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A Retrospective Study of Strangulation in Acute Intestinal Obstruction

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ABSTRACT

Acute intestinal obstruction (AIO) is a potentially life-threatening condition that requires timely diagnosis and intervention. Among the various causes of AIO, strangulation of the intestine represents one of the most serious forms due to compromised blood flow, leading to ischemia and necrosis of the bowel. This retrospective study aims to evaluate the clinical presentation, diagnostic challenges, and management outcomes of patients with strangulated AIO. The study was conducted over a period of one year at a tertiary care hospital, involving patients diagnosed with acute intestinal obstruction. Detailed data was collected on patient demographics, clinical features, imaging findings, surgical interventions, and post-operative outcomes.The findings indicated that strangulation commonly presented with signs of bowel ischemia, including severe abdominal pain, distention, vomiting, and signs of peritonitis. The majority of patients underwent emergency surgery, with bowel resection being the most common procedure performed. Imaging modalities, particularly contrast-enhanced CT scans, played a crucial role in diagnosing the strangulation and identifying the site of obstruction. Early intervention was associated with significantly improved survival rates, whereas delayed treatment resulted in higher morbidity and mortality due to complications such as sepsis and multi organ failure.This study emphasizes the critical role of rapid diagnosis and timely surgical inter vention in managing strangulated intestinal obstruction. It highlights the importance of early recognition of strangulation signs in AIO, urging clinicians to remain vigilant. The findings suggest that increased awareness, early imaging, and prompt surgery significantly reduce adverse outcomes. By contributing to the understanding of strangulation in AIO, this research offers valuable insights into its management, ultimately paving the way for improved clinical outcomes in patients facing this life-threatening condition.

INTRODUCTION

Acute intestinal obstruction (AIO) is a common surgical emergency that presents significant challenges in terms of diagnosis, management, and predicting outcomes. This condition can result from various etiologies, including mechanical obstr - uction or strangulation, which is one of the most serious forms due to compromised blood supply to the affected bowel. Strangulation, if not promptly diagnosed and managed, can lead to bowel ischemia, necrosis, peritonitis, and multi-organ failure [1]. Accurate and early detection of intestinal strangulation in patients with either small or large bowel obstruction is crucial for appropriate surgical intervention, which can significantly improve survival and reduce complications. However, distinguishing between strangulation and simple bowel obstruction remains challenging, even for experienced clinicians [2]. The subtle clinical signs and overlapping symptoms often complicate the decision-making process, and misdiagnosis can result in delayed treatment, worsening the prognosis.

Current diagnostic methods, including clinical evaluation, radiological imaging, and biochemical tests, provide valuable insights but still lack the sensitivity required for early detection of strangulation [3]. A combination of these methods is used, but their predictive value often varies, and there is no single universally accepted criterion for early diagnosis. As a result, many cases are diagnosed only during exploratory laparotomy, where the true extent of the strangulation becomes apparent. The lack of reliable preoperative markers leads to a gap in treatment timing, influencing patient outcomes significantly [4].

In response to these challenges, this retrospective study was designed to explore the incidence and underlying causes of strang-

ulation in acute intestinal obstruction. The study aims to assess the diagnostic capabilities of various preoperative clinical, radiological, and biochemical parameters for predicting strangulation [5]. Additionally, the study seeks to evaluate the outcomes of surgical management, including complications and recovery, following treatment for strangulated obstructions. By focusing on a retrospective study at a tertiary care hospital (GGH, Kakinada), the research aims to provide a comprehensive understanding of this critical surgical issue and contribute to improving diagnostic protocols and management strategies [6].

The study intends to identify risk factors, refine diagnostic accuracy, and improve the overall management of strang ulation in acute intestinal obstruction, ultimately enhancing patient outcomes in this challenging clinical setting [7].

