



ORIGINAL RESEARCH PAPER

General Surgery

EFFECTIVENESS OF MANNHEIM PERITONITIS INDEX IN PREDICTING THE MORBIDITY AND MORTALITY OF PATIENTS WITH PERITONITIS FOLLOWING HOLLOW VISCUS PERFORATION

KEY WORDS: Hollow viscous perforation, MPI, Mortality, Peritonitis

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ABSTRACT

Background: One of the common cause of emergency surgery in India is peritonitis due to hollow viscous perforation. The morbidity and mortality of secondary peritonitis remains high despite advances in surgical skills, antimicrobial agents and supportive care. Many factors determine the prognosis and outcome which includes patient related factors, disease specific factors and management of the case. Management of these case are done by categorizing patients into different risk groups. Based on measuring simple clinical parameters in case of hollow viscous perforation Mannheim peritonitis index (MPI) is calculated. To know efficacy of MPI for predicting morbidity and mortality in hollow viscous perforation this study was conducted.

Methods: 50 patients who were undergoing surgical treatment for peritonitis following hollow viscous perforation at Silchar Medical College and Hospital, Silchar were included in study. Clinical data, surgical treatment, outcome were documented and analysed.

Results: In patients with MPI more than 29 the morbidity and mortality rate were higher. The most common complication in patients with MPI less than 21 was surgical site infection while of those with MPI more than 21 the respiratory complications were common. The ICU stay of the patients were increased if the MPI Score was higher.

Conclusions: MPI is simple and effective in predicting morbidity and mortality in patients with hollow viscous perforation and is very easy to calculate.

INTRODUCTION

In patients with peritonitis secondary to hollow viscous perforation despite advances in medical field, the morbidity and mortality remains high. A reliable scoring system is required for triaging patients in different groups for use of different treatment modalities, monitoring outcome and improving standard of care.^{1,2} Several scoring systems are available like acute physiology and chronic health evaluation II (APACHE II), BOEYS, Sepsis Severity Score (SSS), etc. Mannheim Peritonitis Index (MPI) which is simple to calculate and specific in prediction of outcome in peritonitis due to hollow viscous perforation was developed by Wacha and Linder in 1983.³ Wacha and Linder developed MPI based on the retrospective analysis of data from 1253 patients with peritonitis, in which 20 possible risk factors were considered and of these only 8 proved to be of prognostic relevance and were entered into the MPI, and classified according to predictive powers.⁴ Aim of this study was to evaluate MPI in predicting morbidity and mortality of patients with peritonitis due to hollow viscous perforation.

MATERIALS AND METHODS

This prospective observational study was conducted in Silchar Medical College and Hospital, Silchar in those patients who attended Department of General Surgery between December 2019- July 2020. Written informed consent were taken from the participants and a total of 50 patients were included in study. Diagnosis of peritonitis due to hollow viscous perforation made by history and clinical examination, X-ray plain picture abdomen with both domes of diaphragm which shows air under diaphragm, detailed history of presenting illness and history suggestive of chronic health disorders such as cardiac, renal, hepatic conditions noted. Blood investigations done and relevant clinical details noted. Standard operative procedures were followed for all cases. The morbidity was assessed in terms of post-operative complications such as respiratory complications like pneumonia or lung atelectasis, cardiac complications like acute myocardial infarction or heart failure, renal complications

like acute renal failure or urinary tract infection, wound infection, intra-abdominal collection, endotoxic shock and multi organ dysfunction. Mortality was defined as any death occurring during the hospital stay.

Inclusion Criteria

- Patients with clinical suspicion and investigatory support for the diagnosis of peritonitis due to hollow viscous perforation and are later confirmed by intra operative finding
- Age between 15 years to 80 years

Exclusion Criteria

- Patients with hollow viscous perforation due to trauma,
- Patients with any other significant illness which is likely to affect the outcome more than the disease in study

Once diagnosis of peritonitis had been determined, using history, clinical examination and lab values found in MPI patients were classified.

Table 1: Mannheim Peritonitis Index.

Risk Factor	Weightage
Age >50	5
Female gender	5
Organ failure*	7
Malignancy	4
Preoperative duration of peritonitis > 24 hours	4
Origin of sepsis not colonic	4
Diffuse generalized peritonitis	6
Exudates	
Clear	0
Purulent	6
Fecal	12

*Definition of organ failure as per MPI::

Kidney failure

= creatinine level >177 umol/L or urea level> 167mmol/L or oliguria 20ml/hour;

Pulmonary insufficiency
 = $PO_2 < 50 \text{ mmHg}$ or $PCO_2 > 50 \text{ mmHg}$;

Intestinal Obstruction /paralysis
 >24hours or complete mechanical ileus,

Shock: systolic blood pressure <90mm of hg, MAP<60mm of Hg

The cases were first grouped into three, as described by Billing: those below 21 patients, between 21-29 patients, and those above 29 patients. The minimum possible score was zero, if no adverse factor were present, and maximum was 47 if presence of all were confirmed.

Patient were followed up, and occurrence of complications, discharge due to improvement or death were documented. Time elapsed from initial diagnosis to death or discharge from hospital were determined and the discharged patients were followed up on OPD basis.

Analysis was done for every variable in the scoring system as an independent predictor of morbidity or mortality and the scoring system as a whole.

Statistical Analysis

The data was collected and compiled in MS excel 2019 and statistical significance were calculated using the chi square test and 95 percent confidence interval was considered as a cut-off limit and therefore p value of less then 0.05 was considered significant.

