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The Effectiveness of Jabalpur Score in Predictingmorbidity and Mortality in Patients with Peritonitis Caused By Peptic Ulcer Perforation

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Abstract: ***Background:****Many prognostic systems have been developed to stratify perforative peritonitis patients. Many are complex and cannot be used in developing countries as the prognostic system depends on sophisticated investigations. So, a simpler scoring system is developed to stratify those patients*
Materials and Methods: *Our study included 50 patients who presented with features of peritonitis due to peptic ulcer perforation and underwent emergency laparotomy for the same in Coimbatore medical college hospital.*
Results: *Mortality and morbidity steadily increases with increase in the Jabalpur score. All the parameters in Jabalpur score are individually significant in predicting the outcome. For a score of 9, sensitivity is 87.5%, specificity is 83.3%, positive predictive value is 50% and negative predictive is 97.2%.*
Conclusion: *Jabalpur score is a simple and effective scoring system to predict the mortality and morbidity in peptic ulcer perforation patients.*
Key words: *Perforation, mortality, morbidity, Jabalpur score*

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I. Introduction

Perforative peritonitis is the most common case seen in emergency department by the surgeons all around the world especially in developing countries. Perforation leads to seepage of gastrointestinal contents in to the peritoneal cavity which causes an inflammatory process involving the peritoneal layer of abdomen resulting in the cascade of events. The increased morbidity and mortality that attributes to this condition is due to electrolyte disturbance, septic shock that leads to multi organ failure.Majority of the patients present late, with purulent peritonitis and septicaemia[1].

In treatment of peptic ulcer, incidence of elective surgery tended to decrease due to eradication of Helicobacter pylori during the recent three decades whereas incidence of emergency surgical interventions for complications of the disease did not decrease[2,3,4]Mostly it may be due to abdominal trauma or peptic ulcer perforation or typhoid infected case or even sometimes it may be non-infectious too. The severity of bacterial contamination of the peritoneal region depends on the site of localization of the injury. Perforations due to peptic ulcer disease are commonly encountered in first part of duodenum along with pylorus of the stomach.

Host responses play a major role in containing and localizing the infection and inflammatory process. It is a typical example of acute abdomen. The diagnosis is primarily based upon clinical manifestation with signs and symptoms.

The clinical features include acute abdominal pain, abdominal tenderness, and guarding that is exacerbated by movement of the abdomen that bring visceral organ in contact with the peritoneum, leukocytosis, acidosis and hypernatremia with hypokalemia may be incidental findings. X rays reveal pneumoperitoneum with or without dilated intestines as a sign of paralytic ileus. CT scan helps to differentiate this from other causes. Despite of surgical advances in management and prompt post operative antimicrobial therapy along with antacids the mortality and morbidity is high. The identification of various predictors for prognosis in duodenal perforation can help in risk stratification of individuals and thus signify the need of early prompt therapeutic measures in such individuals[5]

In the view of evaluating the prognostic outcome of patients suffering from this condition multiple scoring system and indexes have been put forth by numerous investigators over the period of time, but many of these scoring grades fall short in aim by requiring lab investigations that are far too complex to obtain in the stipulated period of critical time.

JABALPUR SCORING SYSTEM is one another that prove to be distinct and efficient in predictions of prognosis of patients. It incorporates easily obtainable parameters that includes age, perforation operation

interval, mean systolic blood pressure, serum creatinine and heart rate that is evaluated in bedside manner. Its reliability is tested in this study.

II. Material And Methods

This prospective comparative study was carried out on patients of Department of general Surgery Coimbarore medical cpllege from November July 2017 to July 2018. A total 50 adult subjects (both male and females) of aged ≥ 18, years were for in this study

Study design: Prospective cohort study

Study Location: Department of general surgery, Coimbatore medical college and hospital

Study duration:July 2017 to July 2018

Subjects & selection method :Patients came to emergency department and admitted with acute abdominal pain whose clinical symptoms and investigations leads to the diagnosis of perforative peritonitis and all the patients underwent emergency laparotomy.

Sample size:50

Inclusion criteria:

Patients above the age of 18.

Patients undergoing emergency laparotomy with features of peritonitis due to peptic ulcer perforation.

Exclusion criteria:

Patient less than age of 18.

Pregnant patients.

