Section: General Surgery

Original Research Article

PROGNOSTIC FACTORS IN DETERMINING THE MORBIDITY AND MORTALITY IN PERFORATION PERITONITIS – A PROSPECTIVE OBSERVATIONAL STUDY

Sivanupandian[1], Edwin Kinsraj[2], Gobinath M[3]

[1]Associate Professor, Department of General Surgery, Government Tirunelveli Medical College, Tamilnadu, India
[2]Assistant Professor, Department of General Surgery, Government kanyakumari Medical College, Tamilnadu, India
[3]Assistant Surgeon, Department of General surgery, Government sub district hospital, Attur, Salem, Tamilnadu, India

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Corresponding Author:
Dr. Sivanupandian,
Email: vsiva34@yahoo.com

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Abstract

Background: Perforation peritonitis is a surgical emergency requiring prompt intervention. This study aimed to identify prognostic factors affecting morbidity and mortality in patients with perforation peritonitis. **Materials and Methods:** This prospective observational study was conducted on 100 patients with perforation peritonitis admitted to the General Surgery Department of Kanyakumari government medical college between October 2019 to September 2021. Comprehensive evaluations were performed, including medical history, clinical examination, blood investigations, imaging (X-rays, ultrasound, CT scans), and diagnostic paracentesis, and various prognostic factors were analyzed. Post-treatment, patients were evaluated, and overall complications, the number of hospital days (morbidity) and outcome (death/discharge) were determined. **Result:** Among the 100 patients, the mean age was 42.06 years, ranging from 18 to 60 years. Most were male (74%), and the most common perforation site was the duodenum (50%). Comorbidities, particularly diabetes (31%), were prevalent. Delayed presentation (>24 hours), age (>40 years), and comorbidities were significant prognostic factors associated with increased morbidity and mortality. Patients without comorbidities tend to have shorter hospital stays than those with comorbidities. The findings indicate a significant association between hospital stay and patient outcomes. Patients with shorter hospital stays (< 5 days) had a higher recovery rate and no reported deaths. **Conclusion:** Late presentation, advanced age, and comorbidities were identified as significant prognostic factors influencing the prognosis of patients with perforation peritonitis. Early recognition and prompt treatment of these factors are crucial for reducing morbidity and mortality rates.

INTRODUCTION

Peritonitis resulting from hollow viscus perforation is a common surgical emergency characterized by inflammation of the serosa lining the abdominal cavity and visceral organs.[1] It can be localized or generalized, often caused by introducing infection or acidic substances into the peritoneum. While acute bacterial peritonitis typically arises from the alimentary tract, other routes of contamination are also possible.[2] Less common forms include primary spontaneous peritonitis, which involves a pure infection with specific bacteria. Clinical features of peritonitis include abdominal pain, anorexia, fever, nausea and vomiting, tenderness and guarding, absent or reduced bowel sounds, and septic shock.[3] The mortality rate for diffuse peritonitis is approximately 10%. The prognosis depends on factors such as presentation time, extent and duration of peritoneal contamination, age, fitness, and the underlying cause. The current study focuses on identifying the factors that significantly affect morbidity and mortality in patients with peritonitis.

MATERIALS AND METHODS

This prospective observational study was conducted on 100 patients with perforation peritonitis admitted to the General Surgery Department of Kanyakumari government medical college between October 2019 to September 2021.

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Inclusion criteria

Patients of either sex, 18 – 60 years of age, patients presenting with acute abdomen with pneumoperitoneum on X-rays/ CT scan, and positive diagnostic aspirations on abdominal paracentesis were included.

Exclusion Criteria

Patients not willing to participate in the study, traumatic perforation, iatrogenic perforation, patients not coming under 18 – 60 years, and pregnancy and lactation were excluded.

A detailed patient history, clinical examination and blood investigations followed by x-ray, emergency USG, CT SCAN and diagnostic paracentesis according to the need of the hour depending on the clinical findings. Based on intraoperative findings and the amount of contamination, primary closure, resection and anastomosis or diversion was made. Post-treatment, patients were evaluated, and overall complications, the number of hospital days (morbidity) and outcome (death/discharge) were determined.

Various factors like age, sex, comorbidities, size and site of perforation, amount of contamination, heart rate, blood pressure, respiratory rate, and presentation time are all monitored, and their bearing on the outcome is evaluated and imaging. Patients are primarily resuscitated, and a staged procedure or exploratory laparotomy is performed according to hemodynamic status. Intraoperative findings noted peritoneal fluid sent to culture and sensitivity.

