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Original Research Paper | Radio-Diagnosis

UTILITY OF MULTIDETECTOR COMPUTED TOMOGRAPHY IN SMALL BOWEL OBSTRUCTION

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ABSTRACT

Background: Small bowel obstruction (SBO) is a frequent and potentially life-threatening surgical emergency. Prompt and accurate diagnosis is crucial to prevent complications such as ischemia, perforation, and gangrene. Multidetector Computed Tomography (MDCT) has become the imaging modality of choice for evaluating suspected SBO due to its high diagnostic accuracy. The present study aimed to evaluate the diagnostic performance of contrast-enhanced MDCT in detecting small bowel obstruction, identifying its etiology, localizing the transition point, and predicting complications, in correlation with intraoperative findings. **Methods:** A prospective observational study was conducted on 50 patients with clinically suspected SBO from June 2023 to November 2024. Contrast-enhanced MDCT was performed using standardized protocols. Imaging findings were compared with intraoperative outcomes to assess diagnostic accuracy, sensitivity, specificity, and predictive values. **Results:** MDCT achieved 100% sensitivity in detecting SBO and showed 90% concordance with surgical findings for etiology. Sensitivity and specificity were 90% and 98.55%, respectively. Perfect diagnostic accuracy (100%) was achieved for mass lesions and volvulus. CT correctly identified the transition zone in all bowel segments. Delayed imaging (>24 hours) was significantly associated with ischemia and gangrene ($p = 0.024$). Etiological patterns varied with BMI, and postoperative complications were more frequent in delayed cases. **Conclusion:** MDCT is a rapid, precise, and indispensable tool for diagnosing SBO, enabling early intervention, reducing complications, and guiding surgical management. Early imaging significantly enhances outcomes.

KEYWORDS : Small bowel obstruction, Multidetector computed tomography, Transition point, Bowel ischemia, Diagnostic accuracy, Surgical correlation, Postoperative complications.

INTRODUCTION

Small bowel obstruction (SBO) is a common and potentially life-threatening surgical emergency characterized by partial or complete blockage of the small intestinal lumen [1]. This obstruction interrupts the normal transit of food, fluids, and gas, leading to a constellation of clinical manifestations, including abdominal pain, distension, vomiting, obstipation, and, if left untreated, severe complications such as bowel ischemia, sepsis, and multi-organ failure [1,2]. SBO is broadly categorized into mechanical obstruction, resulting from structural causes such as adhesions, hernias, tumors, or volvulus, and functional obstruction (paralytic ileus), which arises due to impaired intestinal motility from neuromuscular dysfunction [1,3].

SBO continues to be a leading cause of hospital admissions for acute abdominal conditions, accounting for 12–16% of all surgical emergencies worldwide [1,2]. Its incidence in adults is estimated to be 2 to 3 per 1,000 individuals annually, with postoperative adhesions contributing to approximately 50–75% of cases [2]. Risk factors include advanced age, prior abdominal surgeries, and intra-abdominal malignancies. If not promptly diagnosed and managed, SBO can progress to life-threatening complications such as bowel ischemia, perforation, and peritonitis, with mortality rates rising up to 25% in complicated or delayed cases [2,4].

Diagnostic evaluation traditionally begins with plain abdominal radiography due to its availability and cost-effectiveness. However, its sensitivity and specificity are limited, particularly in identifying the exact site, cause, and severity of the obstruction. Ultrasonography, while advantageous in pediatric and pregnant populations, is highly operator-dependent and limited by factors such as obesity or excessive bowel gas [5,6]. In contrast, Multidetector Computed Tomography (MDCT) has emerged as the gold standard for imaging in suspected SBO, offering superior diagnostic accuracy [7–10].

MDCT provides rapid image acquisition, high spatial resolution, and advanced post-processing techniques, such as multiplanar reformation (MPR) and 3D reconstructions, enabling precise localization of the transition point, identification of the underlying etiology, and evaluation of obstruction severity [9,10]. Additionally, MDCT can detect early indicators of ischemia, such as reduced mural enhancement, bowel wall thickening, mesenteric congestion, pneumatosis intestinalis, and portal venous gas—features critical for timely surgical decision-making [11–15].

