



ORIGINAL RESEARCH PAPER

Radio-Diagnosis

128 SLICE MULTIDETECTOR COMPUTED TOMOGRAPHY (MDCT) ASSESSMENT OF SMALL BOWEL OBSTRUCTION

KEY WORDS: Small Bowel obstruction, Multidetector computed tomography, Transition point, Ischemia.

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ABSTRACT	Small bowel obstruction (SBO) is a common and potentially life-threatening cause of acute abdomen, particularly when complicated by bowel ischemia or perforation. Timely and accurate diagnosis is essential to reduce morbidity and mortality. SBO is most commonly caused by postoperative adhesions, hernias, and neoplasms. While plain abdominal X-rays offer limited sensitivity and specificity, MDCT has emerged as the gold standard, capable of identifying the site, cause, severity, and complications of SBO in a single examination. The 128-slice CT scanner provides enhanced resolution, faster imaging, and improved diagnostic accuracy. Accurate and early diagnosis of SBO is critical for optimal patient outcomes. MDCT, particularly with advanced 128-slice technology, plays a pivotal role in the timely identification of obstruction and its complications, enabling effective treatment planning and improving prognosis.
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INTRODUCTION

Small bowel obstruction (SBO) remains a common cause of acute abdomen, with significant morbidity and mortality, particularly when complicated by ischemia or perforation. Early and accurate diagnosis is essential for optimal management. SBO can be categorised into two types: simple obstruction, which involves a mechanical blockage without affecting blood flow, and strangulated obstruction, where restricted blood supply leads to tissue damage and potential necrosis. Prompt identification and treatment are crucial to avoid severe outcomes, including bowel perforation and tissue death.

Bowel obstruction can result from various causes, including adhesions, hernias, volvulus, endometriosis, inflammatory bowel disease, appendicitis, tumors, diverticulitis, ischemic bowel, tuberculosis, and intussusception. Small bowel obstructions are primarily caused by adhesions and hernias, whereas large bowel obstructions are more commonly associated with tumors and volvulus.

The most common causes include postoperative adhesions, hernias, and neoplasms.

While plain X-rays can aid in diagnosis, CT scans offer greater accuracy.

MDCT has emerged as the gold standard for SBO evaluation.

Computed tomography (CT), particularly 128-slice multidetector CT (MDCT), is widely regarded as the most reliable imaging technique due to its high resolution. It allows for precise identification of the obstruction, severity assessment, determination of transition points, and detection of complications such as ischemia or perforation. Furthermore, CT can distinguish between simple and strangulated SBO.

AIM:

The aim of this study is to investigate and analyse the role of multi-detector computed tomography in bowel obstruction with focus on its diagnostic accuracy, efficiency and impact on patient management.

OBJECTIVES

- To diagnose small bowel obstruction cases on MDCT, to evaluate various causes.
- To determine the ability of MDCT to distinguish between simple and complicated bowel obstructions.

MATERIALS AND METHODS:

Study Type / Design: The study was a Prospective Observational Study.

Participant Size: 66.

Inclusion Criteria

- Patients presented to the hospital or outpatient setting with clinical suspicion of bowel obstruction.
- Patients who were willing to participate in the study and provided informed consent were included.

Exclusion Criteria

- Patients with contraindications for Multidetector Computed Tomography (MDCT) imaging, such as:
- Pregnancy or suspicion of pregnancy
- Allergy to iodinated contrast agents used in MDCT
- Patients had deranged RFT (serum creatinine > 1.2).
- Patients who had a history of small bowel surgery that might have affected the interpretation of imaging findings.

Data Collection and Procedure

Study was explained to the patient & written informed consent was taken for contrast administration. Renal function test was performed. Appropriate gauge IV cannula was inserted into a superficial vein of the upper limb.

The scanning parameters included an anatomical coverage of 350–500 mm, a cranio-caudal scan direction, and an acquisition time of 5–6 seconds, Participants were instructed to fast for at least four hours before the scan and were trained in breath-holding techniques for five minutes prior to imaging. For the examination, patients lay supine with both arms raised above the head, administration of intravenous non-ionic, contrast medium Bolus tracking was applied by placing a marker on the descending aorta, initiating scanning after reaching 100 HU attenuation, approximately 45 seconds after contrast injection.

Post scan processing was done using multi planar reconstruction, curved planar reconstruction, maximum intensity projection (MIP), volume rendered imaging. Data was collected and compiled using Microsoft Excel. Statistical analysis was done using descriptive statistics.

Signs And Symptoms

The symptoms of bowel obstruction differ depending on its location but commonly involve abdominal pain, bloating, and difficulty passing stool. If the obstruction persists, it can result

in restricted blood flow to the intestines, perforation, and severe infections caused by bacteria crossing into the bloodstream. In cases of small bowel obstruction, the pain is often colicky. Vomiting usually occurs before the onset of constipation.

RESULTS:

In the present prospective observational study, a total of 66 participants who met the inclusion criteria were enrolled. The analysis focused on identifying the presence of obstruction, localizing the transition point and detecting signs of complications such as ischemia, perforation, or volvulus.

