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General Surgery

A PROSPECTIVE OBSERVATIONAL STUDY TO EVALUATE MANNHEIM PERITONITIS INDEX IN PREDICTING DIFFERENT OUTCOMES OF PATIENTS WITH PERITONITIS

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ABSTRACT **Background:** Perforation peritonitis is one of the most common surgical emergency case which is encountered in the surgical emergency department,with very high morbidity and mortality. The decision making is very important that which patient need urgent surgery and which patient need resuscitation and surgical intervention later on.To help this there are several scoring system made one of which is Mannheim peritonitis index. In this study we tried to evaluate it and its usefullness in peritonitis patients. **Patients and Methods:** A prospective observational study conducted over 300 patients of peritonitis admitted in the Surgery Department of LLR Hospital, GSVM Medical College, Kanpur after taking proper consent in which Mannheim peritonitis index was evaluated. **Results:** From the total 300 patients 233(78%) were men and 40 were expired(13.3%).In expired patients mean MPI score was 29.05 SD7.01. Patients who were alive had mean MPI score 20.79 SD6.1, 194(65%) patients hospitalised for less than 10 days, 106(33%) patients were hospitalised for more than 10 days. In the patients who hospitalised for more than 10 days mean MPI score was 27.68 SD7.43, 96(32%) patients needed ICU care. Mean MPI score in patients who needed ICU care was 30 SD5.93, 15(5%) patients had anastomotic leak postoperatively,In anastomotic leak patients mean MPI score was 27.5 SD6.34, 72(24%) patients had wound dehiscense, Mean MPI score in the patients who had wound dehiscence was 28.03 SD7.008. Patient who faced no morbidity, Had mean MPI score of 12.8 SD3.5. Mortality in male patients was 12.44% and in female patients was 16.41%. **Conclusion:** Mannheim peritonitis index proved to be a good predictor of morbidity and mortality in the patients of peritonitis, With higher the Mannheim peritonitis index score higher the mortality and morbidity,but has limitations in prediction of some morbidites ljke anastomotic leak.

KEYWORDS : MPI score, Perforation peritonitis, Mortality

INTRODUCTION

Acute generalized peritonitis due to gastrointestinal hollow viscus 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.[1,2] Many scoring systems have been designed for assessing the severity of hollow viscous perforation peritonitis like acute physiology and chronic health evaluation (APACHE II) score, Mannheim peritonitis index (MPI), POSSUM score, simplified acute physiology score (SAPS), sepsis severity score (SSS), Ranson score, Imrite score.[3] A score at initial assessment would help triage and plan of treatment, Scoring systems also help in risk categorization, evaluation of new diagnostic modalities and therapeutic advances as well as in the comparison of treatment results from different clinics. In previous studies comparison of mortality has been done, in this study we evaluated relationship of the mortality and morbidities like Need of ICU care, Days of hospitalisation, Anastomotic leak and Wound dehiscence with MPI.

Mannheim's Peritoneal index score (MPI)

Mannheim's Peritoneal index score (MPI) was developed by wacha and linder and used for risk stratifying patients with peritonitis based on age, sex, peritoneal fluid analysis and comorbidities Patients with a score exceeding 26 were defined as having a high mortality rate. The MPI is a specific score, which has a good accuracy and provides an easy way to handle with clinical parameters, allowing the prediction of the individual prognosis of patients.[4]

Patients and methods -

The study conducted on the patients admitted in the Surgery department of LLR Hospital, GSVM Medical College, Kanpur in which MPI scoring system evaluated to predict different outcome of patients with peritonitis.

Duration: December 2020 to December 2022.

Design of The Study -

Prospective, observational study

Place :

Department of Surgery GSVM Medical College, LLR & Associated Hospitals, Kanpur

Inclusion Criteria:

All patients diagnosed with peritonitis, admitted to the emergency department or surgical wards and who underwent emergency surgery. Preoperative consent was sought for the same.

Exclusion Criteria-

Patients who had other associated solid organ, vascular, neurological injuries and Patients who didn't give consent.

Statistical Analysis:

The data analysed using SPSS software version 25.

Ethical approval:

The study approved by the institutional ethics committee.

