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Original Research Article

Replicate and evaluate the results of peptic ulcer perforation score in our setup as a predictor of mortality following a peptic ulcer perforation

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ABSTRACT

Background: Scores commonly employed to risk stratify perforated peptic ulcer patients include ASA (American Society of Anesthesiologists), Boey and peptic ulcer perforation score (PULP). Accurate and early identification of high-risk surgical patients with a perforated peptic ulcer is important for triage and risk stratification. The objective of the present study was to replicate and re-evaluate the results of this score in our setup, compared to the cohort study carried out in Denmark.
Method: A prospective study was conducted on 40 surgically treated patients for peptic ulcer perforation for period of one year. There was no age restriction. The predefined outcome measure was mortality within 30 days of surgical procedure for peptic ulcer perforation. Different Variables used are age, co-morbid disease, liver cirrhosis, steroids use, shock on admission, the time lapse between perforation and admission, serum creatinine, as well as ASA score 2 to 5.
Results: A total of 40 patients were studied in a single hospital over one year. Nearly 12.5% (5 patients) died within 30 days of surgery. Out of total deaths, most deaths occurred in patients with a PULP score of more than 7, and the risk of mortality increases with an increase in the PULP score. So, the risk stratification is classified into low risk and high risk according to pulp score.
Conclusions: The PULP score can be used to predict 30-day mortality in patients with peptic ulcer perforation who have undergone surgery almost accurately and thus assist in risk stratification and triage. This study hence replicates the cohort study in Denmark in our setup.

Keywords: Peptic perforation, Score, Risk, Care, Procedure

INTRODUCTION

A perforated peptic ulcer is a serious condition with an overall reported mortality of 5%-25%, rising to as high as 50% with age.[1-3] With respect to complicated ulcer disease, treatment and eradication of *H. pylori* infection have arguably led to a shift from treating patients operatively to treating them non-operatively.[4] This changing management scheme has occurred despite a relative paucity of data regarding the incidence and contribution of HP infection to the etiology of complicated peptic ulcers.[4] High prevalence of *Helicobacter pylori* infection in duodenal ulcer perforations not caused by non-steroidal anti-inflammatory drugs.[5] A number of prognostic factors and clinical predictions for morbidity and mortality in cases of peptic ulcers have been reported, like the Boey score and ASA score.[6] At present no such clinical predictions

are used extensively in clinical practice in cases of peptic ulcer perforation. Early and accurate identification of high-risk patients with peptic ulcer perforation can help in risk stratification and triage e.g., any preoperative specific care, post-operative ICU care, preoperative respiratory and circulatory stabilization, specific monitoring, etc.[7]

METHODS

A single-center prospective study was conducted at Safal multispeciality hospital, on 40 surgically treated patients for peptic ulcer perforation from April 2015 to March 2021. The medical research centre at Safal multispeciality hospital has approved the study. The aim of this study is to replicate and re-evaluate the results of this score in our setup, as compared to the cohort study carried out in Denmark.[5]

Inclusion criteria

Patients included in the study had-no age limit associated co-morbid disease e.g., liver cirrhosis, steroids use, shock on admission, patients in acute renal failure, delayed presentation and admission, ASA score 2-5, steroids use.

Exclusion criteria

No patient with various morbidities excluded from the study.

Outcome measure

Predefined outcome measure was mortality within 30 days of surgical procedure for peptic ulcer perforation.

Table 1: Assignment of points according to PULP.

Variables	Points
Age >65 years	3
Co-morbid active malignant disease or AIDS	1
Concomitant use of steroids	1
Shock on admission (SBP <100 mmHg)	1
Time from perforation (beginning of symptoms) to admission >24 hours	1
Serum creatinine>1.5 mg/dl	2
ASA score 2	1
ASA score 3	3
ASA score 4	5
ASA score 5	7
Co-morbid liver cirrhosis	2
Total PULP score	0-18

Variables used

They were-age, co-morbid disease, liver cirrhosis, steroids use, shock on admission, the time lapse between perforation (beginning of symptoms) and admission, serum creatinine, ASA score 2-5 (Table 1).

Table 2: ASA score.

