

ACUTE INTESTINAL OBSTRUCTION, SIGNIFICANCE OF CLINICAL AND LABORATORY FINDINGS IN PREDICTING BOWEL STRANGULATION

Dr. Arkan Shubber AbdulKhalik Al-Hamdany

M.B.Ch.B., F.I.B.M.S. \ (General Surgery) Iraqi Ministry of Health, Karbala Health Directorate, General and Laparoscopic Surgeon, Karbala, Iraq

Dr. Salah Mehdi Salih Alsilaykhee

M.B.Ch.B., F.I.B.M.S. \ (General Surgery) Iraqi Ministry of Health, Karbala Health Directorate, General and Laparoscopic Surgeon, Karbala, Iraq

Dr. Ammar Muhammed Kadhem

M.B.Ch.B., F.I.B.M.S., C.A.B.S. \ (General Surgery) Iraqi Ministry of Health, Al-Karkh Health Department, Al-Yarmouk Teaching Hospital, Baghdad, Iraq

Abstract:

Background: Acute intestinal obstruction is a common surgical emergency and a frequently encountered problem in abdominal surgery. A partial or complete blockage of the intestines characterizes it. Aims of the study: Evaluate the relevance of clinical and laboratory findings, such as symptom duration, abdominal pain, tachycardia, hypotension, fever, surgical scars, abdominal mass, tenderness, rebound tenderness, rigidity, bowel sounds, blood on digital rectal exam, and leukocytosis, in predicting strangulated intestinal obstruction. Methodology: This is a prospective study of adult patients admitted with acute intestinal obstruction. All patients were admitted, history was taken, and a physical examination was performed. All data were recorded, and thirteen clinical and laboratory findings were evaluated upon admission. Patients were followed up during admission. Result: The study included 142 patients, with 79 males and 63 females. Initially, 49 patients received conservative management, with 35 successfully treated. Fourteen underwent surgery after failing conservative therapy or developing strangulation symptoms. Ninety-three patients went straight to surgery after supportive therapy, totaling 107 surgical cases. Conclusions: Constant abdominal pain, rebound tenderness, rigidity, absent bowel sounds, blood in digital rectal exam, and leukocytosis are significant indicators of strangulated intestinal obstruction, necessitating early surgical exploration.

Keywords: Acute intestinal obstruction, Bowel strangulation, Surgical emergency, Clinical findings, abdominal surgery, Surgical exploration.

Introduction

Introduction:

The description of bowel obstruction dates back to the 3rd and 4th centuries when the scientist Praxagoras created an enterocutaneous fistula to relieve the obstruction [1]. Additionally, between 1880 and 1925, it was recognized that proximal intestinal decompression could relieve symptoms of mechanical obstruction and ileus [2,3]. In 1933, researchers demonstrated that gastrointestinal intubation was effective in relieving symptoms of intestinal distention caused by obstruction and ileus after laparotomy [4,5]. As a result, the principles of early diagnosis, rapid intravenous fluid resuscitation, gastrointestinal decompression, and timely surgical intervention to prevent intestinal gangrene and peritonitis were established well before the advent of antibiotic therapy, invasive hemodynamic monitoring, and parenteral nutrition [6,7]. Acute bowel obstruction is a common surgical emergency, causing significant morbidity, hospital costs, and emergency admissions worldwide [8]. Surgeons discovered that bowel obstructions often involve strangulation and ischemia, making it challenging to distinguish from simple obstruction [9]. Close and careful clinical evaluation, combined with laboratory and radiologic studies, is crucial for determining the appropriate management of patients with acute bowel obstruction [10].

Methodology:

This prospective study involved 142 patients with acute intestinal obstruction admitted to the Hospital. All adult patients presenting with clinical and radiological evidence of acute intestinal obstruction were included, while those with paralytic ileus were excluded, and patients under 15 years of age were managed by the pediatric surgery department. The data were collection commenced immediately upon patients' arrival at the surgical emergency department and continued daily. Recorded variables included the duration between symptom onset and emergency department arrival, nature of abdominal pain, vital signs (heart rate, blood pressure, and temperature), and abdominal examination findings (scar of previous surgery, abdominal mass, tenderness, rebound tenderness, rigidity, bowel sounds, and digital rectal examination), as well as white blood cell (WBC) counts. Immediate surgical intervention was performed in patients meeting one or more of the following criteria: signs of peritonitis (tenderness, rebound tenderness, and rigidity), obstructed hernia, or hemodynamic instability despite fluid resuscitation with crystalloid solution or recurrence of instability after initial stabilization. Intraoperative findings were recorded as simple or strangulated. Patients without indications for surgery underwent conservative treatment for up to 4 days, consisting of nasogastric tube decompression, intravenous fluids, and antibiotics, with regular monitoring by the attending surgeon, including vital signs and abdominal examinations. All patients underwent WBC count testing and plain abdominal X-ray (erect and supine) every 24 hours. Patients who developed signs of peritonitis or did not respond to conservative therapy underwent surgical intervention, while those who responded were discharged home and considered to have a simple obstruction. All patients were followed up during their admission, and morbidity and mortality were recorded. Statistical analysis was conducted using numbers and percentages of cases, with differences considered statistically significant at $p < 0.05$ and highly significant at $p < 0.01$.

