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Research Article

MDCT EVALUATION OF COLORECTAL LESIONS

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ABSTRACT

Colorectal lesions always been challenging as well as intriguing in their anatomical, surgical and post-surgical management related issues. They are heterogeneous set of pathologies involving different age groups. Our objective is to characterise colorectal lesions by MDCT and differentiating benign and malignant colorectal lesions by histopathological comparison.

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INTRODUCTION

Colorectal cancer is the second most common cause of cancer death in developed countries. In 1998, there were 131,000 new cases of colorectal cancer and 56,000 deaths in the United States.¹ The initial diagnosis is usually made with colonoscopy or air-barium enema examination; however, with the increased use of computed tomography (CT) as the initial imaging modality in patients with a variety of gastrointestinal symptoms, the radiologist may be the first to suggest the diagnosis of colon cancer on the basis of CT findings.

Objective

Effectiveness of MDCT in differentiating benign and malignant colorectal lesions by histopathological comparison

MATERIALS AND METHODS

This is a correlative type of study. Data will be collected from a minimum of 10 cases of suspected large bowel lesions with USG showing bowel wall thickening referred for CT of the abdomen.

After informed consent the patient will be placed in supine position on the CT table and rectal tube will be inserted and room air gently insufflated into the colon to obtain adequate colonic distension. IV injection of 100 ml of non ionic contrast (omnipaque 350) will be administered at 3ml/sec. CT acquisition will be performed in the arterial phase and in the portal venous phase at a rotation speed of 0.8 sec

RESULTS

Adenocarcinoma

In our study of 10 cases with bowel wall thickening of large bowel, 6 cases were reported as malignancies which are subsequently proved to be adenocarcinoma by histopathology. Age group all these patients are above 50 years. 4 cases are male and 2 cases are female with male: female ratio of 2:1

All cases were presented with focal bowel wall thickening (thickness > 2cm) with heterogeneous pattern of attenuation and asymmetrical wall thickening noted. Two cases are noted involving ascending colon, one case involving transverse colon, one case involving descending colon and other two cases noted involving the rectum. One case of rectal carcinoma invaded cervix. One case is showing metastasis to lung, one showing metastasis to liver. All these cases are proved as malignancies by histopathology. All these cases show adjacent lymph node enlargement.

Inflammatory/infective disease

In our study of 10 cases, 4 cases were given as inflammatory/infective lesion by CECT, two of which are reported as tuberculosis and other two as ulcerative colitis by histopathology. Age group of these patients are 30-50, two of these patients are male and other two are female. All these four cases showed symmetrical, mild wall thickening (< 2cm) with homogenous attenuation.

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Two cases which were reported as tuberculosis by histopathology was showing ileo-cecal, ascending colon involvement with ascites and caseating lymphnodes noted Out of the two lesions which were diagnosed as ulcerative colitis by histopathology one case is showing segmental thickening involving rectum, sigmoid colon and other case showing diffuse involvement involving entire left colon

DISCUSSION

Adenocarcinoma

Adenocarcinoma is by far the most common malignancy affecting the colon. The tumor usually involves only a short intestinal segment (3-5 cm) and on CT presents as an eccentric focal mass or as a circumferential asymmetric and irregular thickening of the bowel wall. Larger lesions, when examined during the bolus arterial phase and imaged with narrow windows, show the characteristic patchy areas of low density representing tumor ischemia. The sensitivity of CT in detecting primary adenocarcinoma varies greatly depending on the size of the lesion and the quality of the examination. In the colon, it was reported to be 68% on routine CT examination and 95% on examinations performed on clean and air-distended colons.¹ Horton et al² in their study have said that The sensitivity of CT in detection of primary colon cancer is variable In a study of 158 patients with colorectal cancer, the primary tumor could be identified with CT in only 75% of cases. According to them CT is limited in detection of small tumors or lesions less than 3–5 mm in diameter. However, because the risk of malignancy in a polyp less than 1 cm in diameter is less than 1%, this size limitation of CT detection is probably not clinically significant. Mucinous colorectal carcinoma is a histologic subtype of adenocarcinoma characterized by abundant extracellular mucin production. Compared with non mucinous carcinoma, mucinous carcinoma has been known to have a propensity for higher incidence of lymph node metastasis, venous and lymphatic invasions, local recurrence and distant metastasis. Ko et al³ in their study have proved that compared with non mucinous carcinoma, mucinous carcinoma showed more severe and more eccentric bowel-wall thickening. They also found that heterogeneous contrast enhancement was more common in mucinous than in non mucinous carcinoma. Mucinous carcinoma showed more areas with hypoattenuation and the solid portion of mucinous carcinoma showed less enhancement than that of non mucinous carcinoma.

