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Radiodiagnosis

ROLE OF CT IN EVALUATION OF SUBACUTE INTESTINAL OBSTRUCTION WITH INCONCLUSIVE RADIOGRAPHIC & ULTRASOUND FINDINGS: A PROSPECTIVE STUDY

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ABSTRACT The diagnosis of intestinal obstruction is often immediately evident after thorough clinical examination & plain radiography. But at times it poses a difficulty especially in patients presenting as SAIO with less severe, intermittent features that cause delay in diagnosis. The indications for the use of CT in patients with SAIO have not been fully defined. Accordingly, we did a prospective study to determine the role of CT in the diagnosis of patients with suspected subacute bowel obstruction in whom confident decisions of therapy could not be made on the basis of clinical, plain radiographic & ultrasound findings.

KEYWORDS : Subacute intestinal obstruction(SAIO), CT, ultrasound, radiography, ileal stricture, intussusception.

INTRODUCTION:

Intestinal obstruction is defined as mechanical or functional obstruction of the intestines which prevents the normal passage of the products of digestion.[1] Intestinal obstruction is the most common surgical disorder of the small intestine.[2,3]

Though the knowledge of intestinal obstruction dates back to third to fourth century BC, it still remains important cause of morbidity and mortality in the surgical practice. The diagnosis of intestinal obstruction is often immediately evident after thorough clinical examination & plain radiography.[4] But at times it poses a difficulty especially in patients presenting as SAIO with less severe, intermittent features that cause delay in diagnosis. So subacute intestinal obstruction remains a diagnostic & therapeutic problem[9-11].

Coupled with clinical features, plain radiography can lead to conclusion in 46- 80% cases. Ultrasound plays only adjunctive role to plain radiography.[7, 17] In such equivocal cases CT has been found to be very useful. On CT scan, small bowel diameter of more than 2.5cm is indicative of obstruction. CT has particular advantage to detect exact level & cause of obstruction.[8] Now a days CT is considered to be the most efficacious imaging technique for determining the cause of intestinal obstruction[16]. However, the indications for the use of CT in patients with SAIO have not been fully defined[16]. Accordingly, we did a prospective study to determine the role of CT in the diagnosis of patients with suspected subacute bowel obstruction in whom confident decisions of therapy could not be made on the basis of clinical, plain radiographic & ultrasound findings.

OBJECTIVES:

-To study the role of CT in

- Diagnosis of patients with suspected subacute intestinal obstruction (SAIO).
- To find out site & cause of obstruction.
- To diagnose complications of obstruction.

MATERIALS AND METHODS:

This study was conducted at Department of Radiodiagnosis, Government medical college & Hospital, Aurangabad (Maharashtra) from December 2015 to June 2017. Total number of 14 patients with SAIO having equivocal findings on USG were included in this study.

Inclusion Criteria:

All patients presenting to surgery Out Patient Department or casualty with the following features of Sub-Acute Intestinal Obstruction (SAIO) were included in the study:

1. Patients who had no substantial evidence of intestinal obstruction following sonographic and radiological evaluation

2. Patients with Intermittent/recurrent symptoms.

Exclusion Criteria:

1. Patients with sufficient evidence of intestinal obstruction following clinical, sonographic and radiological evaluation.
2. Pregnant patients.

Patients:

All patients presenting to the Emergency and Out-Patient Department of Surgery unit with features of intestinal obstruction were screened to identify the patients with SAIO.

Detailed clinical evaluation of the patients was done. Plain x-ray of abdomen in erect posture & abdominopelvic ultrasound were performed before CT scan.

Imaging protocol:

CT scans were performed on a GE lightspeed VCT 64 slice scanner and acquired in precontrast & portovenous phase at 60sec after i.v. contrast administration (inj. Iohexol 3ml/sec). Oral contrast agent liq. Sodium diatrizoate 30ml diluted in 1000 ml of water was given over 45 minutes prior to scan.

Helical scanning was performed at 120 kVp & 240 mA. Large FOV was used with scanning from diaphragm to beneath the symphysis pubis with helical speed 0.6sec, slice thickness 5mm, interval 5mm which were used reconstruct 0.625mm thickness axial & also coronal, sagittal images.

