

A Hospital-Based Assessment of Mannheim's Peritonitis Index in Patients of Perforation Peritonitis: An Observational Study

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Abstract

Aim: The aim of the present study was to evaluate Mannheim Peritonitis Index in predicting the outcome of surgery in patients with peritonitis.

Methods: A prospective observational study to assess the efficacy of Mannheim's peritonitis index in 200 cases of perforation peritonitis patients was conducted in department of General Surgery, Darbhanga Medical College and Hospital, Darbhanga, Bihar, India for the period of one year.

Results: In our study; 82% were below the age of 50 years and 80% were males. Organ failure was found to be present in 27% of patients. The most common isolated organ failure was renal (5%) followed by cardiovascular (4%) and the combination of two was 7%. The combination of renal; pulmonary and cardiovascular system was at 1%. The majority of patients 64% in our study had an MPI score of <21 while 20% patients had MPI scores between 21 to 29 and 16% had MPI score >29. The majority of patients 85.5% were discharged and 14.5% expired. Patients with MPI score > 29 had max mortality (62.5%) and with MPI between scores, 21-29 had 20% mortality whereas the least mortality recorded in MPI score < 21(0.78%).

Conclusion: We concluded that MPI scoring is a reliable predictor of death in perforation peritonitis patients and can be helpful in planning and evaluating future treatments with great ease. We would like to recommend its use in the prognostic evaluation of secondary peritonitis cases.

Keywords: Peritonitis, sepsis, MPI- Mannheim peritonitis index, scoring, predictor

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Introduction

Peritonitis is inflammation of the peritoneum and/or peritoneal cavity due to localized or generalized infections. Most cases of peritonitis are consequence to the invasion of the peritoneal cavity by bacteria from the gut. Hence, early prognostic evaluation of abdominal sepsis is desirable to select high-risk patients for more aggressive therapeutic procedures

and to provide an objective classification of the severity of the disease. [1-3] Treatment is primarily surgical and in case of doubt, early surgical intervention is always desired especially in previously healthy patients and those with postoperative peritonitis. Different scorings are used to predict the outcome in patients with peritonitis. These scoring

systems can be a good tool to predict and hence to monitor the priority of treatment for better care in case of peritonitis. [4] 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. [5-8]

A good scoring system is useful in comparing various groups of patients, different treatment modalities, evaluating new therapies, in monitoring resources for effective use and improving standard of care. [9,10] Many scoring systems are available to grade the severity of acute peritonitis for example, 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). [11,12] MPI was developed by Wacha and Linder in 1983. [13] Amongst the various scoring systems Mannheim peritonitis Index (MPI) is very specific and simple score and also has good accuracy. It provides an easy way to handle clinical parameters, also allowing the prediction of the individual prognosis of patients with peritonitis. [14]

Despite aggressive surgical treatment and evolution of critical care, the prognosis of peritonitis and intraabdominal sepsis is not good especially when multiorgan failure develops. Therefore, an early objective and

reliable classification of severity of peritonitis and abdominal sepsis are needed not only to predict the outcome and to select a patient for aggressive surgical techniques and intensive care but also to evaluate and compare the result of different treatments regimens.

The aim of the present study was to evaluate Mannheim Peritonitis Index in predicting the outcome of surgery in patients with peritonitis.

Materials and Methods

A prospective observational study to assess the efficacy of Mannheim's peritonitis index in 200 cases of perforation peritonitis patients was conducted in department of General Surgery, Darbhanga Medical College and Hospital, Darbhanga, Bihar, India for the period of one year.

Patients <12 yr of age were excluded from the study. All patients following a clinical diagnosis of perforation peritonitis and adequate resuscitation underwent exploratory laparotomy in an emergency setting. Post-operatively patients followed up until death or discharge from hospital. The eight prognostic variables included in Mannheim's peritonitis index entered in a proforma given below and the MPI score of each patient was calculated (Table-1). Chi-square test; Pearson chi-square; continuity correction; likelihood ratio and Fischer's exact test were applied to the data to find out whether MPI can predict the outcome in these patients accurately.