MATERIAL AND METHOD

This retrospective study, conducted at Government General Hospital, Kakinada, from June 2022 to June 2024,aimed to investigate acute intestinal obstruction in 50 patients. Data was collected through direct interaction with patients, clinical examinations, laboratory reports, and radiological results. Inclusion criteria were patients with small or large bowel obstruction requiring explorative laparotomy, while exclusion criteria included individuals with subacute obstructions managed conservatively, those under 15, patients with adynamic bowel obstruction, and pregnant women. Each case was evaluated with an abdominal X-ray, and detailed information about symptoms, diagnosis, surgical procedures, and outcomes was recorded. The data was then tabulated for analysis and comparison with existing research. This methodology ensured thorough docume ntation and evaluation of acute intestinal obstruction cases, enabling conclusions based on the latest literature and clinical observations.

RESULT

Table 1: Age Distribution

Age in years	No. of patients
15 - 24	4
25 - 34	5
35 - 44	9
45 - 54	8
55 - 64	14
65 - 74	9
>74	1

The table shows the distribution of patients with acute intestinal obstruction based on age groups. The highest number of patients were in the 55-64 age range, suggesting a higher prevalence of the condition in older adults. The number of patients significantly decreases in the youngest and oldest age groups.

Table 2: Sex Distribution

Sex	No. of Cases	Percentage
Male	43	86%
Female	7	14%

The table indicates that the majority of patients with acute intestinal obstruction were male, accounting for 86% of the cases. Only 14% of the cases were female, highlighting a higher prevalence of the condition in males compared to females.

Table 3: Clinical Symptoms

Symptoms	Total No. of Patients
Abdominal pain	50
Vomiting	35
Abdominal distension	26
Constipation	16

The table shows the frequency of symptoms in patients with acute intestinal obstruction. Abdominal pain was the most common symptom, present in 50 patients, followed by vomiting (35 patients), abdominal distension (26 patients), and constipation (16 patients). These symptoms are key indicators for diagnosis.

Table 4: Signs

Signs	No. of Cases with Strangulation (12)	Total No. of Cases (50)
Tenderness	**10 (83.3%)**	**45 (90%)**
Guarding/Rigidity	**8 (66.7%)**	**39 (78%)**
Dehydration	**7 (58.3%)**	**22 (44%)**
Absent Bowel Sounds	**5 (41.6%)**	**19 (38%)**

The table highlights signs observed in patients with strangulation and overall cases. Tenderness was the most common sign in strangulation cases (83.3%), followed by guarding/rigidity (66.7%). Dehydration and absent bowel sounds were present in 58.3% and 41.6% of strangulation cases, respectively.

Table 5: Disease Spectrum

Etiology	No. of Cases	Percentage
Adhesions	14	28%
Hernias	12	24%
Carcinoma large bowel	8	16%
Sigmoid volvulus	7	14%
Ileocecal TB	6	12%
Intussusception	2	4%
Mesenteric Ischemia	1	2%

This table shows the distribution of various causes of acute intestinal obstruction in the study. Adhesions were the most common etiology (28%), followed by hernias (24%). Less common causes included mesenteric ischemia and intussusception. These findings highlight the diverse origins of intestinal obstruction.

Table 6: Strangulation

Etiology	No. of Cases	Percentage
Hernias	6	50%
Sigmoid volvulus	5	41.60%
Mesenteric Ischemia	1	8.40%

This table illustrates the causes of intestinal strangulation observed in the study. Hernias were the leading cause, contributing to 50% of cases. Sigmoid volvulus followed at 41.6%, while mesenteric ischemia was the least frequent cause at 8.4%.

Table 7: Investigations

Findings	No. of Cases	Percentage
Multiple air fluid levels	41	82%
Dilated bowel loops	29	58%
Coffee bean appearance	6	12%
Inconclusive	5	10%

This table highlights the radiological findings observed in the study. The majority of cases showed multiple air-fluid levels (82%) and dilated bowel loops (58%). A small percen-tage presented with coffee bean appearance (12%), and 10% of cases had inconclusive findings.