Psychiatric patients.

Patients with HIV and TB.

Procedure methodology

Patients presented with acute abdominal pain in emergency evaluated to have perforative peritonitis due to peptic ulcer perforation. All the patients underwent emergency laparotomy for the same. All the parameters were noted and Jabalpur score calculated preoperatively and the outcome of the patient observed postoperatively

JABALPUR PROGNOSTIC SCORING SYSTEM

FOR PEPTIC PERFORATION

FACTOR	SCORE						
	0	1	2	3	4	5	6
P-0 Interval (Hours)	< 24	25-72	73 - 96	97-120	> 120	-	-
Mean Systolic BP (mmHg)	70 - 109	-	50 - 69 or 110 - 129	130 - 159	< 49 or > 160	-	-
Heart Rate (Per Minute)	70 - 109	-	55 - 69 or 110 - 139	40 - 54 or 140 - 179	< 39 or >180	-	-
Serum Creatinine (mg/dl)	0.6 - 1.4	-	1.5 - 1.9	2.0 - 3.4	> 3.5	-	-
Age* (Years)	< 45	-	45 - 54	55 - 64	-	65 - 74	75 or more

* Co-morbid illness, if present given score of 5.

III. Result

TABLE 1: DESCRIPTIVE STATISTICS FOR EACH PARAMETER

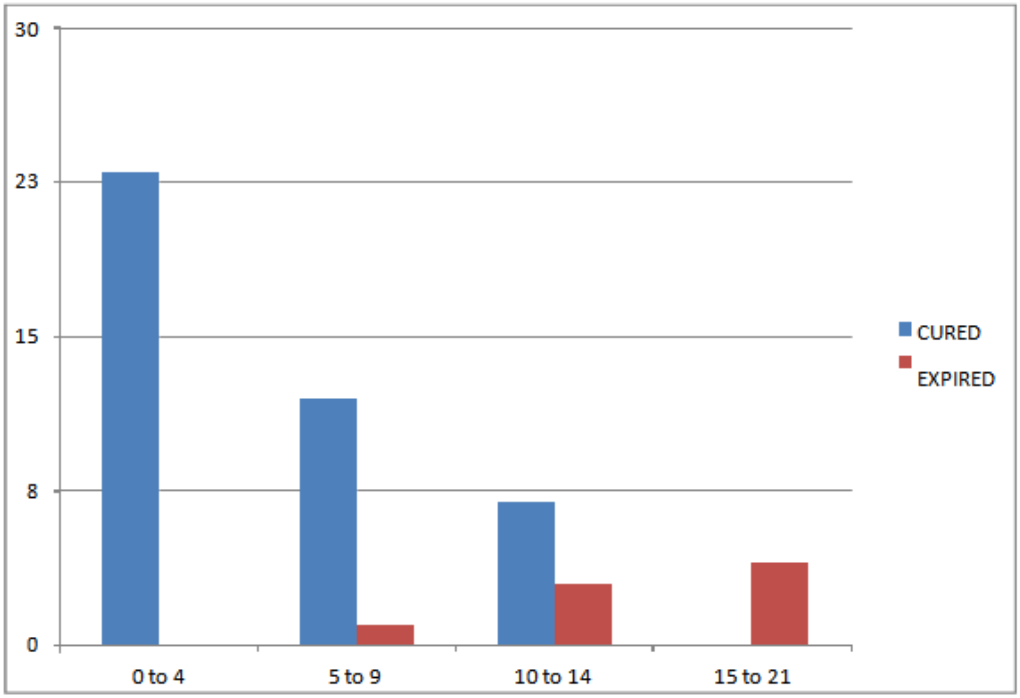
	MIN.	MAX.	MEAN	S.D
AGE	18	70	40.50	15.236
MEAN SBP	60	114	86.68	14.505
HR	80	124	102.52	10.332
Sr.CREATININE	.80	3.80	2.0000	.85762
JABALPUR SCORE	0	16	5.88	4.628

Jabalpur score is obtained by summation of marks obtained in each factors such as age, co morbid illness, heart rate, mean systolic blood pressure, serum creatinine, perforation - operation interval. 46% of the patients have jabalpur score ≤4. 26% of the patients have jabalpur score between 5 and 9. 28% of the patients have jabalpur score >9. No patients died who had score between 0 and 4 and 100% mortality if patient had score more than 14.

