



ORIGINAL RESEARCH PAPER

General Surgery

STUDY OF MANNHEIM PERITONITIS INDEX PROGNOSTIC SCORING SYSTEM IN PERFORATIVE PERITONITIS

KEY WORDS: Perforative peritonitis, Mannheim index, prognostic scoring, outcome.

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ABSTRACT

Background: Peritonitis is the inflammation of the serosal membrane that lines the abdominal cavity and the organs contained therein. Aim: Evaluation of Mannheim peritonitis index prognostic scoring system in perforative peritonitis. **Materials & methods:** This study was conducted at the surgery department of tertiary care hospital. A total of 100 subjects with perforative peritonitis admitted to the surgery ward were examined. Results: Out of 100 perforative peritonitis patients, 77% had MPI Score of ≤ 21 , followed by 18% had 22 to 28 & 5% had ≥ 29 MPI scoring. Age ≥ 50 years, female gender, patients with organ failure, complication & malignancy & high MPI scores had statistically significant the bad outcome (mortality) ($p < 0.05$), higher MPI score is significantly related to morbidity and mortality ($p < 0.001$). Conclusion: The MPI scoring system is a simple and useful method for evaluating this group of patients with perforative peritonitis.

INTRODUCTION

Peritonitis is the inflammation of the serosal membrane that lines the abdominal cavity and the organs contained therein. Perforative peritonitis is defined as the result of a disease process of trauma that extends through the muscular and serosal walls of the gastrointestinal tract, establishing a communication between the lumen of the viscus and the surrounding body cavity and permitting free egress of the luminal contents into the cavity. Its accurate diagnosis and management are still a challenge for every surgeon. In a country like India, where most of the critical care measures are meagerly available and unaffordable by the majority of citizens, it is important that a scoring system is employed to not only prognosticate accurately the outcome but should also be simple and cost-effective. Several scores have been used to identify those risk factors predictive of perforative peritonitis mortality, but most of them are complex to calculate and difficult to use outside intensive care units.

Mannheim Peritonitis Index (MPI)

The Mannheim Peritonitis Index (MPI) was elaborated in a retrospective study on 1253 patients affected by peritonitis treated in the 1980s in two surgical departments in Germany and was then validated in a multi-institutional study. The MPI had the objective to classify the severity of peritonitis or intra-abdominal infections and to identify those patients requiring prompt and aggressive treatment, using parameters readily collectible at clinical examination and surgical exploration. So, this study was conducted to evaluate the efficacy of the Mannheim peritonitis index (MPI) in perforative peritonitis and use this prognostic tool.

MATERIALS AND METHODS:

Study design: A cross-sectional study
Study setting: At a tertiary health care center
Study duration: 18 months
Study subjects: 100 patients with perforative peritonitis were admitted to the surgery ward.

Inclusion Criteria:

All patients with perforative peritonitis admitted to the

surgery department of the tertiary care center were included in the study

Exclusion criteria:

1. Not willing to participate in the study
2. Unconscious patients

Once the diagnosis of peritonitis was confirmed by the operative findings of the patients, the patients were accepted for the study. Along with all the parameters, MPI was calculated. Age, sex, and organ failure were needed to calculate the MPI index.

The MPI score, defined as an “empirically deduced first risk score”, took into account age, general conditions, time from the onset of symptoms, type of surgery, type and extension of peritonitis, and presence of signs of organ dysfunction (Table 1).

**TABLE - 1
Mannheim Peritonitis Index**

Risk factor	Score
Age >50 years old	5
Female sex	5
Organ failure	7
Malignancy	4
Preoperative duration of peritonitis >24 h	4
Origin of sepsis not colonic	4
Diffuse generalized peritonitis	6
Exudate	
Clear	0
Cloudy/purulent	6
Fecal	12
Total score	47

The maximum score is 47 and least score is 0. According to the score, the patients were graded into three groups: Patients belonging to a score ≤ 21 , patients belonging to a score of 22 to 28, and patients with a score ≥ 29 .

The data analysis was done using SPSS version 28. Continuous variables were summarized as mean with standard deviation & Categorical variables were summarized as proportions and the Pearson chi-square test & unpaired t-test were used to observe the differences. P ≤ 0.05 was considered statistically significant.

RESULTS AND ANALYSIS

Table 1. Distribution of patients according to demographic & clinical parameters

Variables	Number/ percentage of study subjects
1. Age	
33-39	31
40-46	25
47-53	20
54-60	09
61-68	15
2. Gender	
Male	62
Female	38
3. Type of peritonitis	
Diffused	62
Localized	38
4. Type of exudate	
Clear	42
Purulent	48
Fecal	10
5. Preoperative duration	
<24 hours	54
>24 hours	46
6. Duration of hospital stay	
<15 days	73
>15 days	27
7. Outcome	
Survived	88
Mortality	12
8. Organ failure	
	12
9. Status of malignancy	
	11
10. Status of complication	
	33

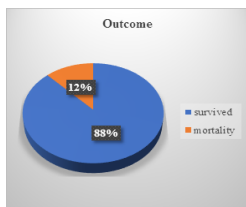


Figure 1. Distribution of patients according to outcome.