Given the morbidity associated with delayed diagnosis, MDCT plays a pivotal role in expediting management and reducing unnecessary surgeries. This study aims to evaluate the diagnostic performance of MDCT in SBO, focusing on its accuracy in identifying the transition point, etiology, and complications, and correlating these findings with intraoperative observations.

MATERIAL AND METHODS

This prospective observational study was conducted in the Department of Radiodiagnosis at Sri Aurobindo Medical College & Postgraduate Institute, Indore. The study duration was 18 months, from June 2023 to November 2024. Prior to commencement, ethical approval was obtained from the Institutional Ethics Committee (IEC No.: SAIMS/IEC/2023/06/SBO-MDCT), and the study was conducted in accordance with the Declaration of Helsinki (2013 revision).

Patients of any age and gender presenting with clinical features suggestive of SBO and referred for MDCT were eligible. Exclusion criteria included refusal to consent, pregnancy, and renal impairment precluding contrast-enhanced imaging. Using a confidence level of 95%, expected surgical intervention rate of 50%, and 14% margin of error, the calculated sample size was 49; 50 patients were ultimately enrolled using non-probability convenience sampling.

Methodology

Pre-Imaging Assessment

Following consent and eligibility confirmation, each participant underwent detailed clinical evaluation including history, physical examination, and routine laboratory investigations (CBC, RFT, serum electrolytes, LFT, and serum creatinine). A serum creatinine test was mandatory to assess fitness for contrast-enhanced imaging. Written informed consent was obtained in the patient's preferred language.

Imaging Protocol

All scans were performed using a Siemens Somatom Definition AS 64-slice MDCT scanner. Patients fasted for at least six hours. Where appropriate, oral contrast was administered 30–60 minutes prior to imaging. Intravenous non-ionic contrast (Iohexol 300 mg/mL) was given at 1.5 mL/kg body weight. Axial images were acquired and reconstructed into coronal and sagittal views using Multi-Planar Reformation (MPR) and Volume Rendering Technique (VRT).

Image Interpretation And Parameters Assessed

Two experienced radiologists independently interpreted the scans, blinded to surgical outcomes. MDCT findings were evaluated for:

Bowel Loop Dilatation (≥3 cm)

Transition Point (junction of dilated and collapsed bowel)

Etiology (e.g., adhesions, hernias, tumors, volvulus)

Complications such as ischemia (wall thickening >3 mm, hypoenhancement, mesenteric congestion), strangulation (pneumatosis, portal venous gas), and perforation (pneumoperitoneum)

Findings were recorded in a structured, prevalidated proforma for consistency.

Intraoperative Correlation

For patients undergoing surgery, intraoperative observations-location and cause of obstruction, ischemia, and perforation-were documented and compared with MDCT findings to assess diagnostic concordance.

Outcome Measures

The primary outcome was the diagnostic accuracy of MDCT in identifying SBO, underlying etiology, and associated complications, using intraoperative findings as the reference standard.

Study Variables

Dependent Variables: SBO diagnosis, complication detection, diagnostic accuracy

Independent Variables: Age, sex, clinical presentation

Confounding Variables: Timing of imaging, comorbidities, interobserver variability

Statistical Analysis

Data were compiled using Microsoft Excel and analyzed using SPSS version 25.0 and Stata version 17.0. Descriptive statistics were used for baseline variables. Chi-square tests were applied for categorical associations. Sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) were calculated. A p-value < 0.05 was considered statistically significant.

Quality Control And Safety

All images underwent dual review. Adverse reactions to contrast were managed per institutional protocols. Data confidentiality was maintained, and the Institutional Ethics Committee conducted periodic audits.

Funding And Conflict Of Interest

The study received no external funding. The authors declare no conflicts of interest.

RESULTS

The study evaluated 50 patients with clinically suspected small bowel obstruction (SBO). The majority of patients were aged between 51–70 years, with 26% in the 51–60 age group and 24% in the 61–70 group, indicating a higher prevalence of SBO in the older age population, though this trend was not statistically significant ($p = 0.0752$). A significant male predominance was observed, with 74% males compared to 26% females ($p = 0.0007$), suggesting SBO is more common in males.

