



TO ESTIMATE THE DIAGNOSTIC EFFICACY OF COMPUTED TOMOGRAPHY IN INTESTINAL OBSTRUCTION.

Radiodiagnosis

Dr. Navdeep Singh	Junior Resident Dept Of Radiodiagnosis, Adesh Institute Of Medical Sciences And Research, Bathinda.
Dr. Manraj Kaur	Prof Dept Of Radiodiagnosis, Adesh Institute Of Medical Sciences And Research, Bathinda.
Dr. Manjot Kaur	Prof And Head Dept Of Radiodiagnosis, Adesh Institute Of Medical Sciences And Research, Bathinda.

ABSTRACT

Introduction- Intestinal obstruction occurs when there is an interruption in the forward flow of intestinal content. 60 to 80% of all intestinal obstruction are in small bowel with adhesions as the most common cause. CT provides valuable information about presence or absence, cause and complications of intestinal obstruction. **Aims And Objectives Of Study-** 1. To evaluate cause and complications of intestinal obstruction using Computed tomography. 2. To assess the accuracy of imaging findings in comparison to operative findings in patients who are operated. **Materials And Methods-** Hospital-based observational study done in AIMS Bathinda. 102 patients with high clinical suspicion of intestinal obstruction or intestinal obstruction diagnosed by X-RAY/USG visiting Department of Radiodiagnosis were enrolled in the study after informed written consent and the results were evaluated. **Results-** Out of 102 patients adhesions were the most common cause of intestinal obstruction with ileum being most common level of obstruction. CT has 100% sensitivity and specificity in diagnosing most of the causes of intestinal obstruction except for few causes like adhesions, stricture and bands where it was 84.38 and 92.86, 88.46 and 94.74, 98.9 and 75 respectively. **Conclusion-** CT has high diagnostic accuracy and is highly sensitive and specific in determining most of the causes of bowel obstruction and is recommended for preoperative evaluation of intestinal obstruction.

KEYWORDS

INTRODUCTION

Intestinal obstruction occurs when there is an interruption in the forward flow of intestinal contents^[1]. Adhesions are responsible for more than half of all small bowel obstructions followed by hernia and extrinsic compression due to neoplastic growths. 60 to 80% of all intestinal obstruction are in small bowel^[2]. On plain radiographs, Bowel obstruction is seen as air and fluid accumulation proximal to the point of obstruction and fluid and air absence distal to the area of obstruction. The characteristic findings of SBO on X-rays are small bowel dilation with diameter > 2.5–3 cm, lack of colonic dilation with colon diameter < 6 cm and cecum < 9 cm, and a relative paucity of colonic gas. In LBO, dilation of small bowel may or may not be present depending on the duration of obstruction. On ultrasound, bowel obstruction is considered to be present when dilated loop measures 3 cm and length of segment is > 10 cm. In Intestinal obstruction, we look for transition point which is identified by caliber change between dilated proximal and collapsed distal bowel loops. CT not only finds the intraluminal cause of obstruction as is determined by oral contrast radiography (when barium is used as contrast agent)^[3], it also finds the extraluminal cause, site and level of bowel obstruction^[4]. MR enterography has advantages over CT enterography as it has excellent soft tissue contrast resolution images can be acquired in customized planes and no ionizing radiation, however takes longer scanning time, more susceptible to motion and breathing artefacts and is incompatible in patients with implant

AIMS AND OBJECTIVES OF STUDY

1. To evaluate cause and complications of intestinal obstruction using Computed tomography.
2. To assess the accuracy of imaging findings in comparison to operative findings in patients who are operated.

MATERIAL AND METHODS

Setting: Hospital based

Study Design: observational study

Study Population: Patients were selected as and when they present to department of Radiodiagnosis, AIMS Bathinda after applying inclusion and exclusion criteria and after obtaining their informed written consent.

