

Efficacy of Mannheim Peritonitis Index (MPI) Score in Patients with Perforation Peritonitis In A Tertiary Care Teaching Hospital.

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Abstract

Aim: To study the outcome of patients with perforation peritonitis using Mannheim Peritonitis Score.

Materials and Methods: 50 patients presenting to a tertiary care centre diagnosed with perforation peritonitis and taken for emergency surgery were scored on the basis of pre-operative and intra operative findings as per Mannheim’s peritonitis index and their post-operative course was followed up and analysed. The different variable for calculating Mannheim’s Peritonitis Index are age, sex, presence of organ failure, malignancy, pre-operative duration of perforation, origin of sepsis, presence of diffuse peritonitis and nature of exudate.

Results and Discussion: Mannheim’s peritonitis index proves to be a good indicator of the post-operative course and risk prognostication in patients presenting with perforation peritonitis.

Conclusion: With the help of this scoring system, it is easy to categorize patients into difference group which predict their post-operative morbidity and mortality, and hence their prognosis and risk of complications can be anticipated and subsequently reduced.

Keywords: Mannheim peritonitis index, perforation peritonitis, emergency surgery, prognosis, scoring

Introduction

Peritonitis due to hollow viscous perforation continues to be one of the most common surgical emergencies to be attended by a surgeon on call duty. This condition most of the times needs an emergency surgical intervention and hence a scoring system should be available to assess the need, type, and quality of the care required for a particular patient. In India, the most commonly affected population is the young men in the prime of their life as compared to the west where the mean age for the occurrence of perforation peritonitis is usually 45-60 yrs. An accurate risk index classification is the only way to settle the associated problems into high risk and low risk.

Taking into consideration the need for a simple accurate scoring system in these conditions, the present study was undertaken to evaluate the performance of Mannheim Peritonitis Index (MPI) scoring system to predict the risk of morbidity and mortality in patients with peritonitis due to hollow viscous perforation.

| Risk Factor | Score |
|----------------|-------|
| Age > 50 years | 5 |
| Female sex | 5 |
| Organ failure | 7 |

| | |
|---|----|
| Malignancy | 4 |
| Pre operative duration of peritonitis >24 hours | 4 |
| Origin of sepsis not colonic | 4 |
| Diffuse generalised peritonitis | 6 |
| Exudate | |
| Clear | 0 |
| Cloudy, purulent | 6 |
| Fecal | 12 |

Materials and Methods

A prospective observational study was carried out over a period of 18 months at a tertiary care hospital after taking permission from the Institutional Ethical Committee.

Cases diagnosed with perforation peritonitis secondary to hollow viscus perforation due to traumatic and non-traumatic causes, in the age group 15-70 years were included in the study. Cases with spontaneous bacterial peritonitis, immunocompromised status, those in the extremes of age and those managed non operatively, were excluded.

After establishing the diagnosis on the basis of intra operative findings, patients were enrolled in the study, and detailed history and clinical examination findings were noted. Patients under went risk prognostication as per Mannheim Peritonitis Index.

The cases were first grouped into three categories depending on the Mannheim Peritonitis Index score, as described by Billing: those below 21 pts, between 21-29 pts, and those above 29 pts.

Detailed in-hospital stay of the patient was duly noted till the time of discharge/death. In addition to personal data such as name, age, sex, etc., the following information was registered: file number; dates of admission and discharge from the hospital; days hospitalized; date of surgery and information related to illness (surgical findings, medical treatment and evolution of illness). Time

elapsed from initial diagnosis to moment of event (death or discharge from hospital) was determined.

Out-patient follow-up was continued for 30 days to establish perioperative morbidity and mortality. The minimum possible score was zero, if no adverse factor were present, and maximum was 47 if presence of all were confirmed. Analysis was done with each variable in the scoring system as an independent predictor of morbidity or mortality and the scoring system as a whole.

Statistical methods

The data was analysed. Each variable in the MPI score along with other patient variables was analysed using chi square analysis with various outcomes that were noted in the study. P value <0.05 was taken as significant in this study.