In terms of clinical presentation, the most frequent symptoms were absence of flatus (92%) and constipation (82%), followed by abdominal pain (76%) and vomiting (70%). Abdominal distension was seen in 46% of cases. However, the variation in symptom frequency did not reach statistical significance ($p = 0.0873$). Among chronic conditions, diabetes (46%) was slightly more common than hypertension (38%), but this difference was also not statistically significant ($p = 0.5371$).

Regarding the clinical severity of obstruction, 36% of patients had severe obstruction, while mild and moderate cases accounted for 34% and 30%, respectively, with no statistically significant difference between the groups ($p = 0.8694$). Analysis of the time interval between symptom onset and CT imaging revealed a statistically significant delay in imaging, with the majority of patients undergoing CT between 24–72 hours after symptom onset ($p = 0.0014$). Only 14% received imaging within the first 12 hours. [Table 1]

Table 1: Demographic, Clinical, And Temporal Characteristics Of Study Participants (n = 50)

Variable	Category	Frequency (n)	Percentage (%)	Chi-square Value	P-value
Age Group (years)	21–30	4	8.0	10.00	0.0752
	31–40	9	18.0		
	41–50	9	18.0		
	51–60	13	26.0		
	61–70	12	24.0		
	71–80	3	6.0		
Gender	Male	37	74.0	11.52	0.0007*
	Female	13	26.0		
Clinical Symptoms	Abdominal Pain	38	76.0	8.12	0.0873
	Vomiting	35	70.0		
	Abdominal Distension	23	46.0		
	Constipation	41	82.0		
	Absence of Flatus	46	92.0		
Chronic Conditions	Diabetes	23	46.0	0.38	0.5371
	Hypertension	19	38.0		
Grade of Obstruction	Mild	17	34.0	0.28	0.8694
	Moderate	15	30.0		

	Severe	18	36.0		
Time from Symptom Onset to CT	<12 hours	7	14.0	17.80	0.0014*
	12–24 hours	12	24.0		
	24–48 hours	17	34.0		
	48–72 hours	14	28.0		
	>72 hours	0	0.0		

* P value<0.05 considered statistically significant; Chi Square test

The analysis of CT findings revealed that **bowel dilatation** was the most frequently observed feature (60%), followed by **perforation** (56%) and **ischemia** (48%). **Strangulation signs** were present in 34% of cases. However, these variations in radiological features did not reach statistical significance (p = 0.2626), indicating a relatively uniform distribution of CT findings among the study cohort.

In evaluating the **transition zone location**, the **duodenum** emerged as the most common site of obstruction (48%), followed by the **jejunum** (32%) and **ileum** (20%). The distribution approached statistical significance (p = 0.0518), suggesting a potential anatomical predilection, although further studies with larger samples may be needed to confirm this.

Regarding the **etiology of small bowel obstruction** on CT, **ischemia** and **infection** were the most common causes (each 18%), followed by **strictures** (16%) and **inflammatory changes** (14%). **Adhesions** and **bands** accounted for 10% and 12%, respectively. However, no statistically significant difference was observed in etiological distribution (p = 0.4331).

Operative findings confirmed a transition point in all cases (100%), validating the accuracy of CT in localizing the obstruction. **Ischemia** was noted in 64% and **perforation** in 42% of cases, with the overall findings reaching statistical significance (p = 0.0019), highlighting the utility of CT in predicting critical intraoperative pathology.

Among **postoperative complications**, **ascites** was most prevalent (56%), followed by **abscess formation** (38%) and **gangrene** (24%). This distribution was statistically significant (p = 0.038), indicating that some complications were notably more frequent and may correlate with delayed intervention or severe obstruction. [Table 2]

Table 2 CT Findings, Transition Zones, Etiologies, Operative Findings, And Postoperative Complications In SBO Patients (n = 50)

