

## VALIDATION OF MODIFIED POSSUM SCORING SYSTEM IN PERITONITIS DUE TO HOLLOW VISCUS PERFORATION

**Dr.K.B.S.Prabhakar<sup>1</sup>, Dr.Adiraju Kalyani<sup>2</sup>, Dr.A.Setu Madhavi<sup>3</sup>, Dr.Ratla. N. Bharat Singh Naik<sup>4\*</sup>**

<sup>1</sup>Professor, Department of General Surgery, Siddhartha Medical College, Vijayawada, AP.

<sup>2</sup>Associate Professor, Department of General Surgery, Siddhartha Medical College, Vijayawada, AP.

<sup>3</sup>Associate Professor, Department of General Surgery, Siddhartha Medical College, Vijayawada, AP.

<sup>4\*</sup>Associate Professor, Department of General Surgery, Government Medical College, Machilipatnam, AP.

**Corresponding Author: Dr.Ratla. N. Bharat Singh Naik**  
**Associate Professor, Department of General Surgery, Government Medical College, Machilipatnam, AP.**

### Abstract

**Background:** Perforation Peritonitis is caused mostly by the perforation of a diseased viscus. Abdominal trauma, ingestion of a sharp foreign body, and iatrogenic perforation are additional causes of perforation. The diagnosis is mostly based on clinical findings.

**Objectives:** To assess the validity of modified POSSUM score in Peritonitis due to hollow viscus perforation.

**Methods:** A total of 50 patients admitted in Department of General Surgery, Siddhartha Medical College, Vijayawada, who are diagnosed with peritonitis due to hollow viscus perforation were included. The data was collected using the POSSUM scoring system's criteria. The patients' outcomes were recorded as death/alive; complicated/uncomplicated, and statistical analysis was performed by comparing predicted and observed outcomes.

**Results:** Out of 50 cases, 18% of the cases died, Complications were seen in 70% of the cases of which multiple complications were seen in 32% of the cases, Deep infection and septicemia was seen in 10% of the cases each, Wound infection a chest infection was seen in 6% of the cases each. Pyrexia of unknown origin, impaired renal function and urinary tract infection was seen in 2% of the cases each. The parameters Glasgow scale, perforation to operation time, mode of surgery, malignancy, multiple procedures, comorbidities and predicted risk of mortality were statistically significant. The sensitivity was 91.11%, specificity was 100%, PPV was 100% and NPV was 55.56% and accuracy was 92%.

**Conclusion:** The outcomes of this study suggest that the POSSUM scoring system can be used to predict the mortality and morbidity of patients undergoing surgery for Perforative peritonitis. Taking into consideration variables such as perforation to surgical intervention can help in enhancing the scoring system. As a result, modifying the scoring system based on the surgery would enhance the patients' outcomes, enabling them to receive better healthcare.

**Key words:** Perforative peritonitis, POSSUM, Morbidity, Mortality, Septicemia.

## **INTRODUCTION**

Generalized peritonitis is a leading cause of mortality. It is still one of the most serious problems that surgeons, and their patients face across the world. Peritonitis was treated medically until the turn of the century, with a 90% mortality rate.<sup>1</sup> Krishna reported in 1926 that rigorous use of surgical principles may minimize peritonitis mortality, and the death rate dropped below 50%.<sup>2</sup> Despite several advancements in surgical skills, antimicrobial medicines, and supportive care since then, peritonitis mortality has remained high, ranging between 13 and 43 % in various multicenter studies.<sup>3</sup>

Peritonitis prognosis and outcome are determined by a complex interplay of numerous variables, including patient, illness, and interventional factors. The result is also said to be influenced by a person's chronic health status.<sup>4</sup>

Acute widespread peritonitis caused by a perforation of the gastrointestinal hollow viscus is a potentially fatal disease. It's a common surgical emergency in many developing-country general surgical departments, and it's generally linked with significant morbidity and mortality. Even if the patient is admitted at the hospital on time and is operated upon, the recovery period is uncertain. Secondary peritonitis occurs when the peritoneal cavity is contaminated by the contents of an organ within the peritoneal cavity. Lesions in the stomach, duodenum, small intestines, appendix, and colon cause the majority of these episodes.<sup>5</sup>

The numerical weighing of clinical data is used to calculate prognostic scores. The prognosis and outcome of peritonitis have been assessed using a variety of scoring systems. The APACHE II, MPI, PIA, Sepsis Score, and POSSUM are among the scores used.

