Research Article

Study of mannheims peritonitis index in patients with peritonitis

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ABSTRACT

Background: Patients with perforating peritonitis often present with acute, severe illness that carries a high risk for morbidity and mortality. Mortality ranges from 3-40% and several prognostic scoring systems have been suggested. The aim of this study was to assess the accuracy Mannheim Peritonitis Index (MPI) in the prediction of outcome of patients with peritonitis.

Methods: A prospective study of 30 months that had 217 patients presenting with peritonitis at our institute from October 2011 to November 2013.

Results: All the MPI variables of adverse outcome namely, presence of organ failure; time elapsed > 24 hrs; presence of malignancy, age > 50 years, generalized extension behaved as expected, except the non-colonic origin of sepsis in peritonitis and female sex.

Colonic origin of sepsis was associated with worse outcome probably due to presence of feculent exudates which was more commonly associated with colonic origin of sepsis. Female sex was associated with better outcome as compared to male sex. Our study differs from MPI in these 2 variables of adverse outcome.

Conclusions: MPI is accurate to be used with patients with peritonitis and should be considered reliable and simple reference for estimating their risk of death. As our study differs in two adverse outcome variables, female sex & non-colonic origin of sepsis, we advocate need for further studies on Mannheim peritonitis index to include colonic origin of sepsis and to remove female sex as variables of adverse outcome in Mannheim peritonitis index.

Keywords: Mannheim, Peritonitis, Index, Study, Prognostic

INTRODUCTION

Peritonitis is defined as inflammation of the serous membrane that lines the abdominal cavity and the organs contains therein. Peritonitis is one of the most common infections, and an important problem that a surgeon has to face.¹ Despite the surgical treatment, sophisticated intensive care units, last generation antibiotics and a better understanding of pathophysiology, the mortality rate of perforation peritonitis are still high. The outcome of an abdominal infection depends on the complex interaction of many different factors and the success obtained with the early institution of specific therapeutic procedures. There is no single, easily available laboratory test that predicts severity or prognosis in patients with

peritonitis. Despite controversial discussion, there is agreement that prospective controlled clinical trials are necessary in the field of intra-abdominal infections. Despite advances, mortality from many forms of intra-abdominal infection remains unacceptably high. It has become apparent that approaches for managing patient profoundly ill from intra - abdominal infection requires further critical review at that new method for analysing the results of various therapeutic interventions must be found.²

The aim and objectives of the study were to study the prognostic factors in perforation peritonitis and to confirm the predictive value of the Mannheim Peritonitis Index.

METHODS

“Evolution of prognosis in patients with peritonitis using Mannheim’s peritonitis index” for time period from October 2011 to November 2013 attending Mahatma Gandhi Memorial (MGM) hospital, Warangal, India, in which diagnosis of peritonitis is established by x-rays and operative finding or surgical interventions during management. Therefore nonrandomized sampling technique was used. Cases of peritonitis secondary to hollow viscous perforation attending our institute in the study period were included in the study. Patients with primary and tertiary peritonitis were excluded from the study. Diagnosis was made by a combination of history, clinical examination and on the basis of reports of radiological examinations after which the patients is posted for emergency laparotomy. It was developed by wacha and linder in 1983.³

It was developed based on the retrospective analysis of data from 1253 patients with peritonitis in which 20 possible risk factors were considered. Of these 20 factors, only 8 were proven to be prognostic relevance and were entered into Mannheim Peritonitis Index. These factors were classified according to their predictive power.

Bilious collections in cases of recent perforation without superadded infection were grouped as clear. Serohaemorrhagic collection of recent origin is taken as clear in traumatic peritonitis.

Table 1: Mannheim peritonitis index score.

Study variable	Adverse factor	Points	Favourable factor	Points
Age	>50 yrs	5	< 50 yrs	0
Sex	Female	5	Male	0
Organ failure	Present	7	Absent	0
Malignancy	Present	4	Absent	0
Evolution time	>24 hrs	4	<24 hrs	0
Origin of sepsis	Non- colonic	4	Colonic	0
Extension of peritonitis	Generalized	6	Localized	0
Character of exudates	Purulent	6	Clear	0
	Fecal	12		0

The individual score of each parameter is added to calculate Mannheim peritonitis index score of each case. Patients were divided into three categories according to the score:^{4,5}

1. Score less than 21
2. Score between 21 to 29
3. Score more than 29

RESULTS

A total of 1, 25,263 cases were admitted to the hospital during the study period, out of which 12,877 (10.3%) were admitted under the department of surgery, of which 217 (1.69%) constituted the study group. The criteria mentioned in materials and methods were followed and results noted.

Age distribution

Table 1: Age distribution of patients.

Total no. of male patients in the study was 151 i.e. 69.59% while female patients accounted for 66 i.e. 30.41% in the study.

Figure 2: Sex distribution of the patients.

The most number of patients had duodenal perforation 98 (45.1%) followed by ileal perforation 51 (23.5%), colonic, appendicular and gastric perforation were 26 (12%), 19 (8.8%) and 16 (7.4%) respectively. The procedure performed was exploratory laparotomy with omental patch repair in 117 cases (53.9%), primary closure in 51 cases (23.5%), Resection and anastomosis in 28 (12.9%) cases and appendectomy in 16 Cases (7.4%). In our study 47 (21.7%) patients presented within 24 hours and 170 (78.3%) presented after 24 hours after onset of peritonitis.

