International Journal of Life Sciences, Biotechnology and Pharma Research Vol. 14, No. 2, February 2025 Online ISSN: 2250-3137
Print ISSN: 2977-0122

DOI: 10.69605/ijlbpr_14.2.2025.203

ORIGINAL RESEARCH

A Study on Prognostic Scoring in Acute Intestinal Obstruction

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Received: 19 December, 2024 Accepted: 11 February, 2025

ABSTRACT

Background: Acute intestinal obstruction presents a significant challenge to the surgeon, and the condition's diverse aetiology makes it more difficult for the treating surgeon to make a diagnosis.Early diagnosis, appropriate management, and treating the cause of the obstructionare critical to treatment success. Research on the different factors affecting the prognosis of patients with acute intestinal obstruction will be very helpfulto lower the incidence of morbidity and mortality. **Methods:** A Cross-sectional study was conducted in Kilpauk Medical College from May 2016 to October 2018 based on the hospital medical records.Patients 18 years and above who presented with clinical and imaging features suggestive of acute intestinal obstruction were included in the study.130 Patients were selected for the study. **Result:** The mean age group among the alive study participants was 48.3 and among death patients, it was 64 years. In the sex distribution, 105 patients were male and 25 were female. Among the male patients, 82.9 % were alive and 17.1 % were dead. Among the 25 female patients, 72 % were alive and 28 % were dead. The association between independent categorical variables and outcome, death or alive status of the study participants was assessed using Chi Square test.Multi variable analysis revealed that out of the twelve parameters, five factors namely Age more than 60 years, fever, hypotension, elevated serum creatinine, Presence of gangrenous or ischemic bowel are independently predictive of death. **Conclusion:** Etiological pattern revealed that Hernias were the most common cause of intestinal obstruction followed by adhesions.The present study's scoring system will be helpful in anticipating a poor prognosis and taking the appropriate actions to improve the outcome.

Key words: Scoring system, Hernia, Intestinal obstruction.

INTRODUCTION

Acute intestinal obstruction is an important challenge to the surgeon in an emergency setting and the varied etiology behind the condition further baffles the treating surgeon in arriving at a diagnosis. It is an acid test for the surgeon's judgement in deciding the line of management. Globally, the reported incidence and prevalence of Intestinal Obstruction has increased by 56.91% and 86.67% from 1990 to 2019, respectively(1). The versatile presentation of the condition demands extreme diligence on the part of the surgeon to navigate through the course of the disease and provide positive outcomes. Success in the treatment depends largely on early diagnosis, skilful management and treating the pathologic effects of the obstruction just as much as the cause itself. A study about the various factors influencing prognosis of patients with acute intestinal obstruction will prove useful in significantly reducing the morbidity and mortality.

Aim of the Study

1. To identify the various etiological factors in acute intestinal obstruction and to analyse the various factors influencing the prognosis of patients with acute intestinal obstruction.
2. To develop a prognostic scoring system in acute intestinal obstruction.

MATERIALS AND METHODS

Study Design: ACross-sectional study
Study Area: Kilpauk Medical College
Study Duration: May 2016 to October 2018

DOI: 10.69605/ijlbpr_14.2.2025.203

Study Population: Patients admitted with features suggestive of acute intestinal obstruction satisfying the following inclusion criteria.

Sample size: 130 Patients were selected for the study

Inclusion Criteria

Patients 18 years and above who presented with clinical and imaging features suggestive of acute intestinal obstruction

Exclusion Criteria

Cases of acute intestinal obstruction due to dynamic causes like electrolyte imbalance, spinal injuries, uraemia, diabetes mellitus, retroperitoneal haematomas, renal surgeries, pseudo – obstruction are excluded from the study.

Statistical analysis

The data was entered in Microsoft excel and analysed in Epi Data analysis software V2.2.2.186 and Stata 12 software. The continuous variable age was described as mean (SD). The categorical variables such as age categories, sex, presence of fever, anemia, hypotension, gangrenous or ischemic bowel, elevated urea, creatinine, peritoneal abscess, intraoperative anaesthetic complications and death or alive status of the study participants were described as percentages. Information of the mentioned factors were collected from the medical records. The association between independent categorical variables and outcome, death or alive status of the study participants was assessed using Chi Square test. Binary logistic regression was done to predict the risk of death associated with each independent variable. The independent variable with p value <0.05 was included for multivariate analysis. The independent variables (duration of presentation, elevated creatinine, hypotension, fever) which were identified to have significant association with death in previous studies were coded as 1 for presence of such independent variable and 0 for absence. The total score was added and categorized into ≤ 2 or more than two. The association with death or alive status of the individual was done using chi square test. Similarly, the independent variables with p <0.05 in multivariate logistic regression (age more than 60 years, fever, hypotension, elevated serum creatinine, Presence of gangrenous or ischemic bowel) were considered for scoring and association with death or alive status of the individual was done using chi square test. Two tailed P value <0.05 was considered for statistical significance. A Scoring system was devised using the factors retained after Multi variate Regression analysis.

