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## Evaluation of Boey scoring in predicting morbidity and mortality in peptic ulcer perforation peritonitis

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### Abstract

Among abdominal emergencies, perforations of peptic ulcer are third most common in frequency, after acute appendicitis and acute intestinal obstruction. The prevalence of peptic ulcer disease ranges from 5 to 15% in the western population. Perforation being the most dreaded complication, occurring in about 2–10% of peptic ulcer cases. In spite of better understanding of the disease, effective resuscitation and prompt surgery under modern anaesthesia techniques, there is still high mortality and morbidity in perforated peptic ulcer with mortality rate ranging from 5% to 15%. Prompt recognition of the condition and early surgery are very important to reduce the mortality. In our study, we stratified the patients with perforated peptic ulcer peritonitis according to Boey score and found a significant relationship between increasing Boey score with higher rates of post-operative morbidity and mortality. The study also demonstrated that using a simple clinical scoring system in surgical emergency room proves critical to reduce the chances of morbidity and mortality among patients with perforated peptic ulcer peritonitis.

**Keywords:** Perforations, demonstrate, emergencies

### Introduction

Peptic ulceration is a major public health problem worldwide. The prevalence of peptic ulcer disease ranges from 5 to 15% in the western population [1, 2]. Haemorrhage, perforation and gastric outlet obstruction are major complications of peptic ulcer. Perforation being the most dreaded complication, occurring in about 2–10% of peptic ulcer cases<sup>3</sup>. The lifetime risk for perforation in patients with duodenal ulceration not receiving therapy approximates 10%<sup>3</sup>. Although the origin of perforated peptic ulcer (PPU) is multifactorial, it is most commonly associated with *Helicobacter pylori* infection and Non-steroidal anti-inflammatory drugs (NSAIDs), chronic alcohol intake, cigarette smoking, intake of smoked foods, spicy foods, irregular diet intake and in type A personalities. If the condition is not diagnosed properly and not treated early, it progresses with a typical course and may lead to the death due to Bacterial peritonitis in about 7-8 days. Mortality rate ranges from 6 to 14% in recent studies. Mortality increases with delay in treatment. A delay of more than 24 hours increases the mortality seven to eight folds and complications rate by three folds [1, 3, 4].

Three prognostic factors, namely preoperative shock, long-standing perforation, and associated medical diseases, were identified in patients with perforated peptic ulcer by Boey *et al.* in 1982 and validated in 1987 [5, 6]. The Boey scoring system is amongst the most commonly used for risk stratification because of its simplicity and high predictive value for mortality and morbidity in cases of PPU. In this study, we intended to evaluate the surgical outcomes and accuracy of Boey scoring system in predicting postoperative morbidity and mortality in patients operated for peptic ulcer perforation over a period of twelve months at I.G.M.C Shimla.

### Materials and methods

In this prospective observational study, all the reviews on boey score were assessed [7, 8] and taken as the starting point. 100 patients were included in the study who had presented with perforated peptic ulcer disease.

Patients of perforation associated with malignancy, Giant perforation, associated trauma, Patients in whom procedure other than primary repair with omentoplasty was done and peptic ulcer perforation with pregnancy were excluded from the study.

Informed Consent of all the patients included in this study was taken. Detailed history was taken of every patient, including history of epigastric pain, drug intake of NSAIDS, smoking, alcohol intake, any coexisting medical illness (diabetes, cardiovascular, respiratory, renal, tuberculosis). Thorough physical examination of every patient was done, including tenderness, rebound tenderness, guarding or rigidity. X-ray chest and abdomen was done in upright position, emergency blood investigations (CHG, RFT, Se, RBS, ABG), USG abdomen and other relevant investigations were done.

Patients were resuscitated before posting for surgery. Broad spectrum antibiotics were given to all patients during induction of anesthesia and post operatively.