Statistical Analysis

All statistical analyses were done using SPSS version 21.0, and the data were presented in frequency and percentage. The chi-square tests were used to compare categorical variables, and a p-value of <0.05 was considered statistically significant.

RESULTS

The majority of the patients in this research are over fifty years old. This demonstrates a significant prevalence of perforation peritonitis in persons over 50. The age range between 41 and 50 is the next most usually afflicted. Most affected were males (74%), and females constitute 26%.

Table 1: Demographic and Clinical Characteristics of Patients with Perforation Peritonitis

		Frequency	Percentage
Age	<20	7	7.0%
	21-30	14	14.0%
	31-40	15	15.0%
	41-50	23	23.0%
	>50	41	41.0%
Sex	F	26	26.0%
	M	74	74.0%
Comorbidities	CAD	6	6.0%
	CKD	1	1.0%
	COPD	1	1.0%
	Diabetes	31	31.0%
	Hypertension	21	21.0%
	TB	2	2.0%
	Nil	38	38.0%
Site of perforation	Colon	1	1.0%
	Rectum	1	1.0%
	Caecum	2	2.0%
	Jejunum	4	4.0%
	Appendix	5	5.0%
	Ileum	7	7.0%
	Gastric	31	31.0%
	Duodenum	50	50.0%
Time of presentation	12	18	18.0%
	12-24	36	36.0%
	24-48	28	28.0%
	>48	18	18.0%
Outcomes	Recovered	77	77.0%
	Dead	23	23.0%
Hospital stays	<5	20	20%
	5-10	63	65.0%
	>10	17	17.0%

Table 2: Impact of Time of Presentation and Comorbidities on Perforation Peritonitis Outcomes

		Outcome		**Total**	**P-value**
		Dead	**Recover**		
Time of presentation	>12	18	0	18	<0.0001
	12-24	36	0	36	
	24-48	22	6	28	
	>48	1	17	18	
Comorbidities	No	37	1	38	<0.0001
	Yes	40	22	62	

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Table 3: Relationship between Age, Hospital Stay, Time of Presentation, and Comorbidities in Perforation Peritonitis

		Hospital stays			Total	P-value
		<5	5-10	>10		
Age	<20	0	7	0	7	0.004
	21-30	1	11	2	14	
	31-40	0	14	1	15	
	41-50	4	12	7	23	
	>50	15	19	7	41	
Time of presentation	>12	0	18	0	18	<0.0001
	12-24	0	30	6	36	
	24-48	6	13	9	28	
	>48	14	2	2	18	
Comorbidities	Yes	0	32	6	38	<0.0001
	No	20	31	11	62	

Table 4: Association between a hospital stay and outcomes (death or recovery) in patients

Hospital Stay	Outcomes		Total	P value
	Dead	Recovered		
<5	0	2	2	<0.0001
5-10	61	2	63	
>10	16	1	17	

The majority of patients arrive within 12 to 24 hours. This group accounts for 36% of the population. Within the next main group, 28% of patients appeared within 24 to 48 hours. In less than 12 hours, 18% of patients appeared, and another 18% presented after 48 hours. In this study, the earliest manifestation was 6 hours, and the later presentation was five days. Diabetic individuals account for 31% of the patients in this research. Hypertension is the next most prevalent comorbidity, affecting 21% of patients. There were no comorbidities in 38% of the individuals.

Of all the Cases, only one case had double perforation involving duodenum and

Ileum. The most common site of perforation is the duodenum constituting 50%. The second most common site is gastric perforation, including 31%.least common perforation sites in the colon and rectum. One patient had a double perforation in the duodenum and ileum. The recovered patients were 77%, and the dead patients were 23%. Maximum patients had a hospital stay within 5 to 10 days, of which 59% were discharged, and 4% died. 20% of patients had a hospital stay of less than five days, among which 18% died. 17% of patients had a hospital stay over ten days, 15% were discharged, and 1% died [Table 1].

The p-value obtained for the presentation time in this study is less than 0.0001, which is very significant and shows that presentation time is the most significant factor determining mortality. Comorbidities also significantly affect mortality, as evidenced by the above statistics from the study [Table 2].

The findings show that age, time of presentation, and comorbidities are associated with the length of hospital stay. Younger patients tend to have shorter hospital stays, while older patients have a higher likelihood of a prolonged stay. Early presentation within 12 hours is associated with shorter hospital stays. Patients without comorbidities tend to have shorter hospital stays than those with comorbidities [Table 3].

