

# Efficacy of Mannheim Peritonitis Index in Prediction of Mortality and Morbidity in Hollow Viscus Perforation

<sup>1</sup>Dr.Narra Venkat Nikhil, <sup>2</sup>Dr.Haleema Neshat M.S.,

<sup>1</sup>Postgraduate, Department of General Surgery, NRI General Hospital, Chinakakani.

<sup>2</sup>Assistant professor, Department of General Surgery, NRI General Hospital, Chinakakani.

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## Abstract:

**Background:** This study attempts to evaluate the prognostic value of MPI scoring system in patients with peritonitis due to hollow viscous perforation, to assess it as a clinical tool in stratifying these patients according to individual surgical risk.

**Materials and Methods:** 60 patients with hollow viscous perforation admitted in NRI General hospital from November 2019 to October 2021 were included in the study. Necessary data was collected; MPI score was calculated for each patient and analysis done.

**Results:** MPI scoring system carried more significance in predicting the morbidity and mortality in the post operative period. Results showed mortality of 58.3% with score >29 & mortality of 5.2% with score between 21-29 & mortality is 0 with score <21.

**Conclusion:** MANNHEIM PERITONITIS INDEX is a simple and effective method in predicting the morbidity and mortality of patients with hollow viscous perforation.

**Key words:** Peritonitis, Scoring systems, Outcome predictors, morbidity.

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## I. Introduction

Hollow viscus perforation, causing peritonitis, continues to be a typical surgical emergency. This may be due to the persistence of the various risk factors among the general population like H.pylori infection, NSAIDs, enteric fever, and several others. This condition, most of the time, needs an emergency surgical intervention. A scoring system should assess the need, type, and quality of the care required for a particular patient.

A simple and accurate scoring system is required in these conditions to anticipate morbidity and Mortality and hence take measures to prevent it. Many scoring systems have been designed to grade the severity of acute peritonitis like Acute physiology and chronic health evaluation APACHE II score, Ranson score, Imrite score, Mannheim peritonitis index (MPI), Sepsis severity score (SSS), simplified acute physiology score (SAPS). Scoring systems utilization would be of great help in salvaging the priceless life of a patient.

The Mannheim Peritonitis Index (MPI) is a specified score, which has good accuracy and provides an easy way to handle clinical parameters, allowing predicting the individual prognosis of patients with peritonitis<sup>1</sup>. Our Study aims at the evaluation of the effectiveness of MPI

## II. Materials And Methods

**Source of Study:** The Study was conducted on 60 patients who presented with peritonitis secondary to hollow viscus perforation to General Surgery department at NRI General Hospital.

**Type Of Study :** This Study is a clinical, prospective and observational.

**PLACE OF STUDY:** NRI General hospital, Mangalagiri, Guntur.

**DURATION OF STUDY:** November 2019 to October 2021

**SAMPLE SIZE:** 60 patients.

**AIM:** To assess the prognostic value of Mannheims Peritonitis Index in Patients with Hollow Viscus Peritonitis.

**INCLUSION CRITERIA:** Patients with a clinical suspicion and investigatory support for the diagnosis of peritonitis secondary to hollow viscus perforation were included in the Study.

Various etiologies causing such features include : • Acid Peptic Disease • Typhoid • Appendicitis • Tuberculosis

**EXCLUSION CRITERIA:** • Primary Peritonitis • Associated vascular and neurogenic injuries • Age < 14yrs • Peritonitis patients with laparotomy done elsewhere.

**PROCEDURE**

In this Study, patients from both gender of age >14 yrs having peritonitis due to hollow viscus perforation of varied etiology were taken.

After taking a detailed history and thorough clinical examination, necessary investigations were done according to a planned proforma. All patients were investigated for Haematological (Hb%, TLC, DLC, BT, CT), Biochemical (blood sugars, RFT, LFT), Urine analysis – Albumin, sugar and microscopy. Chest x-ray, supine and erect abdominal radiographs were done. Based on age, sex, etiology, condition and time of presentation and the pre-operative findings patients were classified according to scores into 3 groups

1. score of <21
2. score ranging from 21 to 29
3. score of >29

<b>Mannheim peritonitis index</b>	
Organ Failure	7
Diffuse peritonitis	6
Age older than 50 years old	5
Female gender	5
Malignancy	4
Non-colonic Sepsis origin	4
Exudate	
Fecal	12
Cloudy or purulent	6
Clear	0

In addition to patient particulars like name, age, sex, etc., the following information was also registered: the inpatient number; admission and discharge dates ; days of hospital stay; Surgery date and illness-related information (preoperative findings, medical treatment and evolution of illness). Patient was followed, occurrence of complications noted and discharge due to improvement or death recorder. Time elapsed from initial diagnosis to the time of event (death or discharge from hospital) was determined. Out-patient follow-up was continued for 30 days from the time of discharge to establish perioperative morbidity and Mortality. The lowest score was 0, if there were no adverse factors, and the maximum was 47 if all adverse factors were present and confirmed . Each variable in the scoring system was analysed as an independent predictor of morbidity or Mortality and the scoring system.

