IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 18, Issue 5 Ser. 5 (May. 2019), PP 75-80
www.iosrjournals.org

Evaluation of Boey's Score in Patients with Peptic Ulcer Perforation: A 10 Year Retrospective Study in Hospital Universiti Sains Malaysia

Mehboob Alam Pasha[1], Ravindra Reddy[2], Wan Mokhzani[3], Zaidi Zakaria[4]
[1] *(Department of Surgery,Faculty of Medicine,Quest International University,Ipoh,Perak, Malaysia)* [2]*(Anson Bay Medical Centre,Teluk Intan, Perak ,Malaysia,)* [3,4]*(Department of Surgery,School of Medical Sciences,Kubang Kerian,Kelantan,Malaysia)*
Corresponding Author: Mehboob Alam Pasha

Abstract: ***Background****: Perforation is a major complication of Peptic ulcer disease, occurring in 2-10% of patients. It carries a high risk of mortality and morbidity. To predict such events and to evolve an appropriate plan of management it is important to stratify the patients with perforation based on the presence or absence of known risk factors. The objective of this study was to evaluate the Boey scoring system as an useful tool to determine the mortality outcome in patients operated for peptic ulcer perforation.*
Methods*: This was a retrospective study conducted in Hospital Universiti Sains Malaysia on 82 patients who underwent laparotomy for closure of perforation between January2004 to December2013. Demographic particulars and details of outcome were collected and transferred into SPSS version 21 software and analysed.Pearson chi square was used for statistical testing. P-value of <0.05 was accepted for statistical significance .*
Results*: In the study preoperative shock, co-morbid illness, and age >60 years proved to be significant for mortality. Duration of perforation >24 hours was not significant for mortality. Statistically, the study proved that Boey scores were highly significant in predicting mortality with p-value <0.001. When the scores were zero, one two, and three, the mortality recorded was 4%, 24%,44% and 28% respectively.*
Conclusion: *Boey scoring system is useful for risk stratification of ill patients undergoing emergency surgery for repair of perforated peptic ulcer.*
Keywords: *Boey score, perforated peptic ulcer , prognostication*

Date of Submission: 30-04-2019 Date of acceptance: 14-05-2019

I. Introduction

Peptic ulcer results from the breakdown of defensive epithelial mucosal barriers in the stomach and/or duodenum . Common causes are infection with Helicobacter pylori, Non Steroidal Anti-inflammatory (NSAIDs) drugs, age more than 60 years, stress, smoking and alcohol ingestion[1]. Annually 4 million people across the world are affected by peptic ulcer disease (PUD)[2] with an estimated incidence of 1.5% to 3% [3]. Introduction of Proton Pump Inhibitors (PPI) for acid suppression and eradication of Helicobacter pylori by antibiotics have helped to reduce the incidence of PUD [4]. However the incidence of perforated peptic ulcer (PPU) has not declined, and remains high[5-6]. 2 to 14% of peptic ulcers will perforate, leading to high risk of death[7-8]. Mortality rates between3% to 40% have been reported[9,.] In order to provide optimum surgical care utilizing available resources, it is imperative to stratify PPU patients into low risk or high risk for mortality[10]. Several scoring systems are available to prognosticate patients according to their risk factors [11]. The most well known is Boeys scoring system (BSS) which was specifically designed for PPU risk prediction[12]. Three easily determined parameters namely shock on admission , defined as systolic blood pressure less than 100mmHg , presence of coexisting medical illness and duration of symptoms before surgery greater than 24 hours were chosen as risk predictors. In Boeys study, when PPU patients were stratified into 4 risk groups with a score 0,1, 2,and 3 , a significant mortality rate of 0%,10%,45.5% and 100% respectively, was reported . Though PPU is a common surgical emergency , prognostication using risk scores is not routinely done[13]. The aim of this study was to determine the effectiveness of Boeys scoring system (BSS) to predict mortality in patients operated for PPU in Hospital Universiti Sains Malaysia(HUSM). A secondary objective was to study the demographics and their association with mortality.

