

A Clinical Study of Perforation Peritonitis Using Mannheim's Peritonitis Index

Dr. Jayaram Adepu¹, Dr. Shailaja Adepu^{2*}

¹Associate Professor, Department of General Surgery, Prathima Institute of Medical Sciences, Naganoor, Karimnagar, Telangana, India

²Assistant Professor, Department of General Surgery, Prathima Institute of Medical Sciences, Naganoor, Karimnagar, Telangana, India

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***Corresponding author**

Dr. Shailaja Adepu

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Abstract: Acute peritonitis is a common surgical emergency because it is associated with a high degree of mortality. Peritonitis is defined as inflammation of the serous membrane that lines the abdominal cavities and organs contained in them. Most of the causes of peritonitis are due to an invasion of the peritoneal cavity by bacteria. Mannheim's Peritonitis Index (MPI) scoring system that helps to determine the condition of the patient in order to provide better management. We in the present study tried to evaluate Mannheim's peritonitis Index in patients with perforation peritonitis reported to the Department of General Surgery. Methods: This prospective study was carried out in the Department of General Surgery, Prathima Institute of Medical Sciences, Naganoor, and Karimnagar. A total No of 50 patients were included in the present study. The inclusion criteria were all the patients of either sex presented with acute abdomen and on investigations X-rays, abdomen showing pneumoperitoneum or USG/CT/diagnostic paracentesis when required were used to diagnose as perforation were included in the study. MPI scores were then recorded by the investigators and kept for each patient Results: Patients with total MPI less than 21, the second category was those between 21- 29 and lastly those with greater than 30. In the category of < 20 scores there 23 patients no deaths were reported in this group. In between 21- 29 score group there were 19 patients and one death was reported in this group the mortality rate in this group was 5.26% and in the > 30 group 8 patients were included with the death of 2 patients the mortality rate of this group was 25%. It can be concluded the Mannheim's peritonitis index is an easy and reliable means for assessment of risk for patients with peritoneal inflammation. Higher risk of MPI indicates greater likelihood of poorer prognosis. Overall mortality can be reduced in the patients by decreasing the time lag between presentations of symptoms and starting of treatment.

Keywords: Perforation Peritonitis, Mannheim's Peritonitis Index.

INTRODUCTION

Peritonitis is categorized into three stages based on the nature and source of microbial contamination. Primary peritonitis is an infection without any visceral perforation, usually from the extra-peritoneal source and monomicrobial in origin [1]. Secondary peritonitis occurs due to perforation from hollow viscera [may be due to infectious diseases like typhoid or non-infectious causes like duodenal ulcer perforation, a blunt trauma of abdomen] Inadequate treatment of the primary/secondary peritonitis leads to the development of tertiary stage which may be potentially fatal [2]. The outcome of abdominal infections depends on the complex interaction of many factors and early recognition treatment [3]. Perforation peritonitis occurs most commonly due to gastrointestinal perforations and timely surgical interventions [4]. The main methods of treatment of

bowel perforation include surgical repair by endoscopy, laparoscopy or conventional approach. Peptic ulceration results in gastric and duodenal contents into the peritoneal cavity initiating chemical peritonitis. If leakage continues gastro-duodenal, bacterial contamination of the peritoneal cavity occurs [5, 6]. The recognition of the severity of peritonitis can help in selecting patients for aggressive surgical approach [7-10]. There is the number of systems that have been used to determine the severity of illness objectively predict morbidity and mortality. Scoring systems like APACHE II, SAPS, MPI have been developed in response to an increasing emphasis on the evaluation and monitoring of health services [11, 12]. Of the other scoring systems in use, the MPI system is the simplest to use and allows the surgeon to easily determine risk during initial surgery. Therefore we in the present study tried to determine the prognosis of the perforation

peritonitis patients presented in our hospital based on MPI scores.

MATERIALS AND METHODS

This prospective study was carried out in the Department of General Surgery, Prathima Institute of Medical Sciences, Naganoor, Karimnagar from Jan 2017 to March 2018. Institutional Ethical committee Permission was obtained for the study. A written consent was obtained from the patient/guardian after explaining the procedure of the study and possible outcomes in the local language. A total No of 50 patients were included in the present study. The inclusion criteria were all the patients of either sex presented with acute abdomen and on investigations X-rays, abdomen showing pneumoperitoneum or USG/CT/diagnostic paracentesis when required were used to diagnose as perforation were included in the

study. Excluded patients were those with traumatic perforations, iatrogenic perforations, pregnant/lactating women and patients with comorbid conditions like Diabetes Mellitus/Hypertension/ known cardiovascular, respiratory diseases. The clinical signs/symptoms like, pain abdomen, distention, vomiting, diarrhea, constipation, oliguria, cold extremities were noted. A complete clinical examination was done including the recording of the pulse, BP, temperature, RR. MPI scores were then recorded by the investigators and kept for each patient [13]. Appropriate surgical approaches were utilized to manage the perforations. Post-surgical outcomes, complications, and mortality were also recorded.