Sample Size: 102 patients with high clinical suspicion of intestinal obstruction or intestinal obstruction diagnosed by X-RAY/USG visiting department of Radiodiagnosis were enrolled in the study.

Duration: Study was carried out in the department of Radiodiagnosis, AIMS Bathinda after getting approval from the Research committee, AIMS and Ethics committee, Adesh University for a period of 1 year

and 6 months.

Statistical Analysis

Sensitivity, specificity, positive and negative Predictive values of computed tomography in detecting the cause of intestinal obstruction was calculated.

Inclusion Criteria

All patients with clinically suspected intestinal obstruction, referred for abdominal CT scan whose follow up regarding surgical or conservative management is available.

Exclusion Criteria

1. Severely decompensated patients.
2. Pregnancy.

Study Tool And Methodology

In this study, multislice (32 slice) Siemens Somatom Go up CT scanner was used. The patients were given 1.5 L of diluted water soluble contrast medium orally 2h prior to the scanning. Then a bolus dose of intra venous contrast medium with 35–40 gm of iodine was given. CT scanning of entire abdomen and pelvis was done with contiguous axial 5 mm sections with pitch of 1.5. In over distension of abdomen and vomiting, oral contrast was not given. Relevant intraoperative findings were compared with computed tomography (CT) findings of all those patients who underwent surgery for intestinal obstruction diagnosed on CT

OBSERVATION AND RESULTS

Adhesions were the most common cause of small bowel obstruction and malignancy is the most common cause of large bowel obstruction on computed tomography. Out of 102 patients 90 patients underwent surgery from which the cause of intestinal obstruction were correctly diagnosed by CT in 80 patients and 10 patients were incorrectly diagnosed by CT. (4 cases of adhesions, 2 cases of bands and 4 cases of stricture were incorrectly diagnosed on CT) The most common zone of transition was found to be distal ileum on computed tomography and was concordant with intraoperative findings. Ascites and perforation peritonitis were the common complications associated with intestinal obstruction.

Table-1 Causes Of Bowel Obstruction On Computed Tomography

CAUSES	Small Bowel(n)	Large Bowel(n)	Total	Percentage
ADHESIONS	32	0	32	31.37%

STRICTURE	23	4	27	26.47%
APPENDICITIS WITH APPENDICULAR LUMP	7	0	7	6.86%
PARALYTIC ILEUS	6	0	6	5.88%
MALIGNANCY	2	3	5	4.90%
HERNIA	5	0	5	4.90%
GALL STONE ILEUS	4	0	4	3.92%
BANDS	4	0	4	3.92%
INTUSSUSCEPTION	4	0	4	3.92%
VOLVULUS	2	1	3	2.94%
MESENTERIC VASCULAR OCCLUSION	3	0	3	2.94%
COLLECTION /HEMATOMA COMPRESSION	1	1	2	1.96%
TOTAL	93	9	102	100%

Above table and graph shows, Adhesions is the most common cause of small bowel obstruction and malignancy is the most common cause of large bowel obstruction on computed tomography

Table 2- Summary Of Sensitivity, Specificity, Positive Predictive And Negative Predictive Of CT In Detecting The Various Surgically Proven Causes Of Intestinal Obstruction.

Cause of obstruction	Sensitivity	Specificity	Positive predictive value	Negative predictive value
Adhesions	84.38	92.86	84.38	92.86
Stricture	88.46	94.74	85.19	96
Appendicitis	100	100	100	100
Malignancy	100	100	100	100
Hernia	100	100	100	100
Gall stone ileus	100	100	100	100
Bands	100	98.99	75	75
Intussusception	100	100	100	100
Volvulus	100	100	100	100
Mesenteric vascular occlusion	100	100	100	100
Collection	100	100	100	100

The sensitivity and specificity of CT in diagnosing the most of the causes of intestinal obstruction are 100%. In some of the causes like adhesions, bands and stricture it is relatively less which were 84.38 and 92.86, 88.46 and 94.74, 98.9 and 75 respectively.