## **AIMS AND OBJECTIVES**

### **AIMS:**

- To assess the validity of modified POSSUM score in Peritonitis due to hollow viscus perforation.

### **OBJECTIVES:**

- To assess the validity of POSSUM scoring in predicting post-operative morbidity and mortality in patients who undergo emergency laparotomy for perforative peritonitis.
- To validate two factors; perforation to operation time and co-morbid status in predicting the post-operative outcome in patients with peritonitis with hollow viscus perforation.

## **MATERIALS AND METHODS**

**Study design:** Prospective cohort study.

**Study duration:** 18 months (JAN 2020-JUNE 2021).

**Sample size:** 50 patients admitted in department of General Surgery, Siddhartha Medical College, Vijayawada who are diagnosed with peritonitis due to hollow viscus perforation.

**Inclusion criteria:**

- Age above 12 years.
- Patients with established peritonitis following hollow viscus perforation.
- Patients with an intra-peritoneal abscess caused by a perforation of the hollowviscus.

**Exclusion criteria:**

- Age 12 years and below.
- Patients who require an emergency exploratory laparotomy for reasons otherthan abdominal trauma.
- Patients who have developed primary peritonitis with TB, nephrotic syndrome, cardiac failure, alcoholic cirrhosis, or systemic lupus erythematosus.

The data was collected using the POSSUM scoring system's criteria. The patients' outcomes were recorded as death/alive; complicated/uncomplicated, and statistical analysis was performed by comparing predicted and observed outcomes.

**Statistical analysis:** The statistical analysis was done using SPSS 22 software, the data was presented in the form of tables and graphs, the chi-square and p-value was calculated. The p-value of <0.005 was considered statistically significant.

**RESULTS**

A total of 50 patients who were diagnosed with peritonitis due to hollow viscus perforation were included.

Gender	Frequency	Percentage
Male	40	80%
Female	10	20%
Total	50	100%

**Table 1: Distribution based on Gender**

Male predominance was seen with 80% and females were 20%. The male: female ratiowas 4:1.

Age group	Frequency	Percentage
31 - 40	2	4%
41 - 50	10	20%
51 - 60	25	45%
>60	13	26%
Total	50	100%

**Table 2: Distribution based on Age group**

Majority of the cases around 45% belonged to the age group of 51 to 60 yrs, followed by >60 yrs age group with 26%, 20% in 41 to 50 yrs age group and the least 4% belonged to 31 to 40 yrs age group. The mean age was  $55.24 \pm 7.96$  yrs.

<b>Indications for surgery</b>	<b>Frequency</b>	<b>Percentage</b>
Appendicular perforation	11	22%
Duodenal and antral perforation	28	56%
Gastric malignancy perforation	2	4%
Ileal perforation	8	16%
Sigmoid Volvulus perforation	1	2%
<b>Total</b>	<b>50</b>	<b>100%</b>

**Table 3: Distribution based on indications for surgery**

In majority of the cases around 56% of them had duodenal and antral perforation. 22% had appendicular perforation, 16% of the cases had Ileal perforation, 4% of the cases had Gastric malignancy perforation and 2% had sigmoid volvulus perforation.

<b>Type of surgery</b>	<b>Frequency</b>	<b>Percentage</b>
Perforation closure with omental patch	33	66%
Appendicectomy	12	24%
Resection anastomosis	4	8%
Stoma	1	2%

**Table 4: Distribution based on type of surgery**

In majority of the cases perforation closure with omental patch was done in 66% of them. Appendectomy was done in 24% of the cases, Resection anastomosis was done in 8% of the cases and stoma was done in 2% of the cases.