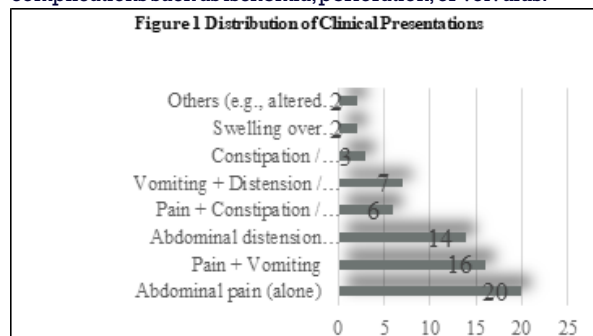


Figure 2 Gender-wise Distribution

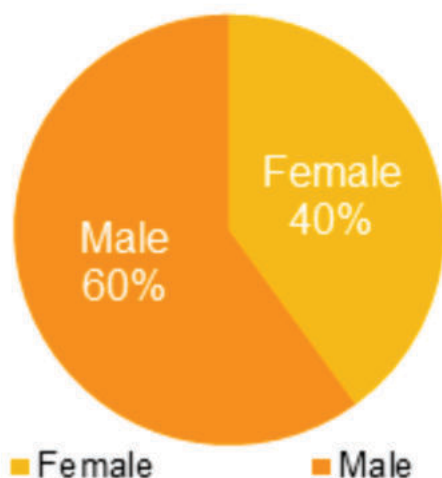


Figure 2 shows gender distribution of the 66 patients included in the study. Of these, 42 patients (60.00%) were male, while 24 patients (40.00%) were female. This indicates a male predominance in the incidence of small bowel obstruction in the study population.

Figure 3 Detection of Transition Point on MDCT

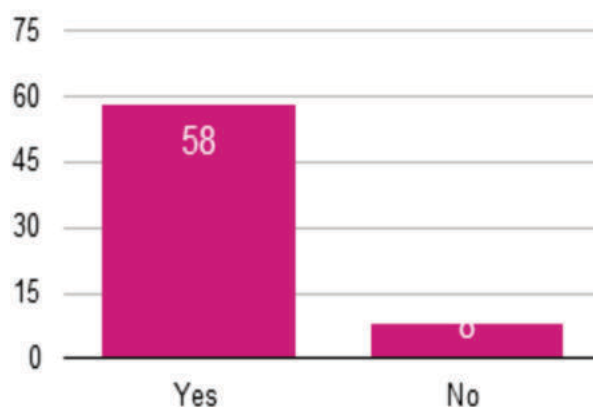


Figure 3 presents the distribution of cases based on the

presence or absence of a transition point. A transition point, which was identified in 58 patients. In contrast to 6 cases showed no definite transition point on imaging. The high detection rate of the transition point highlights the diagnostic efficacy of 128-slice MDCT in evaluating small bowel obstruction.

Figure 4 Distribution of Patients Based on Presence of Complications

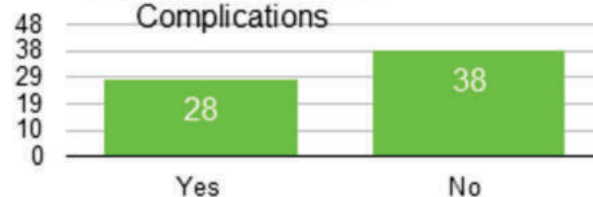


Figure 4: shows the presence of radiological signs of complications in patients with small bowel obstruction as detected on MDCT. Out of 66 patients, 28 exhibited signs of complications, such as bowel ischemia, strangulation, perforation, or pneumatosis intestinalis. The remaining 38 patients showed no radiological evidence of complications, suggesting uncomplicated obstruction.

DISCUSSION

Small bowel obstruction (SBO) remains one of the most common causes of acute abdomen. SBO can result from a variety of causes, including postoperative adhesions, hernias, malignancies, volvulus, and inflammatory strictures. Prompt identification and management are crucial, as delays can lead to complications such as strangulation, bowel ischemia, and perforation, which are associated with significant morbidity and mortality. This high-definition imaging allows for the accurate detection of the transition point the anatomical site where dilated proximal bowel loops transition to collapsed distal loops which is critical in determining the presence and severity of obstruction.

Additionally, 128-slice MDCT is highly effective in differentiating between simple (mechanical) and complicated SBO, such as those involving ischemia, closed-loop obstruction, or strangulation.

CONCLUSION:

This study demonstrated that 128-slice multidetector computed tomography (MDCT) is a highly sensitive and reliable imaging modality in the evaluation of SBO, significantly improving the diagnostic accuracy and clinical outcomes in affected patients.

The ability of MDCT to accurately detect the site, level, and cause of obstruction, as well as to differentiate between simple and complicated cases, including strangulation and ischemia, makes it an invaluable tool in both emergency and non-emergency settings.

CASES

1. Multiple dilated, fluid filled jejunal and ileal loops with transition in proximal part of ileum.



2. CT showing zone of transition



3. Bowel obstruction secondary to intussusception.



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