



## A RETROSPECTIVE STUDY TO EVALUATE THE INDICATORS OF MORTALITY IN CASES OF PERFORATIVE PERITONITIS IN TERTIARY CARE HOSPITAL

### Surgery

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### ABSTRACT

**INTRODUCTION:** perforative peritonitis is still a major challenge for surgeons and is complicated and the mortality rate is still high. Causes of Perforative peritonitis in our country is different than that in western world. It is therefore important to recognize the main indicators of mortality in cases of perforative peritonitis and the objective of my study is to retrospectively study the indicators .

**MATERIALS AND METHODS:** All patients diagnosed as peritonitis and admitted to Surgical Ward or who develop features of peritonitis due to various causes after being admitted between the period JULY 2012 to JUNE 2014. Patients with gynecological peritonitis, biliary peritonitis, post operative peritonitis were excluded from the study.

**RESULTS:** Patients with peritonitis admitted in surgery ward were studied .Total number cases studied were 100. The patients with age ranging from 17 years – 75 years were studied.Mortality rate was more in extremes of age that is  $\leq 20$  years  $> 50$  years group. The mortality rate of elderly patient was 100% (1 patient). Maximum number of patients were male – 90, but mortality rate was more in females. Since maximum patients were males, the number of patient died were maximum in males.

Mortality increased correspondingly with delay in perforation. It was 10% for  $<24$ hours, 74%  $>6$  days . Perforations were grouped into 8 aetiologies. As many as 54 patients (54%) presented with shock on day 1. They had high mortality of 27 (50%) in comparison to 4 (10%) in patients without shock.

**CONCLUSION:** In this Retrospective study various factors affecting both mortality and morbidity in peritonitis patients were studied. Extremes of age ( $\leq 20$  yrs,  $> 50$  yrs) seem to have adverse effect on the outcome. The impact of sex outcome could not be conclusively proved, even though female patient seem to have poorer prognosis. Type and extent of peritoneal contamination seem to have bearing on mortality. Patients with diffuse peritonitis, faecal contamination do worse. Associated factors like diabetes, cardiovascular problems add to mortality. There is wide scope for use of Mannheim peritonitis index, sepsis score of Elebute and Stoner in present context.

### KEYWORDS:

Peritonitis, Perforation, Mortality, Indicators

### INTRODUCTION

Perforative peritonitis is one of the most common surgical emergencies in our country. In spite of many advances in techniques of surgery, antibiotics and intensive care therapy the treatment of perforative peritonitis is still a major challenge for surgeons and is complicated and the mortality rate is still high.

Causes of Perforative peritonitis in our country is different than that in western world.<sup>1</sup>In our set up the common causes are duodenal ulcer perforation, appendicular perforation and perforation due to typhoid and tuberculosis. There is also a increase in cases of perforation due to trauma of abdomen.

In many of the cases the patients present late with peritonitis well established with sepsis and contamination with pus or faeces. It becomes very important to recognize patients who are at more risk depending on various pre-operative, per-operative and post-operative factors<sup>2</sup>

and stratify them according to the risk because of the limited availability of the various intensive care treatment facilities.

It is therefore important to recognize the main indicators of mortality in cases of perforative peritonitis and the objective of my study is to retrospectively study the indicators .

### AIMS AND OBJECTIVES

The objective of my study is to evaluate the indicators that predict the mortality in cases of perforative peritonitis for the purpose of stratifying patients into different categories and for giving them better and early care.

The various indicators that will be studied are:

- Age and Gender
- Presence of co-morbid illness
- Perforation- to operation interval
- Preoperative shock, heart rate
- Blood urea and Serum creatinine

Peroperative findings (site of perforation, septic contents, other organs.)

Operative procedure done  
.- Post operative factors

### INCLUSION CRITERIA:

All the patients admitted in Surgey ward with perforative peritonitis are included in this study.

### EXCLUSION CRITERIA

Patients with gynecological peritonitis, biliary peritonitis, post operative peritonitis were excluded from the study.

### MATERIALS AND METHODS

All patients diagnosed as peritonitis and admitted to Surgical Ward or who develop features of peritonitis due to various causes after being admitted between the period JULY 2012 to JUNE 2014.

### Methodology

The study being RETROSPECTIVE study, all patients admitted to surgical wards as above were considered according to inclusion and exclusion criteria.

### Definitions employed for study

1. **Peritonitis:-** acute suppurative inflammation of the peritoneal cavity, arising as a consequence of primary disease of the abdominal hollow visceral perforation, of blunt or penetrating trauma or operation within the peritoneal spaces.

