

Mannheim's Peritonitis Index - A Predictor of Mortality in Peritonitis

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Abstract: Introduction: Mannheim Peritonitis Index (MPI) is a scoring system that can objectify morbidity and mortality rate in patients presenting with peritonitis and accordingly help in the mode of management. Aims & Objectives: To assess mortality rate in patients presenting with peritonitis using Mannheim's Peritonitis Index. Material & Methods: It is a 12 months retrospective study done taking into account patients who presented to ER with signs of peritonitis. MPI was calculated using age, gender, signs of organ failure, malignancy, preoperative duration of peritonitis, origin of sepsis, diffuse generalized peritonitis and character of exudates. Results: A total of 77 patients were studied, out of which 33 were female and 44 were male. 67 patients were of more than 50 years of age. MPI was calculated and mortality rate was assessed. Number of deaths were 10 out of which 3 patients were in the range of 21-29 MPI and 7 patients were in the range of >30 MPI. Hence MPI was found to be an accurate predictor of mortality. Conclusion: Mannheim Peritonitis Index is an effective tool for surgeons to predict the outcome in cases of peritonitis and helps in planning the mode of management accordingly.

Keywords: Mannheim Peritonitis Index (MPI)

1. Introduction

The outcome of surgical intervention, whether death or uncomplicated survival, complications or long term morbidity is not solely dependent on the surgeon's ability. The patient's physiological status, the disease that requires surgical intervention, nature of surgery and pre and post operative management have a major impact on the outcome. Acute generalized peritonitis is a potentially life threatening condition. The prognosis of peritonitis remains poor despite development in diagnosis and management. Early identification of patients with severe peritonitis may help in selecting patients for aggressive surgical approach [1-3].

Grading the severity of acute peritonitis has improved therapy in the management of severely ill patients [4]. Empirically based risk assessment for important clinical events has been extremely useful in evaluating new therapies, in monitoring resources for effective use and improving quality of care [5,6]. Many scoring systems have been designed and used successfully to grade the severity of acute peritonitis like, Acute physiology and chronic health evaluation (APACHE) II score, Simplified acute physiology score (SAPS), Sepsis severity score (SSS), Ranson score, Imrite score, Mannheim peritonitis index (MPI) [7,8].

MPI was developed by Wacha and Linder in 1983 [9]. It was developed based on the retrospective analysis of data from 1253 patients with peritonitis, in which 20 possible risk factors were considered. Of these only 8 proved to be of

prognostic relevance and were entered into the Mannheim Peritonitis Index, classified according to their predictive power.

The Mannheim Peritonitis Index (MPI) is a specific score, which has a good accuracy and provides an easy way to handle with clinical parameters, allowing the prediction of the individual prognosis of patients with peritonitis [10]. Patients with a score exceeding 26 were defined as having a high mortality rate [9].

2. Materials & Methods

This is a retrospective study of 77 patients conducted in DR PSIMS & RF hospital, Chinaoutpalli, Krishna district, Andhra Pradesh, India from January 2019 to December 2019.

Inclusion Criteria: Patients presenting with peritonitis secondary to hollow viscus perforation

Exclusion Criteria: Patients with peritonitis due to trauma, Age less than 15 years, Patients managed conservatively

Mannheim Peritonitis Index

Risk Factors	Score
AGE >50 YEARS	5
Female	5
Organ Failure*	7
Malignancy	4
Pre-Operative Duration of Peritonitis >24 Hrs	4

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Origin of Sepsis Not Colonic	4
Diffuse Generalised Peritonitis	6
Exudates	
Clear	0
Cloudy, Purulent	6
Faecal	12

*Renal failure = creatinine level >177umol/L or urea level>167umol/L or oliguria <20ml/hr

Pulmonary insufficiency = PO₂ <50mm Hg or PCO₂ >50mm Hg

Intestinal /paralytic ileus > 24 hrs or complete mechanical obstruction

Management- Initial preoperative work up and resuscitation with intravenous fluids, antibiotics, analgesics, nasogastric decompression was done in all the cases. Site of peritonitis secondary to hollow viscus perforation was diagnosed during surgery and dealt with appropriate surgical procedure. Peritoneal lavage was given in all cases.

