comparison to Boey's score with a sensitivity of 100% and specificity of 92.6%. Boey's score is more practical than the PULP score as it contains less variables to be considered. Even though more complicated PULP score is more accurate and score > 7 needs aggressive management.

I. Introduction

Perforation of a peptic (gastric or duodenal) ulcer is a potentially fatal surgical emergency that remains a formidable health burden worldwide. There has been reduction in peptic ulcer disease (incidence 0.10% to 0.19% and prevalence 0.12% to 1.50%)[1] in part explained by the introduction of antibacterial therapy to eradicate Helicobacter pylori and the widespread use of proton pump inhibitors PPIs. Yet, despite the introduction of PPIs, the percentage of perforation (2-14%)[2] as complication of peptic ulcer disease has remained static in several regions of the world. The mortality from perforated peptic ulcer (PPU) is 20 %[3] and the complications are reported in 20–50 % of the patients[4].The original work by Boey et al stated that delay of surgery after onset of symptoms for more than 48 hours, shock upon admission and a high degree of comorbidity, were associated with a 100% mortality when all factors were present. Eventually, the delay of surgery was adjusted to 24 hours, and the scoring system was validated in a cohort from Hong Kong with the same results[5,6]. The Peptic Ulcer Perforation (PULP) score is based on age, presence of comorbid diseases, use of steroids, shock on admission, serum creatinine, time from onset of symptoms to admission and ASA scores[7].

II. Need For The Study

To stratify the patients into risk categories, and provide a suitable risk group based management.
Very few studies have been done to standardize a scoring system for PPU perforation and most of them done are

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conducted in western world.

III. Aim Of The Study
1. To compare the accuracy of Boey's scoring system and peptic ulcer perforation scoring system (PULP) in predicting mortality
2. To determine the sensitivity and specificity of the scores.
3. To study post operative complications pattern in our study group.

Boey's Score
- Concomitant medical illness*
- Preoperative shock(systolic BP <90mmhg)
- Duration of symptoms more than 24 hours during presentation

Score: 0-3(each factor scores 1 point if positive)

Boey's score	Postoperative mortality
0	1.5%
1	14.4%
2	32.1%
3	100%

*(cardiorespiratory disease, renal failure, diabetes mellitus, and hepatic precoma)

PULP Score

-Age > 65 years	3
- Co-morbid active malignant disease or AIDS	1
- Co-morbid liver cirrhosis	2
- Concomitant use of steroids	1
- Shock on admission*	1
- Time from perforation to admission > 24 h	1
- Serum creatinine > 130 mmol/l	2
- ASA score 2	1
- ASA score 3	3
- ASA score 4	5
- ASA score 5	7

(*Shock on admission is defined as blood pressure < 100 mmHg and heart rate > 100 beats per min.)
Total PULP score: 0–18
Low risk (< 25%) 0–7
High risk (> 25%) 8–18

ASA Score
Class 1: Normal Healthy Individual
Class 2: Mild systemic disease with no functional limitation
Class 3: Patient has severe systemic disease that is not incapacitating
Class 4: Patient has incapacitating disease that is constant threat to life
Class 5: A Moribund patient who is not expected to live 24 hour with or without surgery
Class 6: A brain dead patient

IV. Material And Methods
Type of study – Prospective observational study
Duration – October 2016 to September 2017
Sample size – 31
Inclusion criteria – all patients of age > 19 years presenting with peptic ulcer perforation
Exclusion criteria – perforation of hollow viscus due to other causes

METHODOLOGY:
Data was collected on admission and scores were calculated for peptic ulcer perforation cases. To compare the two scores in predicting mortality, Receiver Operating Characteristics (ROC) curve was used using Statistical Package for Social Sciences (SPSS) version 20.0
Sensitivity and specificity was determined for the scores and compared.
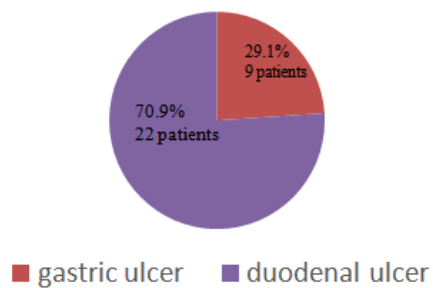

