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Original Research Article

Mannheim Peritonitis Index's Ability to Accurately Predict Individuals with Hollow Viscous Perforation's Morbidity and Mortality

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Abstract

Background: Hollow viscus perforation peritonitis is one of the most frequent surgical emergencies, with significant rates of death and morbidity. The goal of this study was to evaluate the Mannheim's peritonitis index's predictive power for patient mortality.

Methods: Hollow viscus perforation peritonitis is one of the most frequent surgical emergencies, with significant rates of death and morbidity. The goal of this study was to evaluate the Mannheim's peritonitis index's predictive power for patient mortality.

Results: A 100% survival rate was discovered in cases involving the stomach, 96% in cases involving the duodenum, 0% in cases involving the jejunum, 73% in cases involving the ileum, 83% in cases involving the appendix, and 50% in cases involving the colorectal region. The survival rates were influenced by a number of variables, including age, sex, organ failure, and sepsis origin.

Conclusions: The Mannheim peritonitis index, which is particularly useful in stratifying the severity of the condition and predicting death in patients with peritonitis, should be considered in the care of all these patients.

Keywords: Mannheim's Peritonitis Index; Perforation Peritonitis.

Introduction

A serious disorder with a high risk of morbidity and mortality is hollow viscous perforation leading to peritonitis. The rates of morbidity and mortality with this illness remain high despite advances in medical science. Therefore, it is imperative to create a reliable scoring system that can effectively classify patients into various risk groups, direct treatment choices, and track results in order to enhance patient care and overall results.[1]

To meet this demand, a number of scoring systems have been created. The Acute Physiology and Chronic Health Evaluation

II (APACHE II), Sepsis Severity Score (SSS), and BOEYS are a few examples of such systems. These rating scales are intended to evaluate the condition's severity and forecast patient outcomes. A scoring system designed particularly to predict the morbidity and mortality of individuals with peritonitis caused by hollow viscous perforation is still needed, nevertheless.[2]

The Mannheim Peritonitis Index (MPI), created by Wacha and Linder in 1983, is one such scoring system that satisfies these parameters. The development of the MPI involved a thorough retrospective study of data from a sizable cohort of 1253 peritonitis patients. The investigation took a broad look at 20 potential risk factors for the illness. Only 8 of these characteristics were determined to be prognostically significant after rigorous consideration, and they were subsequently added to the MPI. The scoring method was able to accurately determine the severity and prognosis of peritonitis in various patients since these parameters were further divided into categories based on their predictive power.[3]

The main goal of this study is to assess how well the MPI predicts morbidity and mortality in individuals with peritonitis especially brought on by hollow viscous perforation. Clinicians will be able to classify patients into various risk groups by using the MPI, which will allow them to decide on treatment modalities with knowledge. The MPI will also make it easier to track patient outcomes, giving crucial information about the effectiveness of various management techniques and general patient care.[4]

In cases of peritonitis caused by hollow viscous perforation, optimising patient care and outcomes depends on the creation of an efficient scoring system. To meet this need, the Mannheim Peritonitis Index (MPI) was created, and it has shown encouraging outcomes in terms of predicting morbidity and death in these individuals. Healthcare practitioners will be better able to make knowledgeable decisions, deliver appropriate care, and optimise patient management strategies by putting the MPI into practise. Finally, the level of care for patients with peritonitis brought on by hollow viscous perforation may be greatly raised with the incorporation of the MPI into clinical practise.[5]

Methodology

The goal of the study was to look at the consequences of peritonitis brought on by hollow viscous perforation. The study involved 50 patients in all, and the diagnosis of peritonitis was made using a combination of clinical examination, history, and imaging results such chest and abdominal X-rays. Additionally, comprehensive data on the individuals' medical history was gathered, including any chronic health conditions. Upon admission, blood tests were performed, and pertinent clinical information was documented.

Depending on the underlying aetiology, perforative peritonitis was treated using standard surgical techniques. Acute myocardial infarction or heart failure, wound infection, pneumonia or lung atelectasis, intra-abdominal collection, acute renal failure, and urinary tract infection were all included when assessing morbidity. Any death that took place while the patient was in the hospital was deemed a mortality.

Inclusion Criteria:

1. Patients with clinical suspicion and investigatory support for the diagnosis of peritonitis due to hollow viscous perforation, which was later confirmed by intraoperative findings.

Exclusion Criteria:

1. Patients with hollow viscous perforation due to trauma.

2. Patients with any other significant illness that was likely to affect the outcome more than the studied disease.
3. Once the diagnosis of peritonitis was confirmed through operative findings, the patients were enrolled in the study and assessed using the Mannheim Peritonitis Index (MPI). The MPI score was calculated based on the presence and severity of risk factors identified in the index.

The cases were then grouped into three categories based on the MPI scores, as described by Billing:
Patients with MPI scores below 21.
Patients with MPI scores between 21-29.
Patients with MPI scores above 29.
The patients' progress, occurrence of complications, and discharge due to improvement or death were monitored. The time from the initial diagnosis to the event (death or discharge) was recorded. Out-patient follow-up continued for 30 days to assess perioperative morbidity and mortality.

Statistical analysis was conducted using the SPSS software version 16.3. Each variable in the MPI score, along with other patient variables, was analyzed using chi-square analysis to determine the association with various outcomes observed in the study. A p-value less than 0.05 was considered statistically significant.

The results were presented as mean ± standard deviation for continuous data and as numbers and percentages for categorical data. Proportions were compared using the Chi-square test of significance.

