ISSN: 0975-3583,0976-2833 VOL15, ISSUE 06, 2024

EFFECTIVENESS OF MANNHEIM PERITONITIS INDEX IN PREDICTING MORTALITY IN PATIENTS WITH PERFORATION PERITONITIS

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Received Date: 21/05/2024 Acceptance Date: 25/06/2024

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Abstract

Background: Peritonitis is defined as inflammation of the serous membrane that lines the abdominal cavity and the organs contained therein. It is still one of the most important and common infectious problems that a surgeon must face. In this study we have taken into account all the parameters of Mannheim's peritonitis index for predicting mortality and we have found the positive correlation among them. **Aims And Objectives:** To evaluate the outcome of patients using MPI and to confirm its predictive value. **Materials And Method:** It is a prospective study done in department of surgery for an approximate period of two years including patients attending surgery emergency department with features of peritonitis and excluding patients with primary and tertiary peritonitis. The sampling method used is nonrandomised sampling. **Results And Observations:** In our study we found max. patients in age of 25-35 i.e, 56(37%). Male sex (65%) has predominance. Most common site of perforation was found to be duodenal 53 (35%) and the most common clinical feature was pain in abdomen in 97% and not passing flatus and feces in 80%. Evidence of organ failure was seen in approx. 20% (30) of patients. Presentation of patients within 24 hrs was just 12% (18). Presence of malignancy was found in 12(8%) patients. 79% (118) patients had generalised peritonitis with 56% (84) having purulent exudate. Origin of sepsis was non-colonic in 128(85%) patients. maximum patients had MPI score of <21 i.e, 55% (83). 15(10%) patients expired with maximum patients had MPI of >29. **Conclusions:** Mannheim Peritonitis index is a useful method to determine study group outcome in patients with peritonitis. All the MPI variables of adverse outcome namely, presence of organ failure; time elapsed > 24hrs; presence of malignancy; age>50 years, generalized extension of peritonitis and type of exudate behaved as expected, except the noncolonic origin of sepsis in peritonitis and female sex. As our study differs in two adverse outcome variables, female sex & noncolonic origin of sepsis, we advocate need for further studies on Mannheim Peritonitis index to include colonic origin of sepsis and to remove female sex as variables of adverse outcome in Mannheim Peritonitis index.

Key Words: Peritonitis, MPI.

Introduction

Peritonitis is indeed a serious condition characterized by inflammation of the peritoneum, the serous membrane lining the abdominal cavity and covering the abdominal organs[1]. It can be caused by various factors such as infection, trauma, or certain medical conditions[2]. Timely

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diagnosis and appropriate treatment are crucial in managing peritonitis effectively. Despite the surgical treatment, sophisticated ICU pathophysiology, the mortality rate of perforation peritonitis is still high[3]. Not a single easily available laboratory test is present that can predict severity or prognosis in patients with peritonitis[2]. Various classifications have been used and the most commonly used is: Primary, secondary, and tertiary peritonitis[4,5].

Various scoring systems have been used to indicate the prognosis of patients with peritonitis. These scores can be broadly divided into two groups[2]:

A) Disease-independent scores for evaluation of serious patients; - APACHE II score, simplified acute physiology score (SAPS II), sepsis severity score, multiple organ dysfunction score

B) Peritonitis specific score; -Mannheim Peritonitis Score (MPI), Peritonitis index Altona II, left colonic perforation score.

In this study, we have taken into account all the parameters of Mannheim's peritonitis index for predicting mortality and we have found a positive correlation among them.

Mannheim Peritonitis Index

It was developed by Wacha and Linder[6].

The maximum possible score is 47 and the minimal possible score is zero.

Rist Factor	**Points**
Age>50yrs	5
Female sex	5
Organ failure	7
Malignancy	4
Preoperative duration of peritonitis>24th	4
Origin of sepsis not clolonic	4
Diffuse generalized peritonitis	6
Exudates	
Clear	0
Cloudy, purulent	6
Fecal	12

Definitions of organ failure		
Kidney	Creatinine Level	>177umol/L
	Urea	>167mmol/L
	Oliguria	<20ml/h
Lung	PO_2	<50mmhg
	PCO_2	>50mmg
Shock	Hypodynamic or hyperdynamic	
Intestinal Obstruction	Paralysis>24th or complete mechanical obstruction	

Aim And Objective

To evaluate the outcome of patients using MPI and to confirm its predictive value.