Ethical Approval

This study was approved by the Institutional Ethics Committee (IEC) of Kilpauk Medical College.

RESULT

130 patients were selected for the study. The mean age group among the alive study participants was 48.3 and among death patients, it was 64 years which is shown in Table-1. In the sex distribution, 105 patients were male and 25 were female. Among the male patients, 82.9 % were alive and 17.1 % were dead. Among the 25 female patients, 72 % were alive and 28 % were dead depicted in Fig-1.

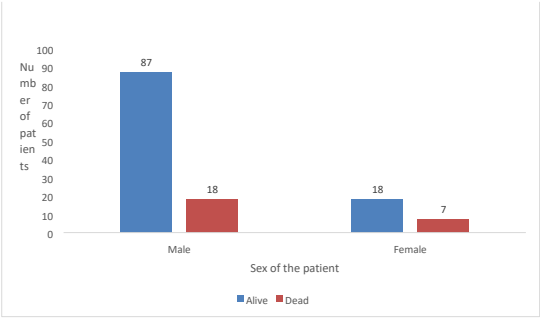

Fig-1 Sex distribution and Death

Table -1 Age distribution and Death

	Alive		Dead		P value
	Mean	SD	Mean	SD	
Age in years	48.3	14.1	64.0	9.1	<0.001

The duration of presentation more than 2 days among males and females and death is shown in Table-2 and Fig-2. The analysis of the etiological pattern is shown in the Table-3

Table- 2 Duration of presentation more than 2 days and death:

Duration of presentation more than 2 days	Male		Female		Total number of patients	
	N	%	N	%	N	%

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No	105	89.7	12	10.3	117	100.0
Yes	0	0.0	13	100.0	13	100.0
Total	105	80.8	25	19.2	130	100.0

