

Efficacy of Mannheim Peritonitis Index (MPI) Score In Patients With Peritonitis

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Abstract: Peritonitis presents most commonly due to localized or generalized infection caused from various factors. Despite advances in diagnosis, management and critical care of patients for patients with peritonitis due to hollow viscus perforation, yet there is lacunae in prognosis of the patient with peritonitis. Early assessment by scoring systems will influence the management and prognosis. A Prospective study was conducted on 62 patients admitted and operated for peritonitis in Maharajah's Medical College Hospital. A structured scoring system i.e. Mannheim peritonitis index (MPI) was administered along with other clinical and biochemical parameters recorded in pre-structured proforma. Data was analyzed for predicting mortality and morbidity using EPI info and SPSS software. The overall mortality and morbidity was 14% and 38% respectively. MPI scores of ≤ 20 , 21-29, and ≥ 30 had a mortality of 0 %, 17.6 %, and 80 % respectively. MPI score 21 and above was associated with mortality among them highest mortality rate was observed at score of > 30 and was found statistically significant (p value of 0.000). MPI is disease specific, easy scoring system for predicting the mortality in patients with secondary peritonitis. Increasing scores are associated with poorer prognosis, needs intensive management and hence it should be used routinely in clinical practice.

Key words: peritonitis, mortality, scoring

Date of Submission: 16-10-2018

Date of acceptance: 31-10-2018

I. Introduction

Peritonitis is inflammation of the peritoneum and peritoneal cavity. Usually caused by a localized or generalized infection. Primary peritonitis results from bacterial, chlamydial, fungal, or mycobacterial infection in the absence of perforation of the GI tract, Whereas secondary peritonitis occurs in the setting of GI perforation. Frequent causes of secondary bacterial peritonitis include peptic ulcer disease, acute appendicitis, colonic diverticulitis, and pelvic inflammatory disease.¹ Acute generalized peritonitis from gastrointestinal hollow viscous perforation 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.^{2,3} Grading the severity of acute peritonitis has assisted in no small way in decision making and 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}. Any surgical clinician would believe that patient age, co-morbidities, origin of sepsis, level of generalization of peritonitis and multi-organ dysfunction play a dictatorial role in surgical decision making.⁷

Many of these factors have been incorporated in a simple Mannheim Peritonitis Index (MPI), which can effectively predict the morbidity and mortality in surgical patients with secondary peritonitis.^{4,5} Other scoring systems have also been used previously successfully in predicting the patient prognosis including APACHE II, POSSUM and APACHE III.^{4,5} However these scoring systems are cumbersome to administer in critically ill patients and a relatively simpler scoring system like Mannheim peritonitis Index still remains valid and effective all over the world.⁸⁻¹¹ Moreover, performing a risk analysis for cases by detecting the prognostic factors that affect morbidity and mortality may help prognosis prediction. Along with the predictive factors affecting the morbidity and mortality of cases, scoring systems have also been developed with parameters including demographic and clinical features.⁸⁻¹¹ Here, we have assessed the utility of one such scoring system that is, Mannheim peritonitis index (MPI) score system in predicting the outcome of patients with peritonitis in our set of population.

II. Objectives

1. To Evaluate Mannheim Peritonitis Index (MPI) score in predicting the outcome in patients with peritonitis.
2. To study their socio-demographic profile and it's effect on the scoring index.

III. Methodology

Study design :Prospective Analytical study.

Study area : This study was conducted at Surgical department of MaharajahsInstitute of Medical Sciences and Hospital,Nellimarla, Vizianagaram district, Andhra Pradesh from July to December 2017. Patients presenting with peritonitis secondary to hollow viscus perforation were included in the study.

Sample size : A total of 62 study subjects admitted and operated for peritonitis in Maharajah's Medical College Hospital were selected.

Study instrument:Patients with primary peritonitis, peritonitis due to trauma, age less than 15 years and patients who were managed conservatively were excluded from the study. Initial preoperative process 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 was operated with appropriate surgical procedure. Peritoneal lavage was given in all cases. Accordingly MPI scoring shown in table 1 was applied along with other clinical and biochemical parameters recorded in pre-structured proforma consisting of demographic characteristics of the study subjects.

Data analysis: Data was collected by using MPI scoring, questionnaire and interviews to evaluate the percentage of morbidity and mortality with respect to site of perforation and MPI scoring among the respondents. Collected data was entered in MS Excel and analyzed using SPSS version 21. Results are shown in the form of percentages, tables and figures.

Ethical clearance: Ethical clearance was obtained from Institutional Ethical Committee, MIMS.

IV. Results

Among the total of 62 study subjects, 52 respondents were males and 10 were females. Age and gender wise distribution of respondents is shown in Table 2. The mean age of the respondents is 43.63 + 2.84 years and 58 % of the study subjects belong to 3rd and 4th decade. Majority of the respondents belong to middle socio-economic class according to Modified B.G.Prasad scale (2017). For those who survived, Mean days of hospitalization was 13.5 days.

Table 1 : Age and gender wise distribution of the study subjects

n=139

Age (YEARS)	Gender		Total
	Female	Male	
15-35	2	12	14 (22.6 %)
36-49	6	30	36 (58%)
50 & Above	2	10	12 (19.4%)
Total	10 (16 %)	52 (84 %)	62 (100%)

Table 2 : Genderwise evaluation of outcome

Gender	Outcome		Total
	Survived	Expired	
Female	7	3	10
Male	48	4	52
Total	55	7	62

In this study, when genderwise evaluation of mortality was done, it was observed that survival rate of 92.3 % was seen in male population and a high mortality rate of 30 % was observed in females (with an p value of 0.041 and chisquare value of 4.17 at $df=1$).

