

“Effectiveness of Mannheim Peritonitis Index in Predicting the Morbidity and Mortality of Patients With Hollow Viscous Perforation”

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Abstract

AIM:

Aim is to predict the risk of mortality and morbidity in patients with peritonitis due to hollow viscous perforation.

This study attempts to evaluate the prognostic value of MPI scoring system in patients with peritonitis due to hollow viscous perforation,

To assess and stratifying these patients according to individual surgical risk.

METHODS:

100 patients with hollow viscous perforation admitted in Govt Mohankumaramangalam Medical college Hospital Salem from December 2019 to September 2021 were included in the study. Necessary data was collected; MPI score was calculated for each patient and analysis done.

RESULTS:

The number of post-operative complications, hospital stay and duration of ICU proportionately increased with the MPI score. Out of the 8 variables used in this scoring system, duration of pain, organ failure and intra peritoneal fluid on admission carried more significance in predicting the morbidity in the post op period than the other variables.

CONCLUSION:

MANNHEIM PERITONITIS INDEX is a simple and effective method in predicting the morbidity of patients with hollow viscous perforation

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

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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. This may be due to persistence of the various risk factors among the general population like H. Pylori infection, NSAID's, enteric fever and several others. 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 particular patient. Realizing the need for a simple accurate scoring system in these conditions the present study was undertaken to evaluate the performance of MPI scoring system in predicting the risk of morbidity and mortality in patients with peritonitis due to hollow viscous perforation. Several scoring systems are in place to stratify the patients with peritonitis due to hollow viscous perforation like APS, SIS, APACHE and BOEYS. 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 And Methods

Aim:

Aim is to predict the risk of mortality and morbidity in patients with peritonitis due to hollow viscous perforation.

This study attempts to evaluate the prognostic value of MPI scoring system in patients with peritonitis due to hollow viscous perforation,

To assess and stratifying these patients according to individual surgical risk.

Study design:

Prospective Study

Place of study :

GMKMC hospital

Study period :

December 2019 to September 2021

Study population :

100 Patients admitted with peritonitis *Govt Mohankumaramangalam Medical college Hospital ,Salem* , during study period December 2019 to September 2021, satisfying inclusion and exclusion criteria are considered into study.

Inclusion criteria:

Patients with clinical suspicion and investigatory support for the diagnosis of peritonitis due to hollow viscous perforation who are later confirmed by intra op findings.

Patients of either sex between 14 & 70 years of age.

Exclusion criteria:

Patients with hollow viscous perforation due to trauma

Patients with any other significant illness which is likely to affect the outcome more than the disease in study.

Pregnant mothers

Patients <14 years and > 70 years

Methodology:

Written informed consent was obtained.

Patients who satisfy the inclusion and exclusion criteria

Diagnosis of peritonitis due to hollow viscous perforation made by

- History and clinical examination
- X-ray chest PA view with both domes of diaphragm which shows air under diaphragm.

III. Results

Duration pain

Duration of pain	Frequency	Percentage
< 24 hours	64	64
1 to 5 days	32	32
> 5 days	4	4
Total	100	100

Site of perforation- statistics

Origin	Frequency	Percentage
Gastric	10	10
Duodenal	58	58
Ileal	18	18
Appendicular	14	14
Total	100	100

The most common site of perforation was duodenum(58%),ileal perforation being the next common

Type of exudate - statistics

	Frequency	Percentage
Clear	60	60
Purulent	26	26
Feculent	14	14
Total	100	100

Only 13% had feculent collection noted intra op, majority (50%) had clear fluid exudate.

Number of complications

58% of the study population had no post-operative complications, 20% had 2 or more complications

Peritonitis - statistics

66% of the study population presented with diffuse peritonitis. Only one case (2%) was perforation due to malignancy.⁹

EVALUATION OF THE SCORING SYSTEM

MPI scores	frequency	Percentage
< 22	64	64
22 – 29	22	22
> 29	14	14
total	100	100

64% of the study population was in the low risk group (scores <22) and 14% were in high risk (scores >29). Patients with organ failure on admission, longer duration of illness before the surgery, diffuse peritonitis, feculent exudates were more likely to have higher scores and hence fall into high risk group than their counterparts.

Assessment of the individual outcomes in each group is as follows.

COMPLICATIONS IN RELATION TO SCORE

Post op complications

90% of the population which had no post procedure complications had a score of <22 (p<0.002) whereas 70% of the patients with Mannheim peritonitis index of >29 had 2 or more complications during the post op period.

Pulmonary complications

Pulmonary complications	Score < 22	Score 22- 29	Score > 29	Total
NO	58	14	02	74
	78.4 %	18.9 %	2.7 %	100%
YES	6	8	12	26
	23.1%	30.8 %	46.2 %	100%
TOTAL	64	22	14	100
	64%	22%	14%	100%

The pulmonary complications in the form of post op pneumonia, pleural effusion which required continuous monitoring of oxygen saturation, nebulization and hence lead to longer post op recovery were significantly higher as the score increased. > 80% of patients with > 29 had some form of pulmonary complications , which was

only about 10% in patients with score < 22 (p < 0.005)

Development of ARDS:

ARDS	Score < 22	Score 22-29	Score > 29	Total
NO	64	18	10	92
	69.6 %	19.6 %	10.9 %	100%
YES	00	04	04	08
	00%	50%	50%	100%
TOTAL	64	22	14	100
	64 %	22%	14%	100%

The development of ARDS in these pts was well predicted with scoring system. 50% of pts who developed ARDS in their post op period had a score of > 29. 30% of pts with score > 29 eventually developed ARDS in the post-operative period

Development of wound complications:

SSI	Score < 22	Score 22- 29	Score > 29	total
NO	56	12	06	74
	75.7 %	16.2 %	8.1 %	100%
YES	08	10	08	26
	30.8 %	38.5%	30.8 %	100%
TOTAL	64	22	14	100
	64 %	22%	14 %	100%

Up to 60% of the patients with scores > 29 developed wound related complications in the post op period which was about 40% in patients with score 22-29 and about 12% in patients with scores <22(p<0.005) The post op complications were significantly higher in the group with score>29. This included the surgical site infections, pulmonary, renal complications

and development of multi organ failure. There was only one death in this study, analysis didn't reach significant figures.