RESULTS AND OBSERVATIONS

Age And Sex:

50 patients with diagnosis of secondary peritonitis were included. The mean age of patients was around 44 years {Range of age group 15 years to 80 years}. Sixty two percent of patients in the study were males. 40% of study population was in low risk group (score <21) and 20% were in high risk (score >29).

Time Of Presentation

Majority of patients (86%) presented to the hospital after 24 hours of onset of symptoms. The mortality of those patients who presented early had a lower mortality rate than those presenting late.

Table 2: Time Of Presentation And Mortality

Time of presentation	Mortality rate
1 st day	7%
2-5 day	27%
After 5 th day	75%

p - value of 0.002696

Age And Mortality

The mortality was significantly high in elderly patients and precisely highest in patients belonging to age group of 60 years.

Sex And Mortality

It is observed that out of the 5 patients that have died, 6.45% mortality is recorded amongst the males and 15.78% amongst females.

Mortality In Relation To Exudate

When mortality is studied in relation to the type of exudate, it is clearly evident that clear exudate is associated with 0% mortality, purulent exudate is associated with (8.33%) and feculent exudate is associated with significantly high mortality.

Organ Failure And Mortality

When organ failure is evaluated, the mortality is higher (60%) in presence of organ failure than in absence of organ failure

(2.5%). Overall survival is higher (97.5%) in absence of organ failure.

Morbidity And MPI Score:

In the study group, 76.20% of the patients had wound infection (morbidity) with MPI score more than 29 as compared to 6.55% of the patients with MPI score less than 29.

Mortality And MPI Score

In the study group, 66.66% of the patients had mortality with MPI score more than 29 as compared to 2.56% of the patients with MPI score less than 29.

Table 3: Morbidity (Complications) And MPI Score.

MPI score	Surgical site infection	Respiratory	Cardiovascular	Endotoxic Shock	Multi-Organ dysfunction
<21	4	0	1	0	0
21-29	8	12	3	1	1
>29	6	10	9	3	4
Total	14	22	13	4	5

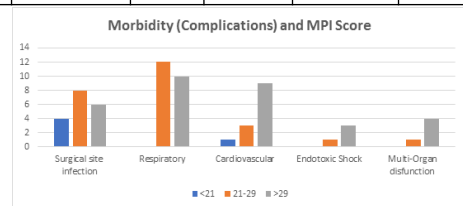


Chart 1: Morbidity (Complications) And MPI Score.

Patients with organ failure on admission, longer duration of illness before surgery, diffuse peritonitis, and feculent exudates were more likely to have higher scores and hence fall into high risk group than their counterparts. Patient with less MPI score required less number of ICU stay.

Table 4: Outcome Of Patients According To MPI Variable

Risk factor	Discharged	Death	Total
Age >50 years	18	3	21
Female gender	16	3	19
Organ failure	6	4	10
PDP >24 hours	38	3	41
Origin of sepsis not colonic	45	5	50
Diffuse generalised peritonitis	26	5	31
Exudates			
Clear	17	0	17
Purulent	22	2	24
Fecal	6	4	10
Malignancy	0	0	0

Around 80% of high risk group (MPI >29) required more than 5 days of ICU stay.

Table 5: Mortality And MPI Score.

Outcome	MPI Score			Total
	< 21	21-29	>29	
Discharged	21	18	6	45
Dead	0	1	4	5
Total	21	19	10	50

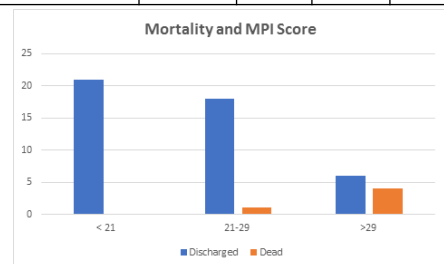


Chart 2 : Mortality And MPI Score.

Morbidity (in form of post-operative complications) and MPI score-Respiratory complications in form of lower respiratory tract infection, post-operative pneumonia, and pleural effusion were most common complication. High risk group (MPI>29)

DISCUSSION

The rate of death in patients with peritonitis is still very high with the mean being 19.5% and reaching upto 60% in some studies.⁴⁻⁶ Few of the other studies confirmed age as a decisive factor related with mortality however this study does not show any statistical significance. In other studies, patients with generalized peritonitis range from 30–66%; in present study, generalized peritonitis was present in about 62% of the patients.^{6,7,8}

The influence of gender on prognosis has been shown of little importance in this study. Gender composition cited in other publications showed percentages, varying from 43 to 52% females and 48 to 57% male 62% were male in this study.^{6,7,8}

Mean MPI score reported in literature for localized peritonitis is 19 (range 0 to 35) and in generalized peritonitis, 26 to 27 points (range 11 to 43) which is similar to the values noted in this study.^{6,7,8} Notash AY, et al have shown important cut-off points to be 21 and 29 when using the MPI, with mortality of 60%, and up to 100% for scores of more than 29.⁹

CONCLUSION

This study validates the Mannheim peritonitis index scoring system for predicting the morbidity and mortality in patients with peritonitis due to hollow viscous perforation. The results of this study conclude that MPI scoring system is an effective tool for assessing this group of patients, and should be used as a guide to decide the management of the patient after the definitive procedure is done.

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Conflict of interest: None declared

Ethical Approval: The study was approved by the Institutional Ethics Committee

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