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Materials and Method

STUDY DESIGN: Prospective study done for a period of two years in the department of surgery, AMCH.

SAMPLING METHOD: Non randomized sampling.

INCLUSION CRITERIA: patients attending surgery emergency department with features of peritonitis in whom secondary peritonitis is confirmed.

EXCLUSION CRITERIA: Patients with primary and tertiary peritonitis.

Results and Observations

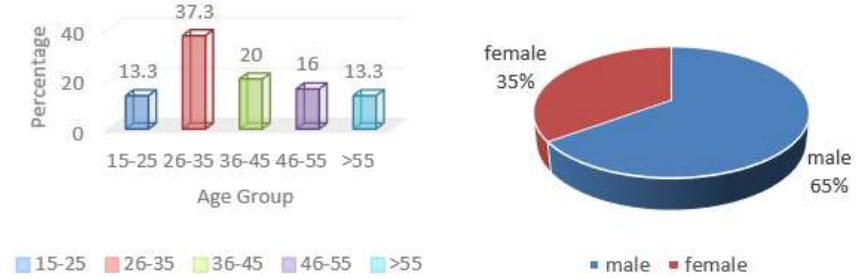

TABLE 1. SHOWING AGE DISTRIBUTION; TABLE 2. SHOWING SEX DITDRIBUTION

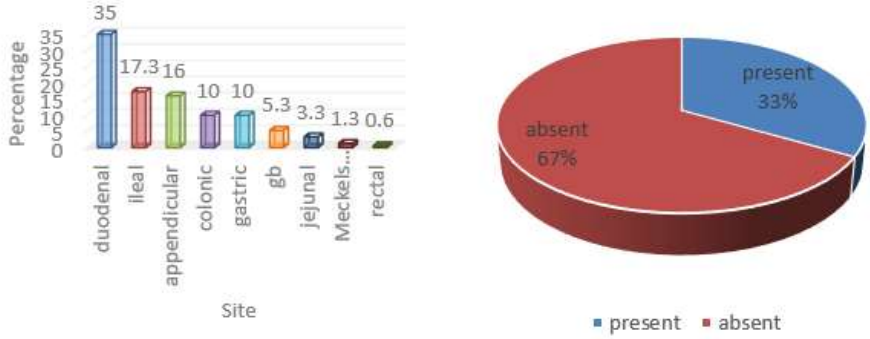

TABLE 3. SITE OF PERFORATION; TABLE 4. SHOWING ORGAN FAILURE

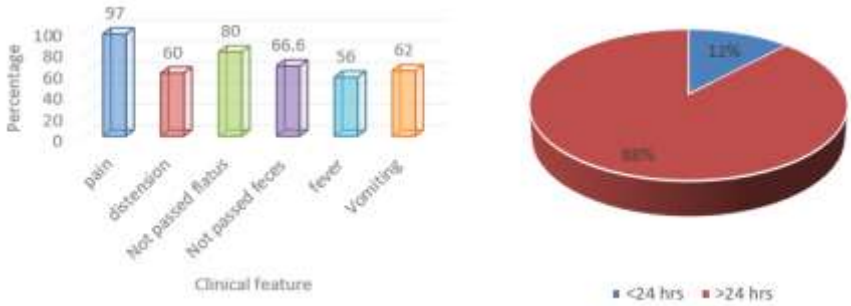

TABLE 5. SHOWING CLINICAL FEATURE; TABLE 6. DURATION AT PRESENTATIO

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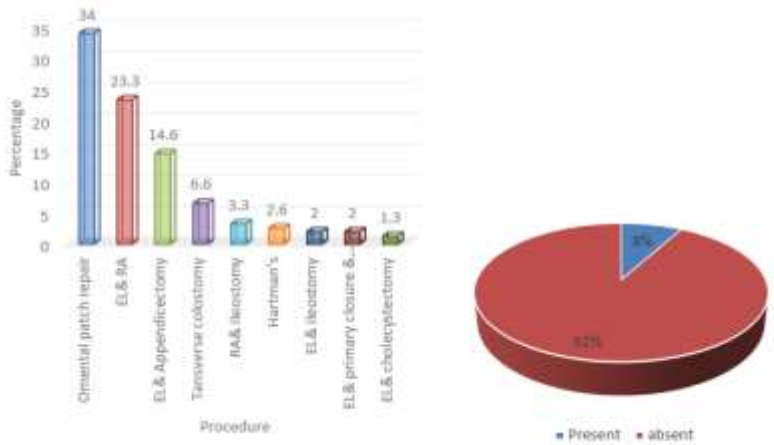