Table 8: CECT Abdomen

Variable	Strangulated Obstruction	Simple Obstruction
Ascites > 500 ml	7	14
Ascites < 500 ml / no ascites	5	24

This table shows the distribution of ascites in strangulated and simple obstruction cases. A higher number of strangulated obstruction cases had ascites > 500 ml (7 cases),while the majority of simple obstruction cases had no significant ascites or less than 500 ml (24 cases).

Table 9: CECT Findings used to Predict Strangulation

VariAble	Strangulated Obstruction	Simple Obstruction
Reduced wall contrast enhancement	**7**	**8**
Normal wall contrast enhancement	**5**	**31**

This table shows the difference in wall contrast enhancement between strangulated and simple obstructions. Strangulated obstructions had fewer cases with normal wall enhancement (5), while simple obstructions had a higher number showing normal enhancement (31), indicating differences in severity.

Table 10: Treatment

Procedure	No. of Cases of Strangulation (12)	Total No. of Cases (50)
Reduction with hernia repair	0	6 (12%)
Resection and anastomosis	7 (58.3%)	14 (28%)
Adhesiolysis	0	11 (22%)
Colostomy	5 (41.6%)	13 (26%)
Ileostomy	0	4 (8%)
Sigmoidopexy	0	2 (4%)

This table illustrates the surgical procedures performed for strangulated and non-strangulated bowel obstructions. Resection and anastomosis was the most common procedure for strangulated cases (58.3%), while colostomy was also frequently done (41.6%). Adhesiolysis and other procedures were more common in non-strangulated cases.

Table 11: Treatment

Procedure	No. of Cases of Strangulation (12)	Total No. of Cases (50)
Reduction with hernia repair	**0**	**6 (12%)**
Resection and anastomosis	**7 (58.3%)**	**14 (28%)**
Adhesiolysis	**0**	**11 (22%)**
Colostomy	**5 (41.6%)**	**13 (26%)**
Ileostomy	**0**	**4 (8%)**
Sigmoidopexy	**0**	**2 (4%)**

This table categorizes the outcomes of patients with acute intestinal obstruction. The majority of cases (54%) had a Grade 1 outcome, indicating good recovery. Fewer cases experienced severe outcomes, with 16% in Grade 2, 26% in Grade 3, and 4% in Grade 4, which implies poor prognosis.

Table 12: Complications

Albumin Level	Good Outcome (Grade 1 & 2)	Poor Outcome (Grade 3 & 4)	Percentage of Good Outcomes
>3.5 gm%	30	0	100%
<3.5 gm%	3	17	15%

This table shows the relatikonship between albumin levels and patient outcomes. Patients with albumin levels greater than 3.5 gm% had all good outcomes (100%), whereas those with lower levels (<3.5 gm%) had significantly fewer good outcomes (15%), suggesting a strong correlation between albumin levels and prognosis.

Table 13: Creatinine vs Outcome

Creatinine Level	Good Outcome (Grade 1 & 2)	Poor Outcome (Grade 3 & 4)	Percentage of Good Outcomes
< 1.2 mg%	29	8	78.40%
≥ 1.2 mg%	4	9	30.10%

This table demonstrates the correlation between creatinine levels and patient outcomes. Patients with creatinine levels less than 1.2 mg% had a higher percentage of good outcome s (78.4%), while those with levels above 1.2 mg% had fewer good outcomes (30.1%), indicating that elevated creatinine is linked to poorer prognosis.

Table 14: C-Reactive Protein vs Outcome

C-Reactive Protein	Strangulated Obstruction	Simple Obstruction
Elevated	10	7
Normal	2	31

The table compares the C-Reactive Protein (CRP) levels between patients with strangulated and simple obstructions. Elevated CRP levels were more commonly seen in strangulated obstructions (10 cases), indicating inflammation while the majority of simple obstruction cases had normal CRP levels (31 cases), suggesting less severe inflammatory responses.