2. **Shock:** - Clinical sign of reduced peripheral perfusion and any two of the Following

- (i) systolic B.P. of no more than 90 mmHg
- (ii) heart rate of at least 100 beats per minute
- (iii) Urine output of less than 80 ml/4 hrs
- (iv) use of pressors to maintain BP for at least  $\geq 1$  hr.

3. **Multiple organ failure:-** Failure of any two or more of the following system.

- (i) Renal: Blood urea  $\geq$  50 mg/dl. and / or serum creatinine  $\geq$  2 mg/dl.
- (ii) Hepatic Serum bilirubin  $\geq$  2 mg/dl
- (iii) Lung:- 5 or more days of ventilatory support. Or PO<sub>2</sub> < 50 mmHg, PCO<sub>2</sub> > 50 mmHg
- (iv) Shock
- (v) Intestinal obstruction – Profound paralytic ileus  $\geq$  24 hr .

**General Parameter**

- (i) Disease Diagnosed using clinical imaging techniques, operative finding (if any) as confirmatory evidence.
- (ii) Disease process Type of perforation
- (iii) Severity Alteration in physiology studied using scoring systems Mannheim peritonitis index (MPI) and sepsis score of Elebute and Stoner and evidence of shock.
- (iv) Concurrent Disease Cancer, Diabetes Mellitus, Cardiac, etc.
- (v) Physiological reserve Age, functional states.
- (vi) Response to treatment Change in physiology

**Sample Size**

Total number of causes studied – 100

**Inclusion Exclusion Criteria**

All patients who satisfied above diagnostic criteria were included in the study.

**Exclusion Criteria**

Patients with gynecological peritonitis, biliary peritonitis, post operative peritonitis were excluded from the study.

**RESULTS**

Patients with peritonitis admitted in surgery ward were studied from JULY 2012 to JUNE 2014, total number cases studied were 100.

**(I) STUDY OF PATIENT FACTORS**

**Age** The patients with age ranging from 17 years – 75 years were studied. Maximum number of patients were in Middle age (31-50 But the years)- 43 patients. mortality rate was more in extremes of age that is  $\leq$ 20 years > 50 years group. The mortality rate of elderly patient was 100% (1 patient)

**TABLE 1-SHOWING RELATION BETWEEN MORTALITY AND AGE**

Age	scoring	Dead	Total
<20	8	3	11
21-30	20	3	23
31-40 9	15	4	19
41-50	15	9	24
51-60	7	7	14
61-70	4	4	8
>70 0 1	0	1	1
TOTAL	69	31	100

**Sex**

Maximum number of patients were male – 90, but mortality rate was more in females. Since maximum patients were males, the number of patient died were maximum in males.

**TABLE 2-SHOWING RELATION BETWEEN MORTALITY AND SEX**

AGE	SURVIVORS	DEAD	TOTAL
MALE	65	31	90
FEMALE	4	6	10
TOTAL	69	37	100

**(II). STUDY OF DISEASE PROCESS**

**Mortality v/s time of presentation**

The time of presentation of patients ranged from <24 hours to >12 days.

Maximum patients presented in 1-3 days(39%). Mortality increased correspondingly with delay in perforation. It was 10% for <24hours, 74%>6 days

**TABLE 3 - SHOWING RELATION BETWEEN MORTALITY AND TIME OF PRESENTATION**

DURATION	SURVIVORS	DEAD	TOTAL
< 24 hrs	19	2	21
24-72 hrs	30	9	39
4-6 days	14	5	19
7-9 days	5	14	19
10-12 days	0	2	2
Total	69	31	100

**Mortality Vs type of perforation**

Perforations were grouped into 8 aetiologies. Duodenal perforation was the commonest cause (73%) followed by enteric and Tubercular. The mortality rate of Duodenal perforation, tubercular and traumatic were similar at 33 while enteric was 40%. Malignant perforation had 100% mortality, while perforation of the stomach had lowest 14% mortality.

**TABLE4- SHOWING RELATION BETWEEN MORTALITY AND SITE OF PERFORATION**

ETIOLOGY	SURVIVORS	DEAD	TOTAL
Duodenal perforation	52	21	73
Enteric perforation	5	2	7
Tubercular Poration	3	1	4
Traumatic Perforation	4	4	8
Malignant Perforation	0	2	2
Stomach	4	1	5
Others	1	0	1
Total	69	31	100

One of the stomach perforations was malignant.

**Effect of shock on mortality**

As many as 54 patients (54%) presented with shock on day 1. They had high mortality of 27 (50%) in comparison to 4 (10%) in patients without shock.