**STATISTICAL ANALYSIS:** Statistical analysis was done using SPSS software version 16. Chi-squared test was used for intergroup comparisons. P-value of < 0.05 was considered significant. The percentage for the categorical data was presented in tables and figures.

**III. Results**

Age Group	Gender		Total
	Male	female	
15-30	14	3	17
31-45	10	6	16
46-60	12	6	18
>60	7	2	9
Total	43	17	60

**Table 1**

**The p-value is 0.820031 with respect to gender , which not significant at p<0.05**

Gender	No. of cases	Morbidity	Mortality
Male	<b>43</b>	<b>28 (65.1%)</b>	<b>6 (13.9%)</b>
Female	<b>17</b>	<b>14 (82.3%)</b>	<b>2 (11.7%)</b>

**Table 2**

Age Group	No. of Cases	Morbidity	Mortality
15-30	17	11 (64.7%)	<b>1 (5.8%)</b>
31-45	16	10 (62.5%)	<b>1 (6.2%)</b>
46-30	18	15 (83.3%)	<b>3 (16.6%)</b>
>60	<b>9</b>	<b>6 (66.6 %)</b>	<b>3 (33.3%)</b>

**Table 3**

**The p-value is 0.685635 which is not significant with mortality & morbidity to age.**

Males accounted for 71.6 % in the present Study. Male : female ratio in the present Study is 2.5 : 1 and 14(82.3%) out of 17 females had postoperative complications (which include wound complications, pulmonary complications) and 28 (65.11%) out of 43 males had postoperative complications which shows a slight high risk in females but statistically not significant ( $p > 0.05$ ). Mortality related to male and female are 13.9% and 11.7% respectively. Mean age of presentation in the Study is 43.11 ranging from 15-70 and majority of patients belonged to age group of 46-60. The morbidity and Mortality concerning age is not statistically significant.

**Site of perforation:**

Site of Perforation	No.	Percentage	Post Op Complications	Mortality
Stomach	10	16.6%	3 (30 %)	1 (10%)
duodenum	16	26.6%	8 (50%)	0
Ileum	7	11.6%	7 (100%)	3 (42.8%)
appendix	16	26.6%	13 (81 %)	1 (6.25%)
Caecum	2	3.33%	2 (100 %)	2 (100%)
Colon	5	8.33%	5 (100%)	1 (20%)
Rectum	2	3.33%	2 (100%)	0
GB	2	3.33%	2 (100%)	0

**Table 4**

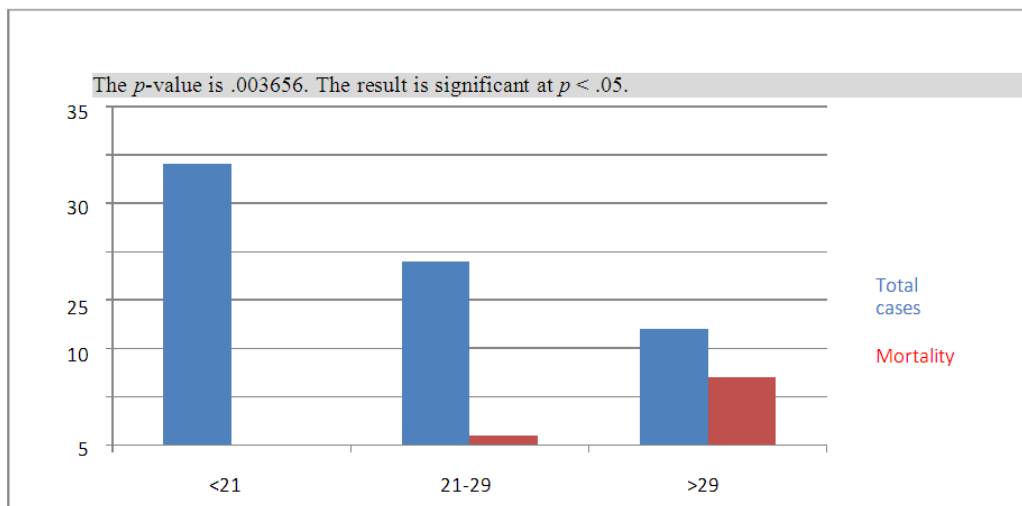
Appendicular and Duodenum perforation were the common sites of perforation in the Study. Next common was stomach perforation.