II. Methods

This retrospective study was conducted in HUSM, which is a tertiary referral centre for the Kelantan state of Malaysia. A total of 82 patients who underwent laparotomy for surgical management of their PPU betweenJanuary 2004 to December 2013 were included. Excluded were patients aged below 13 years, malignant perforations, conservatively managed patients and those with incomplete data. Records were obtained from the Medical records office with permission from the Hospital Director. The HUSM Ethics Committee approved the study. Details of age, sex, race, concomitant medical illness, use of NSAIDs ,smoking habits, alcohol ingestion, presence of shock on admission, time delay between symptoms and operation, site of perforation and post- operative survival outcome were collected and entered into a predesigned pro-forma. For the purpose of this study, shock was defined as preoperative systolic BP of less than 100mmHg. Co-morbidity was defined as presence of co-existing medical disease such as DiabetesMellitus(DM), hypertension, Chronic Obstructive Pulmonary Disease (COPD) and designated as ASAII if present. Duration of perforation was defined as the time interval between the onset of acute abdominal pain (signifying moment of perforation) up-to the time of operation, with a cut-off value of less than or greater than 24 hours. Patients in the study were divided into four groups according to their Boeys risk scores. (Table1.)

TABLE:1 . Boeys Score

Presence of Comorbid medical illness
Pre-operative shock (Systolic BP <100 mmHg.)
Duration of perforation >24 hours
Score 0 -3 (each factor scores 1 point if present)
Minimal possible score '0' (none present)
Maximum possible risk is '3'

Data analysis was done using SPSS software Version 21(SPSS Inc. Chicago IL, USA). Pearsons chi square was used to test the association between mortality and Boeys score, demographic variables and each of the independent risk factors in BSS. A p- value of <0.05 was accepted for statistical significance.

III. Results

The study population comprised 82 patients who underwent surgery for PPU in HUSM between January 2004 and December2013.The majority (81.7%) were aged above 60 years . 24 out of 25 patients (96.0%) who died belonged to this group.(Table 2)

Table 2: Relation between mortality and demographic variables

Variable	Mortality Frequency(%)		P-value
	Survival (n= 57)	Death (n=25)	
Age			
< 60 years	14(24.6)	1(4.0)	0.027*
>60 years	43(75.4)	24(96.0)	
Sex			
Female	17(29.8)	8(32.0)	0.844
Male	40(70.2)	17(68.0)	
Race			
Malay	50(87.7)	23(92.0)	0.503
Chinese	4(7.0)	2(8.0)	
Others	3(5.0)	0(0.0)	
Presence of shock			
Yes	4(7.0)	12(48.0)	<0.001*
No	53(93.0)	13(52.0)	
Presence of Comorbid			
Yes	27(47.4)	21(84.0)	0.002*
No	30(52.6)	4(16.0)	
Duration of symptoms			
< 24 hours	28(49.1)	8(32.0)	0.150
> 24 hours	29(50.9)	17(68.0)	

Older age was a statistically significant predictor for mortality (p=0.027) . 57 patients (69.5%) were males, while 25(30.5%) were females. Although more males died (68.0%), this was not statistically significant (p=0.844). Pre-operative shock was present in 16 patients (19.5%) with 12 deaths (48.0%). Presence of shock on admission significantly predicted mortality (p<0.001) . Associated co-morbidity was noted in 48 patients (58.5%), among whom 21(84.0%) died. Statistically, presence of co-morbid illness was a significant risk factor for mortality (p<0.002). Of the 46 patients (56.1%) who had duration of symptoms >24hours , 17(68.0%) died. Statistically it was not significant as an independent risk factor for mortality (p=0.150). In this study site of perforation was not significantly associated with mortality (Table 3). Though pylorus was the most frequent site of perforation (32.9%), highest mortality (36.0%) was noted when the perforation was in the antrum (p=0.298) .

TABLE 3: Association between site of perforation and mortality

Variable	Mortality Frequency(%)		P –value
	Survival (n=57)	Death (n=25)	
Pylorus	21 (36.8)	6 (24.0)	0.298
Duodenum	16 (28.1)	7 (28.0)	
Antrum	17 (29.8)	9 (36.0)	
Body	2 (3.5)	1 (4.0)	
Fundus	1 (1.8)	0 (0.0)	
Postrerior wall stomach	0 (0.0)	2 (8.0)	

The most common operation performed was simple closure with omental patch reinforcement (79.3%). Two patients (2.4%) required distal gastrectomy with gastrojejonostomy for technically difficult PPU (Fig 1).

