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Observational Clinical Study for Efficacy of Mannheim Peritonitis Index (MPI) Score in Patients with Secondary Peritonitis

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Abstract
Introduction*: Despite advances in diagnosis, management and critical care of patients with peritonitis due to hollow viscus perforation, prognosis remains poor. Early assessment by scoring systems will influence the management and prognosis. This study was done with aim to evaluation of Mannheim Peritonitis Index (MPI) score for predicting the outcome in patients with peritonitis.*
Materials & Methods*: Analyzing the case files of all the 108 operated cases of peritonitis due to hollow viscus perforation over the 3 years in the surgical department. A total number of 108 cases were studied. The structured scoring system i.e. MPI was applied along with other clinical and biochemical parameters available in indoor case records retrieved from the record section.Data was analyzed for predicting using EPI info and SPSS software.*
Result*: 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%).When MPI scorewas < 21, the wound infection rate was very low. Mortality was higher in patients with longer pre-operative duration of presentation, presence of malignancy, generalized peritonitis, non-colonic origin of peritonitis, and purulent and fecal exudates & they were more likely to have higher scores.*
Conclusion*: 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.*
Keywords*: Peritonitis, MPI- Mannheim peritonitis index, scoring*

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I. Introduction:

Peritonitis due to hollow viscous perforation continues to be one of the most common surgical emergencies to be attended by a surgeon on call duty. [1] This may be due to persistence of the various risk factors among the general population like Pylori infection, NSAID ‘s, enteric fever and several others. [2] This condition most of the times needs an emergency surgical intervention, a scoring system should be able to assess the need, type, and quality of the care required for a patient. [3]

The present study was conducted to assess the effectiveness of the MPI scoring system in predicting the risk of morbidity and death in patients with peritonitis caused by hollow viscous perforation, in recognition of the necessity for a straightforward reliable scoring method in these circumstances.MPI was developed by Wacha and Linder in 1983. [4]Several scoring systems are in place to stratify the patients with peritonitis due to hollow viscous perforation like APS, SIS, APACHE and BOEYS. [5] Utilization of scoring systems would be of great help in salvaging a priceless life of a patient. Our study is aimed at testing the effectiveness of MANNHEIM PERITONITIS INDEX.

II. Materials & Methods:

This is a retrospective observational study of 108 cases with records available at medical record office of tertiary care hospital for patients admitted and operated for peritonitis due to hollow viscus perforation from May 2018 to April 2021. The structured scoring system i.e. Mannheim Peritonitis Index (MPI) was applied

along with other clinical and biochemical parameters available in indoor case records retrieved from the record section. Using findings in indoor case sheets of history, clinical examination and laboratory values, risk factors found in MPI were classified according to values indicated and individual variable scores were added to establish MPI score. The cases were first grouped into three, those below 21 points, between 21-29 points, and those above 29 points.Data was analyzed for predicting using EPI info and SPSS software.

Table 1: Mannheim Peritonitis Index (MPI)

Risk factors	Findings	Score
Age of patient	>50	5
	<50	0
Gender	Female	5
	Male	0
Associated with malignancy	Present	4
	Absent	0
Diffuse generalized peritonitis	Present	6
	Absent	0
Preoperative duration of peritonitis > 24 hours	Present	4
	Absent	0
Origin of sepsis / primary focus	Not Colon	4
	Colon	0
Exudates:		
Clear		0
Cloudy, purulent		6
Faecal		12

III. Result:

Among the total of 108 study subjects,72.2% respondents were males and 27.8% were females. The mean age of the respondents is 42.5 + 2.34years and 52 % of the study subjects belong to 3rd and 4th decade. 81.4% of the patients presented with generalizes peritonitis while 18.6% presented with localized peritonitis.

Table 2: Mannheims peritonitis index (MPI) in relation to outcome of study subjects.

MPI score	N (%)	Survived n(%)	Expired n(%)	Test
<21	65 (60.2)	64 (98.5)	1 (1.5)	$\chi 2 = 28.7107$ $p < 0.00001$
21 –29	35 (32.4)	29 (82.9)	6 (17.1)	
>29	8 (7.4)	3 (37.5)	5 (62.5)	
Total	108	96 (88.9)	12 (11.1)	

Based on the MPI Scoring patients were categorized into three groups. Table 2 depicts that About 60.2% of the study population was in the low risk (score <21) and 32.4% were in the intermediate risk group (score 21-29)& only 7.4% were in low risk group (score>29). About 62.5% proportion of study population having MPI score >29 had expired as compared to 1.5% and 17.1% of population having MPI score<21 & 21-29 respectively had expired and difference in mortalities among MPI score categories was observed to be highly significant ($P < 0.0001$). Hence in our study patient with higher MPI score had higher chances of mortality. (Table 2)

Table 3: IndividualparameterwithmortalityinMPI score.