Intestinal Obstruction Research Form

The Intestinal Obstruction Research Form is a comprehensive tool used to collect detailed information about patients with intestinal obstruction. It includes sections for recording patient demographics, symptoms (such as duration, type of abdominal pain, vomiting, constipation, and abdominal distention), past surgical history, physical examination findings (heart rate, blood

pressure, temperature, dehydration, abdominal distention, scar of previous surgery, abdominal mass, hernial orifice swelling, tenderness, rebound tenderness, and rigidity), bowel sounds, digital rectal examination findings (mass, blood, empty rectum, fecal impaction), radiological findings (small bowel, large bowel, number of air-fluid levels), white blood cell count, differential diagnosis (simple vs. strangulated obstruction), treatment (conservative vs. operative, duration, response), operative findings (small bowel, large bowel, simple vs. strangulated, causes including adhesions, hernia type, tumor site, volvulus, others, procedure), hospital stay duration, postoperative complications (wound infection, dehiscence, fistula, ileus, pulmonary complications, others), and mortality (if any, with causes specified). This form serves as a comprehensive tool for collecting and organizing data related to intestinal obstruction cases, aiding in clinical assessment, decision-making, and research.

Results

The age ranged from (15 – 84) years. The highest rate was found in the fifth decade, with 33 patients (23.2 %), followed by the sixth and seventh decades, with 22 (15.4 %) and 21 (14.8 %), respectively. Gender distribution of the 142 patients revealed male predominance, 79 male (55.6%), and 63 female (44.4%) with male: female ratio of 1.25: 1.00, as shown in Table 1.

Age	Male	Female	Total
	Number and Percentage	Number and Percentage	Number and Percentage
11-20	11 (13.9%)	7 (11.1%)	18 (12.7%)
21-30	5 (6.3%)	6 (9.5%)	11 (7.7%)
31-40	10 (12.6 %)	10 (15.9%)	20 (14.1%)
41-50	14 (17.8%)	19 (30.1%)	33 (23.2%)
51-60	15 (18.9%)	7 (11.1%)	22 (15.4%)
61-70	17 (21.6%)	4 (6.3%)	21 (14.8%)
71-80	7 (8.9%)	8 (12.7%)	15 (10.6%)
81-90	---	2 (3.2%)	2 (1.4%)

Duration of symptoms before presentation

The duration of symptoms prior to hospital admission varied from a few hours to a few days. 55 patients (38.7%) presented within 24 hours, 53 (96.4%) of them had simple obstruction while 41 patients (28.9%) presented with symptoms for three days, 28 (68.3%) of them had strangulated obstruction, as shown in Table 2

Table 2: Duration of symptoms before presentation

Duration days		Simple		Strangulated		Total	
		N	%	N	%	N	%
1	<6hr	24	24.2	0	0	24	16.9
		29	29.3	2	4.7	31	21.8
	6-24	53	53.5	2	4.7	55	38.7
25-48 h		26	26.3	3	7	29	20.4
49-72 h		13	13.1	28	65.1	41	28.9
> 72 h		5	5.1	4	9.3	9	6.3
>96 h		2	2	6	13.9	8	5.6
Total		99	100	43	100	142	100

Duration of conservative treatment

The period of conservative treatment was ranged from 1 to 5 days. Most of them, 19 (54.2%), respond in the second day, and only two patients (5.7%) remain to the fourth and fifth days; the first one had a history of laparotomy for perforated D.U. followed by bowel obstruction treated conservatively one year ago, and the second one had laparotomy for bullet injury followed by bowel obstruction treated by adhesolysis nine months ago, as shown in figure1.

