



Role Of Ct Enteroclysis In The Evaluation Of Small Bowel Diseases

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Abstract

Background: The small bowel has always been considered a difficult structure for evaluation, because of its extensive length, its position in the digestive tract, its tortuosity and over lapping loops Purpose of this work is to study elteht of CT Enterography in the assessment of different small bowel diseases. CT Enterography offers superior small bowel visualization compared to standard Abdomino-pelvic CT and provides complementary diagnostic information to capsule endoscopy and MR Enterography more over it can detect the extraluminal pathology.

Aim of Study- To prospectively evaluate the role of multi-detector row helical Computed Tomographic (MDCT) enteroclysis for the depiction of small-bowel diseases.

Methods: The study was conducted in the year 2022,in Department of Radiodiagnosis, Yashoda Hospitals, Hyderabad, Telangana, India Study group included 30 patients of age ranging from 18 years to62 years, suspected of having low-grade small intestinal obstruction, small bowel tumours, small bowel tuberculosis, inflammatory bowel disease, unexplained abdominal pain with a h/o abdominal surgery, malabsorption, entero-enteral fistula.

Results: Out of the 30 cases investigated eleven were found to be normal and the rest nineteen were diagnosed to be abnormal. Among the abnormal cases, small bowel obstruction was seen in four: abnormalities of inflammatory origin three: Tumor was encountered in three cases. Fistula in two cases. Inhomogenous mottled material with small internal air collections in the small intestine may also be found in other conditions, such as cystic fibrosis, infectious or metabolic bowel disease, rapid jejunostomy tube feedings, or, rarely, bezoars. By definition, however, for the diagnosis of the small-bowel feces sign, a dilatation of bowel loops more than 2.5 cm in diameter must be present. Other possible causes of the SBFS include bacterial overgrowth and reflux into the terminal ileum due to an incompetent ileocaecal valve.

Conclusion: CT enteroclysis is a fast, well-tolerated, and reliable imaging modality for the depiction of small-bowel diseases. This technique provides adequate small-bowel distension in a majority of patients. In addition, CT enteroclysis allows the detection of extraluminal disease and provides information relative to the entire abdomen that is not obtainedwith small-bowel follow-throughor endoscopy.

Keywords: CT, enteroclysis, small bowel diseases

Introduction

The mesenteric small intestine is the most challenging segment of the alimentary tube to examine diagnostically because of its length, caliber and overlap of loops within the peritoneal cavity.

Barium enteroclysis examination has been shown to overcome most of the inherent limitations of the small bowel to follow through and is the more reliable of the conventional contrast methods of

radiographic examination [1]. Experience with Computed tomography (CT) has shown that the enteroclysis method of examination fails to show important extra-intestinal manifestations of small bowel disease [2]. Computed tomography enteroclysis (CTE) is a method of examining the small intestine, which combines the advantages of enteral volume challenge and the ability of cross-sectional imaging and reformatting to depict extra-intestinal manifestations of the disease [3].

Though fluoroscopic studies like barium meal follow through (BMFT) ensures luminal distension hence making it ideal for viewing the enteric mucosa and partial strictures, the overlapping bowel reduces the sensitivity of the test. Even capsule endoscopy has superior mucosal visualisation and abilities to obtain biopsies for assessing histologically, but is often limited by its inability to view extra-enteric structures, subjective interpretation, difficulty in tumour localisation and its usage in patients having strictures due to its chances of getting lodged within. 1,4 CT and MR enteroclysis also works on the principles of luminal distension with enteric contrast material through a nasoenteric tube followed by spatial and temporal viewing of the bowel. It is an ideal modality for detecting strictures.[4] However; the semi-invasiveness causing patient discomfort and expert operator dependency often restricts their widespread use.[5] Imaging with computerised tomography (CT) with enteroclysis / enterography (CTE) or magnetic resonance enteroclysis has become an essential tool because of their capability of disease localisation as well as evaluating the entire intestinal wall thickness, mesentery and lymph nodes.[6] This study was conducted to evaluate the role of multi-slice CT enterography in different bowel diseases in patients and to describe CT enterography findings in commonly encountered pathologies. It is used selectively to answer specific questions concerning the small bowel. [7] The ability of multislice CT machines to image larger volumes at a faster speed with the ability to perform reconstruction after the examination, has made CTE a more feasible extension of the conventional barium enteroclysis and CT methods of examining the small intestine.[8,9]