TABLE 7. PROCEDURE PERFORMED; TABLE 8. PRESENCE OF MALIGNANCY

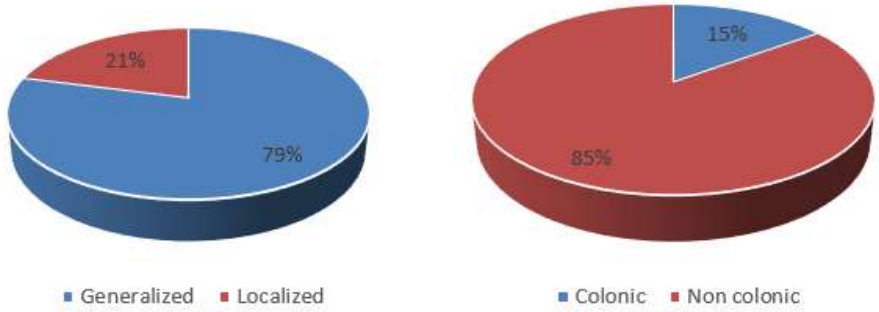

TABLE 8. TYPE OF PERITONITIS; TABLE 9. ORIGIN OF SEPSIS

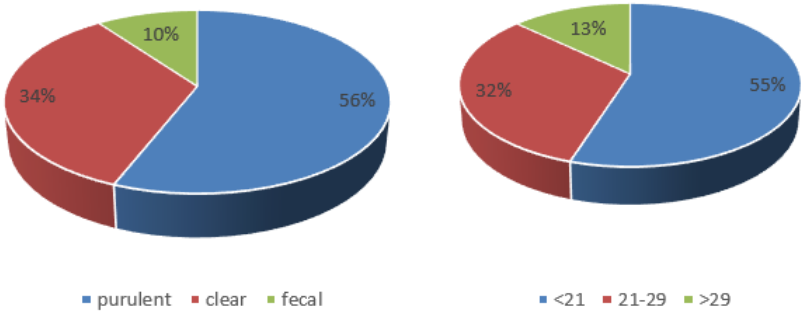

TABLE 10. TYPE OF EXUDATE; TABLE 11. MPI CUT OFF POINTS

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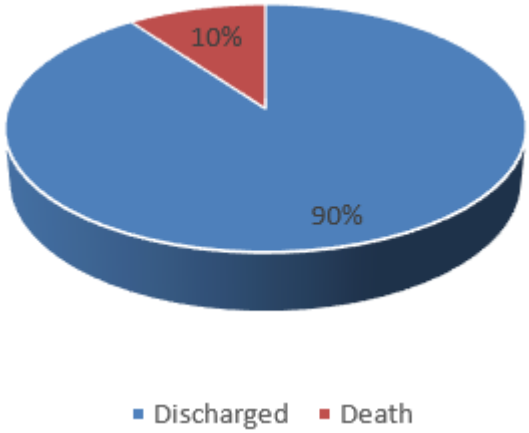

TABLE 12. SHOWING OUTCOMES

BELOW CHARTS SHOWING INCIDENCE OF MORTALITY AS PER DIFFERENT CRITERIA OF MPI AS WELL AS MPI SCORE.