RESULTS

Table 1: Mannheim Peritonitis Index – Score Sheet Risk factor [13]

Mannheim Peritonitis Index – Score Sheet Risk factor	Score
Age > 50 years	5
Female gender	5
Organ failure*	7
Malignancy	4
Pre-operative duration of peritonitis >24 hours	4
Origin of sepsis non-colonic	4
Diffuse generalized peritonitis	6
Exudate	
Clear	0
Cloudy, purulent	6
purulent Faecal	12

*Definition of organ failure

- **KIDNEY**
 - Creatinine more than 177 micromole/litre [> 2.00 mg/dL] or
 - Urea more than 167 millimole/litre [> 1003 . mg/dl] or
 - oliguria less than 20 ml/hour
- **LUNG**
 - $pO_2 < 50$ mm of Hg
 - $pCO_2 > 50$ mm of Hg
- **SHOCK**
 - Hypodynamic
 - Hyperdynamic
- **INTESTINAL OBSTRUCTION (only if profound)**
 - Paralysis of more than 24 hours or
 - Complete mechanical ileus

A total No of fifty (n=50) patients were included in the study. Among them 35 (70%) were male and 15 (30%) were female patients. The mean age of the patients was 53 ± 2 years. The age ranged from 18 to 60 years. The patents were grouped in different age groups as shown in table 1.

Table-2: Showing the demographic profile of the patients included in the study

Groups / Age(Yrs)	Number of patients	Male/female	Percentage
18 - 20	7	5/2	14
21 to 30	11	9/2	22
31 to 40	25	16/9	50
41 to 50	5	4/1	10
51 to 60	2	1/1	4
Total	50	35/15	100

Clinical presentation of the patients with symptoms reported to the department of general surgery. Pain in abdomen 100% of the case, followed

by distention of abdomen in 44%, Nausea and vomiting in 21% followed by constipation/ diarrhoea is 34% fever 28% oliguria and 24% cold extremities.

Table-3: Clinical symptoms of the patients involved in the study

Symptom	Number of patients	Percentage
Pain abdomen	50	100
Vomiting/Nausea	21	42
Distension of abdomen	22	44
Constipation/diarrhoea	17	34
Fever	14	28
Oliguria	12	24
Cold extremities	9	18

The MPI score was calculated based on the score sheet given in table 1. Patients in the study were grouped into three categories based on disease severity. Patients with total MPI less than 21, the second category was those between 21- 29 and lastly those with greater than 29 shown in table 4. In the category of < 20

scores there 23 patients no deaths were reported in this group. In between 21- 29 score group there were 19 patients and one death was reported in this group the mortality rate in this group was 5.26% and in the > 30 group 8 patients were included with the death of 2 patients the mortality rate of this group was 25%.

Table-4: Mortality rate by MPI scoring system

Score	Number of patients	Deaths	Mortality Rate
< 20	23	0	0%
21-29	19	1	5.26%
> 30	8	2	25%
Total	50	3	6%

The most common site of perforation was due to peptic ulcers were seen in 30(60%) and small intestinal perforation was seen in 28% of cases, appendicular perforations was seen in 4(8%), colonic perforation was 1(2%) and rectal perforation was seen

in 2(4%) of cases. Following surgical procedures the number of complications seen was wound infection 7(14%), IP abscess was 2(4%), and burst abdomen and other complications were seen in 2% cases each seen in table 5.

Table-5: complications occurred following the patients

Complication	Total	Percentage
Wound infection	7	14
IP abscess	2	4
Burst abdomen	1	2
Other complications	1	2

DISCUSSION

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 [14]. The study was done with an idea to identify patients requiring prompt and aggressive management. The MPI Scores derived as the first risk scores took several factors into concern like age, the general condition of the patient, time lapse from the onset of symptoms, type of surgery, type and extent of peritonitis and presence of organ dysfunction. Each parameter is assessed by the examiner and a score is given and cumulative scores of more than 26 identified patients at risk of death from severe peritonitis with a good specificity (79%), sensitivity (84%) and overall accuracy (81%) [15]. In the present study we found out of total 50 patients 23 were having MPI below 20 and there was no death in this group and

in the range from 21-29 there were 19 patients and there was 1(5.26%) death and MPI > 30 group 8 patients were included with the death of 2 patients the mortality rate of this group was 25%. In a similar study by Batra P *et al.* [16] found No deaths in MPI scores of < 20, and 3.85% death rate in 21 -29% and 20% death in MPI > 30. The death rate appeared to be higher in the study because of fewer numbers of patients studied (50) and in the former study they had calculated on 160 patients. Demmel N *et al.* [17] studied 438 patients with intra-abdominal infections prospectively. They found higher MPI had a strong correlation to mortality, statistical validation showed a sensitivity of 88% and specificity of 78% at the critical score of 26 points. MPI scores have been evaluated by other studies in literature and resulting an effective and reliable tool to identify subgroups of patients affected by perforative peritonitis at high risk of death, even if some discrepancies

regarding the optimal cutoff value do exist [18-20]. A Neri *et al.* found an MPI of 21 with high sensitivity of 86% but the specificity of 59% compared to 74% of the original value [15.] they concluded that the discrepancy was because of the population included in the study. Therefore it appears that the population studied does have some effects on the MPI scores and outcomes. Therefore we conducted this study in our population and found like other studies conducted in India. The pain was the predominant feature in this study as seen in almost all patients. Other common symptoms were vomiting 42%, distention of abdomen 44%, fever in 28% of cases. It is in agreement with other similar studies [21, 22]. The common cause of perforation in the present was peptic ulcers and small intestinal perforations these observations were similar to other studies [21, 23]. The postoperative complications included wound infections which occurred in 14% of cases followed by IP abscess in 4% of cases. The overall mortality rates were found to be 6% in this study lesser as compared to studies done by Jhobta *et al.* (10%), Agarwal *et al.* (10%) and were comparable to P Batra *et al.*; 5.7% [16, 23, 24].

CONCLUSION

Within the limitations of the present study, it can be concluded the Mannheim's peritonitis index is an easy and reliable means for assessment of risk for patients with peritoneal inflammation. Higher risk of MPI indicates greater likelihood of poorer prognosis. Overall mortality can be reduced in the patients by decreasing the time lag between presentations of symptoms and starting of treatment.

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