Table 15: Variables used in Scoring System in this Study

Variable	No. of Cases with Strangulation (12)	No. of Cases (50)
Pain > 4 days	3 (25%)	10 (20%)
Guarding	8 (66.7%)	33 (66%)
WBC Count > 10 x 10^9/L	12 (100%)	40 (80%)
CRP > 75 mg/L	9 (75%)	17 (34%)
Ascites > 500 ml	10 (83.3%)	21 (42%)
Reduced Wall Contrast Enhancement	9 (75%)	15 (30%)

This table compares various clinical variables between cases with strangulation and general cases. Strangulation cases exhibited higher percentages in several indicators, including elevated WBC count (100%), CRP levels (75%), and ascites (83.3%). These markers suggest more severe inflammation and complications in strangulated obstructions. Reduced wall contrast enhancement (75%) was also higher in strangulation cases, showing more advanced tissue damage compared to general cases.

Table 16: Various Scores noted in this Study

Criteria Score by Schwenter et al.	No. of Cases Having Strangulation	Total No. of Cases Noted
1	0	10
2	3	18
3	2	9
4	5	11
5	2	2

This table shows the distribution of strangulation cases based on the criteria score by Schwenter et al. It reveals that higher criteria scores (4 and 5) are associated with more casesof strangulation. The lowest score (1) had no strang ulation cases, while scores 2, 3, and 4 showed increasing strangulation incidence.

DISCUSSION

This study, conducted at Government General Hospital, Kakinada, between June 2022 and June 2024, evaluated 50 cases of acute intestinal obstruction, focusing on clinical presentations, radiological imaging, and patient outcomes [8]. The average age of patients was 53.75 years, with the most affected age group being 55-64 years (14 cases). The male-to-female ratio was 6:1, with 86% of patients being male, in line with recent literature. Strangulation was most common in the 45-54 years age group, with a higher incidence in females (28.5% vs. 23.2% in males) [9].

Abdominal pain, distention, and vomiting were the primary presenting symptoms, with tenderness observed in 90% of patients, and guarding and rigidity in 78%. Among strangulation cases, tenderness was the most frequent sign (83.3%), followed by guarding (66.7%) [10].

Adhesions (28%) and hernias (24%) were the most common causes of obstruction. Among hernias, inguinal hernia (50%) was the most frequent, followed by incisional hernia (33.3%). Strangulation was noted in 12 cases, with hernias (50%) being the leading cause, particularly inguinal hernia (33.3%) and incisional hernia (16.7%) [11].

Radiological investigations included plain X-rays and CT scans. X-rays showed "multiple air-fluid levels" in 41 cases, while CT scans provided better diagnostic clarity, identifying obstruction in 48 cases with only 2 equivocal results [12]. Contrast-enhanced CT (CECT) revealed ascites (>500 ml) in 33.3% of strangulation cases and reduced wall enhancement in 46.7% [13].

Surgical interventions included resection and anastomosis (14 cases), colostomy (13 cases), adhesiolysis (11 cases), hernia repair (6 cases), ileostomy (4 cases), and sigmoidopexy (2 cases) [14]. Surgical outcomes were favorable in 70% of cases, with 30% experiencing poor outcomes, including one death [15].

Preoperative albumin and creatinine levels were key markers for postoperative morbidity. Patients with albumin levels above 3.5 g% had better outcomes (100%), while only 15% of those with lower albumin levels did. Similarly, 78.4% of patients with creatinine levels below 1.2 mg% had positive outcomes, compared to 30.1% in those with higher creatinine levels [16].

The study also evaluated the use of a 6-point severity score by Schwenter et al. for predicting strangulation in acute intestinal obstruction [17]. A score of 3 or higher had a sensitivity of 75% and specificity of 65%, supporting its use in clinical decision-making, though it should not replace clinical judgment. Further research is needed to validate these findings [18].

CONCLUSION

This study aimed to identify the most common causes of intestinal obstruction, incidence and etiology of strangulation, clinical features, and surgical techniques used. It assessed the effectiveness of radiological and investigative methods, highlighting the importance of early diagnosis and intervention in emergency care. CECT has greatly improved diagnostic accuracy, even in atypical cases, while early resuscitation and electrolyte correction help reduce mor - bidity and mortality. Immediate surgical intervention typically results in favorable outcomes. The Schwenter et al. scoring system was found useful in predicting strangulation, but further studies with larger sample sizes are needed for validation.