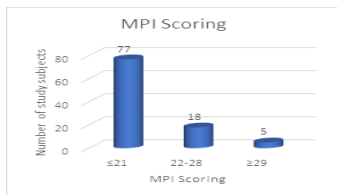


Figure 2. Distribution of patients according to MPI Scoring

Table 2. Association of outcome with demographic & clinical parameters

demographic & clinical parameters	outcome		P value
	Survived	Mortality	
1. Age in years			

<50	68	05	0.004
≥50	20	07	
2. Gender			
Male	60	02	<0.001
Female	28	10	
3. Type of exudate			
Clear	37	05	0.15
Purulent	44	04	
Fecal	07	03	
4. Organ failure			
Yes	02	10	<0.001
No	86	02	
5. Sepsis			
Present	74	10	0.47
Absent	14	02	
6. Malignancy			
Present	05	06	<0.001
Absent	83	06	
7. complication			
Yes	21	12	<0.001
No	67	00	

Table 3. Association of Mortality with MPI Scoring

MPI Scoring	Survived	Mortality	P value
≤21	77	00	<0.001
22-28	11	07	
≥29	00	05	

Table 4. Association of Morbidity with MPI Scoring

MPI Scoring	Status of morbidity		P value
	Yes	No	
≤21	15	62	<0.001
22-28	14	04	
≥29	5	00	

DISCUSSION

Peritonitis is inflammation of the peritoneum, secondary to hollow viscus perforation, and is one of the commonest reasons for emergency surgery to be done immediately. The present study was carried out to evaluate the usefulness of the Mannheim Peritonitis index (MPI) as the prognostic scoring system in patients with perforation peritonitis.

In this study we found mean age of patients was 47.01 years. Out of 100 perforative peritonitis patients, 62% were male as compared to 38% were female. The male-female ratio was 1.78.(Table.1)

Similarly, D Paul et al reported that of the 78 patients studied, 59 (75.6%) were males and 19 (24.4%) were females. The mean age was 48.45±16.67 years.

We found the majority 62% had diffused peritonitis and 38% had localized peritonitis. 48% presented with the purulent type of exudate followed by 42% with clear & 10% with the fecal type of exudate. 12% presented with organ failure, 11% presented with malignancy, and 33% of patients presented with post-op complications. 54% of patients had <24 hours of preoperative duration & rest 46% with >24 hours of preoperative duration. 73% of patients required <15 days for hospital stay and 27% stayed for >15 days in the hospital. 88% of patients survived & 12% died.(Table.1, Figure 1 & 2)

Similarly Yadav S et al observed 77 patients (77%) had diffuse peritonitis while 23 patients (23%) had localized peritonitis. 50 (50%) patients had purulent exudates while clear and fecal exudates were present in 25 (25%) and 25 (25%) patients respectively. 18% presented with organ failure, 6% with malignancy & 7% with sepsis. 87 % had pre-operative

duration ≥ 24 hours and 13% had <24 hours. 57% of patients stay in the hospital for 5-10 days and 16% stay for >10 days. 73 patients (73%) got discharged and 27 (27%) died.

In the present study, the majority of patients 77% had MPI Score of ≤ 21 , followed by 18% having 22 to 28 & 5% had ≥ 29 MPI scoring.

Yadav S et al observed that in 52 patients total MPI score was <21 while in 25 patients total score was 21-29 and it was >29 in 23 patients.

In the present study, we found there was a significant difference between age, gender, organ failure, and malignancy with the outcome (survived v/s mortality) (Table.2).

Yadav S et al observed age, gender, organ failure, sepsis, & malignancy showed statistically significant difference with outcome.

We found more mortality was seen in 7 patients having MPI scoring 22-28, followed by an MPI score ≥ 29 i.e 5 patients. there was a statistically significant difference between MPI scoring and Outcome ($p < 0.001$)

Yadav S et al observed that the Mortality rate among patients with MPI score >29 was 95.65% and with MPI <21 was 0, which is statistically significant with $p < 0.001$.

In the present study, 34 were presented with morbidity, out of that the majority of 15 patients came under ≤ 21 MPI scoring followed by 14 had 22-28 and 5 had ≥ 29 MPI scoring and this difference was statistically significant. ($p < 0.001$)

Krishna VM et al reported that 76.20% of the patients had wound infection (morbidity) with MPI score of more than 27 as compared to 6.55% of the patients with MPI score of less than 27.

CONCLUSION

The significant predictive significance of the MPI index in perforative peritonitis was supported by our study. The findings of this study demonstrate that the MPI scoring system is a simple and useful method for evaluating this group of patients with perforative peritonitis, and it may be utilized as a guiding tool to determine how to care for the patient after the final treatment is performed.

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