

Outcome Prediction in Patients with Perforated Peptic Ulcer By The Peptic Ulcer Perforation (Pulp) Score

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Abstract

Background: Peptic ulcer disease is the most common disease among the Asian population. Perforation of the peptic ulcer being the second most common complication next to bleeding, continues to be real emergencies in surgery, which requires prompt diagnosis and immediate surgical management to save the patients life.

Aims: To assess Risk Stratification using Peptic Ulcer Perforation (PULP) scoring system in patients with perforated peptic ulcer.

Methodology: A descriptive study which includes all patients who underwent emergency laparotomy for gastric or duodenal perforated peptic ulcer in Rajiv Gandhi Government General Hospital during the time period of January 2015 to December 2015. Parameters for PULP scoring system and the time interval between the onset of perforation and the time of surgery is noted in all patients.

Results: Out of 61 patients included in the study, 12 patients died with a mortality rate of 19.7%. Mean PULP score in died patients was found to be 8, lowest being 7, and maximum being 10.

Conclusion: PULP score is statistically significant and it is an accurate predictor of mortality in patients operated for perforated peptic ulcer.

Keywords: Perforated Peptic Ulcer (PPU), PULP score, Perforation Operation time Interval (POI)

I. Introduction

The acute perforation of peptic ulcer continues to be one of the real emergencies in surgery, which requires immediate attention and prompt surgical management. Perforated peptic ulcers (PPU) occurs in 2-10% of the patients with peptic ulcer disease and account for more than 70% of the deaths associated with peptic ulcers. Perforation is the second most common complication of the peptic ulcer disease next to bleeding. Helicobacter Pylori infection is clearly implicated in the development of peptic ulcers in stomach and duodenum and it responds well to antimicrobial therapy.

The clinical picture of the perforated peptic ulcer ranges from abdominal pain, vomiting to overt symptoms and signs of peritonitis and frank sepsis. Perforation is a life threatening complication of the peptic ulcer with morbidity rates of 20 – 50% and mortality rates of 3 – 40% in surgically treated PPU patients. Variations in the clinical presentation as well as the delay in diagnosis and workup at admission in hospital can cause worsening of symptoms and deterioration of the clinical condition of the patient and have a detrimental outcome.

A careful preoperative assessment of the patients severity grade can help in offering the appropriate management to the patient. A large number of prognostic factors for morbidity and mortality of PPU have been reported, and a number of clinical prediction rules have been proposed for prognostic prediction and research purposes: the Boey score, the American Society of Anesthesiologists (ASA) score, the Acute Physiology and Chronic Health Evaluation (APACHE) II score, the sepsis score and the Mannheims' Peritoneal Index (MPI). They have been found to predict mortality poorly in perforated peptic ulcer patients in a comparative study.

The Peptic Ulcer Perforation (PULP) score can be used to accurately predict 30-day mortality in patients operated for PPU, and it performs better than the Boey score and the ASA score. The prognostic predictors included in the PULP score can be readily identified prior to surgery. The PULP score can assist in accurate and early identification of high-risk patients with PPU, and thus assist in risk stratification and triage. PULP score is based on a nationwide study from Denmark and included 2668 PPU patients with a median age of 70.9 years, where 55% were female. Seven factors were taken into account, with weighted points applicable for each factor, with a sum of 18 points being the highest possible score. The optimal cut-off point was found to be 7, which gives a positive predictive value of 25% for those with 0-7 points, and a PPV of 38% for the group with 8 or more points.

Another important prognostic factor which was identified recently in a study of 150 patients with perforated peptic ulcers in KIMS, Andhra Pradesh from 2008 – 2011 was Perforation-Operation time Interval (POI). There was no mortality in patients presenting within 48 hours whereas 15 mortalities were noted among those who presented after 48 hours. The time of perforation was determined based on the onset of acute abdominal pain. More the delay in surgery, heavier is the bacterial contamination, and worsens the prognosis.