Risk Factor		Weighting if present
Age >50 years		5
Female sex		5
Organ failure		7
Malignancy		4
Preoperative duration of peritonitis >24 h		4
Origin of sepsis not colonic		4
Diffuse generalized peritonitis		6
Exudate		
Clear		0
Cloudy, Purulent		6
Fecal		12
Definitions of Organ Failure		
Kidney	Creatinine level >177 umol/L Urea level >167 mmol/L Oliguria <20 ml/h	
Lung	PO_2 <50 mmHg PCO_2 >50 mmHg	
Shock	Hypodynamic or Hyperdynamic	
Intestinal obstruction	Paralysis >24h or complete mechanical obstruction	

Figure 1. Mannheim peritonitis index scoresheet

RESULTS

Out of 300 patients there were 233(78%) men and 67(22%) women. Male: female ratio was 3.6:1. The mean age was 40 years. Commonest

presenting symptoms were pain abdomen, distention of abdomen. Total 100(33%) patients had Gastric perforation, 143(47.6%) patients were of ileal perforation, 21(7%)were of jejnal perforation,12(4%) of duodenal perforation,11(3.6%)of sigmoid perforation and 20(6.3%) of appendicular perforation(Figure.2). Total 15 patients out of 500 had associated comorbidities and 3 patients had malignancy, 40(13.33%) patients from total of 300 died. In expired patients mean MPI score was 29.05 SD7.01. Patients who were alive had mean MPI score 20.79 SD6.1, 194(65%) patients hospitalised for less than 10 days, 106(33%) patients were hospitalised for more than 10 days. In the patients who hospitalised for more than 10 days mean MPI score was 27.68 SD7.43, 96(32%) patients needed ICU care. Mean MPI score in patients who needed ICU care was 30 SD5.93, 21(5%) patients had anastomotic leak postoperatively,In anastomotic leak patients mean MPI score was 27.5 SD6.34, 72(24%) patients had wound dehiscense, Mean MPI score in the patients who had wound dehiscence was 28.03 SD7.008. Patient who faced no morbidity, Had mean MPI score of 12.8 SD3.5.(Figure.3,4&5)) Mortality in male patients was 12.44% and in female patients was 16.41%.

Number of Patients who had MPI score between 1-10 were 28(9.3%), in which NO patient died, no patient needed ICU care,2(7%) patient had wound dehiscense, no one had anstomotic leak and average days of hospitalization was 9 days. 84(28%) patient had MPI score between 11-20 in which 3(3.57%) patient died, 7(8.33%) patient needed ICU care, 6(7%) patient had wound dehiscense,2(2.38%) patient had leak after primary repair and average days of hospitalization was 9 days. 137(45.6%) patient had MPI score between 21-30 in which 16(12%) patient died, 38(28%) patient needed ICU care,32(23%) patient had wound dehiscense, 8(6%) patient had leak after primary repair and average days of hospitalization was 11 days. 51(17%) patient had MPI score more than 30 in which 21(41%) patient died, 51(100%) patient needed ICU care, 32(63%) patient had wound dehiscense, 5(10%) patient had leak after primary repair and average days of hospitalization was 16 days.(Figure.3&4) Most important variable which was associated with mortality in MPI score was presence of organ failure at the time of admission. **ROC curve and Area under the curve for Mannheim peritonitis index evaluated as shown in figure6.**

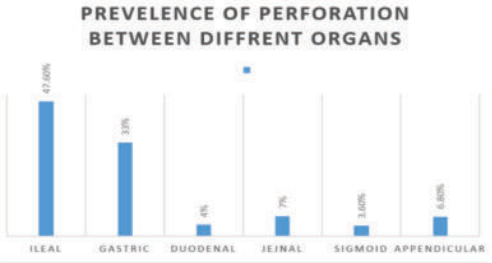

Figure2. Showing prevelence of perforation between different organs.

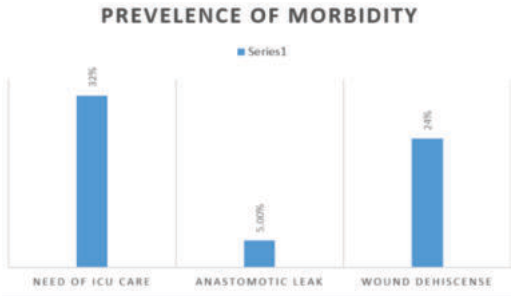

Figure3. Showing prevelence of morbidity.

Figure 4. Showing mean MPI score regarding different outcomes.

	Total patient	Mortality	Need of icu care	wound dehiscense	leak after primary repair	Average days of hospitalisation
Mannheim between 1-10	28	0	0	2(7%)	0	9
Mannheim between 11-20	84	3(3.57%)	7(8.3%)	6(7%)	2(2.38%)	9
Mannheim between 21-30	137	16(12%)	38(28%)	32(23%)	8(6%)	11
Mannheim more than 30	51	21(41%)	51(100%)	32(63%)	5(10%)	16
Mean Mannheim		29.05 SD7.43	30 SD5.93	28.03 SD7.08	27.5 SD6.34	

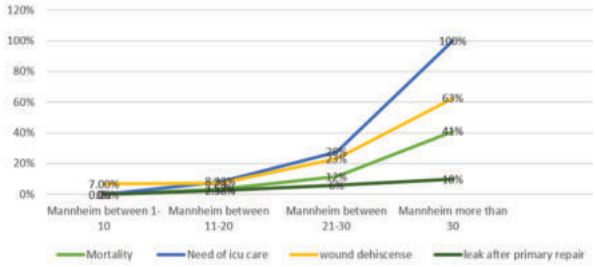

Figure 5.Graph showing relationship between Mannheim Peritonitis Index and mortality, morbidity.