**TABLE 5- SHOWING RELATION BETWEEN MORTALITY AND SHOCK**

Shock	Survivors	Dead	Total
Shock on Day 1	27	27	54
No Shock on day 1	42	4	46
Total	69	31	100

**STUDY OF FACTORS CONTRIBUTING TO MORBIDITY**

Morbidity was defined as patients who developed any complication which required specific treatment and/or whose hospital exceeded 20 days. Four important factors, which had bearing on mortality were undertaken to study whether they had any effect on morbidity they were.

- 1. Age  $\leq$  50 years > 50 yrs
- 2. MPI  $\leq$  26 > 26
- 3. Sepsis score  $\leq$  20 > 20
- 4. Perforation duration  $\leq$  24 hrs > 24 hrs.

5. General and 9 local complications were studied .

\* pulmonary was the commonest general complication it ranged from 21% in patients of perforation duration < 24 hrs, to 94% inpatient with MPI > 26 followed by Renal and Toxemia.

\* Wound sepsis was the common local complication ranging from 2% for perforation  $\leq$  24 hrs to 22% for perforation > 24 hrs.

**Age Factor**

Patients who were  $\leq$  50 yrs formed majority of the population .

they had less general complications than patients who were > 50 years, who developed more general complications.

As many as 54% of total population developed pulmonary complications.

Interesting aspect of study was, patients with younger age group tended to develop more local complication like wound sepsis (17%) pelvic abscess (6%), than older patients.

As many as 59 patients (64%) developed some complication or other. In patient  $\leq 50$  years, they tend to have less number of complication while elderly tend to have more number of complications per patient.

17 patients (24%) in  $\leq 50$  years had only 1 or 2 complications, while 24% had 3 or more complications.

In  $> 50$  years group, only 5 (21%) had 1 or 2, while majority (51%) had more than 3 complications.

The complication rate was 56% in  $\leq 50$  years, while  $> 50$  years it was 72

**TABLE6- SHOWING MORBIDITY AND FACTORS AFFECTING IT**

No. of complications	Age <50	Age >50	MPS <26	MPS >26	Sepsis <20	Sepsis >20	Perforation <2 hrs	Perforation >2 h
1	11	3	15	0	15	1	5	10
2	8	2	9	1	7	2	0	9
3	13	8	3	18	3	18	2	19
$\geq 4$	11	3	2	13	0	14	0	14
<b>TOTAL</b>	<b>43</b>	<b>16</b>	<b>29</b>	<b>32</b>	<b>25</b>	<b>35</b>	<b>7</b>	<b>52</b>

**Mannheim peritonitis**

**Index (MPI) and sepsis score**

As in age group general complication in survivor group (MPI  $\leq 26$ , sepsis  $\leq 20$ ) was considerable less than in mortality group (MPI  $> 26$ , sepsis  $> 20$ ). Approximately 32% had pulmonary complication in survivor group.

It was 89-94% in mortality group, other general complication were similarly higher.

Like in age, survivor group had more local complications like wound sepsis (17%), pelvic abscess (6%) than in mortality group. Interesting aspect was Faecal fistula, a dreaded complication was more in mortality group (16%) than in survivor group (1.2%). So was subdiaphragmatic abscess.

Analyzing the number of complications, the survivor group had less complication rate (41-45%) while mortality group had more (88-91%).

As in age group, survivor group had less number of complications per patient, while mortality group had more complication per patient. In survivor group out of 45% of patient who developed complications, 38% had only 1 or 2 complications; only 7% had more complications.

In mortality group, 88—91% of Patients developed complications, only 2-8% had 1 or 2 complications, as many as 85% had 3 or more complications.

**Duration of perforation and morbidity**

Duration of perforation seem to be having most corresponding relationship to complication.

In survivor group ( $> 24$  hrs) the general complication was pulmonary (21%) and other 1.2%, while it was 68% pulmonary, 40% renal, 45% toxemia in mortality gp ( $> 24$  hrs)

In contrast to previous group where local complication were more in survivor group here even local complication was more in mortality group wound sepsis 22% and faecal fistula 9%. On analyzing the number of complications the same phenomenon repeats. Only 23%, developed complications in survivor group, whereas 76% developed complications in mortality group. The survivor group had less number of complication (1 complication 16%) while mortality group the complication rate increased (1  $\rightarrow$  14%, 2  $\rightarrow$  13%,  $> 3 \rightarrow$  49%).

**Hospital stay as indicator or Morbidity**

As in other complication patients in survivor group had less hospital stay duration than mortality group if only 17% of patients  $\leq 50$  yr, 24% of  $\leq 26$  While considering for hospital stay, patient with very high risk score, died early, hence their hospital stay would be less, hence to obviate this error, we look into consideration the patients who eventually survived for our study of hospital stay.