The patients with perforated peptic ulcer who were treated with simple closure of the perforation required long term treatment in the form of medication or surgery. Common postoperative complications are pneumonia and wound infection and the incidence of postoperative complications are related to the delay in the perforation-operation interval, shock on presentation, immunocompromised state and other comorbidities.

II. Aims & Objectives

1. To assess Risk Stratification using Peptic Ulcer Perforation (PULP) scoring system in patients with perforated peptic ulcer.
2. To assess the significance of Perforation – Operation Time Interval (POI) in patients with perforated peptic ulcer.
3. To study the current status in the management of perforated peptic ulcer patients.
4. To study the postoperative complications.

III. Methodology

Inclusion criteria:

1. All patients undergoing emergency laparotomy for perforated gastric or duodenal ulcers

Exclusion criteria:

1. Traumatic perforation
2. Other small bowel or large bowel perforations
3. Iatrogenic perforation

All patients who come under inclusion criteria and undergo emergency laparotomy for perforated peptic ulcer in Institute of General Surgery, Madras Medical College – Rajiv Gandhi Government General Hospital are selected. After getting ethics committee clearance, all patients were explained about the disease, benefits & possible side effects of treatment. Informed written consent was obtained from all patients before initiation of treatment. Detailed history was taken and patients were evaluated as follows :

1. Epidemiological factors like age, sex, blood group, History of steroid or NSAID drug intake/ Comorbid illness/ malignant or AIDS disease
2. Time of admission to hospital since time of onset of symptoms
3. Investigations namely complete haemogram, liver function tests, renal function tests, and chest x ray, ECG and Viral Markers, Abdomen X ray Erect and Ultrasound abdomen
4. Risk stratification using PULP Scoring system & Perforation – Operation Time interval noted
5. Postoperative period is observed for any complications and follow updone.

Results

Results carried out using IBM-SPSS statistical software version 19.0. In our study, out of 61 patients, majority of the patients are in the age group between 40 to 60 years with a mean age of 40 years. 54 are males and 7 females with a ratio of 7.7 : 1. Majority of the patients belong to Blood group O positive . Majority of the patients have PULP scores between 3 to 7 with a mean PULP score of 5 points and a maximum score of 10 points. In our study, majority of the patients presented to our hospital with history of onset of abdominal pain for more than 24 hours with 33 patients in the group 24 – 48 hours, and 16 patients in the group > 48 hours. Majority of the patients have perforation at the Duodenum (43 patients) rather than at the Stomach (gastric perforation 18 patients). 4 patients had active malignancy in the stomach which caused the perforation.

Most of the patients underwent Modified Graham's Live Omental Patch closure (54 patients). Rest of the patients underwent additional procedures i.e., Feeding Jejunostomy in patients with Active Malignancy. Complications occurred postoperatively in 22 patients with a morbidity of 36%. The common postoperative complications are Wound/Surgical Site infection in 15 patients, Respiratory complications in the form of Consolidation, atelectasis and Pneumonia in 6 patients and Burst abdomen in 5 patients and External Biliary fistula in 2 patients. The mean hospital stay for the patients is found to be 12.5 days with a median of 10 days. Majority of the patients have hospital stay between 7 to 10 days accounting to 28 patients. Death occurred in 12 patients out of 61 patients, with a mortality rate of 19.7% , 12 patients succumbed to death and the cause of death being Septicemia, ARDS/Pneumonia, MODS and Advanced Malignancy. Majority of the patients died within the 5th postoperative day with a mean of 4th postoperative day. All patients with POI < 24 hours have a hospital stay of < / = 10 days with a mean stay of 8 days. Patients with POI between 24 – 48 hours have a wider range of hospital stay ranging from 7 days to 42 days with a mean stay of 13 days and patients with POI more than 48 hours have predominantly longer duration of stay with a mean stay of 20 days.