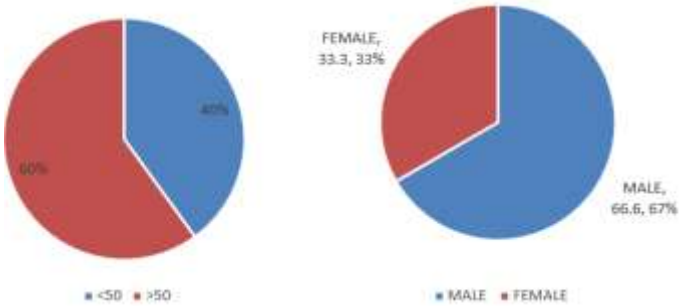

CHART 1. INCIDENCE OF MORTALITY AS PER AGE

CHART 2. INCIDENCE OF MORTALITY AS PER GENDER

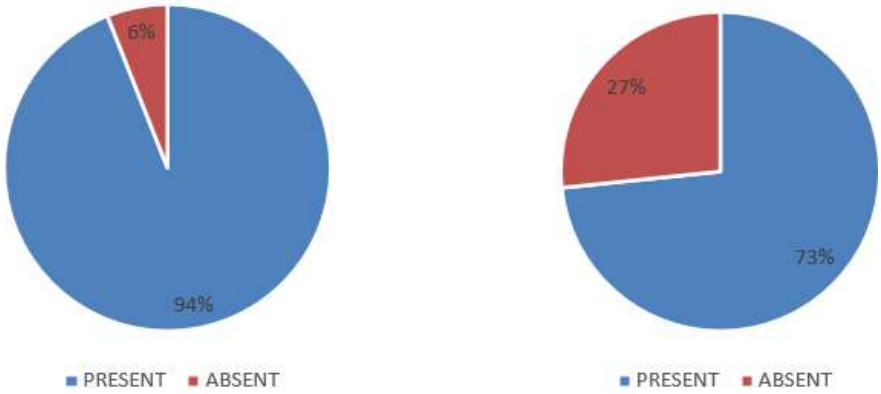

CHART 3. INCIDENCE OF MORTALITY AS PER ORGAN FAILURE

CHART 4. INCIDENCE OF MORTALITY AS PER MALIGNANCY

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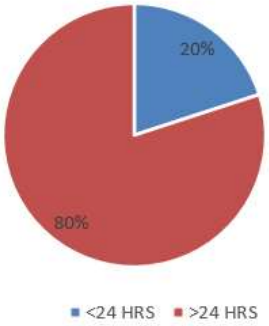


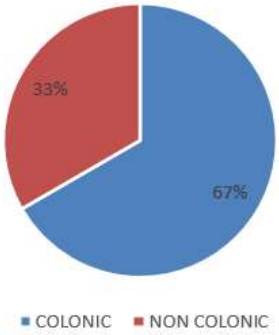
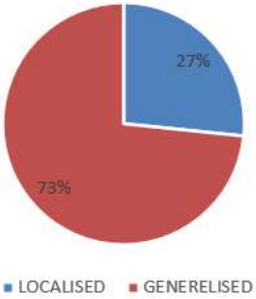


CHART 5: INCIDENCE OF MORTALITY AS PER DURATION AT PRESENTATION

CHART 6. INCICDENCE OF MORTALITY AS PER ORIGIN OF SEPSIS



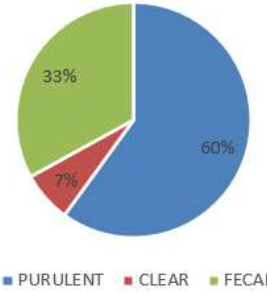


CHART 7. INCIDENCE OF MORTALITY AS PER TYPE OF PERITONITIS

CHART 8. INCICDENCE OF MORTALITY AS PER TYPE OF EXUDATE

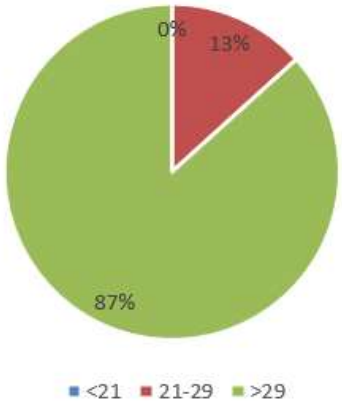


CHART 9. INCIDENCE OF MORTALITY AS PER MPI SCORE

Discussion

- The increased prevalence of the perforation in the age group of 26-35 years in our study can be attributed to the fact that gastro duodenal perforations due to peptic ulcer disease is a major cause of perforation peritonitis in our study and the increased prevalence of the etiological risk factors such as smoking, alcoholism and NSAID abuse in this age group.
- In our study the incidence of male sex was 65 % while that of female sex was 35 %. In a study by Rajender Singh Jhobta[7] (2006) regarding the spectrum of perforation

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peritonitis in India 84% patient's were male. Also others studies showed male sex predominance.