Simple closure of perforation was done in 24% cases, closure with omental graft was done in 46% cases, laparoscopic perforation closure was done in 8% cases, resection anastomosis in 2%, resection with ileostomy in 4% appendicectomy in 12%, ileo-transverse anastomosis in 2% and colostomy was done 2% case.

Table 3 : Status of mortality with respect to site of perforation

Gender	Outcome		Total
	Survived	Expired	
Duodenum	24	0	24
Pyloric	13	1	14
Gastric	7	2	9
Ileal	5	0	5
Jejunum	1	1	2
Colon	0	1	1
Appendix	4	0	4
Rectum	1	0	1
Unknown	0	2	2
Total	55	7	62

(p value off 0.000, χ^2 value = 32.2 at $df = 8$)

Outcome with respect to site of perforation has been summarized in [Table-3]. There were seven deaths (11.3%) in the current study, five patients died of multiple organ dysfunction and two patients died of unknown reason. Mortality was 5% in patients who presented within 24 h, 13% in patients who presented between 2 to 5 days and 50% in patients who presented after 5 days.

The complications occurred in relation to outcome is shown in Fig 1. Among those most common complication in the present study is surgical site infection found in 26 (42 %) study subjects and among those 38 % has survived. Renal complications was least among all complications observed which was 16 % , but with an highest mortality rate of 30 %.



Xray Erect abdomen showing air under diaphragm



Intraoperative picture showing perforation at 1st part of Duodenum

Figure 1 : Complications in relation to outcome of patients

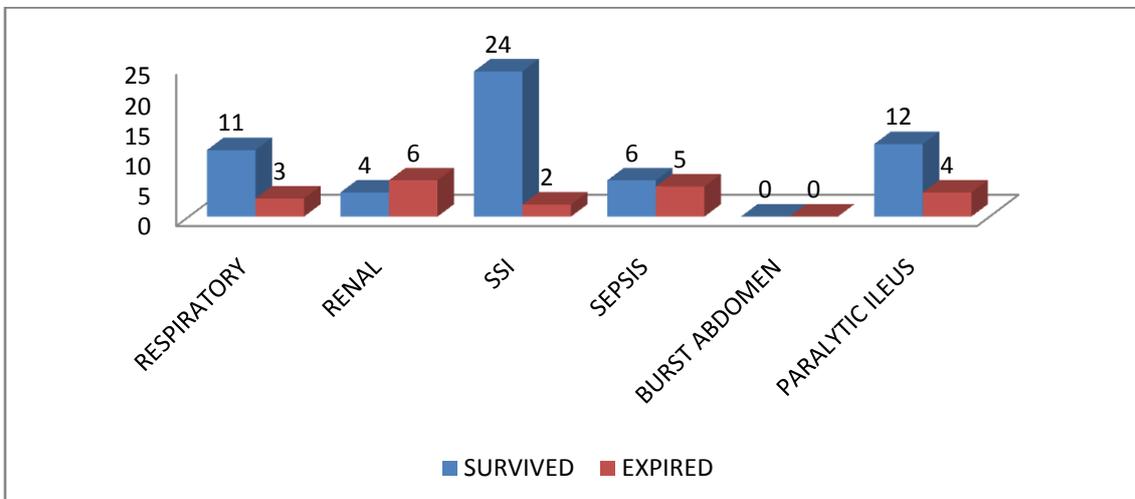


Table 4 : Mannheims peritonitis index (MPI) in relation to outcome of study subjects

MPI	Outcome		Total
	Survived	Expired	
<21	40	0	40
21-29	14	3	17
≥30	1	4	5
Total	55	7	62

MPI score was analyzed with the mortality [Table4], a score < 21 was associated with 100 % survival rate and a score of score 21 and above was associated with mortality among them highest mortality rate was observed at score of ≥30 and was found statistically significant (p value of 0.000).

V. Discussion

In the current study group of 62 patients, 64% of patients had MPI score less than 21, of which 14% of patients developed wound infection with 0 % mortality and 86% of patients being normal, 27.4% of patients with MPI score 21 to 29 had 17.6 % mortality and those patients with MPI score 30 and more had the highest mortality i.e. 80%.

Different studies have mortalities ranging from 6.4% to 17.5%.¹²⁻¹⁴ Kusumotoyoshiko et al., evaluated the reliability of the MPI in predicting the outcome of patients with peritonitis in 108 patients. A comparison of MPI and mortality showed patients with a MPI score of 26 or less to have mortality of 3.8%, where as those with a score exceeding 26 had mortality of 41.0%.¹⁵

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 29.¹⁶ Malik AA et al, did prospective study using 101 consecutive patients having generalized peritonitis over a two-year period.¹⁴ In the MPI system, mortality was 0 in the group of patients with a score of less than 15, while it was 4% in the patients scoring 16-25 and 82.3% in those with scores of more than 25.¹⁷

In the study of Billing et al, patients with scores of less than 21 had a mortality rate ranging from 0-2.3% and those with MPI between 21 and 29 had a mortality rate of approximately 65%.¹⁰ MPI score of more than 29 had the highest mortality, up to more than 80% in some studies.¹⁰

VI. Conclusion

Peritonitis secondary to hollow viscus perforation is one of the commonest reasons for emergency surgery done even today. As we know MPI is disease specific, easy scoring system for predicting the mortality in patients with secondary peritonitis. Increasing scores are associated with poorer prognosis, needs intensive management and can be used as a guiding tool to decide on the management of the patient after an definitive procedure.

Peritonitis and mortality:

In hospital, mortality rate due to peritonitis remains high.

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Dr. Srinivas Rao. RV. "Efficacy of Mannheim Peritonitis Index (MPI) Score In Patients With Peritonitis.".
IOSR Journal of Dental and Medical Sciences (IOSR-JDMS), vol. 17, no. 10, 2018, pp 23-26.