<b>Cardio Vascular Syndrome</b>	<b>Frequency</b>	<b>Percentage</b>
Diuretic	3	6%
Peripheral edema	1	2%
No failure	46	92%
<b>Total</b>	<b>50</b>	<b>100%</b>

**Table 5: Distribution based on Cardiovascular syndrome**

Majority of the cases around 92% didn't had any failure, around 6% of the cases were diuretic and 2% of the cases had peripheral edema.

<b>Respiratory syndrome</b>	<b>Frequency</b>	<b>Percentage</b>
Dyspnea at rest	32	64%
Dyspnea on exertion	3	6%
limiting dyspnea, mild COAD	15	30%
Total	50	100%

**Table 6: Distribution based on respiratory complications**

In majority of the cases, around 64% of them had Dyspnea at rest, Around 30% of the cases had limiting dyspnea with mild Chronic Obstructive Airway Disease. Only 6% of the cases had dyspnea on exertion.

<b>Glasgow coma scale</b>	<b>Frequency</b>	<b>Percentage</b>
Mild	48	96%
Moderate	1	2%
Severe	1	2%
Total	50	100%

**Table 7: Distribution based on Glasgow coma scale**

According to Glasgow coma scale, Mild brain injury was reported in 96% of the cases, Moderate and Severe brain injury in 2% of the cases each.

<b>Operative Complexity</b>	<b>Frequency</b>	<b>Percentage</b>
Moderate	10	20%
Major	40	80%
Multiple Procedures		
1	44	88%
2	4	8%
>2	2	4%
Total	50	100%

**Table 8: Distribution based on operative complexity and number of procedures**

In majority of the cases, it was a major complex procedure in 80% of the cases and in 20% of the cases the operative procedure was moderate complex. In 4% of the cases >2 procedures were done and in 8% of the cases 2 procedures were done.

<b>Perforation to operation duration</b>	<b>Frequenc y</b>	<b>Percentage</b>
<24 hrs	18	36%
24 to 48 hrs	20	40%
>48 hrs	12	24%
Total	50	100%

**Table 9: Distribution based on Perforation to operation duration**

In Majority of the cases, around 40% had Perforation to operation duration in between 24 to 48 hrs. 36% of the cases had Perforation to operation duration of <24 hrs and 24% of the cases had Perforation to operation duration of >48 hrs.

<b>Total blood loss</b>	<b>Frequency</b>	<b>Percentage</b>
<100 ml	11	22%
100 – 500 ml	35	70%
501 – 999 ml	3	6%
>1000 ml	1	2%
Total	50	100%

**Table 10: Distribution based on total blood loss**

In majority of the cases around 70% of them had blood loss in the range of 100 to 500 ml, 22% had <100 ml blood loss, 6% had blood loss in the range of 501 to 999 ml and 2% had >1000 ml blood loss.

<b>Peritoneal Soiling</b>	<b>Frequency</b>	<b>Percentage</b>
Minor (serous fluid)	4	8%
Local pus	7	14%
free bowel contents, pus or blood	39	78%
Total	50	100%

**Table 11: Distribution based on peritoneal soiling**

In majority of the cases gross peritoneal contamination was seen in 78% of them, In 14% of the cases Local pus was seen and in 8% of the cases minor (serous fluid) was seen.

<b>Malignancy</b>	<b>Frequency</b>	<b>Percentage</b>
Nodal metastasis	1	2%
Distant metastasis	1	2%
None	48	96%
<b>Total</b>	<b>50</b>	<b>100%</b>

**Table 12: Distribution based on Malignancy**

Nodal metastasis was reported in 2% of the cases and distant metastasis was also reported in 2% of the cases.