Presence of intratumoral calcification was more frequent in mucinous carcinoma

Tuberculosis

According to the World Health Organization, more than 2 billion people are estimated to be infected with tuberculosis.⁴ Gastrointestinal tuberculosis almost always involves the ileocaecal region (90% of cases), usually both the terminal ileum and the caecum.⁵ The focal predominance of this area is believed to be a result of a few key components - an abundance of lymphoid tissue, increased physiological stasis with minimal digestion (permitting greater contact time between bacteria and intestinal lumen) and an increased rate of fluid and electrolyte absorption.^{4,5} The infection typically results from either reactivation and hematogenous spread from a primary lung focus, ingestion of active pulmonary secretions or

contaminated food and direct spread from adjacent organs or lymph nodes.^{6,7} Hemorrhage and perforation are recognized complications of intestinal TB, although free perforation is less frequent than in Crohn's disease.⁸

The most common CT finding is mural thickening, which is typically concentric but if eccentric tends to involve the medial caecal wall.⁹ Localized lymphadenopathy is usually seen. Skip areas of concentric mural thickening with associated luminal narrowing with or without proximal dilatation can occur elsewhere in the small bowel, findings that strongly suggest tuberculosis in the presence of ileocaecal involvement.

Intestinal tuberculosis (TB) has 3 main forms

- Ulcerative,
- Hypertrophic or ulcerohypertrophic, and
- Sclerotic or fibrous structuring.

In the ulcerative form, barium examination reveals thickened folds, spasticity, and shallow ulcers involving the caecum and terminal ileum. Computerized tomography shows preferential thickening of the ileocaecal valve and medial wall of the caecum as well as a few small regional nodes.

In the hypertrophic or ulcerohypertrophic form, a hyperplastic reaction is seen in the exophytic masses around the ulcerated lumen on computed tomography. An inflammatory mass that extends into adjacent muscle suggests TB. The hypertrophic form may also mimic malignant neoplasms, such as lymphoma or carcinoma. Caecal carcinoma rarely extends beyond the ileocecal valve, however in lymphoma, it can be seen as a greater degree of wall thickness with aneurysmatic dilation of the intestinal lumen.

In the sclerotic form, the main reaction is fibrosis with single or multiple short strictures. The caecum classically becomes amputated, conical, shrunken, and retracted.

Inflammatory Bowel Disease

Although classic barium studies remain the principal tool for diagnosis and evaluation of suspected inflammatory bowel disease, CT can sometimes aid in differentiating Crohn disease and ulcerative colitis when results of barium studies are equivocal. In addition, although barium studies allow exquisite mucosal detail, they provide little information about extraluminal disease, which is often important for accurate diagnosis. CT has the advantage of allowing visualization of the bowel wall as well as adjacent structures and therefore plays an important role in detection of complications of inflammatory bowel disease. There may be considerable overlap between the CT findings in Crohn disease and in ulcerative colitis. However, there are often certain features that may help distinguish the two. Extensive involvement of the right colon and small intestine is more common in Crohn disease, although involvement of the left colon does occur. In contrast, ulcerative colitis is typically left sided or diffuse and only rarely involves the right colon exclusively.¹⁰

At CT, the most frequent finding in both Crohn disease and ulcerative colitis is wall thickening. The mean wall thickness in Crohn disease (11–13 mm) is usually greater than in ulcerative colitis (7.8 mm).^{10,11} Wall thickening in ulcerative colitis may be diffuse and symmetric, whereas wall thickening in Crohn disease may be eccentric and segmental with skip regions. The

asymmetry of the disease involvement, which typically occurs along the mesenteric border of the intestine, can result in the formation of pseudodiverticula along the antimesenteric border. Pseudodiverticula are small outpouchings of the colonic wall that occur opposite regions of fibrosis and scarring. The halo sign, a low-attenuation ring in the bowel wall due to deposition of submucosal fat, is seen more commonly in ulcerative colitis than in Crohn disease.

