Volume-4, Issue-1, Jan-2015 • ISSN No 2277 - 8160

Research Paper Medicine

ROLE OF MDCT IN EVALUATION OF SMALL BOWEL WALL THICKENING -

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KEYWORDS :

AIMS AND OBJECTIVES -

- To study the role of MDCT as a diagnostic modality for evaluation of small bowel wall thickening from duodenum to IC juntion.
- To determine the efficacy of MDCT in identifying the etiology of bowel wall thickening.
- Evaluate role of MDCT angiography of abdominal vessels in ischemic bowel conditions
- To determine the accuracy of MDCT in detection and characterization of benign and malignant bowel mass lesions.

STUDY PLAN -

- A Prospective study of the role of MDCT in detecting and characterizing bowel lesions was conducted in the period, June 2013 to January 2014.
- A total of 50 patients were selected for this study.
- No gender bias was followed in our study.
- No age restriction was in place for the duration of the study.
- Patients undergoing MDCT for unknown causes, presenting with signs and symptoms of small bowel pathologies were part of the study. These symptoms included abdominal pain, diarrhea, bilious or non-bilious vomiting of more than 3 days duration, palpable mass per abdomen, altered bowel habits and weight loss.
- All of the patients had been previously evaluated with ultrasound.

Exclusion criteria-

- Patients with small bowel thickening who were unable to ingest any luminal agent.

SCANNING AND METHODS USED

- MDCT Scanner - Siemens Somatom 64 slice and Philips 16 slice.
- Patient was asked come by at least 8 hrs Nil by mouth before the examination.
- Serum creatinine was obtained, and ensured to be in the normal range.
- History of contrast/drug allergy was ruled out.
- We administered 1 litre of positive luminal agent (1 litre of water with 50 ml of omnipaque dye) before the study. Of this, the patient ingested 750 ml over a period of 30 minutes while seated in the preparation area. 250 ml was ingested just 10 minutes prior to the study.
- In cases of suspected ischemic bowel disease, neutral oral contrast was administered.
- The study was performed with an anaesthetist on site for the entire duration.
- 150 ml of intravenous contrast followed by 150 ml of normal saline was administered by pressure injector.
- In patients of less than 15 yrs of age, we used 1.5 mL/ kg to determine the dose of intravenous contrast.
- Children were given mild sedation by the anaesthesiologist as required.
- Scan was obtained from lung bases to the symphysis pubis.
- Arterial phase was obtained with bolus tracking method.
- Volumetric data was obtained, with pitch kept usually 1 with contiguous 1 mm slices with axial, coronal and sagittal reconstruction.

In patients, suspected of having liver metastasis on other investigation, triple phase scanning was done after administration of intravenous contrast.

- Delayed scan was obtained in cases of intestinal obstruction at 6 and 12 hrs whenever required. To reduce the radiation exposure in these patients we kept the scanned region as small as possible, obtaining only the area of interest. Further we used reduced kVP and mas in these patients.

CRITERIA FOLLOWED FOR ADEQUATE DISTENTION -

- 3 mm was taken as the normal cut-off wall thickness of the small bowel which was adequately distended.
- A diameter of 2 cm was taken as the criteria for adequate distention.
- Thickened bowel loop not distending even a 12 hr delayed scan was considered as pathological.
- Confirmation of the diagnosis was done by following up patient with USG and/or surgery and histopathology.

OBSERVATION ANALYSIS AND DISCUSSION

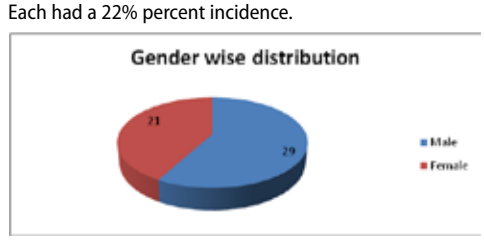
AGE AND SEX DISTRIBUTION

TABLE – 1

Age Group	No.of. Pts	% of Pts	Male No	Male %	Female No	Female %
0-10	2	4	1	2	1	
11-20	2	4	2	4	-	-
21-30	4	8	2	4	2	4
31-40	8	16	4	8	4	8
41-50	7	14	5	10	2	4
51-60	11	22	9	18	2	4
61-70	11	22	4	8	7	14
71-80	3	6	1	2	2	4
81-90	2	4	1	2	1	2
Total	50	100	29	58	21	42

The age of the patients involved in study ranges from 8 yrs to 85 yrs old people.