Patients were divided into 4 groups based on the Boey scoring system (score 0-3). Score of each patient was sum total of three independent risk factors (concomitant medical illness, preoperative shock and duration of peptic ulcer perforation).

Shock is defined as persistent hypotension [systolic BP <90mm of Hg] even after adequate resuscitation and fluid challenge test. Duration of perforation include the time interval between the onset of severe acute abdominal pain and arrival time at the hospital.

- Group 1: no risk factor present-score 0
- Group 2: one risk factor present-score 1
- Group 3: two risk factors present-score 2
- Group 4: all three risk factors present-score 3

#### Risk factor included

No. of hours since perforation

- <24 hours- Score 0
- >24 hours- Score 1

Concomitant severe medical illness

- Absent -Score 0
- Present -Score 1

Preoperative shock

- Absent -Score 0
- Present -Score 1

All 100 patients were treated with exploratory laparotomy with omental patch closure of perforated duodenal perforation and thorough peritoneal lavage with normal saline. Patients were managed in post-operative period as per standard protocol with frequent monitoring and initial nil per oral period with medications as per requirements. Anti-helicobacter therapy in form of triple therapy was started once patient was allowed oral feeding. All patients were followed up after 6 weeks of surgery with Upper GI Endoscopy to look for healing of ulcer.

#### Morbidity was evaluated as

- Pulmonary complications (any consolidation, pleural effusion or lung collapse)
- Surgical site infection (with wound culture suggestive of positive bacteriological etiology)
- Burst abdomen (Either segmental or complete wound dehiscence)
- Length of hospital stay
- Intra-abdominal collection

Mortality was defined as death during hospital stay or within 30 days of operation.

Data was analysed using Epi- info version 7.2.2. P value <0.001 was considered as statistically significant.

#### Results

In one year study, conducted between May 2019 to April 2020, we found male preponderance with 96 male patients out of 100 patients with perforated peptic ulcer disease. Middle age group was affected most commonly with 61% of patients between 31-60 years of age.

On the basis of three risk factors (duration of perforation, comorbid condition and preoperative shock), all patients were categorized into 4 groups. In First group patients were with no risk factor and Boey score was 0 and there were 21 patients (21%). Second group was with one risk factor with Boey score of 1 consisted of 50 patients (50%). Third group was with any two risk factors and Boey score of 2 and included 22 patients (22%). The fourth group with all three risk factors with Boey score of 3 included 7 patients (7%).

Out of 100 patients 36 patients (36%) arrived at hospital within 24 hours of severe abdominal pain while 64 patients (64%) presented after 24 hours of onset of abdominal pain. Pre-existed comorbid conditions including diabetes mellitus, hypertension, COPD and rheumatoid arthritis were present in 30 patients (30%). 22 patients (22%) out of 100 patients presented with hypotension (i.e. systolic BP <90 mm of Hg).

Morbidity included pulmonary complications, surgical site infection, wound dehiscence and intra-abdominal collection. Overall the morbidity noted in 44 (44%) patients. The morbidity was noted in 2 patients (9.5%) in Boey score 0 group, in 18 patients (36%) with Boey score 1, in 17 patients (77%) with Boey score 2 and in all 7 patients (100%) of Boey score 3.