Methods: The study was conducted in the year 2022, in Department of Radiodiagnosis, Yashoda Hospitals, Hyderabad, Telangana, India Study group

included 30 patients of age ranging from 18 years to 62 years, suspected of having low-grade small intestinal obstruction, small bowel tumours, small bowel tuberculosis, inflammatory bowel disease, unexplained abdominal pain with a h/o abdominal surgery, malabsorption, entero-enteral fistula. Study group included 30 patients of age ranging from 18 years to 62 years, suspected of having low-grade small intestinal obstruction, small bowel tumours, small bowel tuberculosis, inflammatory bowel disease, unexplained abdominal pain with a h/o abdominal surgery, malabsorption, entero-enteral fistula. **Inclusion criteria:** Study group included 30 patients of age ranging from 18 years to 62 years, suspected of having low-grade small intestinal obstruction, small bowel tumours, small bowel tuberculosis, inflammatory bowel disease, unexplained abdominal pain with a h/o abdominal surgery, malabsorption, entero-enteral fistula. **Exclusion criteria:** Exclusion criteria consisted of acute complete small bowel obstruction, perforation, general contraindications for helical CT (including pregnancy, acute or chronic renal failure, and hemodynamic instability) and an inability to tolerate a sufficient breath hold for adequate helical CT study. In addition, patients with a history of allergy were excluded from the study group. In patients referred for CT enteroclysis or barium enteroclysis for unexplained gastrointestinal bleeding, anemia, or workups for small bowel neoplasm who have a history of prior colectomy and ileosigmoidostomy or ileoproctostomy, a retrograde (per rectum) enteroclysis or small bowel enema is preferred over antegrade infusions. This is because of the difficulty of distending the small bowel from above without the sphincter mechanism of the ileocecal valve. If only a segment of the right colon has been removed, infusion should be antegrade, because the long length of the remaining colon prevents adequate infusion pressure to challenge the distensibility of the entire small bowel and duodenum. Even with a background of prior colon surgery, if the indication is for small bowel obstruction, an antegrade approach is preferred. A long decompression tube can be used for suction if the small bowel is obstructed.

Results

The present study was carried out on 30 cases with following observations are made. indications of small bowel disorders and the

TABLE NO. 1

Total no. of CTE cases	30	Percentage (%)
Normal	11	36.67
Abnormal	19	63.33

Table :1 Out of the 30 cases investigated eleven were found to be normal and the rest nineteen were diagnosed to be abnormal. Among the abnormal cases, small bowel obstruction was seen in four: abnormalities of inflammatory origin three: Tumour was encountered in three cases. Fistula in two cases. Abnormalities in large bowel were four and there is one case on follow-up. The results of abnormal cases are tabulated below.

TABLE NO. 2:

Abnormality	No. of Cases
Obstruction	4
Inflammatory	3
Tumour	3
Fistula	2
Large bowel	4
Cases on follow-up	1
Others	2

Discussion

Small bowel can be affected by a wide spectrum of pathologies and is a challenging public health issue of considerable importance and magnitude in India. Various forms of involvement of the bowel are observed in the form of ITB, Crohn’s disease, radiation enteritis, ischemic strictures etc. The mean age of patients in our study was 40 +/- 16 years. Out of 30 patients, females were 14 (46.7 %) and males were 16 (53.3 %). In our study abdominal pain was the most common complaint, present in all 30 (100 %) of the patients followed by anorexia seen in 26 (86.7 %) cases. 15 (80 %) patients presented with