Results and Discussion

In this study, 50 patients with diagnosis of secondary peritonitis were included. Patient with age 15 to 70 years was part of study. Majority of patients (42%) belong to age group 20-35 years. Males accounted for 86% of the patients in the present study.

The most common site of perforation was Gastric (40%), appendicular perforation (26%) being next common. Majority 44% has clear exudates collection as noticed intraoperatively, only 30% had purulent and 26% had feculent collection. 62% of the study population presented with diffuse peritonitis and 38% had localized peritonitis. 42% of study population was in low risk group (score <21) and 20% were in high risk (score >29). Patients with organ failure on admission, longer duration of illness before surgery, diffuse peritonitis, feculent exudates were more likely to have higher scores and hence fall into high risk group than their counterparts.

Patient with lower MPI score required a smaller number of days of ICU stay. Around 80% of high-risk group (MPI > 29) required more than 5 days of ICU stay (p=0.00005).

Respiratory complications in form of lower respiratory tract infection, post-operative pneumonia, pleural effusion were the most common complications. High risk group (MPI>29) had more complications than intermediate (MPI 21 to 29) and low risk group. (MPI <21).

Up to 60% patients in high risk group developed surgical site infection (p- 0.066) in post-operative period which was about 42% in patients in the intermediate group and about 19% in patients with low risk. Around 69% of patient who required inotropic support in post-operative period had score of >29 and only one (7%) required inotropes with score <21.

75% of patient who developed endotoxic shock in post-operative period had score >29 (p value 0.014). 40% patients with score >29 developed multi organ dysfunction. All the patients who developed MODS died (p value - 0.002). Mortality rate was 40% in high risk group (MPI score >29).

Mannheim Peritonitis Index provides a good scoring system for risk prognostication of post-operative events and ultimate outcome based on preoperative and intra operative findings. Not only do physiological values vary during the acute admission, making the scores obtained by them unreliable, but there is evidence that to include operative findings and post-operative parameters on ICU improves the accuracy of the prediction. Scoring will never replace clinical judgment. An experienced clinician can not only assess prognosis but also weighs up the local facilities available, the patient's quality of life and ethical issues.

Age distribution

20-35 years was most common age group which is similar to other studies like Roduez et al where it was 39 years, Rodolf L et al [1] had 34 years as most common age. The increased prevalence of the perforation in the age group of 31- 60 years can be attributed to the fact that gastro

duodenal perforations due to peptic ulcer disease is a major cause of perforation peritonitis and the increased prevalence of the etiological risk factors such as smoking, alcoholism and NSAID abuse in this age group.

Sex

In our study 86% were male & 14% were female which is similar to other studies like Yilmazlar et al's [2] study where 63% were male & 37% were female, and Rajender Singh Jhobta's [3] study regarding the spectrum of perforation peritonitis in India in which 422 of the 504 patients studied were males i.e. 84%.

Type of peritonitis

In our study 62% presented with a diffuse form of peritonitis which is similar to other studies like Rajender Jhobta's [3] study 83 % had diffuse and Ohmann's [4] study 65.36 % had diffuse peritonitis.

Diffuse peritonitis is associated with a severe inflammatory reaction and development of sepsis and multiorgan failure. Localization of peritonitis is body's defense mechanism and will lead to formation of abscess.

Nature of exudates

In our study 44% had clear exudates, 30% had purulent exudates and 26% had faecal exudates which is similar to other studies like Rodolf L's [1] in which 69.5% had clear exudates and 21.8% had purulent exudates and Rajender Singh Jhobta's [3] in which 15% had clear exudates, 71% had purulent and 13% had faecal exudates.

Purulent and faecal exudates are associated with delayed presentation and presence of varying degree of septicaemia.

Of the present prognostic scoring system, the Mannheim Peritonitis Index is one of the easiest to apply and the determination of risk is easily available during the initial operation. In the original study by Wacha and Linder [5] the cut off point of 26 MPI point was used. But in our study many patients had attended higher values in the

range of 40 (due to presence of malignancy and faecal contamination) so a lower cut off value of 21 MPI point was used so that the sensitivity and the specificity of the study could be increased.