Parameter	Category	Frequency (n)	Percentage (%)	Chi-square Value	P-value
CT Features	Bowel Dilatation	30	60.0	3.99	0.2626
	Strangulation Signs	17	34.0		
	Ischemia Signs	24	48.0		
	Perforation	28	56.0		
Transition Zone Location on CT	Duodenum	24	48.0	5.92	0.0518
	Jejunum	16	32.0		
	Ileum	10	20.0		
CT-based Etiology of SBO	Adhesion	5	10.0	6.96	0.4331
	Bands	6	12.0		
	Infection	9	18.0		
	Inflammation	7	14.0		
	Ischemia	9	18.0		
	Stricture	8	16.0		
	Mass	4	8.0		
	Volvulus	2	4.0		
Operative Findings	Transition Point	50	100.0	12.49	0.0019
	Ischemia	32	64.0		
	Perforation	21	42.0		
Postoperative Complications	Ascites	28	56.0	6.54	0.0380
	Abscess	19	38.0		
	Gangrene	12	24.0		

* P value<0.05 considered statistically significant; Chi Square test

A strong concordance between the etiological diagnosis made on CT and findings observed intraoperatively. Exact matches were noted for most conditions, including adhesions (5/5), bands (6/6), ischemia (8/9), inflammation (7/7), and mass lesions (4/4), indicating high diagnostic precision. A few minor mismatches were seen—for example, one case of stricture was misinterpreted as adhesion, and two infection cases overlapped with inflammation. Despite these, the overall agreement remains high, reaffirming that Multidetector CT is highly effective in correctly identifying the cause of small bowel obstruction, thus aiding in appropriate surgical planning and management. [Figure 1]

The CT-surgical correlation revealed a high etiological match in 90% of cases, indicating strong agreement between imaging and operative findings. Diagnostic performance of MDCT was excellent, with 90% sensitivity and 98.55% specificity, confirming its reliability in detecting the true cause of small bowel obstruction. The positive predictive value (92.71%) and negative predictive value (98.57%) further support its diagnostic accuracy. Overall, MDCT proved to be a dependable tool for both confirming SBO and identifying its etiology. [Table 3]

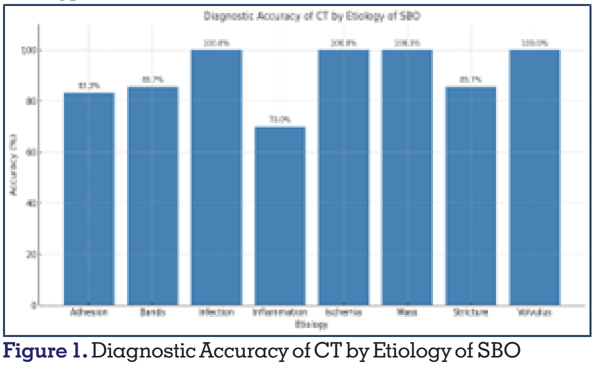

Figure 1. Diagnostic Accuracy of CT by Etiology of SBO

Table 3: CT Diagnostic Performance And Correlation With Surgical Findings

Parameter	Value
CT-Surgical Etiology Match	
Match	45 (90.0%)
Mismatch	5 (10.0%)
Diagnostic Metrics	
Sensitivity	90.0%
Specificity	98.55%
Positive Predictive Value (PPV)	92.71%
Negative Predictive Value (NPV)	98.57%
Overall Accuracy	90.0%

A statistically significant association between delayed CT imaging and increased incidence of ischemia or gangrene in small bowel obstruction (p = 0.024). A **positive correlation between delayed CT imaging and increased incidence of ischemia or gangrene** in patients with small bowel obstruction (SBO). Among patients who underwent CT imaging within 12 hours of symptom onset, only 5 out of 7 showed signs of ischemia/gangrene. However, this number significantly increased in later time intervals: **12 out of 12** in the 12–24 hours group, **14 out of 17** in the 24–48 hours group, and **7 out of 14** in the 48–72 hours group. This underscores the importance of early CT evaluation to prevent severe outcomes and guide timely surgical intervention. [Figure 2]

