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### RESEARCH ARTICLE

#### STUDY OF PROGNOSIS OF PATIENTS WITH PERITONITIS USING MANNHEIM PERITONITIS INDEX SCORING SYSTEM

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#### Abstract

Discussions of the treatment of peritonitis and the evaluation of different therapeutic approaches are hampered by the lack of precise classification (ability). The advantages of various scoring systems used in other studies like Glasgow coma scale, TNM staging and APACHE scores in the evaluation of the pathophysiology and in comparing the efficacy of the treatment made one research for a similar scoring system in the evaluation of peritonitis, i.e., Mannheim peritonitis index.

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#### Introduction:-

Aim of my study was as follows:

1. To study the validity of the scoring system, presently being studied worldwide, i.e., Mannheim peritonitis index. Mannheim peritonitis index (MPI) is a **specific scoring system** that facilitates early identification of patients with severe peritonitis for aggressive surgical approach and improved outcomes.

#### Aim:-

To study the prognostic factor which determines the outcome of the disease.

Patient factors:-

Age, Sex, General Health.

Disease process

i. Site of perforation  
ii. Duration of perforation

iii. The extent of peritoneal contamination.

Effect of General systemic complications like

Respiratory, CV system, Shock

iv. Multi-organ failure

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**Mannheimperitonitisindex(MPI)**

| Risk factor  | Score |
|--|-------|
| 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     |
| Exudates:  |       |
| Clear  | 0     |
| Cloudy, purulent   | 6     |
| Fecal  | 12    |
| *Kidney failure: Creatinine level > 177 mmol/L or urea level > 167 mmol/L or oliguria < 20 mL/h; pulmonary insufficiency: PO <sub>2</sub> < 50 mmHg or PCO <sub>2</sub> > 50 mmHg; intestinal obstruction/paralysis > 24 h or complete mechanical ileus; shock hypodynamic or hyperdynamic |       |

**History:****Surgical anatomy of peritoneum and peritoneal cavity:**

The anatomic relationship within the abdomen is essential in determining possible source and routes of spread of infection. In man, the peritoneal cavity is a closed space. In women, it is perforated by the free ends of the fallopian tubes.

Anteriorly the peritoneal cavity reflects onto the posterior aspect of the anterior abdominal musculature. Posteriorly, the peritoneal lining lies superficial to the retroperitoneal viscera, including aorta, venacava, ureters, and kidneys. The anterior and posterior peritoneal layers are described collectively as the parietal peritoneum. The visceral peritoneum represents the mesothelial lining cells that are reflected onto the surface of the viscera.

The peritoneum is covering the intestine, the serosa of the bowel. Peritoneal reflections and the mesenteric attachments compartmentalize the intraperitoneal space and route, spreading exudates to sites that are often distant from the source. The transverse mesocolon divides the peritoneal cavity horizontally into an upper and a lower space. The greater omentum, extending from the transverse mesocolon and the lower border of the stomach, covers the lower peritoneal cavity.

The peritoneal cavity has several recesses into which exudates may become loculated. The most dependent recess of the peritoneal cavity in the supine position is in the pelvis. In women, the uterus and fallopian tubes project into the pelvic recess.

**Materials And Methods:-**

All patients of peritonitis are admitted to Government General Hospital, Siddhartha Medical College, Vijayawada or who have peritonitis due to various causes after being in a patient between the period of December 2016 to December 2018.

**Methodology:-****Inclusion Exclusion Criteria:**

Patients with clinical suspicion and investigatory support for the diagnosis of peritonitis due to hollow viscus perforation are included.

**Exclusion Criteria:**

Patients with associated injuries to other organs  
 Patients with associated vascular, neurogenic injuries  
 Patients with any other significant illness which is likely to affect the outcome more than the disease in the study.  
 Age below 12 years and above 75 years.  
 Sample size : 100 Patients

**Results:-**

Patients with peritonitis admitted in Government General Hospital, Siddhartha Medical College, Vijayawada were studied from December 2016 to December 2018, total number cases reviewed were 100.

Study of Patient factors :

age, sex Age:-

The patients with age ranging from 17 years – 75 years were considered. The maximum number of patients were in Middle age (21-50 years) – 64 patients. But the mortality rate was more in extremes of age that is >50 years group. The mortality rate of the elderly patient was 100% (1 patient).

**Sex:-**

A maximum number of patients were male – 86, but the mortality rate was more in males (100%). Since maximum patients were males, the number of patients died were maximum male patients.