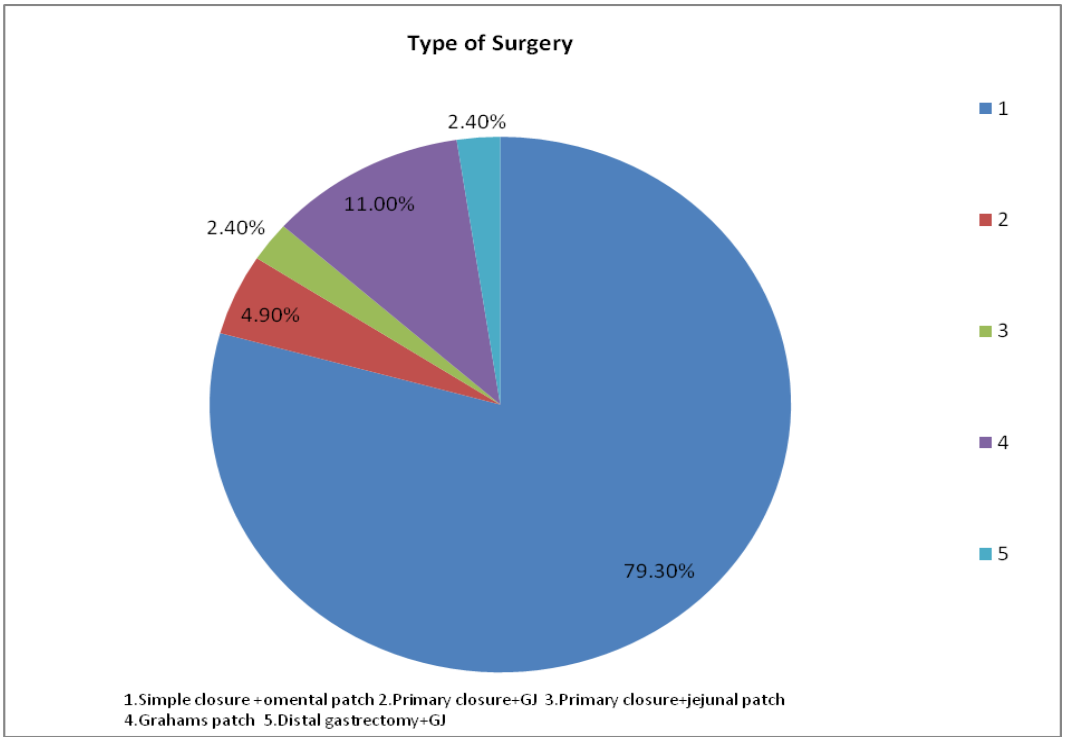

Fig.1.(Pie Chart) Types of surgery done for 82 patients in the study

Table 4 shows the number of patients grouped into the BSS according to their risk scores and mortality rates . Mortality was lower with low Boeys score (0-1). On the other hand mortality increased significantly with higher Boeys score (2-3) (p<0.001).

TABLE 4: Association between Boey Score and mortality

Variable		Mortality Frequency (%)		P-value
		Survival (n=57)	Death (n=25)	
Score	0	10 (17.5)	1 (4.0)	<0.001*
	1	35 (61.4)	6 (24.0)	
	2	11 (19.3)	11(44.0)	
	3	1 (1.8)	7 (28.0)	

IV. Discussion

Peptic ulcer is the result of imbalance between acid-pepsin secretion and mucosal defence barriers in the stomach and duodenum[1]. Perforation of peptic ulcer is one of the commonest indications for emergency surgery. Mortality following surgery can be high due to the presence of risk factors like preoperative shock, older ages, concomitant medical illness, or prolonged duration of symptoms. Clinical prognostication models using risk scores aim to stratify patients into low or high risk and guide proper management of the PPU patient[1,11-13] . An ideal clinical scoring system should be able to predict death or survival precisely, and uses parameters easily available at the bedside[14,11-13.].Though no ideal scoring system has evolved so far, the BSS has been widely used for prognostication in PPU patients.

The present retrospective study involved 82 patients who fulfilled the inclusion criteria. More males were noted with male:female ratio of 2.8:1. In agreement with previous studies[15-16], we found males had a higher mortality (68.1%),but this was not significant statistically (p-0.844) , a finding which coincided with the study by Agarwal [17.,] Contrary to our finding, some studies have noted a shift in the PPU incidence towards older female population[18.]. Probable reason could be more frequent use of NSAIDs in this group.

Mean age of the study population was 60.5 years, suggesting a high incidence of PUD in older patients. H. pylori infection, co-morbid medical conditions and use of NSAIDs can contribute to higher mortality seen in older patients with PPU[19,] In the present study age >60 years was a significant predictor for mortality (p=0.027). Similar findings were reported by others[20-21]. Contrary to our study some have reported that younger ages carry a higher mortality for PPU[22-23,,16-17]. This can be explained on the basis of socioeconomic and demographic differences between the populations studied.