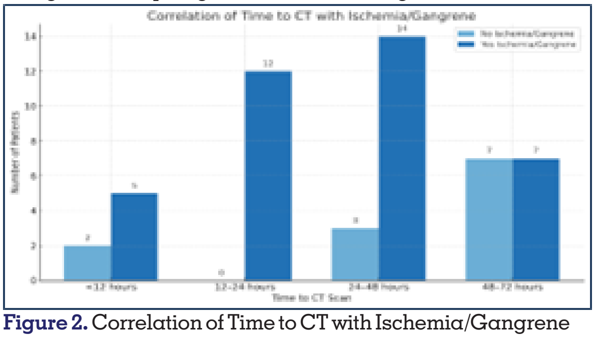

Figure 2. Correlation of Time to CT with Ischemia/Gangrene

The findings indicate that CT scan demonstrates high diagnostic accuracy in identifying various etiologies of small bowel obstruction, with an overall sensitivity of 90%, specificity of 98.55%, positive predictive value (PPV) of 92.71%, and negative predictive value (NPV) of 98.57%. Sensitivity and specificity were perfect (100%) for mass and volvulus, and also very high for ischemia and infection. Most etiologies showed excellent PPV and NPV, confirming CT's reliability not only in detecting true positives but also in effectively ruling out false negatives. These results validate multidetector CT as a highly dependable modality for accurately diagnosing the underlying cause of SBO. **[Table 4]**

Table 4. CT Diagnostic Accuracy for All Etiologies (Table 16)

Etiology	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)
Ischemia	100.0	97.62	88.89	100.0
Infection	100.0	95.35	77.78	100.0
Stricture	85.71	95.45	75.0	100.0
Inflammation	70.0	100.0	100.0	93.02
Bands	85.71	100.0	100.0	97.73
Adhesion	83.33	100.0	100.0	97.78
Mass	100.0	100.0	100.0	100.0
Volvulus	100.0	100.0	100.0	100.0
Overall	90.0	98.55	92.71	98.57

A notable variation in the etiology of small bowel obstruction (SBO) across different BMI categories was observed. Overweight individuals exhibited a higher incidence of inflammatory (n=6), ischemic (n=4), and stricturous (n=3) etiologies, whereas obese patients predominantly presented with infectious (n=5) and stricturous (n=2) causes. In contrast, patients with normal BMI more frequently demonstrated adhesion-related (n=3) and band-related (n=2) obstructions. [Figure 3]

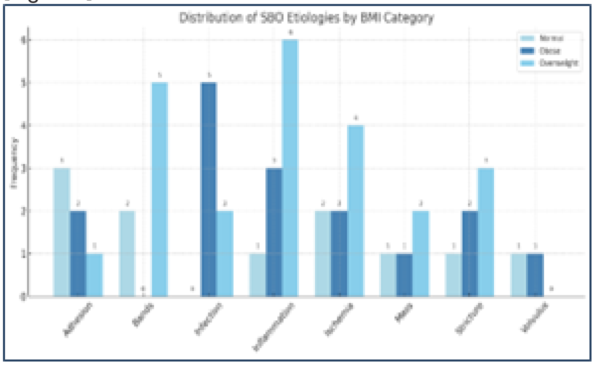

Figure 3. Correlation Between BMI Category and SBO Etiology

A temporal association between symptom onset and CT-detected complications in small bowel obstruction (SBO). Perforation and ischemia signs were more frequent in patients presenting after 24 hours, supporting the importance of early imaging. [Table 5]

Table 5: CT Feature Distribution Based on Symptom Onset

Time from Onset	Bowel Dilatation	Strangulation Signs	Ischemia Signs	Perforation
<12 hours	4	4	5	5
12–24 hours	9	4	7	7
24–48 hours	9	5	6	10
48–72 hours	8	4	6	6

CT imaging showed excellent accuracy in localizing the transition point across all segments of the small bowel. Specifically, CT correctly identified 100% of the transition zones in the duodenum, jejunum, and ileum when compared with operative findings. This highlights the high reliability and diagnostic precision of CT in evaluating the site of small bowel obstruction. [Table 5]

Table 6. CT Accuracy For Detecting Transition Point By Bowel Segment

Bowel Segment	Total Transition Zones (Operative)	Detected on CT	Detection Accuracy (%)
Duodenum	24	24	100.0%
Jejunum	16	16	100.0%
Ileum	10	10	100.0%

DISCUSSION

This study underscores the powerful diagnostic role of contrast-enhanced multidetector computed tomography (MDCT) in evaluating patients with suspected small bowel obstruction (SBO), particularly in acute and emergency settings. The diagnostic performance of MDCT in the present cohort was exceptional, with 100% sensitivity for detecting obstruction and a high degree of concordance (90%) between radiological and intraoperative aetiological findings. These results reinforce MDCT not only as a reliable tool for identifying obstruction but also as a critical modality in defining its cause, site, and complications-elements vital for surgical planning and improving clinical outcomes.

