

The Effectiveness of Manheim Peritonitis Index in Peritonitis Secondary to Hollow Viscous Perforation in Terms of Morbidity and Mortality

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ABSTRACT

Background: Manheim peritonitis index (MPI) is the most effective scoring system in predicting morbidity and mortality in patients with peritonitis secondary to hollow viscus perforation. Higher score of MPI has higher morbidity in terms of prolong stay, wound sepsis, burst and re-burst, multiple explorations within same admissions, multi-organ dysfunction and failure. However, score less than 21 has better outcome in terms of uneventful recovery and timely discharge.

Aim: To find out the effectiveness of MPI in terms of morbidity and mortality in patients with peritonitis secondary to hollow viscus perforation.

Methods: This is a quantitative analytical cross sectional study carried out at a General surgical department and casualty surgical bay of a tertiary care hospital Lady Reading Hospital MTI, located in Khyber Pakhtunkhwa province of Pakistan, spanning a duration of six months from August 2021 to January 2022. MPI score was applied on all the patients with peritonitis secondary to hollow viscus perforation their scores and scores related morbidity and mortality was analyzed using chi-square test, P value kept less than 0.05. All the data entered on predesigned electronically Generated Questionnaire and analyzed through SPSS software 24 version.

Results: Comorbid, age of patient, gender, nature of exudate, time of presentation, associated shock, organ failure was the most associated factors along with all scores of MPI affecting morbidity and mortality in our study. Amongst them Males (n=89) exceeded females (n=10). perforated duodenal ulcer was the most cause of hollow viscus perforation (n= 56), followed by enteric. Most of age group affected by enteric were younger age group ranging between 18y -25y. Higher score of MPI more than 21 have potential morbidity and mortality. The main findings in our study is higher MPI score has higher morbidity and mortality, age and co-morbid were additional factors which increases morbidity and mortality even if the MPI score was less than

Conclusion: Manheim peritonitis index is a simple and effective tool when applied on patients with peritonitis secondary to hollow viscus perforation to predict morbidity and mortality. It should be routinely used for prediction of outcomes, focused strategy and treatment planning in patients with peritonitis secondary to hollow viscus perforation.

Keywords: Manheim peritonitis index, hollow viscus perforation, peritonitis, burst, wound sepsis, anastomotic leak.

INTRODUCTION

Inflammation of both layers of peritoneum is called peritonitis¹. Peritonitis is usually caused by secondary to intestinal perforation, which may be due to typhoid, malignancy ischemia, trauma gall bladder rupture. Now a days NSAIDS at higher toll for secondary peritonitis. Peritonitis secondary to hollow viscus perforation is the most common surgical emergency dealt by surgical department needing prompt surgical intervention, broad spectrum antibiotic, symptomatic treatment. Secondary peritonitis is a life and organ threatening condition several scoring system have been proposed and used for risks stratification of patients with peritonitis secondary to hollow viscus perforation (APACHE II), Manheim peritonitis index (MPI) i.e. simplified acute physiology core (SAPS), i.e. sepsis severity score (SSS), Ransom score and Imrite score^{2,3}. Wacha and linder developed MPI in 1983 in retrospective German analysis and validated it, eight proven risk factors with prognostic relevance entered in score⁴.

MPI is a good scoring system in terms of accuracy for assessment of clinical parameters for prediction of prognosis in patients with peritonitis secondary to hollow viscus perforation^{5,6}. Eight variables are taken in account when applying Manheim peritonitis score: age, gender, organ failure, diagnosis of carcinoma, preoperative duration of peritonitis, origin of sepsis, peritonitis extension, characteristics of exudate^{7,8}. Elderly remains a great challenge because of altered physiology, co-morbidities, and altered immunologic and cellular responses⁹.

A quick diagnosis and prompt surgery saves life of all patients with secondary peritonitis. Surgical control of the source is the paramount for survival and should be kept on zenith of the therapeutic prime concerns. Nevertheless, the therapy of sepsis

requires ultramodern intensive care. The mortality tolls higher up with the lengthy interval between the time of hollow perforation and the time of surgical intervention¹⁰. Despite the surgical treatment, suave ICUs, last generation antibiotics mortality rates due to peritonitis are alarmingly high, i.e., 10–20% even in good and equipped set ups¹¹.

Lady Reading hospital MTI Peshawar is major tertiary care hospital located in KP province of Pakistan. Majority of the patients with different abdominal catastrophe are reported to LRH MTI. Realizing the need for a simple accurate scoring system in these conditions, the present study was undertaken.

This study has not only highlighted the effectiveness of MPI in patients with peritonitis secondary to hollow viscus perforation but has shown score related morbidity and mortality. Routine use of MPI on all patients with peritonitis is extremely helpful in better and strategic treatment planning and better outcome.