**Post-operative complication with leaking gastrointestinal fistula**

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

**FIG 1- Post-operative complication with leaking gastrointestinal fistula**



**DISCUSSION**

Peritonitis is a dreaded complication and if not treated in time, can terminate fatally. In our study on 100 patients in govt.rajaji hospital, we found various factor like age, associated medical illness, shock at the time of admission, and extent of peritoneal contamination as important prognostic factor in the outcome of these patients.<sup>3</sup>

The data we obtained were tabulated and percentage calculated wherever necessary.

**1) STUDY OF PATIENT FACTORS**

**a) Age**

Age seem to be the important factor in determining the outcome. Extremes of age had increased mortality rates. However, when it is divided into different group ranges from  $\leq 20$ , 21-30, 31-40 .....  $\geq 71$ , the Difference in age group is not statistically significant, when verified using  $\chi^2$  test ( $p > 0.05$ )

The probable explanation could be, the classified age group  $< 20$ , 31-30, 41-50 which formed substantial population has similar rates.

Factors like decreased functional reserve, concomitant other illness such as diabetes, hypertension, local factor such as malignancy seem to be the cause of increase mortality in elderly patients.<sup>4,5</sup>

**AGE – PATIENT DISTRIBUTION AND MORTALITY PERCENTAGE**

As in most studies males out number 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)

**2. STUDY OF DISEASE PROCESS**

**Mortality Vs. time of presentation**

In our study, duration of perforations from the time of presentation seemed to have major impact . mortality for patients presenting within 24 hr was 10%. which it increased to 20% for 24-72 hrs. and upto 100% for delayed presentation more than 1 week. This is in complete agreement with the result of most studies.

**DELAY IN PRESENTATION PATIENT DISTRIBUTION AND MORTALITY PERCENTAGE**

The value of 4 points given in MPI is in agreement with this. The spread of peritonitis, shock due to delay, onset of sepsis syndrome. Seem to be the main causes for increase in mortality rate.

This has to be weighed against patient factor like age, associated medical problem also. Even after discounting these factors there seem to be definite increase in mortality due to delay in presentation (Svoannes)<sup>6,7</sup>

**Mortality Vs. type of perforations**

As with most studies duodenal perforation from bulk of the cases (73/100). They contributed as much as 68% to the mortality due to the number of cases itself. They had mortality rate of 28%.

Enteric perforation had mortality of 25% delay in presentation, typical clinical features, general complication of typhoid seem to contribute to higher mortality rate.<sup>8,9</sup>

**Effect of shock on mortality**

In our study, effect of shock on day 1 was associated with significant mortality (50%) similar to other studies<sup>10,11</sup>

Shock is systemic manifestation due to loss of fluid electrolytes, septicemia and organ failure. In agreement with most studies, we had high mortality. MPI also gave seven risk points to multi organ failure a culmination of shock and other systemic manifestations

### SUMMARY

\*Study was done on 100 patients to find out the prognostic factors influencing peritonitis.

\*Duodenal perforation formed 73% (73) of the patients and 66% (21) of mortality. They had mortality rate of 28%.

\* Even though enteric, tubercular and malignant perforations formed small proportion they had high mortality

\* Patients who were  $\leq 50$  years did considerably well than older patients.

\* Various components of scoring system like  $> 50$ , duration of perforation, effect of peritoneal contamination, shock on day 1 has been separately studied and found have significant impact on mortality and morbidity.

\*Delay in perforation of more than 24 hours seem to affect prognosis adversely (mortality 33%) while delay of  $> 72$  hours has very bad impact (mortality  $> 69\%$ ).

\* Patients who had shock on day one, had very high mortality rate of 50%.

\* Perforation duration  $> 24$  hours. is a bad prognostic factor

### CONCLUSION

In this Retrospective study various factors affecting both mortality and morbidity in peritonitis patients were studied.

Extremes of age ( $\leq 20$  yrs,  $> 50$  yrs) seem to have adverse effect on the outcome. The impact of sex outcome could not be conclusively proved, even though female patient seem to have poorer prognosis. Type and extent of peritoneal contamination seem to have bearing on mortality.

Patients with diffuse peritonitis, faecal contamination do worse. Associated factors like diabetes, cardiovascular problems add to mortality. There is wide scope for use of Mannheim peritonitis index, sepsis score of Elebute and Stoner in present context.

It helps in

a) determine the risk of patient preoperatively.

b) surgical decision.

- definitive surgery can be done safely in low score patient.

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