Overall 31% of patients had pulmonary complication in form of pleural effusion, consolidation and segmental lung collapse. In patients with Boey score 0 group, there was no patient with pulmonary complication. In Boey score 1, 2 and 3 group, there were 10 patients (20%), 15 patients (68%) and 06 patients (42%) respectively had pulmonary complications, with P-value <0.001. Surgical site infection was present in all groups of patients on the basis of Boey score. Overall surgical site infection was noted in 29 patients accounting for (29%) patients with surgical site infection. 02 Patients (9.5%), 10 patients (20%), 14 patients (63%) and 3 patients (42%) with Boey score 0, 1, 2 and 3 respectively had surgical site infection with P-value <0.001. There were no patients with intra-abdominal collection in Boey score 0 and 1 group. 3 patients (14%) and 4 patients (57%) with Boey score 2 and 3 group respectively had intra-abdominal collection with P-value <0.001. There were no patients of wound dehiscence in Boey score 0 group. Boey score 1 group had one patient (2%) and Boey score 2 group had 3 patients (14%) and Boey score 3 group had 1 patient (14%) had wound dehiscence with P-value 0.079. The duration of hospital stay varied from minimum of 1 day and maximum of 18 days. Mean length of hospital stay was  $7.9 \pm 3.4$  days. With higher Boey score there was increase in morbidity such as pulmonary complications, wound sepsis and wound dehiscence and intra-abdominal collection which required either intervention in form of pleural tap, USG guided intra-abdominal collection aspiration or catheter drainage or conservative management with antibiotics and chest physiotherapy which leads to increase in length of hospital stay. Patients in Boey score 3 group had high rate of mortality in early post-operative period due to severe septic shock leading to multiple organ failure, leads to slightly less length of stay among patients in this group.

#### Discussion

Our prospective observational study, Evaluation of Boey scoring in predicting morbidity and mortality in peptic ulcer perforation

peritonitis has demonstrated that peptic ulcer perforation peritonitis is common in middle age group male. It is comparable to other studies<sup>[9, 10]</sup>. In present study, Boey score 0 group had 21% patients, Boey score 1 group had 50% patients, Boey score 2 group had 22% patients and Boey score 3 group had 7% patients which is comparable to a study by Agarwal A. *et al.* in 2015<sup>[11]</sup>, they had 30%, 39%, 23% and 8% patients distributed among Boey score of 0, 1, 2 and 3 respectively.

In our study, overall morbidity rate noted as 44% which is in accordance with complication rate of 20- 65% reported in literature and also in conformity with various studies done by other investigators. Pulmonary complications (31%) in form of pleural effusion, lung collapse and consolidation and wound infections (29%) were the leading post-operative complications in this study. Possible explanation for such higher morbidity rates can be the fact that emergency upper abdominal surgery restricts vital capacity in early post-operative period inspite of adequate analgesia support thus carrying a significant risk of pulmonary complication and surgery for perforated peptic ulcer is regarded as a contaminated or dirty wound, which has reported wound infection rates of 5%-30% in various studies. Other post-operative complications noted were in form of intra-abdominal collection (7%) and wound dehiscence (5%). It clearly implies that there is significant increase in these complications as the Boey score increases. Similar findings are seen in various previous studies. Boey *et al.*<sup>[6]</sup> reported that 23% patients had pulmonary complications, wound infection rate of 13%, wound dehiscence rate of 3% and intra-abdominal abscess rate of 8% and Kocer B. *et al.*<sup>[4]</sup> reported post-operative pulmonary complication rate was 37.4%, wound infection rate was 18.5% and intra-abdominal collection was present in 1.86% of patients.

The overall mortality rate noticed in present study was 5%, there was no mortality in Boey score 0 and 1 group, while patients with Boey score 2 and 3 had 9% and 42% respectively, which is in accordance with various previous studies.

### Conclusion

In our study, middle age group male were most commonly affected. All of the 100 patients with perforated peptic ulcer were stratified into 4 Boey groups according to the risk factors present. After emergency resuscitation and stabilization, patients were subjected to exploratory laparotomy with omental patch closure and peritoneal lavage. Post-operative management was done with regular monitoring of the vitals and medications as per the need. Any complication in post-operative period was managed as per standard protocols. It was noted that increase in Boey score is directly related to increase in morbidity and mortality.

The present study revealed the Boey scoring system is a simplified, clinically easy to perform and accurate system to predict morbidity and mortality in patients with peptic ulcer perforations. The availability and timely usage of such an easy clinical scoring system can further guide the aggressiveness of management in needful situations and can help in reducing morbidity and mortality in patients with peptic ulcer perforation.

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