<b>Mode of surgery</b>	<b>Frequency</b>	<b>Percentage</b>
Emergency resuscitation >2 hrs, operation <24 hrs	46	92%
Emergency immediate surgery <2 hrs	4	8%
<b>Total</b>	<b>50</b>	<b>100%</b>

**Table 13: Distribution based on Mode of surgery**

In Majority of the cases, emergency resuscitation of >2 hrs was done and taken up for surgery within 24 hrs of admission in 92% of the cases and in the rest 8% of the cases Emergency immediate surgery was done in <2hrs of admission.

<b>Comorbidities</b>	<b>Frequency</b>	<b>Percentage</b>
Asthma	3	6%
COAD	10	20%
Hypertension	5	10%
COAD with HT	2	4%
DM with HT	2	4%
None	28	56%
<b>Total</b>	<b>50</b>	<b>100%</b>

**Table 14: Distribution based on Comorbidities**

Around 22% of the cases had comorbid conditions. In majority of the cases around 20% of them had COAD, Hypertension was seen in 10% of the cases, Asthma in 6% of the cases, COAD with HT and DM with HT was seen in 4% of the cases each.

<b>Expected Morbidity</b>	<b>Frequency</b>	<b>Percentage</b>
<50%	4	8%
51-80%	10	20%
81-90%	7	14%
91-100%	29	58%
<b>Total</b>	<b>50</b>	<b>100%</b>

**Table 15: Distribution based on expected morbidity**

In majority of the cases, around 58% had expected morbidity in the range of 91 to 100%, followed by 51 to 80% range seen in 20% of the cases, 81 to 90% range seen in 14% of the cases and only 8% of the cases had expected morbidity of <50%.

<b>Expected Mortality</b>	<b>Frequency</b>	<b>Percentage</b>
<50%	26	52%
51-80%	15	30%
81-90%	4	8%
91-100%	5	10%
<b>Total</b>	<b>50</b>	<b>100%</b>

**Table 16: Distribution based on expected mortality**

Around 52% of the cases had expected mortality <50% range. 30% of the cases had expected mortality between 51 to 80%, 10% of the cases had expected mortality between 91 to 100% range and 8% of the cases had expected mortality between 81 to 90% range.

<b>Serum parameters</b>	<b>1</b>	<b>2</b>	<b>4</b>	<b>8</b>	<b>Chi-square</b>	<b>p-value</b>
BP	24	17	4	5	22.48	0.00005
PR	0	6	22	22	30.32	0.000001
Hb	21	9	19	1	20.72	0.0001
WBC	19	29	2	0	46.48	<0.005
Urea	3	11	16	20	12.88	0.004
Na+	33	9	7	1	47.6	<0.005
K+	38	2	8	2	71.28	<0.001

**Table 17: Correlation of possum scoring vs serum parameters**

All serum parameters when correlated with possum scoring were statistically significant.

<b>Surgery Outcomes</b>	<b>Frequency</b>	<b>Percentage</b>
Alive	41	82%
Death	9	18%
Total	50	100%

**Table 18: Distribution based on Surgery outcomes**

Out of 50 cases, 18% of the cases died while 82% of the cases survived.

<b>Complications</b>	<b>Frequency</b>	<b>Percentage</b>
None	15	30%
Urinary tract infection	1	2%
Deep infection	5	10%
Wound infection	3	6%
Chest infection	3	6%
Septicemia	5	10%
Pyrexia of unknown origin	1	2%
Impaired renal function	1	2%
Multiple complications	16	32%
Total	50	100%

**Table 19: Distribution based on Complications**

Out of 50 cases, Complications were seen in 70% of the cases of which Multiple complications were seen in 32% of the cases, Deep infection and septicemia was seen in 10% of the cases each, Wound infection and chest infection was seen in 6% of the cases each. Pyrexia of unknown origin, impaired renal function and urinary tract infection was seen in 2% of the cases each.