Effects on duration of illness:

ICU STAY	Score < 22	Score 22- 29	Score > 29	total
< than 5 days	64	14	08	86
	74.4 %	16.3 %	9.3 %	100%
6 to 10 days	00	08	02	10
	00%	80 %	20%	100%
> 10 days	00	00	04	04
	00%	00%	100%	100%

ICU stay and ward stay is significantly prolonged in patients with higher scores .There is a proportionate increase in the duration of stay with increase in scores. 90% of the patients who were discharged within 10 days had a score of <22.

Scoring system effect on severity of illness

INOTROPES	Score < 22	Score 22 – 29	Score > 29	Total
NO	62	18	06	86
	72.1 %	20.9%	07%	100%
YES	02	04	08	14
	14.3%	28.6 %	57.2%	100%
TOTAL	64	22	14	100
	64 %	22%	14%	100%

57% of the patients who required inotropic support in the post op period had a score of >29 and only 1 patient (14%) required inotropes with a score <2

50% of the patients who required mechanical ventilation had score of >29. Score of >29 indicate a higher risk of need for inotropes and mechanical ventilation and need for intensive care

Organ failure on admission

Patient presenting with any organ failure due to hollow viscous perforation was significantly associated with (p<0.005) increased morbidity. 65% of the patients with no organ failure on admission had uneventful recovery, 97% of the same population had <2 post op complications. On the other hand 66% of the patients with organ failure on admission had >2 complications in the post op. >90% of the patients with organ failure needed post op inotropes and mechanical ventilation whereas it was the same percentage of patients who did not require inotropes in the other group. >50% of the patients with organ failure had pulmonary complications which was <3 % in the other group.

IV. Discussion

There is no ideal scoring system for the pre-operative assessment of patients needing emergency surgery. Some pre-operative scoring systems provide approximate estimates of mortality risk but none have been shown to be sufficiently specific for use on individual patients. At present, the Fitness Score has greatest specificity (80%) but would not be easy to use on all emergency admissions due to significantly large number (26) of variables to be collected and few variables like diagnosis of malignancy may not be available in the pre op settings. Post-operative scoring systems such as P-POSSUM probably provide more accurate predictions, but are not useful in pre-operative assessment. Unfortunately, there are very few studies that have revisited old scoring systems or attempted to compare systems to assess which is best. Most articles in this field have proposed another new system.

The timing of data collection to create risk scores is seldom mentioned in the literature. Not only do physiological values vary during the acute admission, making the scores obtained by them unreliable, but there is evidence that to include operative findings and post-operative parameters on ICU improves the accuracy of the prediction Although a score at initial assessment would help triage and plan treatment, comparative audit with postoperative scores remains the most useful function of scoring systems at present. Even if accurate pre-operative predictions of outcome were possible by estimation of a risk score, an expert surgical opinion would be required to interpret these predictions at the bedside. An experienced clinician can not only assess prognosis but also weigh up the local facilities available, the patient's quality of life and ethical issues, as well as considering the patient or relative's wishes. Scoring will never replace clinical judgment.

Scoring systems are generated and validated on specific populations that may be substantially different from the patients being scored in a different hospital. One potential resolution would be for each hospital to create a system specific to its own population, which is regularly revalidated. This study done in *Govt. Mohankumaramangalam Medical college Hospital ,Salem* , included 100 patients who presented to the surgery department and were diagnosed with hollow viscous perforation. All the patients were appropriately assessed and managed according to standard guidelines.

Few of the other studies confirmed age as a decisive factor related with mortality however this study does not show any statistical significance³⁸. In other studies, patients with generalized peritonitis range from 30–66%; in our study, generalized peritonitis was present in about 66% of the patients^{38, 39}.

The influence of gender on prognosis has been shown of little importance in this study. Gender composition cited in other publications showed percentages, varying from 43 to 52% females and 48 to 57% male^{30,31}, 72% were male in this study.

Mean MPI score reported in literature for localized peritonitis is 19 (range 0 to 35) and in generalized peritonitis, 26 to 27 points (range 11 to 43)^{40, 41} which is similar to the values noted in this study.

Duration of pain >24 hours, organ failure on admission & feculent exudate were found to be independently significant factors in predicting the morbidity among the study population. However presence of diffuse peritonitis wasn't a significant factor in contrast to various other studies³⁷

V. Conclusion

There have been several attempts at creating 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 validation study of the MANNHEIM PERITONITIS INDEX scoring system for predicting the morbidity and mortality in patients with peritonitis due to hollow viscous perforation. The results of this study proves that MPI scoring system is a simple and effective tool for assessing this group of patients, and can be used as a guiding tool to decide on the management of the patient after the definitive procedure is done. Among the various variables of the scoring system duration of pain, organ failure on presentation and presence of feculent exudates had a significant hand in predicting the eventual outcome of the patient.

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