Table 1: Mannheim's Peritonitis Index

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

Cloudy, purulent	6
Fecal	12

Results

Table 2: Demographic data and type of organ failure

Organ failed	Frequency	Percent
Age groups		
Below 50 years	164	82
Above 50 years	36	18
Gender		
Male	160	80
Female	40	20
Type of organ failure		
Renal	10	5
Cardiovascular	8	4
renal cardiovascular	14	7
Pulmonary, cardiovascular	2	1
Pulmonary	2	1
Renal and CNS	1	0.5
Renal, pulmonary	14	7
CNS	1	0.5
Renal pulmonary, cardiovascular	2	1

In our study; 82% were below the age of 50 years and 80% were males. Organ failure was found to be present in 27% of patients. The most common isolated organ failure was renal (5%) followed by cardiovascular (4%) and the combination of two was 7%. The combination of renal; pulmonary and cardiovascular system was at 1%.

Table 3: MPI score among cases

MPI score	Frequency	Percent
<21	128	64
21-29	40	20
>29	32	16
Total	200	100

The majority of patients 64% in our study had an MPI score of <21 while 20% patients had MPI scores between 21 to 29 and 16% had MPI score >29.

Table 4: MPI Score and the outcome

			Outcome		Total
			Discharged	Expired	
MPI score	< 21	Count	127	1	128
		% within Mpi score	99.21%	0.78%	100.0%
	21-29	Count	32	8	40
		% within Mpi score	80%	20%	100.0%
	> 29	Count	12	20	32
		% within Mpi score	37.5%	62.5%	100.0%
Total		Count	171	29	200
		% within Mpi score	85.5%	14.5%	100.0%

The majority of patients 85.5% were discharged and 14.5% expired. Patients with MPI score > 29 had max mortality (62.5%) and with MPI between scores, 21-

29 had 20% mortality whereas the least mortality recorded in MPI score < 21(0.78%).

Discussion

Many prognostic indices are available that are based on clinical features, biochemical investigation, and invasive monitoring. Out of which APACHE II and MPI are superior to others. MPI scoring system contains clinical factors that are simpler and easily applicable. The aim was to study the efficacy of the Mannheim peritonitis index in predicting the outcome in the patient of peritonitis i.e. mortality. Several scoring systems have been developed for this purpose such as acute physiological and chronic health evaluation (APACHE), that considers 12 physiological variables [15], simplified acute physiological score (SAPS); sepsis severity score(SSS); Ranson's score; Mannheim's peritonitis index (MPI). [16,17]

In our study; 82% were below the age of 50 years and 80% were males. Organ failure was found to be present in 27% of patients. The most common isolated organ failure was renal (5%) followed by cardiovascular (4%) and the combination of two was 7%. The combination of renal; pulmonary and cardiovascular system was at 1%. The majority of patients 64% in our study had an MPI score of <21 while 20% patients had MPI scores between 21 to 29 and 16% had MPI score >29. The majority of patients 85.5% were discharged and 14.5% expired. Patients with MPI score > 29 had max mortality (62.5%) and with MPI between scores, 21-29 had 20% mortality whereas the least mortality recorded in MPI score < 21(0.78%). This is comparable with findings of other international studies carried out for validation of MPI scores in predicting the outcome. [18-20]

Batra et al [21] calculated MPI score in a cross-sectional study of 160 patients of perforation peritonitis to evaluate MPI

scoring system in defining the prognosis of the patients and to be able to deliver better patient care and furnish efficient management. The cut-off from ROC curve was 26. Sensitivity and specificity of MPI in predicting mortality were calculated to be 100% and 65.54%, respectively. The rate of mortality was 5.7%. This was a pioneering study in India where MPI scoring system was applied specifically for patients of perforation peritonitis in a hospital in the rural area. The Peritonitis study group [22] performed a multicentric study and compared APACHE II, MPI and peritonitis index altona scores in 271 cases of laparotomies for perforation peritonitis. The sensitivity and specificity of MPI were 60% and 80%, respectively. The AUC of ROC for a cut-off point of 26 was 0.79. Correia et al [23] retrospectively analyzed data of 89 cases with perforation peritonitis and found the mean MPI score to be 26.6 points (range: 5-47), with a sensitivity of 87.3%, and a specificity of 41.2%. The best accuracy (69.7%) was reached at a score of 21.

Conclusion

We concluded that MPI scoring is a reliable predictor of death in perforation peritonitis patients and can be helpful in planning and evaluating future treatments with great ease. We would like to recommend its use in the prognostic evaluation of secondary peritonitis cases.

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