METHOD AND MATERIAL

This is a single center based analytical cross sectional study conducted at a tertiary care hospital located in KP province of Pakistan. The study spanned the duration of six months from August 2021 to January 2022. Ethical exemption was taken from ethical review board of Lady Reading Hospital MTI (ref no.289/LRH/MTI). Sample size calculated was (n=100) was calculated. However, (n=99) patients came during this tenure. The study was conducted at casualty surgical bay and casualty surgical OT of Lady Reading Hospital MTI Peshawar KP. All the patients with acute abdomen from both genders above 14 years' age with a clinical suspicion of peritonitis (rigid abdomen and negative bowel sounds) secondary to hollow viscus perforation supported by radiological evidence (erect abdominal x-ray with hemi diaphragms) air under diaphragm was included in the study. All the patients with traumatic perforation, neurogenic and vascular

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etiologies leading to abdominal catastrophe was excluded. After a brief period of stabilization of the patients with fluid resuscitation with 16g IV cannula nasogastric intubation, Foley catheterization, intravenous analgesia written and informed consent was taken, patients were subjected to emergency laparotomy, where operating finding confirmed. MPI score applied and all the finding were recorded on predesigned electronically generated questionnaire (google doc). MPI score has 3 components based on history and clinical examination, laboratory parameters as well as nature of exudate per-operatively. MPI Score was calculated and entered on pre-structured questionnaire which includes patient's bio-data, demography pre-and post- operative diagnosis, procedure executed, imaging and laboratory parameters result, patient's destination, immediate and late complication along with fates were entered. All the findings were entered in HMIS for record keeping as well. All the data was analyzed by SPSS VERSION 24 software.

Manheim Peritonis Index

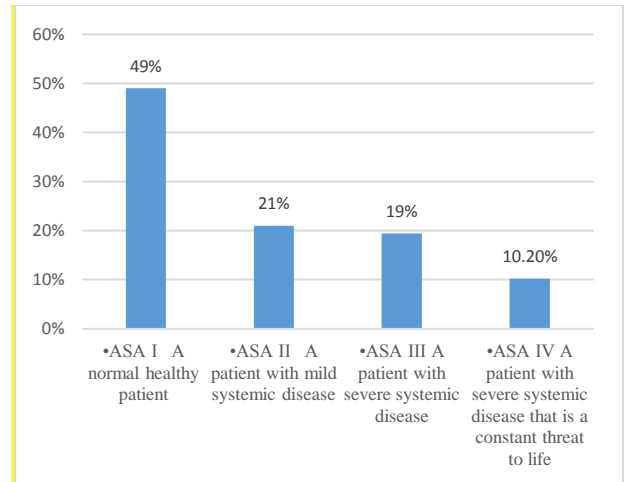
Table 1:

Risk factor	Weighting if present
Age >50 years	5
Female sex	5
Organ failure	7
Malignancy	4
Origin of sepsis not colonic	4
Diffuse generalized peritonitis	6
Preoperative duration of peritonitis >24 h	4
Intraperitoneal exudates	
Clear	0
Cloudy, purulent	6
Fecal	12

Organ	Criteria
Kidney	
Creatinine level	≥177 μmol/L (≥2.31 mg/dl)
Urea level	≥167 mmol/L (≥467.78 mg/dl)
Oliguria	<20 ml/h
Lung (mmHg)	
PaO ₂	<50
PaCO ₂	>50
Shock	Hypodynamic or hyperdynamic
Intestinal obstruction (only if profound)	With paralytic ileus >24 h, complete mechanical

RESULTS

All the cases were presented in casualty. Males being mostly affected (n=89) in all age group with male to female (n=9). With M: F ratio 9:1. The mean age of 36.19 with the SD of ±18.5. majority falling into age group 14 years to 75 years. We found the female has comparatively the highest morbidity and mortality. Out of nine, the four died (n=4), three readmitted for second surgical intervention (n=3) and two discharged (n=2) with uneventful recovery. Out of n=99 admission n= 20 needed ICU for organ support and critical care, n=24 needed HDU admission for close monitoring and vigilance, n=53 were directly shifted to surgical floor.



Mortality was significantly higher in patients who had comorbid, delayed presented and who had organ failure at initial presentation which remained refractory throughout their stay despite organ support and critical care.