<b>POSSUM Variables</b>	<b>Surgical outcome</b>		<b>Total</b>	<b>Chi-square</b>	<b>p-value</b>
	<b>Alive N=41</b>	<b>Death N=9</b>			
<b>CVS</b>					
Diuretic	3	0	3	0.954	0.620
Peripheral edema	1	0	1		
No failure	37	9	46		
<b>Respiratory</b>					

Dyspnea at rest	23	9	32	6.173	0.045
Dyspnea on exertion	3	0	3		
limiting dyspnea, mild COAD	15	0	15		
<b>Glasgow coma scale</b>					
Mild	41	7	48	9.49	0.008

Moderate	0	1	1		
Severe	0	1	1		
<b>Perforation to operation time</b>					
<24 hrs	17	1	18	11.08	0.003
24 to 48 hrs	18	2	20		
>48 hrs	6	6	12		
<b>Mode of surgery</b>					
Emergency resuscitation >2 hrs, operation <24 hrs	40	6	46	9.57	0.001
Emergency immediate surgery <2 hrs	1	3	4		
<b>Malignancy</b>					
Nodal metastasis	0	1	1	9.490	0.008
Distant metastasis	0	1	1		
None	41	7	48		
<b>Peritoneal Soiling</b>					
Minor (serous fluid)	4	0	4	3.09	0.212

Local pus	7	0	7		
free bowel contents, pus or blood	30	9	39		
<b>Operative Complexity</b>					
Moderate	10	0	10	2.74	0.097
Major	31	9	40		
<b>Multiple Procedures</b>					
1	40	4	44	20.28	0.00003
2	1	3	4		
>2	0	2	2		
<b>Total blood loss</b>					
<100 ml	11	0	11	7.54	0.056
100 – 500 ml	28	7	35		
501 – 999 ml	2	1	3		
>1000 ml	0	1	1		
<b>Comorbidities</b>					
Yes	14	8	22	8.97	0.002
No	27	1	28		

<b>Predicted risk of mortality</b>					
Alive	41	4	45	16.93	0.00003
Death	0	5	5		

**Table 20: POSSUM variables vs Surgical outcomes**

The parameters Glasgow scale, perforation to operation time, mode of surgery, malignancy, multiple procedures, comorbidities and predicted risk of mortality were statistically significant.

<b>Statistic</b>	<b>Morbidity</b>		<b>Mortality</b>	
	<b>Value</b>	<b>95% CI</b>	<b>Value</b>	<b>95% CI</b>
Sensitivity	93.33%	68.05% to 99.83%	91.11%	78.78% to 97.52%
Specificity	77.14%	59.86% to 89.58%	100.00%	47.82% to 100.00%
Positive Likelihood Ratio	4.08	2.19 to 7.62	∞	
Negative Likelihood Ratio	0.09	0.01 to 0.58	0.09	
Disease prevalence(*)	30.00%	17.86% to 44.61%	90.00%	
Positive Predictive Value (*)	63.64%	48.40% to 76.55%	100.00%	
Negative Predictive Value (*)	96.43%	80.12% to 99.45%	55.56%	
Accuracy (*)	82.00%	68.56% to 91.42%	92.00%	

**Table 21: Sensitivity specificity of predicted morbidity and mortality**

Morbidity - The sensitivity was 93.33%, specificity was 77.14%, PPV was 63.64% and NPV was 96.43% and accuracy was 82%. Mortality - The sensitivity was 91.11%, specificity was 100%, PPV was 100% and NPV was 55.56% and accuracy was 92%.

## **DISCUSSION**

One of the most common surgical emergencies is perforation peritonitis. Perforation peritonitis is caused mostly by the perforation of a diseased viscus. Abdominal trauma, ingestion of a sharp foreign body, and iatrogenic perforation are additional causes of perforation. The diagnosis is mostly based on clinical evidence. Peritonitis often manifests as an acute abdomen. Abdominal pain, guarding or rigidity, distension, and reduced bowel sounds are instances of localized findings. Fever, chills, or rigour, palpitations, perspiration, dyspnea, restlessness, dehydration, oliguria, disorientation, and, finally, shock are all systemic symptoms. Plain (erect) abdominal X-rays may show dilated and edematous intestines with pneumoperitoneum. Ultrasound and CT scan can show up to 72% and 82% of perforations, respectively.

