

EVALUATION OF PEPTIC ULCER PERFORATION WITH A NEW PROGNOSTIC SCORING SYSTEM

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Abstract

Background: A perforated peptic ulcer is a dangerous ailment that has to be managed by emergency surgery. The fundamental concepts of fast resuscitation, early diagnosis, and immediate surgical intervention constitute the cornerstone of the therapy of these situations. **Materials and Methods:** According to the New Prognostic Scoring system, a Prognostic high score indicates a bad prognosis, and patients with higher scores often have poor results and a higher death and morbidity rate. **Result:** Show that high mortality rates among those whose case studies were presented with a known fact that early recognition of signs and treatment of such patient populations is crucial for decreasing morbidity and mortality rates. The results indicate that late presentation is associated with higher mortality rates. **Conclusion:** A dedicated surgical critical care unit that carefully monitors the patient's vital signs should be used for these kinds of patients while closely monitored.

INTRODUCTION

Gastrointestinal perforation is one of the most common unforeseen problems that lead to the need for emergency surgery, which surgeons in India and worldwide have to deal with.^[1] Perforation peritonitis is a disease that is often seen in developing countries such as India.^[1] Inflammation of the serosal membrane, which borders the abdominal cavity and protects the organs, is the defining characteristic of the condition that medical professionals describe as peritonitis.^[2] The intensity of the peritoneal pathogenic bacteria directly correlates to the hole's location in the peritoneum. Peptic ulcers are known to be related to various life-threatening effects, including bleeding, perforation, and obstruction.^[2] This research was conducted with the objectives of identifying the clinical features and surgical results of perforated peptic ulcers (PPU) and determining the validity of the Boey points system in determining mortality and morbidity.^[3] Bleeding occurs in around 2-10% of the cases with peptic ulcers, and perforation happens in about 2-10%. The most common microbe responsible for causing peptic ulcer is *Helicobacter pylori*. Previously, duodenal ulcer perforation was most common (54.29%) followed by gastric ulcer perforation accounting for 2.86% of all cases.^[4] The percentage of people who die due to perforation

peritonitis may vary anywhere from 6 to 27%.^[5] From a ruptured peptic ulcer, it is also possible for chemical compounds, such as stomach acid, to leak into the body, which may cause the condition. Perforation contributes to the cause of death in over 2.70% of cases of peptic ulcer disease deaths.^[6] Various scoring systems are available which allow stratification of patients based on severity, identify the ones with high risk and provide prognostic information.^[7-9] To have a better chance of survival during these types of medical crises, it is necessary to accurately identify patients at a high risk. During routine surgical procedures, perforation peritonitis is an extremely frequent and deadly complication that may arise in any hospital.^[7] The patients that are brought to our hospital are from rural regions and have poor socio-economic status. They also often present themselves late to the hospital, increasing morbidity and mortality.^[10,11] There are many different scoring systems available, and each one allows for the categorization of patients according to the severity of their condition, identifies patients who are at high risk, and provides prognostic information.^[8] According to a research it was found out that, PULP (peptic ulcer perforation scale score) is responsible for between 50 and 70% of all cases of peritonitis in different population-based studies.^[12-14] The higher mortality and morbidity that may be attributed to this syndrome is caused by electrolyte

disturbances and septic shock, which ultimately fails many organs. The vast majority of patients present purulent peritonitis and septicaemia as their primary symptoms.^[15] A rapid worsening in a patient's health might be brought on by either a delay in getting them to the hospital or in getting a diagnosis because of an uncommon presentation.^[16] A perforated peptic ulcer is a dangerous ailment that has an overall documented death rate of 5%-25%, with that number increasing to as high as 50% with age regarding ulcers that are complex.^[17] It might be argued that the illness, treatment, and eventual eradication of *H. pylori* infection have contributed to the motive of moving away from treating patients through the use of surgical procedures and instead moving towards treating patients through the use of non-surgical interventions.^[17] A perforated peptic ulcer is a dangerous ailment with a documented death rate ranging from 5% to 25% overall, and that percentage may reach as high as 50% with age.^[18] Inflammation of the peritoneum is what medical professionals refer to as peritonitis.^[19] Secondary peritonitis and complex intra-abdominal infections are prevalent causes of emergency surgical admissions across the globe, and they are linked with a large amount of mortality and morbidity.^[20]

MATERIALS AND METHODS

The research will be carried out at the rural medical college located in the heart of India in the department that is dedicated to general surgery. Participating in the study were all patients, regardless of age or gender, who presented themselves at the surgical emergency department with the suspicion that they had perforated peptic ulcers. This was done in accordance with the inclusion criteria described before. Written and oral consent was obtained beforehand from each patient who participated in the research project. The patient had a comprehensive history review as well as a systemic examination. At the time of enrolment, each participant had their performance on the measures that would later be included into the study's scoring system subjected to a careful assessment at the rural medical college in

central India's Department of General Surgery from August 2018 to July 2020.