OBSERVATION & RESULTS:

We studied 14 patients of subacute intestinal obstruction with equivocal findings on plain radiography & ultrasound. They were subjected to CT scan & our study findings are as follows:

Table 1: Age distribution of the patients

Age range of the patient	Number of patients (percentage)
15-30	6 (43&)
31-45	3 (21%)
46-60	2 (15%)
60-75	3 (21%)

Table 2: Sex distribution of the patients

Sex	Number of patients (percentage)
Male	7 (50%)
Female	7 (50%)

Table 3: Distribution of the patients by type of obstruction	
Obstruction type	**Number of patients (percentage)**
True	12 (86%)
pseudo	2 (14%)

Age of the patients in the study range between 16 to 72 years. Out of 14 were 7 male & 7 female patients. (table 1,2)

On CT scan all 14 patients were found to have obstruction with 12 patients having mechanical obstruction & 2 patients having pseudo obstruction secondary to appendicitis, jejunal perforation. (table 3,4)

12 patients underwent surgery & 1 patient biopsy. CT diagnoses of 12 out of 13 patients who underwent surgery & biopsy were found to be correct on intraoperative findings. 1 patient was correctly diagnosed of strangulation with SMV thrombosis & ileal gangrene which was confirmed intraoperatively.

1 patient diagnosed of ileo-caecal TB was started on ATT who improved symptomatically on ATT.

1 patient incorrectly diagnosed as duodenal neoplastic thickening on CT was found to have cholecystitis with pyloric stricture intraoperatively.

The concordance between the operative findings and the CT scan findings was examined. CT scan correctly diagnosed intestinal obstruction with its cause in 13 out of 14 patients. Most common cause of SAIO was ileal stricture 36% (5/14) followed by intussusception 21% (3/14).

Table 4: Etiology of obstruction	
Cause of obstruction	**Number of patients (percentage)**
Stricture	5 (35%)
Intussusception	3 (21%)
Bowel wall thickening	2 (14%)
Ileocaecal TB	1 (7%)
Appendicitis	1 (7%)
Jejunal perforation	1 (7%)
SMV thrombosis with ileal gangrene	1 (7%)

Fig 1: Terminal ileal stricture

Fig 2: Ileo-ileal intussusception

DISCUSSION:

SAIO has been defined in many ways and characteristically it suggests incomplete & intermittent obstruction.[5] It is characterized by continued passage of flatus and/or feces beyond 6-12 hrs. after onset of symptoms namely colicky abdominal pain, vomiting, and abdominal distension.[3]

The intestinal obstruction can be of small intestine or large intestine.

The causes of a small bowel obstruction can be divided into three categories:

1. Obstruction arising from extraluminal causes such as adhesions, hernias, carcinomas, and abscesses.
2. Obstruction intrinsic to the bowel wall (e.g., primary tumors).
3. Intraluminal obstruction (e.g., gallstones, enteroliths, foreign bodies, and bezoars).

Large bowel obstruction can be classified as dynamic (mechanical) or adynamic (pseudo-obstruction). Mechanical obstruction is characterized by blockage of the large bowel. Miscellaneous causes like intussusception, endometriosis, radiation enteropathy also comprise important cause of bowel obstruction.[6]

Usefulness of CT scan in diagnosis & management of patients with SAIO is proven[18] and confirmed by the results of our study, in which CT diagnosis well correlated with final operative diagnosis in 93% of cases.

Amit ojha et al[18] performed a study to evaluate role of investigations in diagnosis & management of SAIO. Their study concluded that CT scan is highly useful in diagnosing SAIO. Accordingly we compared our study findings with theirs. (table 5,6)

Our study confirmed the high sensitivity of CT scan in diagnosis of SAIO & establishing its etiology. In both the studies most common cause of SAIO was ileal stricture. In comparison incidence of bowel wall thickening was less where as intussusception was more in our study. Remaining cases comprised of tuberculosis, appendicitis, jejunal perforation & SMV thrombosis. (table 5)

As there was no negative CT scan in our study, so specificity of the CT remained unevaluated.

Table 5: Distribution of CT scan findings in 14 patients, comparative study		
CT findings	**Our study**	**Amit ojha et al[18]**
Strictures	5	4
Bowel wall thickening	1	4
Intussusception	2	1
Colonic mass with intussusception	1	0
Ileo-caecal Tuberculosis	1	2
Appendicitis	1	0
Malrotation of gut	0	2
Jejunal perforation	1	0
SMV thrombosis with ileal gangrene	1	0
Rectosigmoid mass	1	0
Abdominal cocoon	0	1
Total	**14**	**14**

Table 6: Sensitivity of CT scan in SAIO, comparative study		
Study	**True positive rate**	**Sensitivity**
Our study	13/14	**93%**
Amit ojha et al[18]	9/10	**90%**

CONCLUSION:

The findings of the study show that CT is a valuable diagnostic procedure in patients with subacute intestinal obstruction with high sensitivity. It is a problem-solving tool in equivocal cases. CT is not only useful in distinguishing mechanical obstruction from paralytic ileus but also it often establishes the cause of obstruction & presence of complications like strangulation & perforation. CT findings lead the surgeon to surgical management in significant number of patients.

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