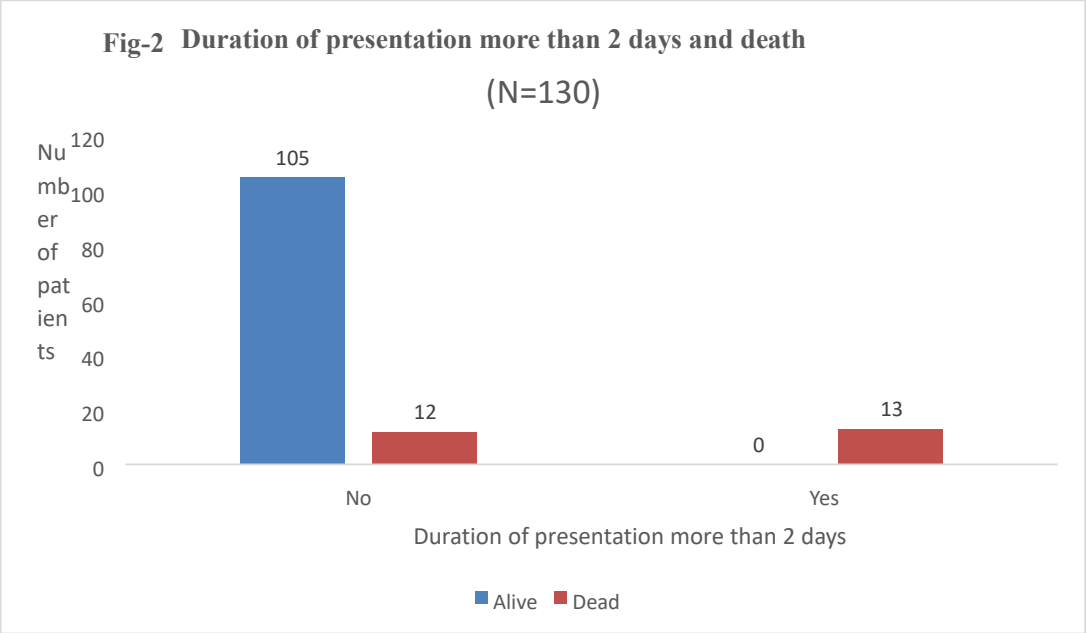

Table-3 Factors related to death of the patients

Factors		Alive		Dead		Total number of patients		P value
		N	%	N	%	N	%	
Age in years	≤ 60 years	74	89.2	9	10.8	83	100.0	0.001
	>60 years	31	66.0	16	34.0	47	100.0	
Presence of decreased urine output	No	98	86.0	16	14.0	114	100.0	<0.001
	Yes	7	43.8	9	56.3	16	100.0	
Presence of fever	No	102	92.7	8	7.3	110	100.0	<0.001
	Yes	3	15.0	17	85.0	20	100.0	
Presence of comorbidities	No	88	88.9	11	11.1	99	100.0	<0.001
	Yes	17	54.8	14	45.2	31	100.0	
Presence of previous history of surgery	No	93	83.8	18	16.2	111	100.0	0.035
	Yes	12	63.2	7	36.8	19	100.0	
Presence of hypotension at present	No	104	92.0	9	8.0	113	100.0	<0.001
	Yes	1	5.9	16	94.1	17	100.0	
Presence of anaemia	No	96	82.8	20	17.2	116	100.0	0.098
	Yes	9	64.3	5	35.7	14	100.0	
Presence of elevated urea	No	102	82.9	21	17.1	123	100.0	0.009
	Yes	3	42.9	4	57.1	7	100.0	
Presence of elevated serum creatinine	No	100	88.5	13	11.5	113	100.0	<0.001
	Yes	5	29.4	12	70.6	17	100.0	
Presence of malignant lesion	No	102	83.6	20	16.4	122	100.0	0.001
	Yes	3	37.5	5	62.5	8	100.0	
Presence of	No	99	84.6	18	15.4	117	100.0	0.001

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gangrenous or ischemic bowel	Yes	6	46.2	7	53.8	13	100.0	
Presence of peritonitis or intraabdominal abscess	No	103	86.6	16	13.4	119	100.0	0.001
	Yes	2	18.2	9	81.8	11	100.0	
Presence ofintra operative anaesthetic complications	No	104	81.9	23	18.1	127	100.0	0.035
	Yes	1	33.3	2	66.7	3	100.0	

Scoring in previous studies included Duration of presentation, Elevated creatinine,hypotension, and fever.Univariable analysis revealed twelve of the fourteen parameters studied namely Duration of presentation >2 days, Decreased urine output, Fever, Co-morbid illness (DM and HT), History of previous surgery, Anaemia, Hypotension at presentation, Elevated Blood urea, Elevated Serum Creatinine, presence of ischemic / gangrenous bowel, presence of peritonitis / intra – abdominal abscess, presence of intra – op anaesthetic complications were associated with death (P<0.050)

Multi variable analysis revealed that out of the twelve parameters, five factors namely Age more than 60 years, fever, hypotension, elevated serum creatinine, Presence of gangrenous or ischemic bowel are independently predictive of death.

Table-4 Multivariate analysis of patient characteristics in association with death

Patient characteristics	Alive		Died		Unadjusted OR (95%CI)	Adjusted OR (95%CI	P value
	N	%	N	%			
Age in years							
≤ 60 years	74	89.2	9	10.8	1	1	<0.001
>60 years	31	66.0	16	34.0	4.2 (1.7-10.7)	0.5 (0.0-0.1)	
Sex*							
Male	87	82.9	18	17.1	0.53 (0.2-1.5)	-	-
Female	18	72.0	7	28.0	1	-	
Duration of presentation more than 2 days*							
No	105	89.7	12	10.3	1	-	-
Yes	0	0.0	13	100.0	1.01 (0-1)	-	
Presence of decreased urine output							
No	98	86.0	16	14.0	1	1	0.713
Yes	7	43.8	9	56.3	7.9 (.6-24.1)	0.5 (0.1-27.7)	
Presence of fever							
No	102	92.7	8	7.3	1	1	0.004
Yes	3	15.0	17	85.0	72.2 (17.4-299.7)	1180.2 (9.1153298.4)	
Presence of comorbidities							
No	88	88.9	11	11.1	1	1	0.807
Yes	17	54.8	14	45.2	6.6 (2.5-16.9)	0.7 (0.1-14.8)	
Presence of previous history of surgery							
No	93	83.8	18	16.2	1	1	0.063
Yes	12	63.2	7	36.8	3.0 (1.0-8.7)	26.5 (0.8839.1)	
Presence of hypotension at present							
No	104	92.0	9	8.0	1	1	0.007
Yes	1	5.9	16	94.1	2.7 (0.8-8.8)	2938.2 (9.2934735.9)	
Presence of anemia*							