Sample Size: 150

Inclusion Criteria

1. The X-ray report of the abdomen reveals signs of peritonitis.
2. A peptic ulcer perforation was identified during the exploratory laparotomy, which provided an accurate diagnosis.
3. Permission for hospital setting admission and treatment must be obtained.

Exclusion Criteria

1. Refuse to provide permission.
2. Women who are either pregnant or nursing.
3. Individuals with additional underlying conditions led to the perforation
4. Major medical condition that is not well managed (severe cardio-respiratory disease, renal failure).
5. Hepatic pre-coma.
6. Neurological condition.

RESULTS

A hospital-based retrospective cross-sectional observational study with 150 patients was conducted to analyze peptic ulcer perforation using a new predictive technique. The study was carried out in a cross-sectional format. During the pre-operative examination that was performed on each of the 150 people who took part in the experiment, the Novel Prognostic Scoring System was used, and a score was then assigned to each patient. All patients who took part in this study had their results monitored, and their information was kept in a database.

In order to build a unique prognostic scoring system that enables pre-operative prediction of morbidity and mortality for patients, we made use of the results of the study in conjunction with the observations that were made all during the research process. Merely 6% of the patients in our study group were younger than 45 years, while the other 84% belonged to an age demographic group that was older than 45 years old. There were only six patients who belong to an age category which was older than 75 years old; this represented 4% of the entire population that was studied throughout the investigation [Table 1].

Table 1: is given below as follows

Age in years	Score	Number of patients	Percentage
Less than 45	0	9	6
45-54	1	36	24
55-64	2	84	56
65-75	3	15	10
More than 75	4	6	4
Total	--	150	100

Just 6% of the patients in our research group were younger than 45 years old, while the remaining 84% belonged to the age group of patients older than 45. There were only six patients who belong to an age group that was more than 75 years old; this represented 4% of the total population of the research [Table 1]. According to Table 2, it was discovered that of the entire population of 150 people who participated in the study, 24 patients passed away while 126 people were found to be healed. Just two of the nine patients who were 75 years old and participated in the trial were cured, whereas four of the patients who died were participants. A chi-square test of independence

was carried out between the two variables of age and mortality to investigate the link between age and the result, specifically whether or not growing older leads to an increased risk of passing away.

Table 2: Number of patients undergoing treatment.

Sex of the patient	Number of patients	Percentage of patients undergoing treatment at a rural hospital in India
Male	112	74.6%
Female	38	25.4%
Total	150	100%

The [Table 2] below gives an analysis of the site or region of perforation and the number of patients undergoing treatment.

Table 3: Patients undergoing the surgical treatment procedure

Region of perforation in the digestive system	Number of patients undergoing treatment	Percentage of patients
Duodenal perforation	36	24%
Gastric	114	76%
Total	150	100%

The [Table 3 and Figure 1] shows the percentage of patients undergoing the surgical treatment procedure for duodenal and gastric perforation medical condition.

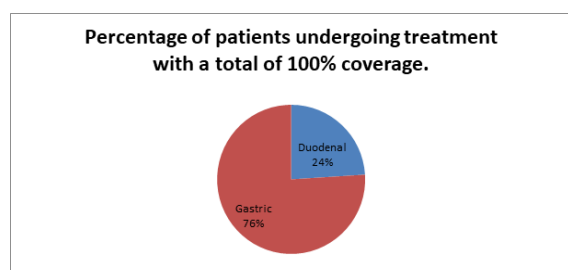


Figure 1: Shows the percentage of patients undergoing duodenal perforation treatment versus those undergoing the gastric perforation treatment.

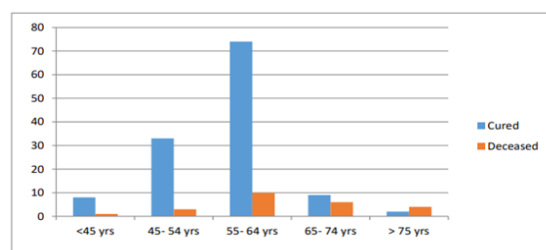


Figure 2: shows the age distribution bar chart for the treated patients and those who died due to prolonged illness.