Stomach and duodenum showed less postoperative complications than other sites with less than 50% cases developing postoperative complications.

All the patients with Ileum, gallbladder, Caecum, colon, and rectum perforation developed postoperative complications. Caecal perforation cases had more severe illness with all the 2 cases leading to death. Ileal perforation also showed a high mortality rate of 42.8%.

**Mortality in relation to the score: Table 5**

Scores	cases	Mortality	%
<21	29	0	0
21-29	19	1	5.2 %
>29	12	7	58.3 %



There was 58.3 % mortality in patients with a score >29. None of the patients died with an MPI score <21, and the patients with a score of 21-29, there was a mortality of 5.2%. So there is a significant increase in mortality rate with higher MPI score (P <0.05)

#### IV. Discussion

Peritonitis still remains a hot spot for surgeons despite the advancements in surgical technique and intensive care treatment. Various factors like age, sex, duration of symptoms, perforation site, peritonitis extent, and delay in the surgical intervention are associated with morbidity and mortality. A successful outcome depends upon early surgical intervention, source control, and exclusive intraoperative peritoneal lavage. Also, various methods and scoring systems are used to identify the risks and morbidity and mortality in those patients.

The present Study is done in NRI Medical College and General Hospital from November 2019 to October 2021, which included 60 patients who were diagnosed with peritonitis due to hollow viscous perforation. All the patients were assessed appropriately and managed according to standard guidelines

There was little influence of gender on prognosis in our Study. In other publications, gender composition percentage varied from 43 to 52% females and 48 to 57% male<sup>2,3</sup>.

In our study, the most common etiology of peritonitis was appendicular and duodenal perforation, both accounting for 26.6% each.

Ohmann et al.<sup>5</sup> reported duodenal ulcer perforation as the commonest cause for peritonitis in his series, while Kachroo et al. found appendicular perforation as the commonest cause.

In Billing A, Fröhlich D, Schildberg FW.,<sup>7</sup> patients with scores of less than 21 had a mortality rate ranging from 0-2.3% and those with MPI between 21 and 29 had a mortality rate of approximately 65%. MPI score of more than 29 had the highest mortality, up to more than 80% in some studies.

Notash AY, Salimi J, Rahimian H, Fesharaki MH, Abbasi A. have shown important cut-off points to be 21 and 29 when using the MPI, with mortality of 60%, and up to 100% for scores more than 29.

Kusumoto yoshiko et al., evaluated the reliability of the MPI in predicting the outcome of patients with peritonitis in 108 patients. A comparison of MPI and mortality showed patients with a MPI score of 26 or less to have mortality of 3.8%, where as those with a score exceeding 26 had mortality of 41.0%

In a study conducted by Qureshi AM et al.<sup>6</sup>, score of < 21 had mortality of 1.9%, score of 21-29 had 21.9% and score > 30 had mortality of 28.1%. Mortality rate for MPI score more than 26 was 28.1% while for scores less than 26 it was 4.3% .

MORTALITY COMPARISON WITH OTHER STUDIES					
MPI Score	This Study	A.S.Ermalovetal.(1996) <sup>4</sup>	C.Ohmann et al.(1999) <sup>5</sup>	Qureshi et al(2005) <sup>6</sup>	Billing et al.(1994) <sup>7</sup>
<21	0%	0%	0%	1.9%	2.30%
21-29	5.2%	42%	29%	21.9%	22.50%
>29	58.3%	100%	100%	28.1%	59.10%

Despite the fact that the Mannheim score is easy to use and effective in predicting mortality, it cannot be solely used as a preoperative predictor at the time of admission to stratify patients based on the risk of death, since it requires consideration of intraoperative assessment, histopathological assessment (a cause of neoplastic or non-neoplastic origin). Other disadvantage of the score is the fact that it does not take into account chronic diseases and major systemic disorders, which are very important risk factors for death and serious complications.

### V. Conclusion

There have been a few efforts to create a scoring system to predict mortality and morbidity risk after emergency surgery. Some scoring systems provide a prediction that approximates to the observed mortality rate for a cohort, but none is sufficiently accurate to rely upon when considering an individual patient.

This is a study to validate the MANNHEIM PERITONITIS INDEX scoring system for predicting the prognosis in patients with hollow viscus perforation. The results of this Study proves that the MPI scoring system is a simple and effective tool in predicting the prognosis and deciding on the management of the patient after the definitive procedure is done. The Study confirmed the high prognostic value of MPI Index in perforative peritonitis. The variables of the scoring system, like duration of pain, feculent exudates, and organ failure on presentation, had an important role in predicting the eventual outcome of the patient.

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