In Crohn disease, the bowel wall tends to enhance homogeneously, although edema within the wall may result in low attenuation.¹⁰ Proliferation of mesenteric fat is seen almost exclusively in Crohn disease, whereas proliferation of perirectal fat is nonspecific and can be present in Crohn disease, ulcerative colitis, pseudomembranous colitis, or radiation colitis.¹⁰ Mesenteric lymphadenopathy suggests Crohn disease rather than ulcerative colitis, although this finding is certainly not specific for inflammatory bowel disease. Complications of inflammatory bowel disease can be imaged with CT; in the case of Crohn disease, CT has been shown to affect disease management in 28% of cases.¹¹ Abscesses are detected almost exclusively in Crohn disease and not in ulcerative colitis.^{10,12} An abscess can be confined to the bowel wall and pericolonic fat or involve adjacent structures such as the bladder, psoas muscle, and pelvic sidewall. Fistulas can also be reliably detected with CT.

Enterovesical, enterocutaneous, perianal, and rectovaginal fistulas have all been detected with CT. If an enterovesical fistula is suspected, it is often helpful to perform CT with oral or rectal contrast material but no intravenous contrast material. If positive contrast material is detected in the bladder, it must have originated from the intestine, thus confirming the presence of an enterovesical fistula. If intravenous contrast material is administered, positive contrast material can reach the bladder via the ureters or intestine. Other CT findings of enterovesical fistula include air in the bladder and focal bladder wall thickening adjacent to a diseased bowel loop. Enterocutaneous, perianal, and rectovaginal fistulas may be diagnosed by detecting oral or rectal contrast material within the actual fistulous tract



Axial CECT showing thickening of ileum and cecum which was proved later to be tuberculosis By histopathology



Axial CECT of a case of ileo-cecal tuberculosis showing multiple mesenteric and retroperitoneal lymph nodes



Axial cect showing lung metastasis secondary to colon adenocarcinoma



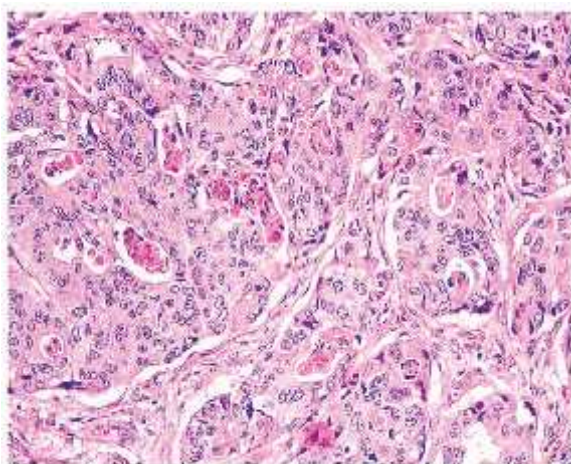
Axial CECT image showing thickening of sigmoid colon which was proved to be adenocarcinoma histologically



Axial CECT image showing ring enhancing metastatic lesion secondary to sigmoid colon Adenocarcinoma



Axial CECT showing heterogeneously enhancing asymmetric wall thickening involving the rectum which is seen infiltrating the cervix causing pyometra



Slide showing adenocarcinoma growing in solid sheets, a faint glandular differentiation can be noted

CONCLUSION

MDCT is an excellent modality in the diagnosis and differentiation of benign and malignant lesions of the colon and rectum, since it has the advantage of providing thinner sections, faster acquisition and multi planar reformatted images. Besides identifying the lesion MDCT provides further information regarding pericolic abnormalities associated with the lesion, presence of lymph nodes, infiltration of adjacent viscera and the presence of distant metastases.

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