It is a well-known observation that as age increases, the incidence of concomitant medical conditions such as DM, heart or lung disease may also increase[10]. Older patients tend to have poorer nutritional status and lower immunity[24,1,14]. 58.7% of patients in this study had associated co-morbidity on admission. In agreement with the published literature[13,16,20.,] presence of co-morbidity was significant for mortality in our study(p-0.002).However some studies have reported age alone to be an independent predictor for mortality in PPU irrespective of presence of co-morbidity [17,24] .

Shock (Systolic BP<100mmHg.) on admission is one of the parameters assessed in the Boey scoring system. Its association with older age and comorbid illness has been described[16,21,22.,] These factors in addition to the prolonged duration of perforation >24 hours produces a Systemic Inflammatory Response (SIRS), followed by sepsis and multi-organ failure if not treated earlier[12-13,16.]. In the present study, shock on admission was significant for mortality in agreement with reported literature[25,6,10,17,21.] (p<0.001) .

Delay in treatment may be due to difficulty in obtaining history in ill patients [1] or the long distances patients have to travel from the peripheral health centers[17.] Previous studies have reported delay in treatment >24 hours to be a significant risk factor for mortality in PPU [26-27,21.,] We did not find delay in treatment >24 hours to be a significant predictor for mortality, similar to the finding of Agrez[28.]. Demographic and population differences could be a reason.

In the era of PPI and eradication for H. pylori, current guidelines state that simple closure of the perforation with omental patch reinforcement is a safe and effective procedure in emergency surgery for PPU[5] . The majority of patients in the study (97.6%) underwent simple closure of the perforation with serosal protection. 25 deaths were noted with overall mortality of 30.5%. When the three parameters of the BSS were

correlated with individual risk score, we observed an increase in mortality when the Boeys score increased from a low (0-1) to a high (2-3) level. (Table4) This was noted to be statistically significant ($p<0.001$), and in agreement with other studies[29,10,17,25.]

Limitations: The present study was retrospective non-randomized in design , and used a small sample size. Case-mix was predominantly (89.0%) restricted to the local Malay population. Malaysia being a multiracial country, more generalized population- based prospective studies with adequate randomization will be required for meaningful validation of BSS.

The BSS itself has been criticized for its crude-ness[12] . Shock on admission is poorly defined and degree of severity of co-morbid illness in terms of Charlson comorbidity Index is not considered[12]. Besides, its convincing earlier results could not be replicated in subsequent studies[6.,13.]

V. Conclusion

PPU is a lethal complication of PUD. An effective scoring system will go a long way in reducing the high mortality associated with PPU. The BSS was specifically designed for use in PPU. It is simple,user-friendly and utilizes parameters available at the bedside in the emergency setting. All the three parameters studied, except for delay in treatment >24 hours were statistically significant for prediction of mortality. We also noted age >60 years to be a significant risk factor. Overall, BSS was effective for prediction of mortality in PPU patients in HUSM. Other factors like race, gender, site of perforation, and type of surgery did not influence the outcome. We recommend more generalized prospective studies with randomization to be conducted before adopting BSS for routine use in PPU patients .