The MPI was applied along with other clinical and biochemical parameters recorded in pre-structured proforma. Prediction was categorized into 3 groups:

- Score ≤ 20
- Score 21-29
- Score ≥ 30.

Further resuscitation and ICU care was given as and when was necessary. Patients were followed up postoperatively till the outcome i.e. mortality, morbidity or discharge. Data obtained was analysed for predicting mortality and morbidity.

3. Results

67 out of 77 were aged above 50 years of age. 33 were females. 54 patients presented to ER with history >24hrs duration. 3 patients were diagnosed with malignancy. 13 patients had colonic origin of sepsis, while 64 had not colonic origin of sepsis. 54 patients had diffuse generalized peritonitis. 51 patients had purulent exudates, 18 had fecal exudates and 8 had clear exudates. 10 patients died with Multi Organ Dysfunction Syndrome as the cause of death.

Out of 77 cases, 10 resulted in death. Out of 10 deaths, 7 patients had MPI > 30 and 3 patients had MPI of range 21-30. 18 patients had MPI>30, out of which 11 cases were discharged with efficient care. Hence, Manheims Peritonitis Index is found to be an easy and accurate predictor of mortality in patients with peritonitis as per the observations drawn from my study.

Variables	Discharge	Death
Age >50 Yrs	58	9
Females	28	5
Organ failure	0	10
Malignancy	2	1
Duration >24 hrs	41	5
Diffuse Peritonitis	48	6
Clear exudates	8	0
Purulent exudates	46	5
Faecal Exudates	13	5
Non colonic origin of sepsis	61	3

MPI score	No of Patients
< 20	25
21-30	34
>30	18

4. Discussion

The increased prevalence of the perforation in the age group of 31- 60 years in our study can be attributed to the fact that gastro duodenal perforations due to peptic ulcer disease is a major cause of perforation peritonitis in our study and the increased prevalence of the etiological risk factors such as smoking, alcoholism and NSAID abuse in this age group. There has been a decline in incidence in young people and there has been a rise in elderly population. These changes can be correlated to the cohort phenomenon: ulcer perforation risk is particularly common in the cohorts born after the turn of 20 century and is less common in previous and succeeding cohorts.

It is also attributed to the increased numbers of traumatic perforations in the younger age group leading to parallel increase in the overall prevalence of perforation peritonitis in this age group. Appendicular perforation is more common in the age group of 20-30 years but no age is exempted. Majority of the ileal perforations are seen in the age group of 10-30 years, typhoid being the main etiological factor.

The higher death rate among the elderly undoubtedly reflects an increased prevalence of pre existing cardiovascular and other diseases as well as a predictable decline in many physiological functions. Even if there is no evidence of disease there may be a decrease in the physiological reserve such as the decrease in the glomerular filtration rate despite a normal creatinine. The increased number of duodenal perforations in our study is due to increased prevalence of the acid peptic disease. The perforations of the proximal gastro intestinal tract are more common than distal gastrointestinal tract.

In large perforations, there exists threat of postoperative leakage following closure by the simple method. Here other surgical options such as partial gastrectomy, jejunal serosal patch, or gastric disconnection may be needed for the secure closure. The reason of prolonged pre op duration is due to unawareness among people and lack of sophisticated investigations in peripheral areas. Colonic perforation presents with faecal exudates which induces a severe form of 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 thereby leads to formation of abscess. Purulent and faecal exudates are seen in patients presenting late and usually has severe sepsis. Clear exudates are generally sterile to start with so evolution of sepsis is slow. Purulent exudates and fecal exudates had a significant number of microorganisms many of which are gram negative anaerobes and they result in endotoxaemia and septic shock.

5. Conclusion

MPI is disease specific, easy scoring system for predicting the mortality in patients with peritonitis. Increasing scores are associated with poorer prognosis, needs intensive management and hence it should be used routinely in clinical practice. Hence, Mannheim's Peritonitis Index is an effective tool for surgeons to predict the outcome in cases of peritonitis and helps in planning the mode of management accordingly.

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