According to our research findings, the prevalence was seen to be much more prevalent in men than in girls. In this particular research, the population was made up of mostly men (74.6%), with just 25.4% of the participants being girls.

As can be seen in [Table 2], out of the entire population of 150 people who participated in the research, 24 patients passed away while the remaining 126 were considered cured. Just two of the nine patients in the study who were over 75 years old were cured, and four of those patients who were over 75 years old died during the research. A chi-square test of independence was carried out between the two variables of age and mortality in order to investigate the link between age and the result, specifically

whether or not growing older leads to an increased risk of passing away.

When one takes a look at [Figure 2], it is immediately apparent that the vast majority of the people who took part in the study fell within the age group of 55 to 64 years old. This study indicated that the average presentation age was 55.5 years, which is in line with the results of the studies. Within the scope of this specific investigation, the typical age was 55.5 years old, with a standard variation of 2.72 years. For the whole of our study, about 70 of the participant patients had a mean systolic blood pressure that varied from 70 to 109 mm Hg, while 28 percent of the patients had a mean systolic blood pressure that ranged from either 50 to 69 mm Hg or 110 to 129 mm Hg.

In the group of persons who have died away, 58.3% of the patients had a mean systolic blood pressure between 50 and 69 mm Hg, and 25% of the patients had a mean systolic blood pressure was between 70 and 109 mm Hg. In all, 109 mm Hg was the mean systolic blood pressure for 25% of the patients. A chi-square test of independence was carried out between the two variables to study the nature of the connection between the two variables (mean systolic blood pressure and outcome).

According to [Table 2], it was revealed that out of the total population of 150 persons who participated in the study, 24 patients died away, while the remaining 126 people were regarded to have cured. Just two of the nine patients who participated in the experiment and were 75 years old were healed, while four of the patients who passed away were participants in the study. A chi-square test of independence was performed between both the two variables of age and mortality in order to study the possible link that exists between the two. This investigation aimed to determine whether or not there was a correlation between the two. The objective of this examination was to ascertain whether or not advancing years are associated with an increased likelihood of dying away. According to the results of the research, six individuals out of the whole study population of 106 who had a mean systolic blood pressure between 70 and 109 mm Hg passed away, while 14 individuals

out of the entire study group of 27 who had a mean systolic blood pressure between 50 and 69 mm Hg also passed away. The difference in mortality rates between these two groups was statistically significant.

According to the results of our study, 79.4% of the patients who were able to make a complete recovery had a mean level of systolic blood pressure that was in the range of 70 to 109 mm Hg. 10.3% of the patients had a mean systolic blood pressure level that varied from 50 to 69 mm Hg, whereas 9.5% had a mean systolic blood pressure level that varied in the range of 110 to 129 mm Hg. Both of these ranges are shown as a percentage of the total patient population. Among the deceased population, 58.3% of the patients had a mean systolic blood pressure in the range of 50-69 mm Hg, and 25% of the patients had a mean level of systolic blood pressure between 70-109 mm Hg. In all, there were 109 patients who had a mean level of systolic blood pressure of 70 mm Hg or higher.

A chi-square test of independence was performed between the two variables to investigate the relationship between the two variables (mean level of systolic blood pressure and outcome). This was done in order to investigate the kind of relationship that exists between the two variables. The goal of the test was to evaluate whether or not there is an increase in the risk of mortality when the patient experienced hypotension when they presented themselves in the hospital. At the moment of presentation, the patients' heartbeat ranged between 70 to 109 beats per minute in 70% of the patient cases, while in the remaining 30% of the cases, the patients' heartbeat ranged between 110 to 139 beats per minute. The findings of our research indicate that this range of heart rates was present in 70% of the cases. Most people who survived postoperative treatment for PPU had a pre-operative heartbeat rate in the range of 70-109 beats per minute, whereas the majority of those who did not survive had heartbeats in the range of 55-69 and 110-139 beats per minute.

In this specific piece of study, among patients who had been effectively treated for their disease, the statistical results revealed that 81% of patients had a heartbeat rate that was in the range of 70 and 109 beats per minute, while the other 19% of patients had a heartbeat rate that was in the range of 110 and 139 beats per minute. In 58.4% of the instances, the deceased patients had an average heart rate ranging between 110 to 139 beats per minute. This was the situation for all of the patients who'd already passed away. A chi-square test, which can be shown below, has been performed in order to determine whether or not there is a link between the two factors, heart rate and outcome. With the use of data analysis using the chi-square test, the following findings were revealed: $\chi^2 (n = 150) = 44.98, p = .00001$; the correlation between these parameters of heart rate and the outcome was proven to be significant. This was demonstrated to be the case by the following results: $\chi^2 (n = 150) = 44.98, p < .00001$.