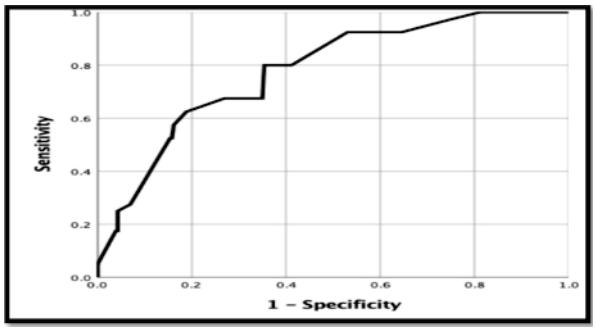

Figure 6. ROC curve of Mannheim Peritonitis index, Area under the curve for Mannheim score was 0.78. Cut off point for Mannheim was 22 with 80% senstivity and and 65% specificity.

DISCUSSION

Hollow viscusperforation peritonitis is very common in surgical emergency department worldwide, with more frequency in tropical countries like India.[5] In hospital mortality rate in patients with perforation peritonitis ranges between 10% to 30%.[6,7] Outcome of such patients is depends upon several factors related to patients age and sex, organ which perforates,Associated co morbidities, and cause of perforation, time of presentation, therapeutic intervention undertaken and the postoperative complications.[8-10] Pre-operative assessment by various scoring systems provide the approximate estimates of mortality risk, Scoring systems also help in risk categorization and also help to make decisions that which patient needs urgent surgery and which needs to be resuscitated. Mannheim score has variables and easy to calculate, but needs operative finding to complete. MPI has physiological variables which is easy to calculate easy to apply and can be used in remote areas where labs are not easily available.[11] Some authors over weighted the MPI score then other scores.[12-13] The MPI has been shown to contribute independently to the prediction of outcome.[14-16]

This study done in GSVM MEDICAL COLLEGE KANPUR included 300 patients who presented to the emergency department and were diagnosed with hollow viscous perforation. All the patients were appropriately assessed and managed according to standard guidelines. Average age of the patients were 40 year. Men patients were more than women in the study but Mortality in the women patients were more than the men patients(16&12%).

Ileal perforation was most common hollow viscus perforation and second common was Gastric perforation. In the study it shown that more the MPI score related with more the morbidity and mortality as shown in the figure3.ROC curve was plotted for MPI and Mortality as shown in figure 4&5,Area under the curve was 0.78 which is statistically Significant. The cut off point for MPI was 22 with 80% senstivity and 65% specificity(figure6).Area under the curve for MPI and Need of ICU care,Wound dehiscence and anastomotic leak was 0.91 ,0.86 and 0.60, which showed that MPI score is a good predictor of morbidity but senstivity and specificity is limited for anastomotic leak.

CONCLUSION

Mannheim peritonitis index proved to be a good predictor of morbidity and mortality in the patients of peritonitis, With higher the Mannheim peritonitis index score higher the mortality and morbidity,but has limitations in prediction of some morbidites ljke anastomotic leak.

Decleration

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Authors contribution:

Dr Vijay kumar Gupta contributed in all phases of the study.Dr.Prof Sanjay kala helps in conception & design of the study, drafting of manuscript and in critical revision. Dr.R.K.Jauhri helps in data analysis and interpretation and in critical revision. Dr. Yukteshwar Mishra contributed in drafting of manuscript. All authors approved final version of manuscript.

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Availability of data and material:

Full database will be made available for analysis on reasonable request to corresponding author.

Ethical approval and consent to participate:

Ethical approval taken from the institutional ethics committee and written informed consent taken from the patients before including them in the study.

Consent for publication: Obtained.

Competing intrests: The authors declare no competing interests.