- In our study duodenal perforations account for 35%, illeal perforation for 17.3%, colonic perforation for 10%, appendicular perforations for 16%.
- In a study by Rodolfo L *et al.*[8] appendicular perforations constitute 48.28% while gastric pathology and small bowel pathology constitutes 2.87% each and colonic pathology 2.30%. The increased number of duodenal perforations in our study is due to increased prevalence of the acid peptic disease.
- In our study pain in abdomen was the most common symptom and 97 % of patients had pain abdomen at presentation while 80% of patients have complaints of not passing flatus. Diagnosis of perforation peritonitis is always clinical and immediate resuscitative measures should be initiated. Radiological investigations are only for the confirmation of diagnosis.
- In our study 50 patients i.e. 33% of the study population shows evidence of organ failure at presentation.
- Distribution of organ failure in different studies are – 48.5 % in MM Correia *et al.*[9], 11.5 % in Rodolf L *et al.*,[8] 20 % in Murut Kologlu *et al.*[10].
- In peritonitis a systemic inflammatory response induced by the peritoneal infection may progress to septic shock and multiorgan failure. The high rate organ failure in our study denotes a delay in presentation of most cases.
- In our study 18 patients i.e. 12 % presented within 24 hours while 132 patients i.e. 88 % presented after 24 hours of onset of the disease. Other studies had approx. 50% patients presenting within 24 hrs. In our institute the cause of delayed presentation i.e. a preoperative duration of peritonitis more than 24 hours was mainly related to the. a) Illiteracy among the study population. b)Lack of proper referral services. C) In some patients the delay was due to diagnostic dilemma which demands early use of more sophisticated investigations like CT scan, which is not available at the peripheral hospitals
- In our study 12 patient's (8 %) had malignancy. few were cases of colonic malignancy with perforation and others were of carcinoma stomach with perforation and 2 had a malignancy as an associated finding. In a study by Rodolf L[8] 2 patients had malignancy. In a study by M.M. Correi[9] 89 patients with cancer were studied.
- 83 (55%) patients had MPI score of less than 21.
- 48 (32%) patients had MPI score between 21 to 29
- 19 (13%) patients had MPI score greater than 29
- Of the present prognostic scoring system the Mannheim Peritonitis Index is one of the easiest to apply and the determination of risk is easily available during the initial operation
- In the original study by Wacha and Linder[6] the cut off point of 26 MPI point was used. But in our study many patients had attended higher values in the range of 25-35 ,so a lower cut off value of 21 MPI point was used so that the sensitivity and the specificity of the study could be increased.

STATISTICAL VALIDATION OF MPI IN THE PRESENT STUDY

AUTHOR	YEAR	SENSITIVITY	SPECIFICITY
Billing a. et.al[11]	1994	70	67
Lombordoand et.al.	1998	87	88
Wacha et.al[6]	1987	88	90
Altaca. Et. al	1992	90	94

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Demmel. Et. al[12]	1994	89	92
Corriea M. et. al[9]	2001	87	41
Dani .t. *et al.*[2]	2011	91	92
Present study	2021	90	91

Conclusion

MANNHEIM PERITONITIS INDEX is a simple and useful method in predicting outcomes.

All the variables with adverse outcomes namely, presence of organ failure, time of presentation >24 hrs, presence of malignancy, age >50 yrs, generalised peritonitis, and the type of exudate behaved as expected except for the female sex and the non colonic origin of sepsis.

In our study:

Colonic origin of sepsis was associated with adverse outcomes and the female sex was associated with better outcomes.

Our study differed from MPI in these 2 variables of adverse outcome.

Mortality can be further reduced by early arrival, early diagnosis and early intervention.

Many prognostic scoring systems have been developed for critical patients. Most accepted score presently is APACHE 2 i.e, acute physiology and chronic health evaluation, during first 24 hrs within the ICU. However its is complex and time consuming.

Hence, MPI is one of the most simple scoring system useful to a surgeon in determining the outcome of the patient with clinically and with simple bare minimum investigations.

MPI cutoff points should be adjusted for each hospital study population in our study it was divided into 3 groups, <21, 21-29, >29.

Death rate in patients with score<21 was 0%, 21-29 was 13% and >29 was 87%.

Simplicity of mpi makes it ideal for low resource hospitals and hospitals with shortage of staff.

Based on our study we conclude

Our study differs in 2 adverse outcomes variables of MPI, i.e, female sex and colonic origin of sepsis, we recommend further studies to include male sex and remove non colonic origin of sepsis and include colonic origin of sepsis as adverse outcome variables in MPI.

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