DISCUSSION

The majority of patients in this research who were diagnosed with perforation peritonitis belonged to the age category of 55–64 years old. This age group made up around 56% of the study population, while only 6% of the population was younger than 45 years old. According to the findings of a study that was carried out by Jhobta et al,^[10] Lohsiriwat et al,^[3] and Batra et al,^[11] on patients who had peptic ulcer perforation peritonitis, the mean age of presentation was between 45 and 60 years, 56.5 years, 52 years, and 40.87 +/- 17.42 years, respectively.

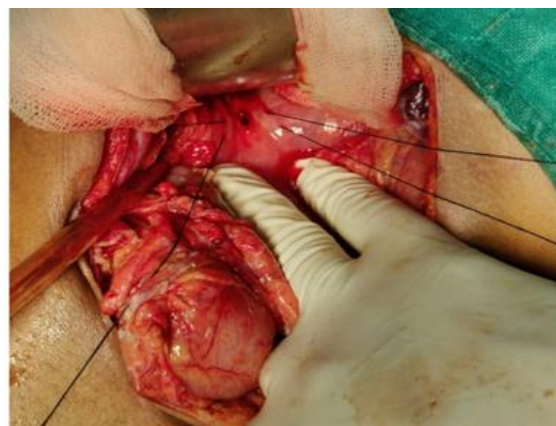


Diagram 1: The above photo shows the diagnosis of pyloric perforation in the patient upon surgical examination.

According to the findings of this study, stomach perforation represented for 76% of the population among those diagnosed with peptic ulcer perforation peritonitis. This conclusion was drawn from the observations of a number of patients who were all being treated for peptic ulcer peritonitis at the time of their examinations. The remaining 24 percent of individuals had a perforation close to the commencement of their duodenum. It was observed that the prepyloric region was the location that was involved the vast majority of the time in instances of stomach perforation. According to the results of a different study that was conducted by Lohsiriwat V et al., the pre-pyloric region was the most frequent site for peptic ulcer rupture³. After this, the first segment of the duodenum was removed, and then the antrum and the main body of the stomach were dissected out. In contrast to the results of previous study, which revealed that the majority of ulcers were located in the first section of the duodenum, our data demonstrated a unique pattern. This pattern was discovered to be the case because of the location of the first portion of the duodenum. The results of these other research are congruent with our own, which means that our findings are accurate. On the other hand, newer studies have shown that a perforation of the duodenum due to an ulcer is far more common than a perforation of the stomach.^[4,10] These are the results of the studies that Jhobta and his colleagues conducted.^[10]

In accordance with the findings of G. V. Prakash et al. 2019, the death rate was found to be 0% in a sample of 150 patients where the median MPI score was 21. Also, 12.8% of the patients fell within the medium range of 21 to 29, and 65.2% fell within the maximum range of 30. A study found that individuals with MPI values between 21 and 29 had a mortality risk that was over 65%, while those with MPI values below 21 had a mortality risk that ranged between 0% and 2.3%. Those with an MPI score of 29 or above had the greatest death rates, with some studies,^[12] reporting that these individuals had death rates as high as 80 percent. Notash et al. 2006 came to the conclusion that the critical cut-off values for the MPI are 21 and 29, with a death rate of 60 and 100 per cent respectively at those ages.^[13]

CONCLUSION

By using the New Prognostic Scoring method, one is able to concentrate on improving both the overall result and the prognosis. Even in smaller hospitals in underdeveloped countries where more in-depth investigations cannot be conducted due to a lack of resources, the New Prognostic Score is a straightforward, trustworthy, expedient, and user-friendly instrument that can predict the outcome of cases of peritonitis. So, it is possible to say that, even though several scoring systems such as APACHE II and the Jabalpur Peritonitis Index (JPI) are available for the prediction of morbidity and mortality in the instances with Peptic Ulcer Perforation peritonitis, their prognosis was not upto the mark as stated. As a result, we attempted to build a novel approach for prognostic scoring by including two additional factors into the equation. Our research was superior to previous grading systems in its ability to predict mortality and morbidity. It is less complicated and more straightforward to use. Notwithstanding this, we are carrying on with the assessment of our scoring system in order to publicly acknowledge this method as a fresh system of scoring.

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