ASA score	Description
1	Healthy patient
2	Mild systemic disease
3	Severe systemic disease
4	Severe systemic disease that is constant threat to life
5	A moribund patient who is not expected to survive without the operation

RESULTS

A total of 40 patients studied over a period of 1 year admitted to our hospital. The median age of the patients was 46 years (21-81 years) (Table 3). The 12.5% (5 patients) died within 30 days of surgery (Figure 1). In the present study no patient scored 0, 1, 2, 17, 18 PULP score. Risk of mortality is divided into 2 classes (Table 4). Out of total deaths, most of deaths occurred in patients with a PULP score of more than 7 and risk of mortality increases with increase in PULP score (Table 5).

Table 3: Age group of patients.

Age groups (Years)	N
0-20	0
21-40	10
41-60	22
61-80	6
>81	2
Total	40

Table 4: Mortality risk according to PULP score.

Risk of mortality	PULP scores
Low risk	0-7
High risk	8-18

Table 5: Risk stratification.

PULP score risk group	N
Low risk (0-7)	32
High risk (8-18)	8

DISCUSSION

In the present study we have used the PULP Score as a prognostic factor and to replicate and evaluate its application on peptic ulcer perforation patients previously used in a cohort study done in Denmark.[7] We studied a total of 40 patients operated on for peptic ulcers for 30-day mortality. All patients as undergone emergency laparotomy procedures with standard midline vertical incision. Out of all these operated patients, none were having any intra-operative complications.

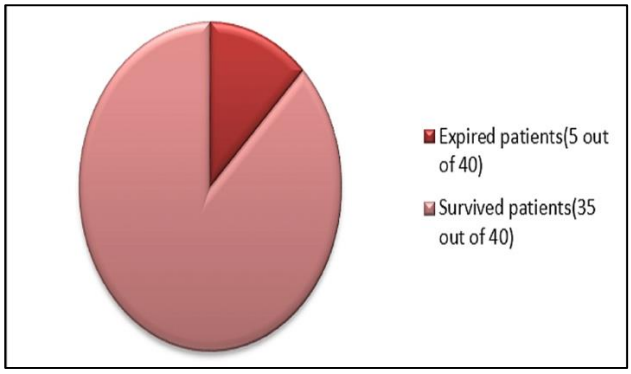

Figure 1: Mortality stratification.

We have seen there is a trend of high mortality as well as morbidity as the PULP score increases. As such ASA score is a subjective phenomenon but, in our study, patients with an ASA Score of more than 3 have an increased risk of mortality. Patients with ASA score more than 3, age older than 65, co-morbid liver cirrhosis, and elevated serum creatinine had got highest prognostic impact.[8] The cohort study carried out in Denmark used many patients over a period of six years, but our study was carried out over a period of one year in a single hospital with a small sample size. The study carried out in Denmark had 27% mortality and most of them had PULP score above 7. This study has a 12.5% mortality. PULP Score combines readily available predictors of a patient's baseline health status and acute disease severity with the ASA scoring system.

Based on the risk of dying within 30 days of surgery, we could classify patients as low and high risk as mentioned earlier. PULP score can thus assist in risk stratification and triage of patients with peptic ulcer perforation like preoperative respiratory and hemodynamic stabilization, post-operative ICU care, specific monitoring and proper peri-operative management. Eradication of *H. pylori* after simple closure of a perforated duodenal ulcer should reduce the incidence of residual and recurrent ulcers.[9,10] The APACHE II score may be a useful tool for stratifying patients into various risk groups, and the Boey score might select appropriate patients for laparoscopic repair in a study done by Lee et al.[11]

Risk scores may be helpful in sick elderly patients needing emergency abdominal surgery, but an experienced clinical opinion is still essential.[12]

Limitations

The research on PULP is rare, with inconsistent accuracy indices. This study used/assessed one scoring system only and did not compare the different scores commonly used. In terms of outcomes, studies of PPU scores assessed mainly mortality rather than morbidity, although post repair PPU morbidities are more common and serious (bleeding, perforation, obstruction).

CONCLUSION

This study demonstrates PULP Score can be used to predict 30-day mortality in patients operated for peptic ulcer perforation almost accurately and thus it's very useful in risk stratification and triage. Therefore, this study thus replicates the cohort study done in Denmark in our setup.

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Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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