Parameter/ MPI score	MPI score			
	<21	21-29	>29	Mortality N (%)
Age >50	1	4	5	10 (83.3)
Female	1	2	3	6 (50)
>24 hrs	0	4	5	9 (75)
Not colon	1	3	2	6 (50)

Generalized peritonitis		1	5	5	11 (98.2)
Malignancy		0	1	4	5 (41.6)
Exudate	**Clear**	0	0	1	1 (8.3)
	Purulent	0	2	3	5 (41.6)
	Faecal	0	2	4	6 (50)

Table 3 revealed that Each parameters and Mannheim peritonitis index were studied to mortality. Mortality was higher in patients with age>50 years, presence of malignancy, longer pre-operative duration of presentation, presence of malignancy, generalized peritonitis, non-colonic origin of peritonitis, and purulent and fecal exudates& they were more likely to have higher MPI scores and hence fall into higher risk group (score>29) than intermediate (score 21-29) and low (score <21) . It is also seen in our study that higher the score, mortality is higher, and the details as shown in the Table 3. MPI scores were individually assessed for its correlation to mortality in our set of patients. Age >50 years, non-colonic origin of peritonitis, type of exudate and generalized peritonitis were significantly associated with mortality ($p<0.05$) (Table 3).

Table 4: Mannheims peritonitis index (MPI) in relation to different perimeters ofoutcome of the study.

Different perimeters of outcome		**MPI Score**			**Total N (%)**	**Test**
		<21 n (%)	**21 –29 n (%)**	**>29 n (%)**		
Woundcomplication	**Absent**	57 (70.4)	23 (28.4)	1 (1.2)	81 (75)	$\chi2$= 23.860 p< 0.00001
	Present	8 (29.6)	12 (44.4)	7 (26)	27 (25)	
Inotropicsupport	**No**	62 (68.1)	29 (31.8)	01(1.1)	91 (84.3)	$\chi2$= 38.998 p< 0.00001
	Yes	03 (18.7)	06 (37.5)	07 (43.8)	16 (15.7)	
Mechanical ventilation	**No**	62 (68.1)	29 (31.8)	01 (1.1)	91 (84.3)	$\chi2$= 38.998 p< 0.00001
	Yes	03 (17.6)	06 (35.3)	07 (41.1)	17 (15.7)	
ICUstay	**<5days**	03 (27.3)	08 (72.7)	0	11 (10.2)	$\chi2$= 12.601 p=0.0133
	6 -10days	0	04 (66.6)	02(33.4)	06 (5.6)	
	>10days	0	02 (28.6)	05 (71.4)	07 (6.4)	

Table 4 shows that 7 (26%) patients who had wound complication, scored >29 as compared to only single (1.1%) patients who hadn't wound complain, scored >29. Patients having Wound complication had significantly associated to get higher MPI score as compare to its counterpart& it is significantly associated. ($p<0.05$). Around 43.8% of patients who required inotropic support in post-operative period had score of >29 and only 18.7% patientswho required inotropic support with score<21. Around 68.1% patients who didn't need inotropic support had MPI score of <21. Score >29 indicate a higher risk of need for inotropicsupport (Chi-Square test value=38.99, $p < 0.05$ indicates Significant).Around7 (41.1%) patients who had required mechanical ventilation, scored > 29 as compare to only single (1.1%) ofthe patients not required mechanical ventilation having score more than 29. Patient with less MPI score less chance of requiredmechanical ventilation stay and it is significantly associated ($p<0.05$). Total 5 (71.4%) patients who had required more than 10 days ICU stay scored > 29 as compare to none of the patients required more than 10-day ICU stay having score less than 29. Patient with less MPI score required a smaller number of ICU stay and it is significantly associated ($p<0.05$) (Table 3).

IV. Discussion:

This is a study of 108 cases with records available at medical record office of tertiary care hospital for patients admitted and operated for peritonitis due to hollow viscus perforation. According to the literature, MPI is an independent, objective and effective scoring system in predicting mortality and has advantages over the other scoring systems [6-8]. In our study patients with MPI scores of ≤ 20, 21-29 and ≥ 30 had a mortality of 1.5%, 17.1%, and 62.5% respectively. When compared with other studies, the present study is similar to the study done by Billing et al,in which Patients with a score < 21 the mean mortality rate was 2.3%, for score 21–29 it is 22.5% andfor score > 29 it is 59.1%. [9]In the study done by Malik AA et al, in which they did prospective study using 101 consecutive patients having generalized peritonitis over a two-year period&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.[10] In the study done by Muralidhar VA et al, they found 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. [11]

When mortality is studied in relation to the type of exudate, it is clearly evident that clear exudate is associated with low mortality (8.33%), purulent exudate is associated with (41.6%) and feculent exudate is associated with significantly high mortality rates (50%). Feculent exudate was found to be independently

significant factors in predicting the mortality among the study population. Non-colonic origin of peritonitis, type of exudate and generalized peritonitis were significantly associated with mortality with increase of MPI score. Similar result was found in study done by SaleemArif et al, they found that Age >50 years (P = 0.00001), organ failure (P=0.00001), non-colonic origin of sepsis (P= 0.008), type of exudate (P=0.00001) and generalized peritonitis (P=0.0001) were significantly associated with mortality. [12]