Generalized peritonitis is a leading cause of mortality. It is still one of the most serious complications that physicians, surgeons, and their patients face across the world. Peritonitis was treated medically until the turn of the century, with a 90% mortality rate. Krishner et al demonstrated that meticulous use of surgical principles may minimise peritonitis mortality, and the mortality rate dropped below 50%. Despite several advancements in surgical skills, antimicrobial medications, and supportive care since then, peritonitis mortality has remained high, ranging between 13 and 43 % in various multicenter trials.

Elderly patients are a high-risk category for a variety of medical conditions, and they account for a substantial number of surgical patients. Surgeons must appropriately assess the risk of surgery based on each elderly patient's individual physical state in order to choose the optimum timing for surgery. The ideal surgical scoring system is one that is simple, reproducible, objective, and accessible to all patients, and it is based on preoperative risk factors rather than intraoperative and postoperative data. The primary purpose of scoring should be to categorize the patient's risk before to surgery and to establish the best specific treatment for the patient. However, no optimal scoring system exists that may effectively predict surgical risk in the elderly.

Surgical audit based on mortality and morbidity has long been known not just as a research tool but also as a crude method of evaluating a surgical unit's performance, and it is now required in several areas of the industrialized world. Although good surgical technique is critical in preventing negative outcomes, the final outcome is also influenced by the patient's physiological condition, the operational severity, and the availability of peri-operative care services. These essential elements make it impossible to evaluate a unit's success just on the basis of raw result numbers, necessitating the use of an objective technique that takes case mix into consideration.

### **Gender:**

In this study Male predominance was seen with 80% and females were 20%. The male: female

ratio was 4:1. The outcomes of this study were similar to previous studies where male predominance was seen. And in the study by nachiappan et al the male: female ratio was 2.33:1 which is in accordance with this study.

In a study by Rajandeeep et al, out of 400 patients 68.5% were males and the rest 31.5% were females and the male: female ratio was 2.1:1. In a study by Ngulube et al, Their study comprised of 181 study participants, of which 123 were males (68%) and 58 females (32%). The male:female ratio was 2.12:1.

#### **Age group:**

Majority of the cases around 45% belonged to the age group of 51 to 60 yrs, followed by >60 yrs age group with 26%, 20% in 41 to 50 yrs age group and the least 4% belonged to 31 to 40 yrs age group. The mean age was  $55.24 \pm 7.96$  yrs.

The outcomes of this study were similar to previous studies. In a study by Chatterjee et al, 80% belonged to <60 yrs of age group, 14% belonged to 61 to 70 yrs age group and 6% belonged to >71 yrs age group. In a study by Rajandeeep et al, who studied a total of 400 patients. The mean age was 37.8 yrs (ranging from 13 to 88 yrs). In a study by Ngulube et al, The ages varied from 18 to 87, with a mean of 48. (SD 17.7). Males had a mean age of 47 (SD 18.7), while females had a mean age of 50. (SD15.5).

#### **Indications for surgery:**

In majority of the cases around 56% of them had duodenal and antral perforation. 22% had appendicular perforation, 16% of the cases had Ileal perforation, 4% of the cases had Gastric malignancy perforation and 2% had sigmoid volvulus perforation.

The outcomes of this study were nearly similar to previous studies. Nachiappan et al reported that 47 of their patients had gastroduodenal perforations, 34 had gastric perforation mostly in the prepyloric area, and 13 had duodenal perforation. There were no malignant aetiologies among the 47 gastroduodenal perforations. Four of the 47 gastroduodenal perforations resulted in death, followed by 27 ileal perforations, four of which resulted in death. There were 13 appendicular perforations with no mortality. There were five patients with colonic perforations, one of whom died, and four patients with jejunal perforations, all of whom died. There's also one uterine perforation.

In a study by Ngulube et al, Peritonitis from appendiceal rupture or visceral perforation (26%) was the most common reason for surgery, followed by Sigmoid Volvulus (11%), Colorectal Tumors (8.8%), and Small Bowel Obstruction (8%). (8.3 percent).