Table-3 Level/Transition Zone Of Obstruction On Computed Tomography

LEVEL				
JEJUNUM	PROXIMAL MID DISTAL	03 03 16	22	21.57%
ILEUM	PROXIMAL MID DISTAL	08 28 27	63	61.76%
	ASCENDING	02		
LARGE BOWEL	TRANSVERSE DESCENDING SIGMOID	02 0 05	09	8.82%
NO TRANSITION ZONE		08	08	7.84%
TOTAL			102	100%

In our study most common level/zone of transition of intestinal obstruction is ileum from which distal ileum was the most common site. In cases of large bowel obstruction most common site is sigmoid colon and in 8 cases no transition zone is seen.

Table- 4 Summary Of Concordance And Diagnostic Accuracy

	NO OF CASES CONCORDANT WITH FINAL DIAGNOSIS
NO OF PATIENTS	80/90
PERCENTAGE %	88.89%

DISCUSSION

Intestinal obstruction is one of the most commonly encountered emergency condition which requires urgent surgical management. The

early diagnosis and detection of intestinal obstruction is of prime importance to prevent bowel ischemia and necrosis and the resultant bowel resection. The computed tomography is fast and accurate technique in the detection of the cause and site of bowel obstruction as well as its complications, and thereby helping to plan appropriate measures to achieve the desired outcome.

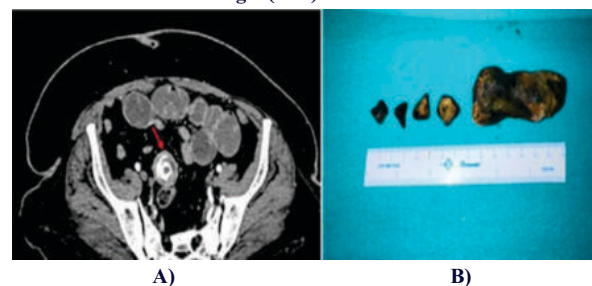
In our study group of 102 patients with high clinical suspicion of intestinal obstruction or diagnosed by X-RAY/USG, all the patients were confirmed as cases of intestinal obstruction on CT scan. Small bowel obstruction was seen in 93 patients with the ileum being the most common site of obstruction seen in 65 patients (63.33%). Among the patients with the ileum being the site of obstruction, a distal ileal obstruction was seen in the majority of patients (30 patients). 9 patients had large bowel obstruction with sigmoid colon involvement seen as the most common site in 5 patients and the most common cause of LBO is colon cancer. In 8 patients, Transition zone was not found from which 6 patients were of paralytic ileus, 1 was of adhesions and 1 was of stricture.

In this study adhesions were the most common cause and this was consistent with most of the studies carried out by Pongpornsup S et al^[5].

The sensitivity and specificity of most of the causes were 100 % whereas in some causes it is relatively less. In adhesions cases the sensitivity and specificity is 81.25% and 92.8%, and 87.5% and 93.9% in cases of stricture whereas in case of bands the sensitivity and specificity is 75% and 97%. Our results were comparable with Sultan A et al^[6] in which the sensitivity and specificity of most of the cause are 100%.

The limitation in present study were relatively smaller number of affected subjects to evaluate additional signs such as small-bowel feces sign or sign of associated bowel strangulation. Secondly 88.2% of the presented patient population with intestinal obstruction were surgically proven, as 10 patients were managed conservatively.

GALLSTONE ILEUS Fig -1(A-B)



Axial CECT image A) demonstrates dilated fluid-filled small bowel loops compatible with small bowel obstruction along with impacted calculus in ileum. B) Multiple gall stones as retrieved from the GI tract on surgical exploration.

CONCLUSION

MDCT should be recommended for patients with suspected bowel obstruction when clinical and conventional radiographic findings remain indeterminate or associated complications are suspected.

When MDCT is used with comprehensive approach it not only helps in making correct diagnosis but also affects outcome in patients with bowel obstruction.

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