V. Results

Age distribution
Out of 31 patients of peptic ulcer perforation, age group 30 to 50yrs were most affected, Mean age – 43.19 years
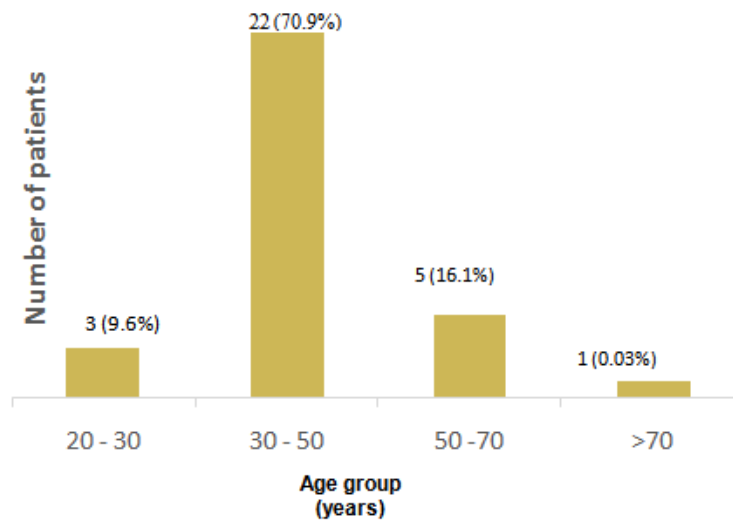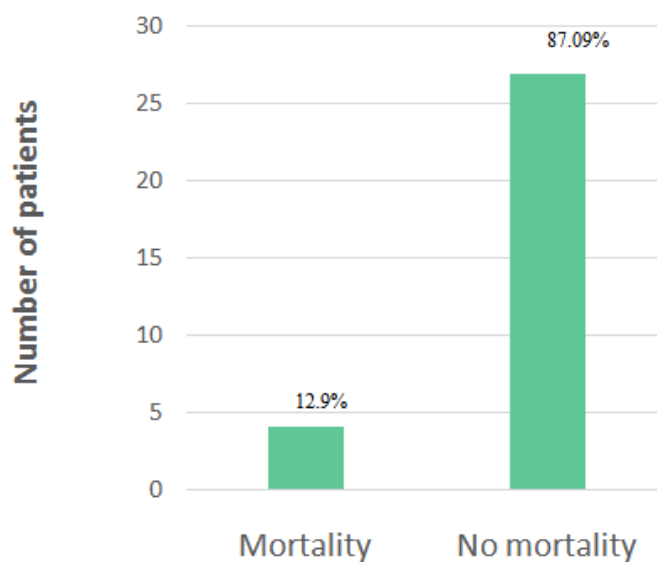

Gastric ulcer and Duodenal ulcer
Maximum numbers of patients were of duodenal perforation (22 patients/ 70%)
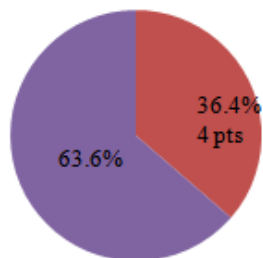

Mortality
In our study, the overall mortality rate was 12.9%
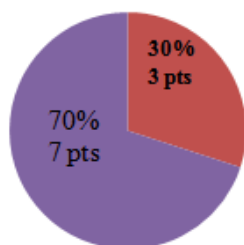
High risk score and Mortality

PULP score

score >7 (11 patients)

36.4%
4 pts

63.6%

■ mortality

Boey's score

score >1 (10 patients)

30%
3 pts

70%
7 pts

■ mortality

Low risk score and Mortality
PULP score

score <7 (20 patients)
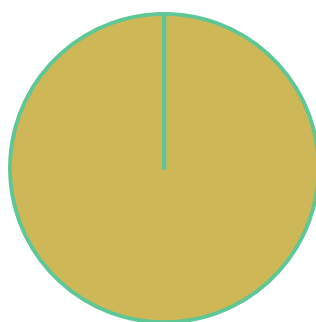
No mortality

Boye's score

score ≤ 1 (21 patients)