In a research by Chakma et al, proximal gastro-intestinal tract perforations were nearly 7 times more prevalent than distal tract perforations, which is in stark contrast to developed countries where distal perforations are more common. Other research found that duodenal ulcer perforation was the most prevalent (54.29 percent). Gastric ulcer perforation accounted for 2.86 percent of all cases, which was somewhat higher than the rate found by Afridi SP et al. in their research. Peptic ulcer perforation was more prevalent in males than females, with a male to

female ratio of 2.6:1, in this study. However, the incidence of peptic perforation in females was greater than in men, according to the studies by Kozoll DD et al. and DeBakey M.

**Type of Surgery:**

In majority of the cases perforation closure with omental patch was done in 66% of them. Appendectomy was done in 24% of the cases, Resection anastomosis was done in 8% of the cases and stoma was done in 2% of the cases.

In a research conducted by Chakma et al, 469 patients were treated surgically, whereas 21 patients were managed conservatively since they were unfit to undergo anaesthesia. Graham's omental patch repair was performed in 56.72 percent of the cases, primary closure in 31.34 percent of the cases, and appendectomy in 11.65 percent of the cases. In eight cases of primary colon closure, a proximal colostomy was added.

**Cardiovascular syndrome:**

Majority of the cases around 92% didn't had any failure, around 6% of the cases were diuretic and 2% of the cases had peripheral edema. The outcomes of this study were similar to previous studies. In this study out of 92% patients with no CVS, 18% of the patients died. In a study by chatterjee et al, Diuretics was seen in 4% of the cases and peripheral edema was reported in 2% of the cases.

**Respiratory syndrome:**

In majority of the cases, around 64% of them had Dyspnea at rest, Around 30% of the cases had limiting dyspnea with mild Chronic Obstructive Airway Disease. Only 6% of the cases had dyspnea on exertion. The outcomes of this study were similar to previous studies. In this study out of 64% patients with dyspnea at rest, 18% of the patients died. In a study by Chatterjee et al, 62% had dyspnea at rest, 32% had limiting dyspnea and 6% had dyspnea on exertion.

**Glasgow coma scale:**

According to Glasgow coma scale, Mild brain injury was reported in 96% of the cases, Moderate and Severe brain injury in 2% of the cases each. The outcomes of this study was similar to previous studies. In this study out of 97% with mild brain injury 14% of the patients died, while all of the moderate and severe brain injury patients died.

**Operative complexity:**

In majority of the cases, it was a major complex procedure in 80% of the cases and in 20% of the cases the operative procedure was moderate complex. In 4% of the cases >2 procedures were done and in 8% of the cases 2 procedures were done. In this study, out of 80% major plus complex major cases, 18% of the cases died.

The outcomes of this study is in contrast with previous study by Kumar et al who had major procedure in 62% of the cases and major plus complex major in 38% of the cases.

**Perioperative duration:**

In Majority of the cases, around 40% had Perforation to operation duration in between 24 to 48 hrs. 36% of the cases had Perforation to operation duration of <24 hrs and 24% of the cases had Perforation to operation duration of >48 hrs.

Of 40% who had Perforation to operation duration in between 24 to 48 hrs, 4% of the cases died. 36% of the cases had Perforation to operation duration of <24 hrs, 2% of the cases died and of 24% of the cases who had Perforation to operation duration of >48 hrs 12% of the cases died. The outcomes of the study are nearly similar to the previous study.

**Peritoneal soiling:**

In majority of the cases gross peritoneal contamination was seen in 78% of them, In 14% of the cases Local pus was seen and in 8% of the cases minor (serous fluid) was seen.

The outcomes of this study were similar to previous studies. Out of 78% of the cases with gross contaminated bowel, 18% of the cases died.