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No	96	82.8	20	17.2	1	-	-
Yes	9	64.3	5	35.7	184.9 (21.91558.8)	-	
Presence of elevated urea							
No	102	82.9	21	17.1	1	1	0.352
Yes	3	42.9	4	57.1	6.5 (1.3-31.1)	0.1 (0.1-8.0)	
Presence of elevated serum creatinine							
No	100	88.5	13	11.5	1	1	
Yes	5	29.4	12	70.6	18.5 (5.6-60.8)	363.9 (4.132464.6)	0.010
Presence of malignant lesion							
No	102	83.6	20	16.4	1	1	0.442
Yes	3	37.5	5	62.5	8.5 (1.9-38.5)	0.2 (0.1-21.5)	
Presence of gangrenous or ischemic bowel							
No	99	84.6	18	15.4	1	1	0.015
Yes	6	46.2	7	53.8	6.4 (1.9-21.3)	0.1 (- 3.1- +0.15)	
Presence of peritonitis or intraabdominal abscess							
No	103	86.6	16	13.4	1	1	0.138
Yes	2	18.2	9	81.8	28.9 (5.7-146.4)	22.5 (0.41390)	
Presence of intra operative anaesthetic complications							
No	104	81.9	23	18.1	1	1	0.685
Yes	1	33.3	2	66.7	9.0 (0.8-104.0)	0.4 (0.1-37.1)	

*Not included in multivariate analysis

Table-5 Scoring of significant factors(Age more than 60 years, Fever, hypotension, elevated serum creatinine, presence of gangrenous or ischemic bowel) and death

Scoring of significant factor	Alive		Died		Total number of patients		P value
	N	%	N	%	N	%	
≤ 2	103	98.1	10	40.0	113	86.9	<0.001
>2	2	1.9	15	60.0	17	13.1	
Total	105	80.8	25	19.2	130	100.0	

Table-6Prognostic scoring system in acute intestinal obstruction

S.No.	Parameter	Score
1.	Hypotension at presentation	1 Point
2.	Age more than 60 years	1 point
3.	Presence of gangrenous or ischemic bowel	1 point
4.	Fever (>37 degree centigrade)	1 point
5.	Elevated serum creatinine (>1.2 mg / dl)	1 point
Total Score > 2 points indicates poor prognosis		
Sensitivity of scoring of significant factors for detecting death= True positive / True positive * False Negative = 60% Specificity of scoring of significant factors for detecting death= True Negative / TrueNegative * False Positive = 98.1%		

DISCUSSION

The spectrum of intestinal obstruction in this study was analyzed and results obtained were compared to other studies. Obstructed Hernias had emerged the most common cause of intestinal obstruction in this study. Results obtained were compared with both western studies and Indian studies depicted in Table-7.

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Table-7 Western studies and Indian studies comparison

Study	Western				Indian	
Causes	Vick (%) (2)	Bizer et. al (%) (3)	McEntee et. Al (%) (4)	Miller et.al (%) (5)	Souvik et al (%)(6)	Present study (%)
Hernias	49	8.1	25	4	35.9	70.3
Adhesions	7	74	32	66	15.5	10.6
Neoplasms	13	8.6	26	3	16.6	7.6
Others	29	9.3	17	27	32	11.4

The present study represents an attempt to develop a model predictive of poor prognosis in intestinal obstruction based on clinical and basic investigations. Similar study done by Krebs and Goplerud stated that elderly patients (>65 years), poor nutritional status, palpable intraabdominal tumour masses, liver involvement or distant metastases, rapid re-accumulation of ascites requiring paracenteses, combination drug therapy failure (in contrast to none, or no adequate chemotherapy) and previous radiation therapy are criteria of poor prognosis in terms of survival after surgery for intestinal obstruction(7).In a study done by Larson JE, Podczaski ES, Manetta A, Whitney CW and Mortel R from the Department of Obstetrics and Gynaecology, Milton S. Hershey Medical Center, Pennsylvania State University, Survival time was found to be significantly related to the prognostic index initially proposed by Krebs and Goplerud(8). The present study's scoring system will be helpful in anticipating a poor prognosis and taking the appropriate actions to improve the outcome.

CONCLUSION

Etiological pattern revealed that Hernias were the most common cause of intestinal obstruction followed by adhesions.A points scoring system that is easy to use, involving a simple computation suitable for the busy clinical setting has been developed which will prove useful in predicting poor prognosis and take necessary precautions in improving outcome.

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