TABLE 2: Jabalpur score for mortality

JABALPUR SCORE	CURED	EXPIRED	TOTAL
0-4	23	NIL	23
5-9	12	1	13
10-14	7	3	10
15-21	NIL	4	4

RELATIONSHIP BETWEEN JABALPUR SCORE AND MORTALITY



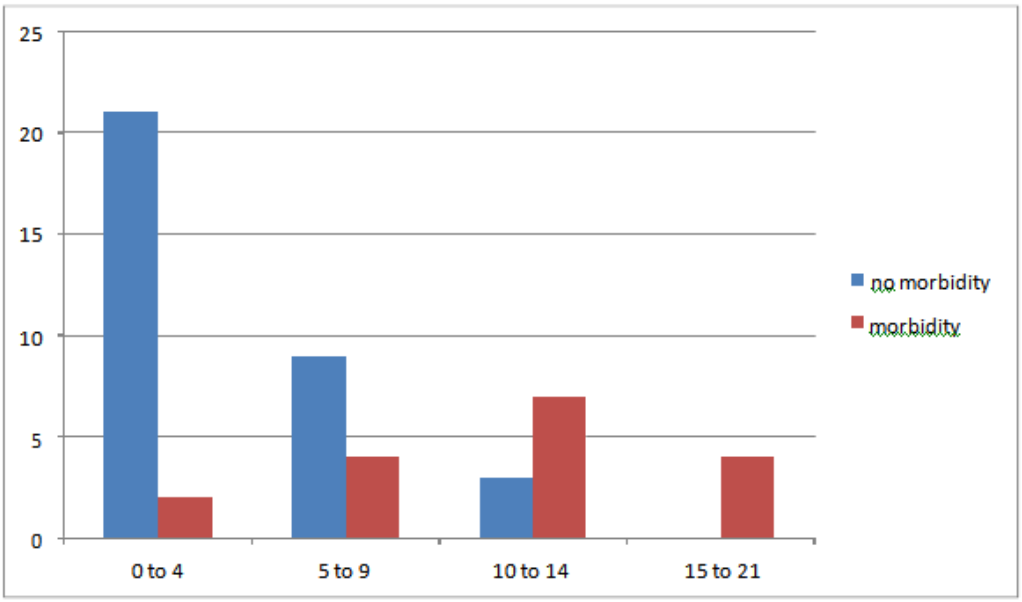
Morbidity:

In our study, out of 50 patients 17 patients had developed complications. Out of which some patient had more than one complication. Out of 14 patients who had Jabalpur score >9 11 patients developed complications. 6 patients had developed complications out of 36 patients who had score <9. Superficial wound infection was developed by 7 patients. Multiple organ dysfunction syndrome was developed by 5 patients. Acute kidney injury was developed by 10 patients. ARDS was developed by 3patients

TABLE 3: Jabalpur score for morbidity

JABALPUR SCORE	NO MORBIDITY	MORBIDITY	TOTAL
0-4	21	2	23
5-9	9	4	13
10-14	3	7	10
15-21	NIL	4	4

Bar Chart Showing Relationship Between Jabalpur Score And Morbidity



Relationship Of Jabalpur Prognostic Scoring System With Morbidity And Mortality

Among the 23 patients who had Jabalpur score between 0 and 4 only 2 patients develop morbidity and there were no mortality.13 patients have scored between 5 and 9 among that 1 patient expired and 4 patients develop morbidity.10 patients have score between 10 and 14 among which 7 patients develop morbidity and 3 patients died. 4 patients scored above 14 and all the patients have both morbidity and mortality.

TABLE 4: Relationship of jabalpur scoring system with morbidity and mortality

SCORE (RANGE)	NO. OF PATIENTS	MORBIDITY (n{%})	MORTALITY (n{%})
0 - 4	23	2	-
5 - 9	13	4	1
10 - 14	10	7	3
15 - 21	4	4	4

Among cured patients 83.4% of the patients have Jabalpur score less than 9 in which 54.8% of the patient have Jabalpur score between 0 and 4. And the remaining 16.6% of the cured patients have score between 10 and 14. No patients who are cured does not have score more than 14.