In a study by Nachiappan et al, Generalized and cloudy purulent exudates was seen in 52% of the cases, generalized and clear was seen in 13% of the cases, Generalized and feculent was seen in 13% of the cases, localized and cloudy purulent exudates was seen in 10% of the cases, localized disease with local pus was seen in 7% of the cases and localized disease with clear exudate was seen in 4% of the cases.

**Malignancy:**

Nodal metastasis was reported in 2% of the cases and distant metastasis was also reported in 2% of the cases. The outcomes of this study were in accordance to previous studies. In this study Out of 4% of the cases who had malignancy, all 4% of the cases died. In a study by Rajandeep et al, out of 400 cases, malignancy was reported in 13 cases constituting 3.25% of the cases.

**Surgery outcomes:** Out of 50 cases, 18% of the cases died while 82% of the cases survived. The outcomes of this study were similar to previous studies. The mortality was correctly predicted in 10% of the cases died whose OE ratio was 1.06 while in 8% of the cases who died the OE ratio was 0.87.

**Complications:** Out of 50 cases, Complications were seen in 70% of the cases of which Multiple complications were seen in 32% of the cases, Deep infection and septicemia was seen in 10% of the cases each, Wound infection and chest infection was seen in 6% of the cases each. Pyrexia of unknown origin, Impaired renal function and urinary tract infection was seen in 2% of the cases each. The outcomes of this study were similar to previous studies.

**Sensitivity:**

Using logistic equations, the predicted risk of mortality and morbidity was calculated and the results compared with the actual observed mortality and morbidity. In this study the sensitivity for morbidity was 93.33%, specificity was 77.14%, PPV was 63.64% and NPV was 96.43% and

accuracy was 82%. In this study the sensitivity for mortality was 91.11%, specificity was 100%, PPV was 100% and NPV was 55.56% and accuracy was 92%. The findings of this study were consistent with the findings of a previous study by Kumar et al, who reported mortality and morbidity, positive predictive value of 100 % and 94 %, negative predictive value of 78 % and 82 %, sensitivity 95 % and 71 %, and specificity 100 % and 96 %, respectively.

### **CONCLUSION**

The outcomes of this study suggest that the POSSUM scoring system can be used to predict the mortality and morbidity of patients undergoing surgery for perforative peritonitis. Taking into consideration variables such as perforation to surgical intervention can help in enhancing the scoring system. As a result, modifying the scoring system based on the surgery would enhance the patients' outcomes, enabling them to receive better healthcare.

### **REFERENCES**

1. Pacelli F, et al. Prognosis in intra-abdominal infections. Multivariate analysis on 604 patients. Arch Surg. 1996 June; 131(6): 641-5.
2. Durham H. The mechanism of reaction to peritoneal infection. J. Pathol. Bacteriol. 1897;4:338-82.
3. Melaney F.L. Olip J, et al. Peritonitis: II. Synergism of bacteria commonly found in peritoneal exudates. Arch Surg. 1932;25:709.
4. Fry D.E. Garrison R.N. et al. Determinants of death in patients with intra-abdominal abscess. Surgery. 1980;88:517.
5. Pine R.W. Wertz M.J. et. Al. Determinants of organ malfunction or death in patients with intra-abdominal sepsis. Arch Surg. 1983; 118:242-249.
6. Stevens L.E. Gauging the severity of surgical sepsis. Arch Surg. 1983;118:1190- 1192.
7. Knaus W.A, Draper E.A, Wagner D.P. et al. Prognosis in acute organ – system failure. Ann. Surg. 1985;202:685-693.
8. Teichmann W. Wittmann D.H, et al. Scheduled reoperations (ettappenlavage) for diffuse peritonitis. Arch. Surg. 1986;121:147-152.
9. Wach. H, Linder M.M, et al. Mannheim peritonitis index – prediction of risk of death from peritonitis; construction of a static and validation of an empirically based index. Theoretical Surgery 1987; 1: 169-77.
10. Kohli V, et al. Evaluation of prognostic factors in perforated peptic ulcer. Indian Journal of Surgery. 1988 May-June; 50:184.