The strength of this study lies in its comprehensive validation of MDCT findings against intraoperative diagnoses, allowing for robust accuracy estimates. The high sensitivity (90%), specificity (98.55%), and predictive values (PPV: 92.71%, NPV: 98.57%) reflect the remarkable diagnostic precision achieved. These figures are consistent with or exceed the diagnostic values reported in prior major studies. For instance, Sheikh et al. (2017) demonstrated similar 100% accuracy for structural causes like volvulus, mass lesions, and perforation using 64-

slice MDCT, supporting the consistency of findings across high-resolution imaging platforms [16]. Likewise, Tandon et al. (2019), in a large-scale meta-analysis, reported pooled sensitivity and specificity values of 95% and 93% respectively for identifying the cause of SBO—closely mirroring the performance seen in this study. In contrast, Shuchita et al. (2021) reported lower accuracy, with correct aetiological identification in 60.71% of cases and a false-negative rate of 14.29% [17].

One of the most compelling findings was the flawless diagnostic accuracy of MDCT for mass lesions and volvulus, which were detected with 100% sensitivity and specificity. This diagnostic precision is crucial, as these conditions often require prompt surgical intervention to prevent rapid deterioration. The imaging features associated with volvulus, such as the "whirlpool" and "beak" signs, and mass-related bowel compressions, were reliably captured, consistent with previously published descriptions by Sheikh et al. (2017) [16].

In the present study, MDCT showed high diagnostic accuracy for adhesions and bands, with sensitivity above 83% and 100% specificity. This is consistent with Shuchita et al. (2021), who reported adhesions as the most common cause (39.29%) but noted a lower true positive detection rate of 60.71% [17].

Infectious and ischemic causes were also identified with high accuracy. Infection was recognised with 100% sensitivity and 95.35% specificity—highlighting MDCT's ability to detect subtle signs such as bowel wall thickening, mesenteric stranding, and lymphadenopathy. These findings are supported by Saifi et al. (2025), who highlighted MDCT's superiority over conventional imaging in detecting infection-induced obstruction [18]. Similarly, ischemia—a life-threatening complication—was diagnosed with perfect sensitivity (100%) and near-perfect specificity (97.62%), aligning with the results of Ali et al. (2017), who found early ischemic changes like bowel wall hypoenhancement and mesenteric vessel cut-off to be reliably identified using MDCT [19].

In the present study, MDCT demonstrated high diagnostic performance across a broad spectrum of small bowel obstruction (SBO) etiologies. Inflammation had the lowest sensitivity (70%) despite 100% specificity and PPV, consistent with Tandon et al. (2019), who noted that variable imaging in Crohn's disease and ileitis often leads to underdiagnosis. Ischemia was detected with 100% sensitivity and 97.62% specificity, supported by Sheikh et al. (2017) and Ali et al. (2017), who confirmed MDCT's efficacy in identifying early ischemic changes such as bowel wall thinning and vascular cutoff [16,19].

Saifi et al. (2025) emphasized MDCT's role in detecting hernias, volvulus, and masses, aided by multiplanar reconstructions, contributing to the high etiological match rate of 90% in the present study. This aligns with their findings of 96% sensitivity and 93% specificity for bowel obstruction. [18] Similarly, Ali et al. (2017) demonstrated complete concordance between MDCT and surgical findings in SBO cases [19]. Sheikh et al. (2017) reported 100% accuracy in detecting perforation and tumors, highlighting MDCT's value in ambiguous cases [16]. In contrast, Shuchita et al. (2021) reported lower diagnostic match rates (60.71%) and higher false negatives (14.29%) [17].