No mortality is seen when the score is between 0 and 4. Among expired patients 12.5% of the patients have score between 5 and 9, 37.5% of the patients have score between 10 and 14.

Among expired patients 50% have Jabalpur score more than 15. Statistical analysis done using chi square and T test. P value is less than 0.05. Jabalpur score is statistically significant in predicting the mortality and morbidity of the patients with perforative peritonitis

Out of 42 cured patients 10 (23.8%) of the patients have morbidity.76.2% of the cured patients do not have any morbidity. 12.5% of the expired patients does not have any morbidity and the remaining 87.5% of the expired patients have morbidity. Chi square test done. P value is less than 0.05. Jabalpur score is statistically significant in predicting the morbidity and morbidity increases the mortality of the patients

IV. Discussion

Perforative peritonitis is one of the challenging and demanding surgical emergency thatrequires immediate management which can be lifesaving at all situations. The emphasis on triaging the patients prior to management is aimed at significantly decreasing the morbidity and mortality of the patient.

All the patients undergoing this study were diagnosed with perforative peritonitis with proper radiological and clinical evidence. The study confirmed that this ideal scoring system improves the clinical efficiency in management. Though variety of scoring system has been proposed and devised for assessment of the severity, none of the scoring system is complete. Many scoring systems are complex. The parameters that are included in this study are easily obtainable and taken without delay in bringing out the score.

The undertaken study group comprises of 50 patients with these diagnosis who are given scores and taken further for emergency laparotomy. Patients having score above 9 has mortality of 50% and morbidity of 78.5% and score less than 9 has mortality of 2.7%and morbidity of 16.6%.the sensitivity is 87.5% and specificity is 83.5% with positive predictive value is 50% and negative predictive value of 97.2%.

There were no death if the patient had perforation to operation interval less than 24 hrs and there is 100% mortality if the P - O interval is greater than96 hrs. There were no deaths if Jabalpur score is less than 4 and 100% mortality if the score is above 14. All the parameters such as age, perforation operation interval, mean systolic blood pressure, serum creatinine and heart rate are independently and statisitically significant in predicting the mortality and morbidity of the patients with perforative peritonitis.

According to this score, one can plan their management and assess the complications that are anticipated along the treatment so that the overall survival improves. just because the score is low doesn't necessarily mean they can be ignored or compromised in any way. The significant increase in score can lead to bad prognosis and acts as early marker for shifting the focus to such patients and active intervention.

Mishra et al studied 140 patients with perforative peritonitis the sensitivity is 87% and specificity is 85% that is more than any other scoring system applied for this specific study.[6] Comparison of Jabalpur scoring system to other scoring systems in practice also proves it as an effectively favorable one. In country like India were one cannot expect sophisticated investigation to be readily available in time. Considering various factors the use of easily available parameters is the most promising reason for the success of this study.

In a similar study conducted by Subangi et al mortality of 3.2% is seen with Jabalpur prognostic score of 0 to 4,whereas mortality of 44% was seen in patients with Jabalpur prognostic score of 5 to 15 and 100% mortality is seen in patients with Jabalpur prognostic score of >15[7]

In a similar study conducted byPrakash GV in patients with perforation peritonitis, Jabalpur prognostic scoring system is an easy and reliable predictor in evaluating prognosis. In developing countries like India, where in resources are limited, Jabalpur prognostic scoring system will greatly help in predicting prognosis in patients with perforarion peritonitis. Because of its cost effectiveness, availability and ease of use, it is recommended as a part in the holistic approach of treatment of perforation peritonitis[8]

V. Conclusion

While no scoring system was ideal and all were hampered by certain limitations, Jabalpur scoring system is by far the most easily acceptable and applicable one. High Jabalpur score predicts poor prognosis and the patients with higher score usually have a poor outcome and higher mortality and morbidity rate, such patients should be monitored closely in a specialized surgical intensive care unit with intensive monitoring of vitals. One can all start triaging the patients accordingly and focus on improving the overall outcome and prognosis using this scoring system. Jabalpur score appears to be simple, reliable, quick and easy to use tool in predicting the outcome in cases of peritonitis even in small hospitals in developing countries where sophisticated investigations could not be done. Since the present study has a small study group further validation should be done for using Jabalpur score as a standard tool in determining the prognosis after perforative peritonitis.

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