The findings indicate a significant association between hospital stay and patient outcomes. Patients with shorter hospital stays (< 5 days) had a higher recovery rate and no reported deaths. In contrast, patients with longer hospital stays (5-10 days exceeding ten days) had a higher mortality rate, with fewer recoveries observed [Table 4].

DISCUSSION

Perforation peritonitis is a prevalent surgical emergency frequently encountered in Indian hospitals. Interestingly, it predominantly affects young men in their prime, which differs significantly from the Western scenario, where the mean age of incidence ranges from 45 to 60 years.[4] Moreover, comprehensive data regarding the specific types of perforations is lacking. Still, in India, upper gastrointestinal (GI) perforations are more prevalent than lower GI perforations. This contrasts with the Western pattern, where lower GI perforations are relatively higher.[5,6]

The highest number of patients encountered in this series were in the age group above 50, followed by the age group of 41 -50. The mean age group in this study was 42.06 years. This is comparable with the study by Rajender Singh Jhobta in 2010, who studied 504 cases of perforation peritonitis in which the mean age was 36.8 years. The sex ratio incidence of perforation, irrespective of site and pathological condition, was 2.84:1 in the present study.

In the current study, regardless of the specific location and underlying pathological condition, the incidence of perforation showed a sex ratio of 2.84:1. These findings align with research conducted internationally in developed and developing nations. For instance, a study conducted in Tanzania reported a sex ratio of 1:1.8, while another study in Burkina Faso found a ratio of 1:1.6.

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Similarly, in Rwanda, the ratio was reported as 1:7.30, in India as 1:5.49, and in a European study, it was found to be 1:1.16, with all these ratios favouring men.[7-10]

Different authors have found variable results in sex ratio. The commonest site involved in this study was duodenal ulcer perforation (50%), followed by gastric perforation (31%) and ileal perforation (7%). Rajender Singh Jhobta, in 2006, in his study of 504 cases of perforation peritonitis, found duodenum was the commonest site of involvement, followed by appendicitis and gastrointestinal perforation.[11] Hypertension was the most common comorbidity, followed by diabetes in our study. At the same time, a similar incidence had been reported in other studies.[12] 54% of patients who presented within 24 hours of the onset of pain had a good prognosis and 100% recovery in this study. Of those who showed up late after 48 hours, only 5.6% survived. The length of hospital stay is prolonged in the later stages of presentation. All the patients who presented within 12 hours were discharged within ten days. Of the patients who presented within 12-24 hrs, 83.3% were discharged within 5-10 days, and 16.7% had a hospital stay greater than ten days. Of the patients, 88 presented within 24-48 hrs, 46.4% were discharged within 5-10 days, and 32.1% after ten days. Patients presenting late after 48 hrs – 14% died, and 11.1% of patients had a prolonged postoperative stay.

From this study, it is known the time of presentation is one of the most significant factors in determining the morbidity and mortality in perforation peritonitis. The patients without comorbidities had a survival rate of 64.5%. In contrast, patients with comorbidities had a survival rate of 64.5%, and the length of hospital stay greater than ten days was 15.8% in patients without comorbidities and 17% with comorbidities. This shows that comorbidities significantly impact the patients' morbidity and mortality. All patients with perforative peritonitis were treated as a surgical emergency. Preoperatively all patients had broad-spectrum antibiotic coverage, nasogastric suction and management of fluid and electrolyte imbalance and oxygen supplementation when necessary, and anaemic patients required blood transfusion.

Postoperatively parenteral antibiotics were continued, and oral antibiotics were given for five days. In all cases of peritonitis, thorough peritoneal lavage was given with 0.9% saline. Drains were kept in the pelvis and the perforation site, usually removed on the third and fifth post-operative day or when the drainage was < 30ml. A nasogastric tube was usually removed on the second and third post-operative days and started orally on the fourth day, depending on bowel sounds. All patients were started on chest physiotherapy from the first postoperative day.

CONCLUSION

Perforation peritonitis is a critical surgical emergency primarily affecting individuals aged 50 and above. Duodenal ulcer perforations are the most common in this age group, followed by gastric ulcer perforations. Male patients are predominantly affected by this condition. Diagnosis is typically based on clinical assessment, with confirmation obtained through radiological imaging showing the presence of pneumoperitoneum. Prognostic factors such as age, time of presentation, and comorbidities play a significant role in determining the morbidity and mortality rates associated with perforation peritonitis. Early admission, prompt treatment, and attentive care are vital in preventing adverse outcomes in these cases.

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