For checking the significance of Perforation Operation time Interval in predicting the hospital stay, Statistical test has been carried out using Chi-Square test which showed a p- value of 0.043 (P value <0.05) ,which is statistically significant. Higher the Perforation Operation Time Interval, lengthier is the hospital stay. In our study, the mean hospital stay of patients with PULP scores between 1 to 3 is less than 10 days and there is increase in the length of the hospital stay with higher scores. To prove its significance, a statistical analysis carried out using Chi-square test which showed p-value of 0.034 (p value < 0.05) and found to be statistically significant. Higher the PULP scores, lengthier the hospital stay for patients .

Out of 12 deaths, no death occurred in patients with POI <24 hours, 3 deaths occurred in interval between 24-48 hours and 9 deaths in POI >48 hours. Test of Significance carried out using Chi-Square test, which revealed a p-value of 0.00 (p value <0.05), which is statistically significant. Thus, Perforation Operation time Interval is significant in predicting the Mortality outcome in patients with perforated peptic ulcers.

Mean and the median PULP score of the dead patients was found to be 8 points. Test of Significance carried out using Chi-Square test, which showed a p value of 0.00 (p value < 0.05) , it is statistically significant. Thus, PULP score is an accurate and significant predictor of mortality outcome in patients with perforated peptic ulcer.

In our study, out of 12 patients who died, 9 patients died due to gastric perforation and 3 patients from duodenal perforation. Hence Gastric perforation has higher mortality and has been proven to be statistically significant (p value 0.001).

In our study, out of 4 patients with malignancy, 3 patients died. Malignancy has been found to be an independent factor in predicting mortality outcome and has been statistically proven (p value 0.022). Out of 61 patients, 2 patients suffered from AIDS and both the patients are died. Thus, Comorbid AIDS has higher influence on Mortality and has been statistically proven (p value 0.036).

IV. Discussion

In a Tertiary Care Centre with a study population of 61 patients, the majority of the patients presenting to the hospital with perforated peptic ulcer belong to the age group between 40 to 60 years with a mean age of 40 years. Of these, 54 were male and only 7 were female with a male preponderance of the disease with a ratio of 7.7 : 1. From the results, it has been found that perforated peptic ulcers are more common in patients with O positive and A positive Blood groups. Coming to the Peptic Ulcer Perforation (PULP) score, the Original PULP score was based on a nationwide study in Denmark. In our study PULP scores are calculated in south indian population and the results are obtained. It has been found that 67.2% of the patients have PULP scores ranging between 3 to 7 with a mean PULP score of 5 points and maximum being 10 points. None of the patients had score above 10 points. Regarding Perforation Operation Time interval, 80.3% of the patients presented to the hospital more than 24 hours of symptom onset and only 12 out of 61 patients presented within 24 hours of onset of symptoms. In our study, 70.5% of the patients were found to have perforation at the Duodenum and the rest had Gastric perforation. Malignant perforation was found in 4 patients.

The preferred mode of treatment in most of the cases was Modified Graham's Live Omental Patch Closure technique (86.8%). For patients with sealed duodenal perforation, Laparotomy and peritoneal lavage was done. For one patient who presented with a Retroduodenal perforation, primary closure of perforation with Tube duodenostomy, Gastrojejunostomy and Feeding jejunostomy was done. For Patients with malignant perforation, Patch closure with biopsy from the perforation site and Feeding jejunostomy was done. Of 61 patients, 22 patients developed postoperative complications with a morbidity of 36%. The most common complication was Wound site / Surgical Site infection found invariably in all patients who presented with septic shock. The next common complication being Respiratory complications in the form of Basal Atelectasis and Pneumonic consolidation, was seen following prolonged Endotracheal intubation and Pain associated atelectasis. One patient developed Pleural effusion for which intercostal drain was inserted. Some patients developed Burst abdomen in day 4 of the postoperative period for which Emergency Abdomen closure was done with adequate antibiotic cover and improvement of general status of the patient. Two patients developed External Biliary Fistula following primary closure and Omental patching of large duodenal perforation which contributed to very longer hospital stay.