4.76%

95.24%

■ mortality
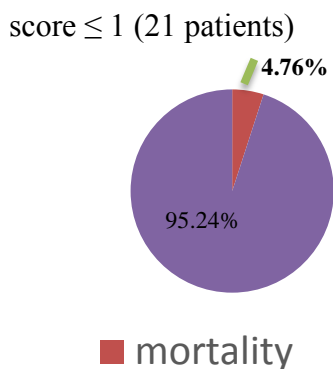
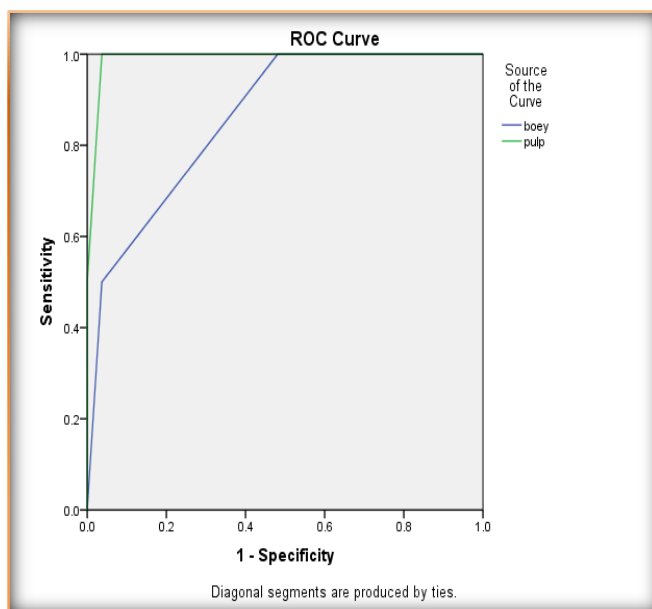**AREA UNDER CURVE (AUC)** (95% confidence interval)
- Boey's score – 0.861
- PULP score – 0.991

Sensitivity
- Boey's score– 75%
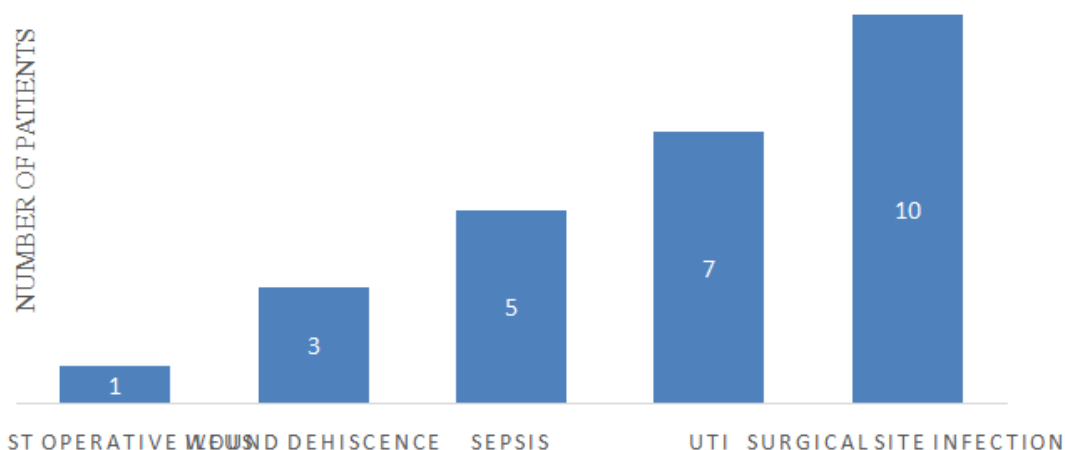- PULP score – 100%

Specificity
- Boey's score – 74.1%
- PULP score– 92.6%

Post operative complications
- The most common complication encountered was surgical site infection (32%) followed by UTI.
- Post operative paralytic ileus was the least with 3.22%.

VI. Discussion

- In our study ; n=31, Mean age – 43.19 years
- The overall Mortality rate in our study– 12.9% (4 patients)
- There was no mortality in low risk group predicted by PULP score, whereas 4.76% mortality in Boey's score.
- The AUC for PULP score was (0.991) greater than Boey's score (0.861)
- Sensitivity and specificity of PULP score was significant with100% and 92.6%.
- Most common complication encountered was SSI followed by UTI.

	Our study	N.Noppawan et al [8](2016)	Thorsen K. et al [9](2014)	Menekse et al [10](2015)	Møller M.H. et al[11] (2011)
Mean age	43.19 years	48.5 years	-	-	-
AUC for mortality Boey's score PULP score	0.861 0.991	0.728 0.784	0.75 0.79	0.92 0.955	0.70 0.83
Mortality	12.9%	-	-	10.1%	-
Morbidities Wound dehiscence Sepsis UTI Post operative ileus SSI	9.68% 16.12% 22.58% 3.22% 32.25%	6.89% 13.79% 13.79% -	-	1.84% 7.07%	-
Conclusion		The PULP score may be the better prognostic scoring system for postoperative morbidity and mortality of PPU patient than Boey scorer	The new PULP score and the ASA score predicted mortality equally well and better than the Boey score		The new PULP score and the ASA score predicted mortality equally well and better than the Boey score

VII. Conclusion

- PULP score is a better prognostic scoring system in comparison to Boey's score with a sensitivity of 100% and specificity of 92.6%.
- Boey's score is more practical than the PULP score as it contains less variables to be considered.
- Even though more complicated PULP score is more accurate and score > 7 needs aggressive management.

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