**Study of the disease process**

Mortality vs time of presentation: The time of presentation of patients ranged from <24 hours to >12 days. Maximum patients presented in 1-3 days (41%). Mortality increased correspondingly with the delay in perforation. It was 0% for <24 hours, 80% >9 days, and 100% for more than 9 days.

**AGE & SEX :**

| Age    | Survived           | Died             | Total         |
|--------|--------------------|------------------|---------------|
| Male   | 81 (94%)<br>(85%)  | 5 (6%)<br>(100%) | 86<br>(86%)   |
| Female | 14 (100%)<br>(15%) | 0                | 14<br>(14%)   |
| Total  | 95 (95%)<br>(100%) | 5 (5%)<br>(100%) | 100<br>(100%) |

| Age     | Survived           | Died              | Total         |
|---------|--------------------|-------------------|---------------|
| < 20    | 17 (100%)<br>(18%) | 0                 | 17<br>(17%)   |
| 21 – 30 | 28 (100%)<br>(29%) | 0                 | 28<br>(28%)   |
| 31 – 40 | 17 (100%)<br>(18%) | 0                 | 17<br>(17%)   |
| 41 – 50 | 19 (100%)<br>(19%) | 0                 | 19<br>(19%)   |
| 51 – 60 | 7 (70%)<br>(7%)    | 3 (30%)<br>(60%)  | 10<br>(10%)   |
| 61 – 70 | 7 (89%)<br>(7%)    | 1 (13%)<br>(20%)  | 8<br>(8%)     |
| > 71    | 0                  | 1 (100%)<br>(20%) | 1<br>(1%)     |
| Total   | 95 (95%)<br>(100%) | 5 (5%)<br>(100%)  | 100<br>(100%) |

**DurationOfPresentation:**

Mortality Vs. type of perforation: Perforations were grouped into eight etiologies. Appendicular perforation was the commonest cause (29%) followed by gastric and enteric. The mortality rate of Gastric perforation is 100%. Another type of perforations duodenal, enteric and appendicular perforations contributed 0% mortality.

| Etiology                 | Survived           | Died              | Total         |
|--------------------------|--------------------|-------------------|---------------|
| Duodenal Perforation     | 7 (100%)<br>(7%)   | 0                 | 7<br>(7%)     |
| Enteric Perforation      | 17 (100%)<br>(18%) | 0                 | 17<br>(17%)   |
| Tubercular Perforation   | 6 (100%)<br>(6%)   | 0                 | 6<br>(6%)     |
| Traumatic Perforation    | 16 (100%)<br>(17%) | 0                 | 16<br>(16%)   |
| Malignant Perforation    | 2 (100%)<br>(2%)   | 0                 | 2<br>(2%)     |
| Non-specific Ileal       | 3 (100%)<br>(3%)   | 0                 | 3<br>(3%)     |
| Stomach                  | 15 (75%)<br>(16%)  | 5 (25%)<br>(100%) | 20<br>(20%)   |
| Appendicular perforation | 29 (100%)<br>(30%) | 0                 | 29<br>(29%)   |
| Total                    | (95%)<br>(100%)    | (5%)<br>(100%)    | 100<br>(100%) |

**EvaluationOfScoringSystem**

Results of MPI:-

The minimum score of the presentation was ten while the maximum was 47. Maximum patients were in the age 20-29. The mortality increased exponentially for a score more than 26. While the range of 10-19 had 0% mortality, the range 20-29 had 19 (28%) mortality. It jumped to 79% for score 30-39, and only one case who had a score of above 40 died (100%). To analyze the mortality rate more critically, an arbitrary cutoff point of MPI score 26 was taken. Sixty-five patients were in score <26 while 40 had more than 26. The mortality rate was as low as 5 (7%) with a score of <26 while it was as high as 35 (86%) in patients with a score of more than 26.

| MPI   | Survived          | Died            | Total         |
|-------|-------------------|-----------------|---------------|
| ≤ 26  | 49 (98%)<br>(52%) | 1 (2%)<br>(20%) | 50<br>(50%)   |
| > 26  | 46 (92%)<br>(48%) | 4 (8%)<br>(80%) | 50<br>(50%)   |
| Total | 95<br>(95%)       | 5<br>(5%)       | 100<br>(100%) |

MPI, of ≤ 26 MPI, 25% of ≤ 20 sepsis score, 7% of patients ≤ 24 hr duration stayed more than 20 days. It was reversed in 71% in age >50 years, 100% in MPI >26, 91% in sepsis score >20 and 47% duration >24 hrs.