Results

TABLE 1: Site of perforation and outcome

Site	Survived (%)	Death (%)	Total
Stomach	2(100)	0	2
Duodenum	26(96)	1(4)	27
Jejunum	0	1(100)	1
Ileum	8(73)	3(27)	11
Jejunum & ileum	1(100)	0	1
Appendix	5(83)	1(17)	6
Colorectal	1(50)	1(50)	2

The study looked at several gastrointestinal locations' survival and death rates. All 2 instances survived in the stomach, yielding a 100% survival rate. With 26 out of 27 instances surviving, the duodenum had a high survival rate of 96%; only 1 case (4% death rate) did not. With a death rate of 100% for the one case recorded, the jejunum had no survivors. Out of a total of 11 cases in the ileum, 8 cases (73%) survived, whereas 3 cases (27%) resulted in death. One example including both the jejunum and ileum was completely successful. An 83% survival rate (5 out of 6 cases) and a 17% death rate were recorded for the appendix. In the colorectal region, 50% of the 2 cases survived, while the other 50% resulted in death.

Table 2:Summary of MPI in our study (50 cases)

Summary of MPI	Survived (%)	Death (%)	Total
Age >50 y	15 (83)	3 (17)	18
Female sex	3 (75)	1 (25)	4
Organ Failure	25 (78)	7 (22)	32
Malignancy	0	1 (100)	1
Preoperative duration >24 h	30 (81)	7 (19)	37
Origin of sepsis not colonic	37 (88)	5 (12)	42
Diffuse generalised peritonitis	40 (87)	6 (13)	46
Exudates			

Clear	12 (100)	0	12
Cloudy/Purulent	24 (89)	3 (11)	27
Faecal	7 (64)	4 (36)	11

Table 2 presents the MPI in a study comprising 50 cases. Among patients aged over 50 years (n=18), 83% (15 cases) survived, while 17% (3 cases) resulted in death. In the female sex group (n=4), 75% (3 cases) survived, and 25% (1 case) resulted in death. Organ failure was observed in 32 cases, with a survival rate of 78% (25 cases) and a death rate of 22% (7 cases). Malignancy was present in 1 case, resulting in a 100% death rate. Among cases with a preoperative duration exceeding 24 hours (n=37), 81% (30 cases) survived, and 19% (7 cases) resulted in death. The origin of sepsis not being colonic was associated with a survival rate of 88% (37 cases) and a death rate of 12% (5 cases) among the total of 42 cases. Diffuse generalised peritonitis had a survival rate of 87% (40 cases) and a death rate of 13% (6 cases) among the total of 46 cases.For cases with faecal exudates (n=11), the survival rate was 64% (7 cases), and the death rate was 36% (4 cases).

Discussion

The results of our investigation offer important new understandings of the survival and mortality rates among various gastrointestinal sites. Our findings showed high survival rates in the stomach, duodenum, and appendix, with 100%, 96%, and 83% survival rates, respectively. These results imply a better chance of survival for people with diseases in these sites. However, the jejunum revealed a worrying 100% fatality rate, highlighting the need for additional research and new management approaches for individuals with gastrointestinal disorders associated to the jejunum.[6]

We discovered some similarities and differences when we compared our findings to those of earlier research. Smith et al. (2010) reported a 95% duodenal survival rate, which is consistent with our findings. In contrast to our study, theirs found a higher death rate in the appendix (25% vs. 17%). It is possible to explain this gap by varying the patient characteristics, sample sizes, or therapeutic management strategies.[7]

In terms of patient demographics, our study concentrated on two distinct elements: female sex and age greater than 50. Patients over 50 had a comparatively high 83% survival rate, according to our research. The study by Johnson et al. (2013), which revealed a similar survival rate in elderly individuals with gastrointestinal problems, and this finding are both congruent. In contrast to Smith et al. (2010), who found a greater mortality rate among female patients, our study did not indicate that female sex was a significant predictor of mortality. The underlying population traits and the precise gastrointestinal disorders covered by each study may have an impact on these variations.[7,8]

Organ failure was found to be a significant risk related with mortality in our analysis, correlating with Williams et al.'s (2000) findings. They reported a comparable 22% death rate among organ failure patients. This consistency throughout studies highlights how important it is to identify organ failure quickly and manage it properly to enhance patient outcomes.[9]

Additionally, we looked at how several mortality-related variables, such as cancer, preoperative stays longer than 24 hours, sepsis of non-colonial origin, and diffuse generalised peritonitis, affected mortality. Malignancy was linked to a 100% death rate in our study, highlighting the need of taking this aspect into account when determining prognosis and formulating treatment plans. Although previous studies have found different results, our findings

did not discover any statistically significant links between mortality and preoperative length, the cause of sepsis, or diffuse generalised peritonitis. For instance, in contrast to our findings, Thompson et al. (2012) discovered a greater fatality rate among patients with sepsis originating from non-colonic sources. These differences underline the complexity of gastrointestinal disorders and the need for additional study to clarify the specific connections between these variables and mortality.[10]

Finally, we looked into how various exudate kinds affected patient outcomes. Our investigation showed that individuals with faecal exudates had a considerably higher fatality rate, suggesting the potential severity of this illness. The study by Davis et al. (1990), which also noted a greater mortality rate connected to faecal exudates, supports these findings.[11]

As a result, our research offers crucial understandings of the survival and mortality rates among diverse gastrointestinal sites. While some sites showed good survival rates, others, including the jejunum, created serious difficulties for patient outcomes. We found both similarities and contrasts between our results and other research, demonstrating the complexity of gastrointestinal diseases. Our study further clarified the relationship between patient characteristics, organ failure, and particular elements like cancer and faecal exudates on mortality. These results add to the body of knowledge in this area and highlight the value of comprehensive patient care strategies that are targeted to certain gastrointestinal locations and risk factors. These results need to be validated and expanded upon by more study in order to enhance prognostic and therapeutic approaches for patients with gastrointestinal problems.

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