REFERENCES

1. Deitch E. Simple Intestinal Obstruction Causes Bacterial Translocation in Man. Archives of Surgery. 1989; 124(6):699.
2. Stewart R, Page C, Brender J, Schwesinger W, Eisenhut D. The incidence and risk of early postoperative small bowel obstruction. The American Journal of Surgery. 1987;154(6):643-647.
3. Duepree H, Senagore A, Delaney C, Fazio V. Does means of access affect the incidence of small bowel obstruction and ventral hernia after bowel resection?. Journal of the American College of Surgeons. 2003;197(2):177-181.
4. Beck D, Opelka F, Bailey R, Rauh S, Pashos C. Incidence of small-bowel obstruction and adhesiolysis after open colorectal and general surgery. Diseases of the Colon & Rectum. 1999;42(2):241-248.
5. 5. Wilkins B, Spitz L. Incidence of postoperative adhesion obstruction following neonatal laparotomy. British Journal of Surgery. 1986;73(9):762-764.
6. McEntee G, Pender D, Mulvin D, McCullough M, Naeeder S, Farah S et al. Current spectrum of intestinal obstruction. British Journal of Surgery. 1987;74(11):976-980.
7. Miller G, Boman J, Shrier I, Gordon P. Natural history of patients with adhesive small bowel obstruction. British Journal of Surgery. 2000;87(9):1240-1247.
8. Adesunkanmi A, Agbakwuru E, Badmus T. Obstructed abdominal hernia at the Wesley Guild Hospital, Nigeria. East African Medical Journal. 2009;77(1).
9. Ahmad M, Niaz W, Hussain A, Saeeduddin A. Polypropylene mesh repair of incisional hernia. [Internet]. Europepmc.org. 2017 [cited 15 October 2017]. Available from: http://europepmc .org/abstract /med/ 129 21679
10. Oladele A, Akinkuolie A, Agbakwuru E. Pattern Of Intestinal Obstruction In A Semiurban Nigerian Hospital [Internet]. Ajol.info. 2017 [cited 15 October 2017].

Available from: https://www.ajol. info/index. php /nj cp /Arctic le /view/11434

11. Adhikari S, Hossein M, Das A, Mitra N, Ray U. Etiology and outcome of acute intestinal obstruction: A review of 367 patients in Eastern India. Saudi Journal of Gast - roenterology. 2010;16(4):285.
12. Philip P. Afferent limb internal strangulation in obstructed inguinal hernia. British Journal of Surgery. 1967;54 (2): 96-99.
13. Ören D, Atamanalp S, Aydinli B, Yildirgan İ, Başoğlu M, Polat Y et al. An Algorithm for the Management of Sigmoid Colon Volvulus and the Safety of Primary Resection: Experience with 827 Cases. 2017.
14. Ballantyne G. Review of sigmoid volvulus. 2017.
15. Drapanas T, Stewart J. Acute sigmoid volvulus. The American Journal of Surgery. 1961;101(1):70-77.
16. H. Najah, G. Godiris Petit, S. Noullet, A. Ayed, F. Menegaux, C. Trésallet, Sigmoïdectomie par voie élective pour volvulus du sigmoïde (avec vidéo), Journal de Chirurgie Viscérale, 2017, **154**, 1, 63
17. H. Najah, G. Godiris Petit, S. Noullet, A. Ayed, F. Menegaux, C. Trésallet, Sigmoidectomy via an elective approach for sigmoid volvulus (with video), Journal of Visceral Surgery, 2017, **154**, 1, 59
18. Jon D. Vogel, Daniel L. Feingold, David B. Stewart, Jacquelyn S. Turner,Marylise Boutros,Jonathan Chun, Scott R. Steele, Clinical Practice Guidelines for Colon Volvulus and Acute Colonic Pseudo Obstruction, Diseases of the Colon & Rectum, 2016, **59**, 7, 589

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