More than one forth (26%) patients who had wound complication scored >29 as compared to only few (1.2%) patients who hadn't wound complain scored >29which is comparable with study done by V.M Krishna et al. where 20% of the patients had wound infection (morbidity) with MPI score more than 27 as compared to 6.55% of the patients with MPI score less than 27.In the study done by S Kumaraswamy et al, they found that round 72% of patients who had wound complication scored >29 as compared to only single 4.5% patients who hadn't wound complain scored >29. [13] Patients having Wound complication had significantly associated to get higher MPI score.Patients with higher scores have much longer stays in the ICU and ward. With an increase in scores, the length of stay increases proportionately.Around 43.8% & 41.1% of the patients who required inotropic support and mechanical ventilation respectively. Score of >29 indicates a higher risk of need for inotropes and mechanical ventilation and need for intensive care. [14] In study done by Ankitmeena et al, they found around 69% of patient who required inotropic support in post-operative period had score of >29 and only one (7%) required inotropes with score<21. [15]

V. Conclusion:

This is a validation study of the Mannheim Peritonitis Index scoring system for predicting the morbidity and mortality in patients with peritonitis due to hollow viscus perforation.The results of this study prove that the MPI scoring system is a simple and effective tool for assessing this group of patients and can be used as a Following the completion of the decisive procedure, a guidance tool is used to select how to care the patient.Among the various variables of the scoring system age, non-colonic origin of peritonitis, type of exudate and generalized peritonitis had a significant hand in predicting the eventual outcome of the patient.

Reference:

[1]. Bohnen J, Boulanger M, Meakins JL, Mclean APH. Prognosis in generalizedperitonitis: relation to cause and risk factors. Arch Surg. 1983;118:285-90.

[2]. Giessling U, Petersen S, Freitag M, Kleine-Kraneburg H, Ludwig K. Surgicalmanagement of severe peritonitis. ZentralblChir. 2002;127:594-97.

[3]. Farthmann EH, Schoffel U. Principles and limitations of operative management ofintra-abdominal infections. World J Surg. 1990;14:210-17.

[4]. Kologlu M, Elker D, Altun H, Sayek I. Validation of MPI and PIA II in twodifferent groups of patients with secondary peritonitis. Hepatogastroenterology.2001;48:147-51.

[5]. Wacha H, Linder MM, Feldman U, Wesch G, Gundlach E, Steifensand RA.Mannheim peritonitis index – prediction of risk of death from peritonitis:construction of a statistical and validation of an empirically based index.Theoretical Surg. 1987;1:169-77.

[6]. 6.Notash AY, Salimi J, Rahimian H, Fesharaki MH, Abbasi A. Evaluation of Mannheim peritonitis index and multiple organ failure score in patients with peritonitis. Indian Journal of Gastroenterology. 2005;24(5):197–200. [PubMed] [Google Scholar]

[7]. Demmel N, Muth G, Maag K, Osterholzer G. Prognostic scores in peritonitis: the Mannheim Peritonitis Index or APACHE II? Langenbecks Arch Chir. 1994;379(6):347.

[8]. Mulari K, Leppäniemi A. Severe secondary peritonitis following gastrointestinal tract perforation. Scand J Surg. 2004;93(3):204–8.

[9]. Billing A et al. Prediction of outcome using the Mannheim peritonitis index in 2003 patients. Br J Sur 1994; 81: 209–13.

[10]. Malik AA, Wani KA, Dar LA, Wani MA, Wani RA, Parray FQ, et al. Mannheim Peritonitis Index and APACHE II - prediction of outcome in patients with peritonitis. UlusTravmaAcilCerrahiDerg. 2010;16(1):27–32.

[11]. Muralidhar VA, Madhu CP, Sudhir S, Srinivasarangan M. Efficacy of Mannheim peritonitis index (MPI) score in patients with secondary peritonitis. Journal of clinical and diagnostic research: JCDR. 2014 Dec;8(12):NC01.

[12]. Arif S, Waseem T, Ashraf JU. Prognostic Predictive Value of Mannheim Peritonitis Index in Secondary Peritonitis: A Prospective Study. pakistan journal of medical & health sciences. 2016 Jul 1;10(3):1024-7.

[13]. S Kumaraswamy, Vishnu Kumar S, MadeswaranChinnathambi, et al. Effectiveness of Mannheim Peritonitis Index in Predictingthe Morbidity and Mortality of Patients With Hollow Viscous Perforation. New Indian J Surg. 2020;11(2):113–116.

[14]. Krishna VM, Joseph PKT, Vattikutti V,Garika G. Evaluation of Mannheim Peritonitis Index in predictingthe prognosis of hollow viscus perforation. Int J Med Sci PublicHealth 2017;6:250-256.

[15]. Meena A, Singh R, Sharma M, Bhadoo M, Sethi D. Efficacy of Mannheim Peritonitis Index (MPI) Score in Patients with Perforation Peritonitis in a Tertiary Care Setup.

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