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Efficacy of Mannheim peritonitis index (Mpi) score in patients with perforation peritonitis

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Abstract
Background: Despite aggressive surgical treatment and evolution of critical care, the prognosis of peritonitis and intraabdominal sepsis is not good especially when multiorgan failure develops.
Aim: To study the efficacy of the Mannheim peritonitis index in predicting the outcome in a patient of peritonitis.
Material and Methods: Analyzing the case files of all the operated cases of gastrointestinal perforations over the 5 years in the surgical department by open procedure. A total number of 200 cases were studied. The eight prognostic variables included in the Mannheim's peritonitis index entered in a proforma and the MPI score of each patient was calculated.
Results: Out of 200 patients 176 were discharged and 26 died. Mortality found in this study was 13%. Patients with MPI score >29 had max mortality (61.5%) and MPI between 21-29 scores had 20.9% mortality. Least mortality recorded in MPI score < 21(0.8%).
Conclusion: MPI score is an excellent prognostic index for peritonitis with high accuracy in individual prognosis and that it is cheap, cost-effective, easily measurable, and reproducible.

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

Introduction
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. 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.

Materials and Methods
Patients operated for gastrointestinal perforations were included in the study. The retrospective study started with analyzing the case files of all the operated cases of gastrointestinal perforations by open procedure over the past 5 years in the surgical department from January 2014 to January 2019 were rolled into the study. A total number of 200 cases were studied. 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

In our study; two-third of patients i.e. 79.54% were below the age of 50 years and 77.4%were males. Organ failure was found to be present in 18% of patients. The most common isolated organ failure was renal (4%) followed by cardiovascular (3.5%) and the combination of two is 6 %.The combination of renal; pulmonary and cardiovascular system was at 1%. (Table 2) The majority of patients 65% in our study had an MPI score of <21 while 21.5% patients had MPI scores between 21 to 29 and 13% had MPI score >29. (Table 3) The majority of patients 87% were discharged and 13% expired. (Figure 1) Patients with MPI score > 29 had max mortality (61.5%) and with MPI between scores, 21-29 had 20.9% mortality whereas the least mortality recorded in MPI score < 21(0.8%). (Table 4)

Table 2: Type of Organ Failure

Organ failed	Frequency	Percent
Renal	8	4.0
Cardiovascular	7	3.5
renal cardiovascular	12	6.0
Pulmonary, cardiovascular	2	1.0
Pulmonary	2	1.0
renal and cns	1	.5
Renal, pulmonary	12	6.0
CNS	1	.5
Renal pulmonary, cardiovascular	2	1.0

Table 3: MPI score among cases

MPI score	Frequency	Percent
<21	131	65.5
21-29	43	21.5
>29	26	13.0
Total	200	100

Table 4: MPI Score and the outcome

			Outcome		Total
			Discharged	Expired	
Mpi score	< 21	Count	130	1	131
		% within Mpi score	99.2%	0.8%	100.0%
	21-29	Count	34	9	43
		% within Mpi score	79.1%	20.9%	100.0%
	> 29	Count	10	16	26
		% within Mpi score	38.5%	61.5%	100.0%
Total		Count	174	26	200
		% within Mpi score	87.0%	13.0%	100.0%

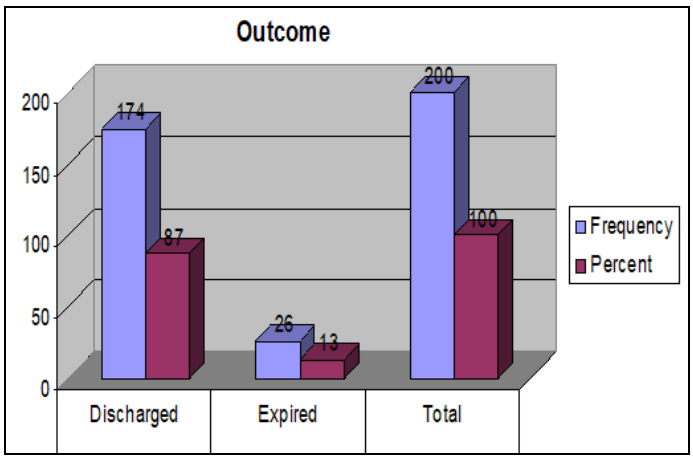

Fig 1: Outcome of cases

Discussion

The prognosis of peritonitis and intraabdominal sepsis, particularly when multiorgan dysfunction develops, remains poor despite improvement in diagnosis and surgical and medical management of this condition. Early and objective classification of severity of peritonitis may help in selecting patients for aggressive surgical approach [1-4]. Several scoring systems have been developed for this purpose such as acute physiological and chronic health evaluation (APACHE), that considers 12 physiological variables [5], simplified acute physiological score (SAPS); sepsis severity score(SSS); Ranson's score; Mannheim's peritonitis index (MPI) [6-7].

The concept of MPI to measure the prognostic outcome in these patients in the Indian setting is very much appealing and practically well suited, as India is a developing nation, there is always scarcity of resources. Therefore, if we can identify these high-risk patients of peritonitis or patients with the poor outcome; then the available resources can be better allocated and utilized.

Considering all these factors; this study was carried out at tertiary care MIMSR Medical College. We aimed to study the efficacy of MPI in predicting the outcome i.e. mortality in these patients of peritonitis. In our study; 16 out of 26 with MPI score >29 expired (61.5% mortality) while those with MPI scores between 21-29 had 20.9% mortality. On the other hand, those with MPI score <21 had 0.8% mortality. Therefore, this increase in mortality with an increase in MPI score was significant and it proved again that an MPI score of 21 could be taken as a threshold score above which there is a significant rise in mortality. This is comparable with findings of other international studies carried out for validation of MPI scores in predicting the outcome [8-10].

So patients with MPI scores 21-29 are the ones who need to be aggressively managed and better resuscitated so that mortality in this group can be brought down. It allows us to identify these patients at risk i.e. those with MPI 21-29 and preferentially allocate them the limited resources available so that their

outcome can be improved. Similar observations have been made by international scientists who have carried out studies for evaluation of Mannheim peritonitis index [8-10].

Conclusion

Patients with MPI score 21-29 should be managed aggressively with prioritization so that their mortality can be brought down. Therefore, to summarize we can say that MPI score is an excellent prognostic index for peritonitis with high accuracy in individual prognosis and that it is cheap, cost-effective, easily measurable, and reproducible

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