In our study 26 (12%) patients origin of sepsis was colonic while 191 (88%) patients origin of sepsis was non colonic. In 91 (41.93%) patients total MPI score was less than 21, while 80 (36.87%) patients total score was 21 – 29 and it was more than 29 in 46 (21.2%) patients. In our study out of 217 patients with peritonitis, 34 i.e. 15.7% patients expired.

Table 2: Correlation of sex with incidence of mortality.

Sex	Total	Outcome		Mortality according to gender	χ^2	Df	p-value
		Discharged	Death				
Male (n)	151	126	25	25	0.2983	1	2
%	100%	83.45	16.55	75%			
Female (n)	66	57	9	9			
%	100%	86.36	13.63	25%			

χ^2 - 0.2983 d (f) - 1 p - 0.6292

Table 3: Correlation between origin of sepsis (colonic/non colonic) with incidence of mortality.

Diagnosis	Total	Outcome		Mortality according to Diagnosis	χ^2	Df	p-value
		Discharged	Death				
Non colonic(n)	191	165	26	26	5.215	1	0.0129
%	100%	86.4%	13.6%	76.5%			
Colonic (n)	26	18	8	8			
%	100%	69.2 %	30.8%	23.5%			

χ^2 - 5.215 d (f) - 1 p - 0.0129

Table 4: Distribution of MPI variables and outcome of patients.

Variables	Outcome		p-value
	Discharged	Death	
50 or more years (n)	65	27	<0.001
%	70.65%	29.35%	
Female (n)	57	9	0.6292
%	86.36%	13.67%	
Organ failure (n)	15	32	<0.001
%	31.9%	68.1%	
24 hours or more duration (n)	136	34	0.004
%	80.0%	20.0%	
Malignancy (n)	5	9	<0.001
%	35.7%	64.3%	
Diffuse peritonitis (n)	157	34	0.0052
%	82.2%	17.8%	
Exudates	Clear (n)	38	<0.001
	%	95.0%	
	Purulent (n)	123	
	%	87.9%	
	Feculent (n)	22	
	%	59.5%	
Non-colonic (n)	165	26	0.0129
%	86.4%	13.6%	

DISCUSSION

A total of 217 patients were studied. The age range is from 6 years to 80 yrs. The mean age of the study population was 44 years and the highest numbers of patients were found in the age group of 46-60 yrs and they constitute about 31.3% of the study population. The highest mortality was in the age group of 61 years and above followed by 46-60 years. The lowest mortality was in the age group less than 15 years followed by 15-30 years.⁶ In correlation between age more than 50 years with the incidence of mortality, our study showed statistically significant result with $p < 0.001$.

The increased prevalence of male sex in our study is mainly due to increased number of male patients in the category of duodenal perforation; similar findings noted by Dawson JL, et al.⁷ In correlation of sex with incidence of mortality, p value in our study was 0.6292 which is statically not significant and shows contrast result with MPI as against Cook TM et al.⁸

In our study 26 patients i.e. 12.5% had colonic origin of sepsis while in the rest 191 patients the origin of sepsis was non colonic. In the study by Rodolf L 12.64% of patient's had colonic origin of sepsis while in the study by Jhobta RS it was 3.76%.^{9,10}

In correlation between origins of sepsis (colonic/non-colonic) with incidence of mortality p value in our study was 0.0129, which is statistically not significant and shows contrast results with MPI. Colonic perforation presents with feculent exudates and a severe form of peritonitis. Increased mortality was proportional to duration in our series as in Cecilie Svanes.¹¹

Table 5: Correlation of MPI score with incidence of mortality.

MPI	Total	Outcome		Mortality according to MPI	χ^2	Df	P-value
		Discharged	Death				
<21 (n)	91	91	0	0	119.0870	2	<0.001
%	100%	100.0%	0.0%	0			
21-29 (n)	80	77	3	3			
%	100%	96.25%	3.75%	8.82%			
>29 (n)	46	15	31	31			
%	100%	32.6%	67.4%	91.18%			

$\chi^2=119.0870$ d (f)-2 p<0.001

In our study correlation between non colonic origin of sepsis and female sex did not show statistically significant results while other factors showed statistically significant results.¹²⁻¹⁴ In our study mortality rate among patients with MPI score > 29 was 67.4% and with MPI <21 was 0, which statistically significant with p<0.001.

Mannheim peritonitis index is a prognostic index for peritonitis with high accuracy in individual prognosis and that it is also very easily documented.^{14,15}

CONCLUSION

Mannheim peritonitis index is a useful method to determine study group outcome in patients with peritonitis. All the MPI variables of adverse outcome namely, presence of organ failure; time elapsed > 24 hrs; presence of malignancy, age >50 years, generalized extension behaved as expected, except the non-colonic origin of sepsis in peritonitis and female sex.

Colonic origin of sepsis was associated with worse outcome probably due to presence of feculent exudates which was more commonly associated with colonic origin. Female sex was associated with better outcome as compared to male sex.

The MPI is one of the simplest scoring systems in use that allows the surgeon to easily determine the outcomes risk during initial surgery. The MPI cut-off points should be adjusted for each hospital on individual basis. The simplicity of MPI makes ideal for hospitals with serious shortages of staff and resources.

We therefore conclude that MPI is accurate to be used with patients with peritonitis and should be considered reliable and simple reference for estimating their risk of death. As our study differs in two adverse outcome variables, female sex & non-colonic origin of sepsis, we advocate need for further studies on Mannheim peritonitis index to include colonic origin of sepsis and to remove female sex as variables of adverse outcome in Mannheim peritonitis index.

We hereby declare that this study entitled “study of Mannheims peritonitis index in patients with peritonitis” is a genuine research work carried out by us.

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