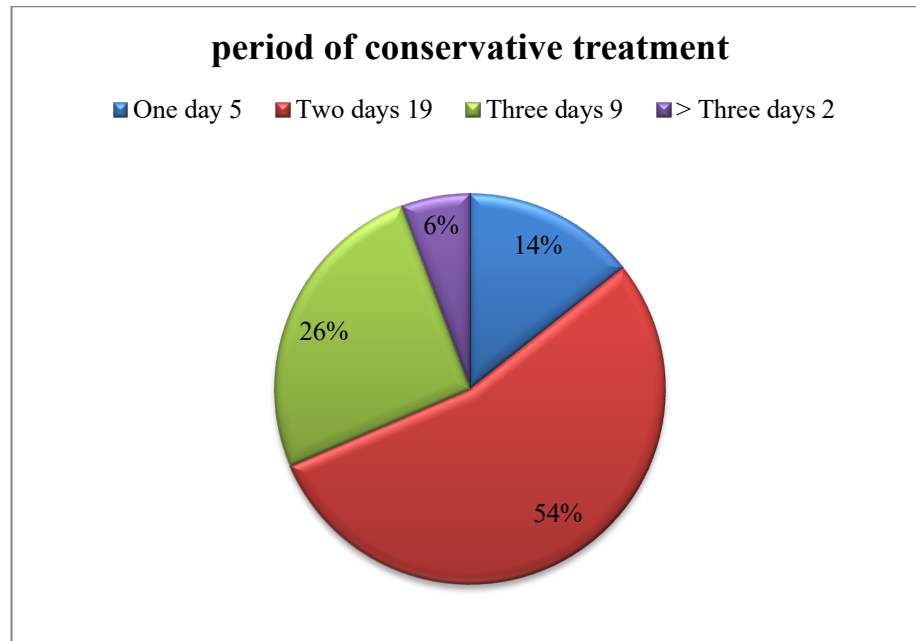


Figure 1: period of conservative treatment

Operative Findings

Operative intervention is required for 107 patients (75.3%), 59 (55.1%) of them presenting with signs of peritonitis (tenderness, rebound tenderness, and rigidity), 34 (31.8%) of them presented with obstructing hernia, and 14 (13%) patients who fail to improve with conservative management after a period of observation. Operative findings were 64 (59.8%) with simple obstruction, and the remaining 43 (40.2%) had strangulated obstruction.

Clinical Presentation

Abdominal pain was the commonest presentation, found in 131 patients (92.3%); 38 patients (88.4%) of them had strangulated bowel obstruction, and 93 patients (93.9%) had simple presentation, as shown in Table 3.

Table 3: Distribution of presentation

Clinical Presentation Symptoms/Signs/WBC		Simple 99		Strangulated 43		Total 142	
		N	%	N	%	N	%
Abdominal Pain	Total	93	93.9	38	88.4	131	92.3
	Colicky	79	79.8	26	60.5	105	73.9
	Constant	14	14.1	12	27.9	26	18.3
Tachycardia PR>110		53	53.5	23	53.5	76	53.5
Hypotension Systolic BP<90		28	28.3	11	25.6	39	27.5
Temp > 38		37	37.4	14	32.6	51	35.9
Scar of Previous Surgery		35	35.4	11	25.6	46	32.4
Abdominal mass		3	3	1	2.3	4	2.8
Generalized Tenderness		46	46.5	29	67.4	75	52.8
Rebound Tenderness		9	9.1	17	39.5	26	18.3

Rigidity		3	3	25	58.1	28	19.7
Bowel Sounds	Normal	18	18.2	5	11.6	23	16.2
	Hyperactive	57	57.6	7	16.3	64	45
	Absent	24	24.2	31	72	55	38.7
Digital Rectal Exam	Empty	34	34.3	14	32.6	48	33.8
	Blood	3	3	8	18.6	11	7.7
	Mass	0	0	0	0	0	0
	Fecal Impaction	4	4	0	0	4	2.8
WBC > 12000		21	21.2	26	60.5	47	33.1
< 3 days		79	79.8	5	11.6	84	59.1
>3 days		20	20.2	38	88.4	58	40.8

Postoperative Complication

Postoperative complications were occurred in 25 patients (23.3%). The main complications were wound infection in 9 patients (36%) and pulmonary complication in 8 patients (32%) and other complications include wound dehiscence in 3 patients (12%), prolonged ileus in 3 patients (12%), anastomosis leakage and fistula in 1 patient (4%) and deep venous thrombosis in 1 patient (4%) as shown in figure 2.