Conflicts of Interest: Nil
Funding Source: Nil

References

[1]. K.Soreide,K.Thorsen, E.M.Harrison, et al,Perforated Peptic Ulcer,Lancet 386,2015,1288-98
[2]. MS Zelickson,CM Bronder,BL Johnson et al, Helicobacter pylori is not the predominant etiology for peptic ulcers requiring operation.*AmSurg.77*,2011,1054-1060.
[3]. TT Zittel,EC Jehle,HD Becker Surgical management of peptic ulcer disease today-indication,technique and outcome. *Langencecks Arch Surg. 385*,2000,84-96
[4]. M Hermansson, C Stael von Holstein,T Zilling, Surgical approach and prognostic factors after peptic ulcer perforation.*Eur.J Surg.165*,1999,566-572
[5]. JY Lau,J sung,C Hill et al,Systematic review of the epidemiology of complicated peptic ulcer disease:incidence,recurrence,risk factorsand mortality.*Digestion 84*,2011,102-113
[6]. K Thorsen,JA Soreide,K Soreide et al,Scoring systems for outcome prediction in patients with perforated peptic ulcer.*Scand J Trauma Resusc Emerg Med. 21:25*,2013,1-10
[7]. G Bas,R Eryilmaz,I Okan et al, Risk factors of morbidity and mortality in patients with perforated peptic ulcer.*Acta Chir Belg.108*,2008,424-427
[8]. MJ Bertleff, JF Lange,Perforated peptic ulcer:a review of history and treatment.*Digestion.27*,2010,161-169
[9]. S Bae,KN Shim, N Kim et al, Incidence and short-term mortality from perforated peptic ulcer in Korea: a population –based study.*Journal of Epidemiology, 22(6)*,2012,508-16
[10]. J Boey,SK Chooi,A Poon et al Risk stratification in perforated duodenal ulcers.A prospective validation of predictive factors.*Ann Surg. 205*,1987,22-26
[11]. K Anbalakan,D Chua, GJ Pandyaet al, Five year experience in management of perforated peptic ulcer and validation of common risk prediction models-are existing models sufficient?A retrospective cohort study, *Int J Surg.14*,2015 ,38-44
[12]. DL Buck,MV Andersen,MH Moller,Accuracy of clinical prediction rules in peptic ulcer perforation :an observational study, *Scand J Gastroenterol. 47*,2012,28-35
[13]. MH Moller,MC Engebjerg, S Adamsen et al,The peptic ulcer perforation(PULP) score:a predictor of mortality following peptic ulcer perforation.A cohort study, *Acta Anaesthesiol.Scand.56*,2012,655-662
[14]. M Schein.Perforated peptic ulcer.In : Schein's common sense emergency abdominal surgery,vol.partIII:(Heidelberg Springer - Berlin ,2005),143-150
[15]. M Unver,O Firat, OV Unalp et al, Prognostic factors in peptic ulcer perforation: a retrospective 14-year study,*Int Surg. 100(5)*,2015,942-8
[16]. C Noguiera, AS Silva, JN Santos et al, Perforated peptic ulcer : main factors of morbidity nad mortality.*World J Surg. 27*,2003,782-787
[17]. A Agarwal,S Jain, LN Meena et al,Validation of Boey's score in predicting morbidity and maortality in peptic perforation peritonitis in Northwestern India,Trop *Gastroenterol.36(4)*,2015,256-60
[18]. LG Blomgren,Perforated peptic ulcer :long-term results after simple closure in the elderly,*World J Surg. 21*,1997,412-414
[19]. JY Kang, A Elders, A Majeed et al, Recent trends in hospital admissions and mortality rates for peptic ulcer in Scotland1982-2002, *Aliment Pharmacol Ther. 24*, 2006 65-79
[20]. M Imhof, S Epstein, C Ohmann et al, Duration of survival after peptic ulcer perforation, *World J Surg. 32*, 2008, 408-412
[21]. B Kocer, S Surmeli, C Solak et al, Factors affecting mortality and morbidity in patients with peptic ulcer perforation, *J Gastroenterol Hepatol,22*,2007,565-570
[22]. P Kujath,O Schwandner,HP Bruch, Morbidity andf mortalityof perforated peptic gastroduodenal ulcer following emergency surgery, *Langenbecks Arch Surg. 387(7-8)* ,2002, 298-302
[23]. S Arveen, S Jagdish, D Kadambari, Perforated peptic ulcer in South India: an institutional perspective, *World J Surg. 33(8)*, 2009, 1600-1604

[24]. S Christiansen, A Riis, M Norgaard et al, Short-term mortalityafter perforated or bleeding peptic ulcer among elderly patients: a population-based cohort study, *BMC Geriatr. 7:8*, 2007,1-8
[25]. V Lohsiriwat, S Papasrivorakul,D Lohsiriwat, Perforated peptic ulcer: clinical presentation,surgical outcomes, and the accuracy of Boey scoring system in predicting postoperative morbidity and mortality. *World J Surg. 33*, 2009, 80-5
[26]. C Svanes, RT Lie, K Svanes et al, Adverse effects of delayed treatment for perforated peptic ulcer,*Ann Surg. 220*, 1994,168-175
[27]. S Sushama,S Rajkumar, AR Vijaybhasker ,The perforation-operation time interval:an important mortality indicator in peptic ulcer perforation, *Journal of Clinical and Diagnostic Research ,7(5)*, 2013,880-882
[28]. MV Agrez,DA Henry,S Senthilselvan et al, Changing trends in perforated peptic ulcer during the past 45 years.*Aust NZ J Surg. ,62*,1992,729
[29]. JS Guzar, SB Paruthy, SV Arya et al, Improving outcome in perforated peptic ulcer emergency surgery by Boey scoring , *International Surgery Journal 3(4*), 2016, 2120-8

Mehboob Alam Pasha. "Evaluation of Boey's Score in Patients with Peptic Ulcer Perforation: A 10 Year Retrospective Study in Hospital Universiti Sains Malaysia." IOSR Journal of Dental and Medical Sciences (IOSR-JDMS), vol. 18, no. 5, 2019, pp 75-80.