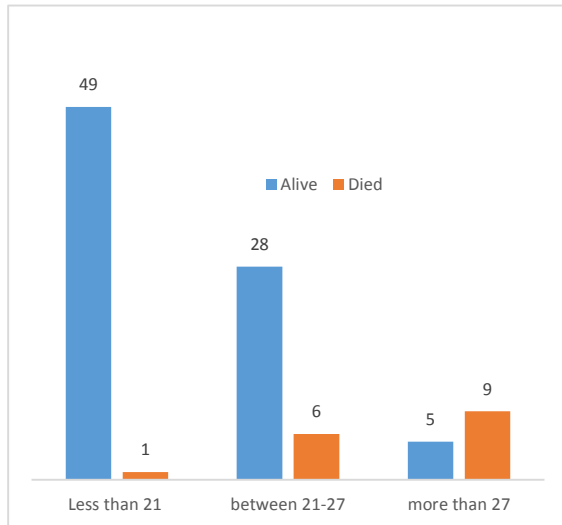
Patients Characteristics	(n=98)
Gender	
Male	9(9.2%)
Female	89(90%)
Age	
Mean	36.19 with SD 18.5
Range	14-75 (years of Age)
ASA grade	
ASA IA normal healthy patient	49%
ASA II A patient with mild systemic disease	21%
ASA III: Patient with severe systemic disease	19.4%
ASA IV: A patient with severe systemic disease that is a constant threat to life	10.2%
Need for critical care	
ICU	25%
HDU	22%
No	53%
Risk measurement	
High	33%
Low	17%
Dose	48%
Outcomes	
Died	16.3%
Prolong stay	19.4%
Readmission	8.2%
Uneventful recovery (Within 5-7 days)	56.1%

The Chi-squared test showed highly significant 0.000 between Died and MPI score greater 28.

Manheim Peritonitis Index in peritonitis secondary to hollow viscus perforation in terms of morbidity and mortality

MPI Score	FATE		Total
	Alive	Died	
Less than 21	49	1	50
between 21-27	28	6	34
28 and Above	5	9	14
Total	82	16	98

Fig. Manheim peritonitis index in peritonitis secondary to hollow viscus perforation in terms of morbidity and mortality



DISCUSSION

The main aim of conducting our study was to evaluate the score related effectiveness of Manheim peritonitis index in terms of morbidity and mortality on 99 patients with peritonitis secondary to hollow viscus perforation who reported at lady reading hospital MTI. The maximum number in our study fell in age group 14years to 75 years. Males (n=89) outnumbered females (n=9) with male to female ration M: F 9:1. Mean age in our study population 36.19 with ± SD 18. With maximum age group affected in between 14-25 years (n=25) when compared these studies^{12,13}. we have much younger age group affected. Although females made a small population of our study 9% but carried high morbidity and mortality 44.4% mortality and 30% morbidity in the form of prolong stay, multiple exploration and readmission for second or definitive procedure, in comparison to male who had 14% mortality and 18% morbidity shown in other studies as well¹⁴. After females there was significant morbidity and mortality in patients aged 60 years and above. Over all in our study mortality was 16.3%(n=16.3) which was secondary to organ failure and sepsis. 18(19%) patients were 60y and above with male to female ratio of 17:1 out of them 5(28%) mortality and 5(28%) morbidity.

It is difficult to be predictive for single case about morbidity and mortality as besides higher MPI score many other factors also determined outcomes which includes age, gender, site of perforation and co-morbidities which even controlled by medical therapies worsen the acute event prognosis¹⁵. In our study mortality was inevitable even in those who had low MPI score less than 21 but had organ failure at arrival which remained refractory despite organ support through their out stay, delayed presentation, poorly controlled co-morbidities with medical therapies or known to have morbidity at the time of presentation aided to further increase in morbidity and mortality reflected through other studies¹⁶. Out of n=99 17.1% died, 21.2 % had prolong stay (more than 7 days) and went through second and third exploration in same admission.

The most common site of perforation was duodenum 57%, then ileal 20% which can be compared to [17]. Nature of exudate n=42 had a clear exudate, n=30 had cloudy/purulent exudate and n=27 found to have feculent exudate contrary to [18] we have more clear exudate 43%.

We divided the score related patients into three categories score less than 21, 49(49.4%) with no morbidity and mortality of 2%. Score between 22-27 34(34.4%) with 6% mortality and score more than 27 13(13.1%) with 100% mortality which is statistically significant, proven through various other study as well¹⁹.

There is significant score related morbidity mortality reflected through our study, however to determine its relationship study at large scale at a multicenter level is required to prove the relationship being linear or exponential.

CONCLUSION

we have alarmingly higher number of young individuals presented to us with peritonitis secondary to hollow viscus perforation. The MPI is safe, simple and effective tool in predicting morbidity, mortality, fates, and outcomes who have peritonitis secondary to hollow viscus perforation. A higher MPI score indicates a poor prognosis predicts bad outcomes in terms high morbidity and mortality which is burden on health care system as well as has increased treatment cost. It should be routinely used for focused strategy and treatment planning in patients with peritonitis secondary to hollow viscus perforation.

Recommendation: Setting up of referral system at different level of province will help the patient to seek medical help in acute phase of this abdominal catastrophe.

Maximum public awareness in the form by utilizing social media can bring mass awareness about this condition.

NSAID should only be sold on doctor prescription to halt injudicious use.

We have much younger population affected with perforated duodenal ulcer who have no history of NSAID use must be screened for GASTRINOMA.

Limitation: It's a single center based analysis of MPI score applied on patients with peritonitis secondary to hollow viscus perforation need multi-center input. It is a quantitative analysis need quality analysis at larger scale at multicenter level

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