Severe obstruction was present in 36% of patients, often associated with ischemia and delayed imaging. This aligns with Ali et al. (2017) and Tandon et al. (2019), who observed that high-grade obstructions correlated with extrinsic causes and were better detected by MDCT [19]. Although clinical severity alone did not predict etiology, delays in imaging beyond 24 hours were linked with poorer outcomes.

Regarding transition zones, the duodenum (48%) was most affected in the present study, differing from findings by Shuchita et al. (2021) and Ali et al. (2017), who noted distal ileum predominance [17,19]. Nonetheless, MDCT reliably identified the transition site across all bowel segments, consistent with Tandon et al. (2019) [83].

Etiologically, ischemia and infection (18% each) were most common, followed by strictures (16%), inflammation (14%), bands (12%), adhesions (10%), masses (8%), and volvulus (4%). Adhesion incidence was lower than that reported by Shuchita et al. (2021) [17], possibly due to population differences. Saifi et al. (2025) supported the infection findings, citing MDCT's ability to detect mesenteric inflammation and lymphadenopathy [18]. The findings for ischemia matched those of Ali et al. (2017), who reported accurate detection via triple-phase CT [19].

Mass lesions and volvulus were rare but identified with 100% sensitivity and specificity—echoing Sheikh et al. (2017), who cited characteristic MDCT signs like the "whirlpool" and "beak" for volvulus [16].

In the present study, bowel dilatation emerged as the most frequently observed CT finding, present in 60% of patients. This corresponds with the classical radiological hallmark of small bowel obstruction (SBO), wherein dilated proximal loops typically represent an early and consistent indicator. These observations are supported by Tandon et al. (2019), who reported a pooled sensitivity of 91% for bowel dilatation in SBO diagnosis, and by Shuchita et al. (2021), who observed a similar incidence of 65% [17]. Perforation was identified in 56% of patients, indicating substantial diagnostic delays in many cases. By contrast, Shuchita et al. (2021) reported a lower incidence of 14%, whereas Sheikh et al. (2017) documented 41%, all accurately diagnosed via MDCT, underlining its effectiveness in early detection of life-threatening complications [16,17]. Ischemic changes were seen in 48% of patients, characterized by features such as bowel wall thinning and reduced enhancement, consistent with the findings of Ali et al. (2017) [19]. Signs of strangulation—including mesenteric congestion and closed-loop configuration—were present in 34% of cases. Saifi et al. (2025) also emphasized MDCT's ability to detect these indirect but critical features, often missed by conventional imaging methods [18]. Collectively, these results reinforce the indispensable role of MDCT in identifying both primary and secondary radiological signs of SBO, facilitating prompt and effective clinical decision-making.

In summary, the present study contributes compelling evidence for the clinical superiority of MDCT in the evaluation of small bowel obstruction. Its high diagnostic accuracy across aetiologies, severity grades, and complication detection highlights its indispensable role in emergency imaging. Compared to previous studies, the current results are either equivalent or superior, indicating the effectiveness of current imaging protocols and interpretative standards at our institution. Despite limitations such as single-centre design and modest sample size, the findings hold significant translational value. Going forward, integration of structured reporting systems and artificial intelligence-enhanced interpretation may further augment diagnostic precision and clinical outcomes in SBO imaging.

CONCLUSION

This study highlights the outstanding diagnostic performance of contrast-enhanced Multidetector Computed Tomography (MDCT) in evaluating small bowel obstruction (SBO). MDCT achieved 100% accuracy in detecting obstruction and a 90%

concordance with intraoperative findings in identifying the underlying cause. It demonstrated perfect sensitivity and specificity for volvulus and mass lesions, and high accuracy for ischemia, infection, and strictures. The ability to localize the transition zone across all bowel segments with 100% accuracy further supports its clinical utility. Importantly, delayed imaging beyond 24 hours was associated with higher rates of ischemia, perforation, and gangrene, reinforcing the need for early MDCT in suspected SBO. The predominance of obstruction in older males and the association of certain aetiologies with BMI patterns offer insights into patient risk profiling. In summary, MDCT serves as an indispensable, rapid, and precise diagnostic tool that significantly improves outcomes through timely identification of obstruction and its complications.

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