small bowel obstruction and about 4 (13.3 %) had a previous surgical history. [10] In our study, bowel thickening and mural hyperenhancement were the most common CT enterography findings, present in 23 (76.7 %) cases each, followed by significant lymphadenopathy was present in 12 (40 %) cases. Engorged vasa recta was seen in 10 (33.33 %) patients. Bowel was dilated in 10 (33.3 %) cases. Ascites was seen in 10 (33.3 %) patients. Skip lesions were present in 6 (20 %) cases. Strictures were seen in 5 (16.6 %) cases. Findings are similar to previous studies.7 Intestinal pathologies were classified as either involving the jejunum, ileum or other colonic

segments in isolation or in different combinations. IC junction was considered to be a part of the terminal ileum and cecum was considered to be a part of the large bowel for our study.[11] In our study, ileum was the most commonly involved segment (47.73 %) which was in concordance with other studies. Mural thickening was defined as mural wall thickness exceeding 3 mm. Mural thickening could be caused due to both non-neoplastic causes like ITB, Crohn's disease, ischemic strictures, radiation enteritis, ulcerative colitis etc. Neoplastic causes of thickening include adenocarcinoma, gastrointestinal stromal tumour (GIST), metastases and lymphoma.⁹ In our study, bowel wall showed increased thickening in 23 (76.7 %) cases. Mural thickening was mostly caused by non-neoplastic conditions (91.3 %) with 2 cases (8.7 %) of neoplastic adenocarcinoma. Our findings are similar to previous studies.[12] Bowel wall thickening that is asymmetric and irregular usually indicated malignant pathology while symmetrical and regular mural thickening is usually seen in benign pathologies but can also be seen in neoplastic pathologies.¹¹ In our study, the type of wall thickening was symmetrical in 19 (82.61 %) cases; however, 4 (17.39 %) patients presented with asymmetrical thickening. ¹² Pathologic conditions can cause focal involvement (≤ 5 cm), segmental involvement (6 – 40 cm), or diffuse involvement (> 40 cm).¹³ Focal thickenings were mostly associated with malignancies (except lymphoma). Malignancies could present with asymmetric heterogeneous focal thickening. However certain inflammatory conditions could also present with focal mural thickening.[13] Perienteric findings like predominant and out of proportion fat stranding in comparison with the focal bowel thickening would suggest inflammatory pathologies like appendicitis, diverticulitis, omental infarction.[14] Segmental and diffused bowel thickenings were usually associated with benign conditions (except lymphoma) like infections, inflammation and ischemia. In our study majority (84 %) of the cases with bowel wall pathology showed segmental involvement. 2 (8 %) of the cases showed diffuse pattern of involvement with 2 (8 %) patients having focal pattern.[15] In our study, mesenteric lymph nodes were present in 20 (66.7 %) cases, however only 12 (40 %) of them had significant lymphadenopathy. Lymph nodes were considered significant (lymphadenopathy) if they measured > 10

mm in short axis dimension.[16] Mesenteric lymph nodes were present in 20 (66.7 %) cases, however only 12 (40 %) of them had significant lymphadenopathy. Calcification of the nodes was not present in any of the cases. However necrosis of the lymph nodes were seen in 7 (23.3 %) cases. 5 (16.7 %) patients presented with matting of the mesenteric lymph nodes. Fat stranding was seen in 18 (60 %) cases. Proliferation of fat in the surrounding mesentery was present in 7 (23.3 %) patients. Collection in the fat was noted in only 1 (3.3 %) of the case. Peritoneal and omental linings also showed abnormalities with a frequency of 7 (23.3 %) and 4 (13.3 %) cases respectively Free fluid was seen in the abdomen in one third (33.3 %) of the total cases. In our study, CT enterography showed a sensitivity of 96.15 % specificity 100 %, PPV 100 %, NPV 80 % and an accuracy of 98.08 % for the detection of small bowel diseases. [17,18,]

Conclusion

In summary, CT Enteroclysis represents a problem solving modality for well selected patients concerning the detection and characterization of small bowel pathology. The successful adoption of CT Enteroclysis by the clinical environment depends on how radiologists can educate surgeons, gastroenterologists and other specialists. Using a very small intestinal catheter can show them that this technique does not increase patients' discomfort because of the necessary nasojejunal intubation. CT Enteroclysis also essentially contributes to the diagnostic quality of modern small bowel imaging, and therefore deserves an established place among the other available techniques.

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