The lesions are more in ages of 51 to 60 yrs and 61 to 70 yrs of age. Each had a 22% percent incidence.



CLINICAL SIGNS AND SYMPTOMS

The most common complaints of patients is

- Non- specific abdominal pain in 80%.
- Vomiting.
- Altered bowel habits.
- Weight loss
- Dark coloured stools.
- Abdominal Distention.

Table No 2

Complaints	% of patients
Non- specific abdominal pain	80
Vomiting	40
Altered bowel habits	50
Abdominal Distention	25
Dark coloured stools	20
Weight loss	30

As is evident, patients have small bowel pathology often present with overlapping clinical complaints. Typical findings are not reliable in such patients.

Diagnosis	No of patients	Percentage
Infection and inflammation Ischemic Neoplasm Traumatic Miscellaneous	24 3 16 5 2	48 6 32 10 4
Total	50	100

- **ETIOLOGY OF THE LESIONS**
- Study shows Inflammation and infective lesions (48%) as most common followed by neoplastic bowel lesions (32%).
- Study shows 3 patients (6%) with ischemic etiology as their cause of symptoms.
- Most common benign lesion was inflammatory colitis and granulomatous lesions.

PART OF SMALLBOWEL INVOLVED
TABLE – 4

Bowel	No of patients	Percentage
Duodenum Jejunum Proximal Ileum Terminal ileum & I. C. junction Appendix	6 8 9 25 2	12 16 18 50 4

- As the data reflects 50 % of small bowel pathologies were noted in terminal ileum and IC junction.
- In our study, 2 cases of appendicitis were detected.
- Out of cases of amoebic colitis were associated with liver abscess and presented with ileocaecal wall thickening.

• PATHOLOGICAL DISTRIBUTION OF MALIGNANT BOWEL LESIONS
TABLE – 5

Type	Number	Percentage
Adenocarcinoma GIST Carcinoid Lymphoma	10 2 3 1	62.5 12.5 18.75 6.25
Total	16	100

- Adenocarcinoma was most common malignant lesion (81.2%). Of these 3 were detected in the duodenum, 7 in the ileum.
- 2 cases of GIST were identified, both of them from the duodenum.
- Only 1 case of primary lymphoma was identified, involving the jejunum.

• DEGREE OF BOWEL WALL THICKENING
TABLE – 6

	Mild (<1.5cm)	Marked (>1.5cm)
Malignant Carcinoid Lymphoma Inflammatory or infectious Ischemic	- 2 - 16 3	8 - 1 8 -
Total	24	47

- As the data indicated, infectious and inflammatory processes were usually associated with mild wall thickening, as compared to malignant process.
- In the three cases of carcinoid detected by us, 2 had mild wall thickening. No visible mass was detectable, however the associated desmoplastic reaction and mesenteric clouding led us to suspect it. One case of jejunal carcinoid was seen as a well defined submucosal mass.

• SYMMETRY OF BOWEL WALL THICKENING
TABLE – 7

	Symmetrical	Asymmetrical
Malignant Carcinoid Lymphoma Inflammatory or infectious Ischemic Diverticulitis Trauma	3 2 1 16 3 - 5	8 1 - 6 - 2 -
Total	30	17

• LENGTH OF INVOLVED SEGMENT
TABLE 8

	Focal (1-2cms)	Segmental (2 to 4 cms)	Diffuse (>4cms)
Malignant Carcinoid Lymphoma Infectious or inflammatory ischemic diverticulitis	7 1 - - 2	3 2 1 10 - -	1 - - 12 3 -
Total	52	15	4