REFERENCES

1. Bohnen J, Boulanger M, Meakins JL, McLean AP. Prognosis in generalized peritonitis. Relation to cause and risk factors. Arch Surg. 1983 Mar;118(3):285-90. doi: 10.1001/archsurg.1983.01390030017003. PMID: 6824428.
2. Giessling U, Petersen S, Freitag M, Kleine-Kraneburg H, Ludwig K. Chirurgisches Management der schweren Peritonitis [Surgical management of severe peritonitis]. Zentralbl Chir. 2002 Jul;127(7):594-7. German. doi: 10.1055/s-2002-32839. PMID: 12122587.
3. Kologlu M, Elker D, Altun H, Sayek I. Validation of MPI and PIA II in two different groups of patients with secondary peritonitis. Hepatogastroenterology. 2001 Jan-Feb;48(37):147-51. PMID: 11268952.
4. Linder MM, Wacha H, Feldmann U, Wesch G, Streifensand RA, Gundlach E. Der Mannheimer Peritonitis-Index. Ein Instrument zur intraoperativen Prognose der Peritonitis [The Mannheim peritonitis index. An instrument for the intraoperative prognosis of peritonitis]. Chirurg. 1987 Feb;58(2):84-92. German. PMID: 3568820.
5. Neeraj Kumar Jain,Manjari Goel Jain,Sunil Maini,Vicky Khobragade.A study of clinical profile and management of perforation peritonitis in a tertiary health centre located in Central India. International Surgery Journal (ISJ).https://doi.org/10.18203/2349-2902.isj20170847
6. Kumar P, Singh K, Kumar A. A comparative study between Mannheim peritonitis index and APACHE II in predicting the outcome in patients of peritonitis due to hollow viscous perforation. Int Surg J 2017;4:690-6.
7. Malik AA, Wani KA, Dar LA, Wani MA, Wani RA, Parray FQ. Mannheim Peritonitis Index and APACHE II--prediction of outcome in patients with peritonitis. Ulus Travma Acil Cerrahi Derg. 2010 Jan;16(1):27-32. PMID: 20209392.
8. Singh R, Kumar N, Bhattacharya A, Vajifdar H. Preoperative predictors of mortality in adult patients with perforation peritonitis. Indian J Crit Care Med. 2011 Jul;15(3):157-63. doi: 10.4103/0972-5229.84897. PMID: 22013307; PMCID: PMC3190466.
9. Adigun TA, Idowu OK, Ayandipo OO, Afuwape OO, Kuti M. Factors associated with mortality in patients with peritonitis presenting for anesthesia and surgery in a tertiary center in Nigeria - A cross-sectional study. J Clin Sci [serial online] 2020 [cited 2023 Feb 25];17:108-12. https://www.jcsjournal.org/text.asp?2020/17/4/108/298461
10. Shin R, Lee SM, Sohn B, Lee DW, Song I, Chai YJ, Lee HW, Ahn HS, Jung IM, Chung JK, Heo SC. Predictors of Morbidity and Mortality After Surgery for Intestinal Perforation. Ann Coloproctol. 2016 Dec;32(6):221-227. doi: 10.3393/ac.2016.32.6.221. Epub 2016 Dec 31. PMID: 28119865; PMCID: PMC5256250.
11. Himanshu Agrawal, Arun K Gupta, Nikhil Gupta, Manu Vats, Sumit Pathania, CK Durga. Comparison of MPI and APACHE II in the Prognosis of Perforating Peritonitis.Journal of clinical and diagnostic research.Surgery Section DOI : 10.7860/JCDR/2020/42507.13798
12. Rogy M, Függer R, Schemper M, Koss G, Schulz F. Unterschiedliche Aussagekraft von zwei verschiedenen Prognose-Scores bei Patienten mit Peritonitis. Mannheimer Peritonitis-Index versus Apache II-Score [The value of 2 distinct prognosis scores in patients with peritonitis. The Mannheim Peritonitis Index versus the Apache II score]. Chirurg. 1990 Apr;61(4):297-300. German. PMID: 2347264.
13. D Paul Trinity Stephen, Vijay Abraham, Reka Karuppusami, Evaluation of Usefulness of Mannheim Peritonitis Index and APACHE II Score in Predicting Mortality and Morbidity in Patients with Peritonitis- A Prospective Diagnostic Test Study Journal of clinical and diagnostic research.Surgery Section DOI : 10.7860/JCDR/2020/45556.14110
14. Sharma R, Ranjan V, Jain S, Joshi T, Tyagi A, Chaphekar R. A prospective study evaluating utility of Mannheim peritonitis index in predicting prognosis of perforation peritonitis. J Nat Sci Biol Med. 2015 Aug;6(Suppl 1):S49-52. doi: 10.4103/0976-9668.166076. PMID: 26604619; PMCID: PMC4630763.
15. Ravindra N Irpatgire, Avinash Badane. Efficacy of Mannheim peritonitis index (Mpi) score in patients with perforation peritonitis. Int J Surg Sci 2019;3(4):457-459. DOI: https://doi.org/10.33545/surgery.2019.v3.i4h.285
16. V A Murlidhar, C P Madhu, S Sudhir, Srinivasarangan M. Efficacy of Mannheim Peritonitis Index (MPI) Score in Patients with Secondary Peritonitis. J Clin Diagn Res. 2014;8(12):NC01-NC3. PMID: 25653985; PMCID: PMC4316291