Majority of the patients had a postoperative hospital stay duration between 7 to 10 days which was relation with the PULP score and the perforation operation time interval. The mean hospital stay was 12.5 days and the median was 10 days with a maximum hospital stay of 42 days. The cause for maximum hospital stay in 3 patients being, external biliary fistula and massive pleural effusion with intercostal drain. Death occurred in 12 patients with a mortality rate of 19.7%. The causes of death were ARDS/Pneumonia, Septicemia, MODS and Advanced Malignancy. Most patients died due to Septicemia and MODS and death had direct relationship with their PULP scores and the perforation Operation time interval. Most of the patients died within the 5th postoperative day with a mean of 4th POD.

With regard to relationship between Hospital Stay and Perforation Operation time Interval, the mean Hospital stay for patients with POI <24 hours was 8 days, 13 days for patients with POI between 24 – 48 hours and 20 days for POI >48 hours. It has been statistically significant that more the Perforation Operation time Interval, lengthier the hospital stay. Comparing the Hospital stay and PULP scores, patients with PULP scores <5 points had a hospital stay less than 10 days, and with higher PULP scores had longer hospital stay which has been proven to be statistically significant. With regard to Death and Perforation Operation time Interval, out of 12 deaths, 3 deaths occurred in patients with POI between 24 to 48 hours, and 9 deaths occurred for POI >48 hours, with no deaths occurring in POI group < 24 hours. It has been statistically significant and there is significant relation between the POI and the Mortality. Comparison of PULP scores and Death, death has been documented in patients with PULP scores 7 and 8, 9 i.e., Patients with higher PULP scores have a higher percentage of mortality and it has been statistically proven significant. In our study, Deaths occurred in all patients with malignancy, AIDS and most of the deaths occurred in patients with Gastric perforation (9 out of 12 deaths).

Tables

1. Assignment of points according to PULP score:

Variables	Points
Age more than 65 years	3
Comorbid liver cirrhosis	2
Serum creatinine > 1.47 mg/dl or 130umol/l	2
Concomitant use of steroids	1
Comorbid AIDS or active malignant disease	1
Time from perforation to admission >24 hours	1
Shock on admission HR >100 beats/min BP < 100mm Hg	1
ASA scores	
Score 2	1
Score 3	3
Score 4	5
Score 5	7
TOTAL PULP SCORE	0 – 18

Pulp Score

Statistics				
PULP RISK SCORING				
N	Valid	61		
	Missi ng	0		
Mean	5.07			
PULP RISK SCORING				
	Freque ncy	Percent	Valid Percent	Cumulative Percent
Valid	1	3	4.9	4.9
	2	7	11.5	16.4
	3	15	24.6	41.0
	5	11	18.0	59.0
	6	2	3.3	62.3
	7	13	21.3	83.6
	8	5	8.2	91.8
	9	1	1.6	93.4
	10	4	6.6	100.0
	Total	61	100.0	100.0

Death And Pulp Score

PULP RISK SCORING * DEATH Cross tabulation				
PULP	SCORES	DEATH		Total
		DEAD	ALIVE	
	1	0	3	3
	2	0	7	7
	3	0	15	15
	5	0	11	11
	6	0	2	2
	7	4	9	13
	8	5	0	5
	9	1	0	1

	10	2	2	4
Total		12	49	61

V. Conclusion

1. Perforation Operation time Interval is a significant factor in predicting the mortality and morbidity in patients with perforated peptic ulcer
2. Hospital stay can be better anticipated with the Perforation Operation time Interval
3. Peptic Ulcer Perforation (PULP) score is an accurate and significant predictor in predicting mortality and morbidity in patients with perforated peptic ulcer.
4. POI more than 48 hours and PULP scores more than 7 points have increased mortality and morbidity rates.
5. Gastric perforation has higher mortality owing to its increased probability of malignant etiology.
6. PULP score is assisted in accurate and early identification of high risk patients with PPU.

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