POSTCONTRAST ENHANCEMENT PATTERN
TABLE – 9

	Homogeneous	Heterogeneous	No enhancement
Adenocarcinoma Carcinoid Lymphoma Inflammatory or infectious Ischemic Diverticulitis	- 2 1 12 1 -	11 1 - 10 - 2	- - - - 2 -
Total	16	24	2

SUMMARY OF OUR FINDINGS-

- Present study shows that in most cases, adenocarcinomas were associated with marked, asymmetrical thickening of bowel wall (>1.5cm).
- 73% of malignant adenocarcinomas were associated with asymmetrical bowel wall thickening.
- The two cases of GIST detected in our study, presented as exophytic masses.
- 90.9% of adenocarcinomas were associated with short segment

bowel wall thickening (few cms in length <4 cm). Only in one case, the length of the involved segment was 7 cms.

- 100% of adenocarcinomas were associated with heterogenous postcontrast enhancement of bowel wall, which is also a significant finding.
- Only 1 case of lymphoma was detected by us, where the patient had a 3 cm long thickening of the ileum, which showed homogenous post contrast enhancement.
- Significant number of inflammatory and infectious lesions were showing marked bowel wall thickening (33%) but they were more commonly associated with symmetrical wall thickening (73%) and homogenous postcontrast enhancement (55%).
- Koch's lesions tended to show marked bowel wall thickening with heterogeneous enhancement(45%). Associated ascites, omental thickening and necrotic calcified lymph nodes were helpful in pointing towards the diagnosis.
- All dudodenal diverticulitis were showing asymmetrical bowel wall thickening involving the medial wall and inhomogenous postcontrast enhancement, but were associated with small fluid collections.
- 2 cases of the carcinoids were associated with hypervascular liver metastasis.
- Lymphadenopathy was associated with both benign and malignant conditions. Adenocarcinomas had a tendency to have clusters of perilesional lymph nodes. Calcification was not seen in these nodes. Koch's lesions had necrotic nodes with associated calcification.
- Out of 50 patients with bowel wall thickening, 46 were diagnosed correctly as benign or malignant with MDCT with help of above mentioned findings. Thus, MDCT was accurate in 92% cases for differentiation between benign and malignant etiology in patients with bowel wall thickening.
- Thus no single finding is highly specific for bowel malignancy, except asymmetric wall thickening and heterogenous postcontrast enhancement. But together, bowel wall characteristics as mentioned above and associated findings and clinical findings will help to come to a specific diagnosis.
- Findings were correlated and confirmed by either scopy, biopsy report, postoperative study or followup CT and/or USG.

Inflammatory conditions showed regression/resolution of disease process by antibiotics.

CONCLUSION

- The major CT scan picture was bowel wall thickening.
- MDCT had a high degree of accuracy in identifying the etiology of the thickening.
- In many cases MDCT can differentiate benign and malignant lesions by characteristic features like pattern of attenuation; degree of thickening; symmetric versus asymmetric thickening; focal, segmental, or diffuse involvement; and associated perilesional abnormalities.
- Koch's abdomen is very significant in our country. MDCT can be • helpful in differentiating adenocarcinoma from Koch's. However as we have shown in our study, it is not always reliable. This poses a significant diagnostic dilemma for the radiologist as well as clinician. In some cases biopsy is only reliable method.
- MDCT has shown its importance with the advent of CT Angiography. Detection of vascular thrombosis and consequent ischemic bowel conditions is very helpful in management of patients who were diagnosed as normal with help of radiographs or ultrasonography. Even if positive contrast is administered in these patients, one can easily detect the site of occlusion of the vessels. Post-processing limitations during filming and the inability to detect mucosal enhancement are significant disadvantages, but we have found that the diagnosis of ischemia can be reliably made.
- Ionizing radiation is another important factor to be considered by the radiologist. We advocate lowering kVp and mas with no significant loss of diagnostic information.
- With wide availability of MDCT, barium studies are decreasing in number, and it proved ultimate tool before surgical treatment in pathologies identified by barium studies or ultrasonography.

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