Distribution of organ failure

In our study 80% of the study population shows evidence of organ failure at presentation and in other studies like 48.5 % in MM Correia et al [6], 11.5 % in Rodolfo L et al [1] and 20 % in Murut Kologlu et al [8] study.

In peritonitis a systemic inflammatory response induced by the peritoneal infection may progress to septic shock and multiorgan failure. The high rate organ failure in our study denotes a delay in presentation of most cases.

Origin of sepsis

In our study 4 patients i.e. 8 % had colonic origin of sepsis while in the rest 46 patients the origin of sepsis was non colonic as compared to other studies like Rudolf L 12.64% of patient's had colonic origin of sepsis.

Colonic perforation presents with faecal exudates and a severe form of peritonitis.

Preoperative duration

In our study 8 patients i.e. 16 % presented within 24 hours while 42 patients i.e. 84 % presented after 24 hours of onset of the disease in comparison to other studies like Rodolfo L's [1] where 54.48% had presented before 24hrs and 49.42% had presented after 24hrs and MM Correia's [6] study where 34.5% had presented before 24hrs & 65.5% had >24hrs

The cause of delayed presentation i.e. a preoperative duration of peritonitis more than 24 hours was mainly related to the illiteracy amongst the study population and lack of proper referral services.

Outcome

Among the 50 patients studied by us, 5 patients died thus placing the mortality at 10% in comparison to other studies like Atsushi Hourichi's [7] in which the mortality

rate was 23.1% and Koperna T et al's [9] in which the average total mortality rate was 18.5%.

Development of organ failure and sepsis are important determinants of mortality

In our study a total of 50 patients. Out of 50 patients 13 patients were of age more than 50 years in which 6 (46.2 %) patients died confirming age as a decisive factor related with mortality. In our study we confirm that patients over 50 years undergoing emergency surgery for laparotomy have a higher risk of mortality.

In our study a total of 9 patients showed evidence of organ failure and 4 patients died amongst them resulting in a mortality rate of 44.4%. As compared to other similar studies like Rodolfo L et al [1]; 11(6.32 %) patients died and all of them presented with the variable of organ failure. These results mentioned above highlight the importance of early recognition, prevention, and treatment of organ dysfunction in our attempt to improve the short- and long-term outcome in patients with peritonitis.

In our study 3 patients had malignancy. All 3 patients expired thus placing the mortality rate in presence of malignancy to a whopping 100% as compared to other studies like that of MM Correia et al [6], who found that in presence of malignancy the mortality rate under the score of 21 was of 33.3% and for score equal to or greater than 21 the mortality rate was 70.6% and Chao- Wen Hsu [10] in their study of colorectal perforations found out that although the overall mortality was 36.9% the highest disease specific mortality was due to malignancy (61.5%). These patients are less prone to survive serious infections. Many disturbances of the immune system have been identified in oncologic patients, such as destruction of the anatomic barriers and derangement in the phagocytic activities and humoral and cellular responses.

Conclusion

Perforation peritonitis due to hollow viscus perforation is one of the most common surgical emergencies. This condition almost always needs emergency surgical intervention. To assess the need, type & quality of care, MPI scoring system is designed. It is a very simple & accurate tool to predict morbidity & mortality in these patients.

The factors like age, sex, organ failure, malignancy, pre-operative duration of peritonitis, origin of sepsis are included in MPI scoring system.

This scoring system has been classified into 3 categories i.e low risk (<21 score), moderate risk (21-29 score) & high risk (>29 score). Low risk patients remain mostly vitally stable & they rarely develop respiratory or cardiac complications. Moderate risk patients are at risk of developing more of respiratory than cardiac complication & less likely to go into MODS. High risk patients develop respiratory complications more commonly than cardiac & more than 50% patients can go into MODS. Once predicted, proper intensive care can be taken and morbidity and mortality can be reduced. Among the various variables of the scoring system duration of pain, organ failure on presentation and presence of feculent exudates these factors had a significant hand in predicting the eventual outcome of the patient. Hence MPI system helps to reduce post-op complication and overcome morbidity and mortality of patients having hollow viscus perforation.

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