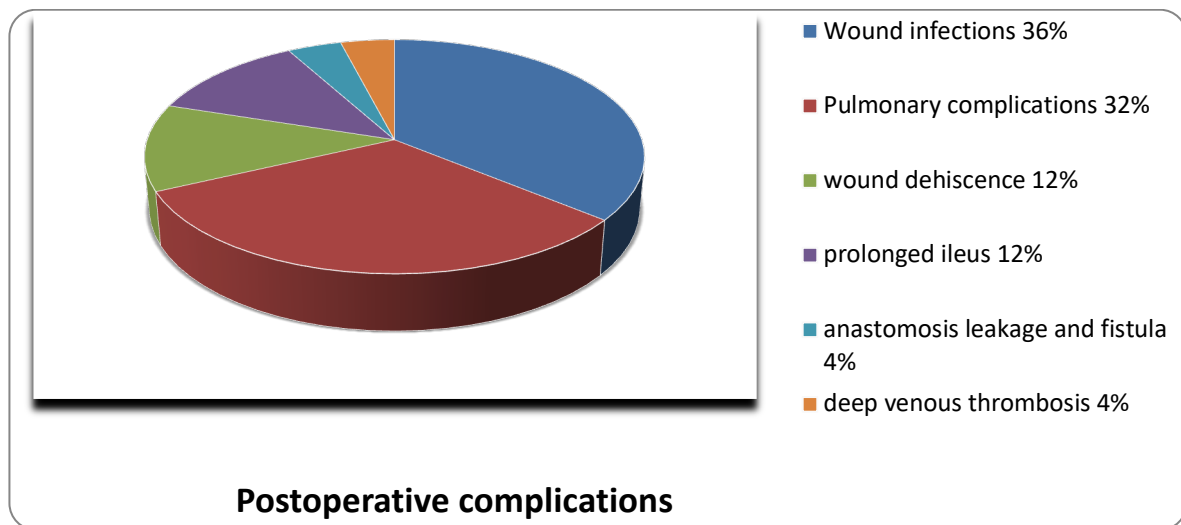


Figure 2: Postoperative complications

Table 4: Postoperative complications in simple and strangulated obstructions.

Complications	simple	strangulated	Total	%
Wound infection	2	7	9	36
Pulmonary complication	3	5	8	32
Wound dehiscence	0	3	3	12
Prolonged ileus	1	2	3	12
Anastomosis leakage and fistula	0	1	1	4
Deep venous thrombosis	0	1	1	4
Total	6	19	25	100

Period of Hospital Stay

Most of the patients, 105 (73.9%) discharged within the first week of admission; those with successful conservative treatment, 34 patients (97.1%), simple obstruction 48 (75%), and 23 patients (53.4%) in strangulated obstructions, as shown in Table 5.

Table 5: Period of hospital stay

Period/week	Conservative	Surgical		Total	
		Simple	Strangulated	N	%
< 1 week	34	48	23	105	73.9
1-2 weeks	1	11	13	25	17.6
2-3 weeks	0	5	6	11	7.8
3-4 weeks	0	0	1	1	0.7
Total	35	64	43	142	100

Mortality

Overall mortality in our study was seven deaths (4.9%) out of 142 patients. Most of the patients were over the age of 60 years; 6 deaths followed surgery for strangulated obstruction and one mortality during conservative treatment, as shown in Table 6.

Table 6: Causes of death

Causes of death	Surgical	Conservative
Pulmonary causes and RCU need	3	0
Malignant	1	0
Septicemia	1	0
Ischemic heart diseases	1	1
Total	6 (4.2%)	1 (0.7%)

Discussion:

Acute intestinal obstruction is a major challenge in clinical decision-making and management, with mortality rates increasing with each hour since symptom onset, ranging from 3% in simple obstruction to 30% in obstruction with vascular disturbance or perforation [11,12]. In our study, the age group affected was between 15 and 84 years, with a higher incidence in those aged over 40 years, consistent with previous studies [11,12,13,14]. A male predominance was observed in the study, consistent with some studies but in contrast to others where females were more affected, or the incidence was equal between the sexes. The duration of symptoms was associated with the incidence of strangulation, with a higher proportion of patients who developed symptoms within 24 hours having simple obstruction, which is supported by similar studies [15,16]. Clinical criteria such as signs of peritonitis, rebound pain, rigidity, absence of bowel sounds, blood on rectal examination, and elevated white blood cell count were significant indicators of possible strangulation, consistent with previous research. However, systemic symptoms such as tachycardia, hypotension, and fever were not significant indicators of strangulation, possibly due to their nonspecific nature [12,13,14,15,16]. Conservative management was sometimes successful, with early response observed as early as day 2. The timing of surgical intervention in non-responsive cases remains controversial, with variations in approach. Surgical intervention was necessary in the majority of cases, with complications and prolonged hospital stays being more common in cases of strangulated obstruction.

Conclusion:

Duration of symptoms of intestinal obstruction of more than three days, presence of leukocytosis, and local abdominal findings (constant abdominal pain, abdominal signs of peritonitis, rebound tenderness and rigidity, absent bowel sounds, blood in digital rectal examination) had significant results, in predicting strangulated intestinal obstruction; their presence should call for early surgical exploration. Systemic manifestations such as fever, tachycardia, and hypotension were not significant in the prediction of strangulation.

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