**Discussion:-**

Peritonitis is a dreaded complication and if not treated in time, can terminate fatally in our study on 100 patients in Government General Hospital, Siddhartha Medical College, Vijayawada. We

found various factors like age, associated medical illness, shock at the time of admission, and extent of peritoneal contamination as an important prognostic factor in the outcome of these patients. The data we obtained were tabulated and the percentage calculated wherever necessary, the significance of the difference in various groups was calculated using  $\chi^2$  test, student-t-test and other statistical methods.

### Study of patient factors

Age: Age seems to be an important factor in determining the outcome. Extremes of age had increased mortality rates. This is in agreement with studies by Dellinger et al.

### Sex :

As in most studies males outnumber females by 9:1. Mortality rate was higher in females. This difference is not significant, ( $p < 0.05$ ) may be because of very less number of females in our study (only 10).

A degree of freedom: 1

chi-square: 0

### Study of the disease process

Mortality Vs. time of presentation: In our study, the duration of perforations from the time of presentation seemed to have the major impact. It can be seen that mortality for patients presenting within 24 hrs was 0%. And up to 100% for delayed presentation for more than one week. This is in complete agreement with the results of most other studies.

On further analysis of the data using the  $\chi^2$  test (30.15) for group data the  $P < 0.001$ , confirming that the difference in mortality is highly significant. Hence, delay in presentation is associated with the corresponding increase in mortality.

### Mortality Vs. type of perforations

As with most studies gastric perforation contributed maximum mortality of the cases (20/100). They contributed as much as 100% to the mortality. They had a mortality rate of 100%. Enteric perforation had the mortality of 0% even though delay in presentation, typical clinical features, the general complication of typhoid seem to contribute to higher mortality rate compared with other studies.

| Etiology              | Our Study | Nair <sup>33</sup> | Mishra | Tripathi <sup>31</sup> | Golighe r | Delinger <sup>2</sup> |
|-----------------------|-----------|--------------------|--------|------------------------|-----------|-----------------------|
| Duodenal perforation  | 0 %       | -                  | -      | 16.6%                  | -         | 41%                   |
| Enteric               | 0%        | 48%                | -      | 32%                    | --        | -                     |
| Tubercular            | 0%        | 100%               | 30%    | -                      | -         | -                     |
| Malignant perforation | 0%        | -                  | -      | -                      | 71%       | -                     |
| Traumatic perforation | 0%        | -                  | -      | 33%                    | -         | -                     |
| Gastric Perforation   | 5%        | -                  | -      | -                      | -         | -                     |

For each analysis, the factor is divided into two groups.

### Survivor group:

Age  $\leq$  50 years, MPI  $\leq$  26, Perforation duration  $\leq$  24 hrs.

### Mortality group :

Age  $>$  50 years, MPI  $>$  26, (High-risk group) Perforation duration  $>$  24 hrs.

In our study we found that in survivor group of patients tend to have less General complication and less serious local complications conversely, the mortality group had more serious local complications like fecal fistula, deep seated abscess.

| Complications | Our study | Tripathi et al. <sup>32</sup> |
|---------------|-----------|-------------------------------|
| Fecal fistula | 7 %       | 7.5 %                         |
| Wound sepsis  | 24 %      | 26 %                          |
| MOF           | 15 %      | 11 %                          |

An interesting aspect in our study was in perforation duration, patients presenting with 24 hours had a very good prognosis with fewer complications both general and local. This is in agreement with current studies. We advocate needing for further studies on Mannheim Peritonitis index to include acolic origin of sepsis and to remove female sex as variables of adverse outcome in Mannheim Peritonitis index.

### Conclusion:-

The prospective study was done on 100 patients in Government General Hospital, Siddhartha Medical College, Vijayawada.

Extremes of age ( $\leq 20$  yrs,  $> 50$  yrs) seem to hurt the outcome - other comorbidities like HIV and renal failure.

Type, Time and extent of peritoneal contamination seem to have a bearing on mortality. Patients with diffuse peritonitis, fecal contamination do worse.

Associated factors like diabetes, cardiovascular problems add to mortality.

There is wide scope for the use of Mannheim peritonitis index, in the present context. It helps in determining the risk of patient preoperatively.

### surgical decision.

definitive surgery can be done safely in low score patient.

Aggressive, newer modalities of treatment need to be tried in high score patients to improve mortality by Intensive therapy unit & dialysis.

To compare the efficacy of various treatment can be accurately compared by taking into consideration their effect on mortality with respect to their scores.

Patient with high scores needs to be managed in surgical ICU centers which are adequately equipped and well equipped with trained personnel and facilities.

Only adequate Health education, proper referral mechanism can help in reducing this.

Peritonitis and its sequelae management involve lots of skill, expensive modalities of monitoring and treatment which has to be utilized judiciously based on risk stratification.

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