

Gastrointestinal stromal tumors (GISTs): Diagnostic value of multi detector computed tomography (MDCT).

Dr. Asutosh Dave¹, Dr. Sanjana Doshi², Dr. Chirag Prajapati³

Dr. Nirav Patel⁴, Dr. Nilesh Parkar⁵

¹ (Professor & Head of Radio-diagnosis Department, GCS Medical College, Hospital and Research Centre, Ahmedabad)

²(3rd year Resident in GCS medical college, Ahmedabad)

³(3rd year Resident in GCS medical college, Ahmedabad)

⁴(3rd year Resident in GCS medical college, Ahmedabad)

⁵(3rd year Resident in GCS medical college, Ahmedabad)

Corresponding Author: Dr. Asutosh Dave

Abstract:

GISTs are the commonest mesenchymal tumors of the GIT. It can arise from the gastrointestinal tract, mesentery, omentum or retroperitoneum. It has either intramural growth or exophytic growth. They characteristically have haemorrhage, necrosis or cyst formation that appears as low attenuation on CT images. On MDCT we can easily differentiate the origin of GIST from other mesenchymal tumors.

AIMS OF STUDY:

- To study the role of MDCT in diagnosis of GISTs of variable origin.
- To differentiate GISTs of variable origin from other mesenchymal tumours.

MATERIALS AND METHODS:

It's a prospective study of 6 months duration (April 2019 – September 2019). Typical CT findings are the main differentiating features for GIST from other mesenchymal tumours.

RESULTS : This study includes 30 cases of pathologically proved GISTs (15 gastric GIST, 10 small intestinal GIST, 3 colonic cases, 1 mesenteric case and 1 anorectal case) demonstrating the tumor size, organ of origin and its characteristics on CT imaging.

CONCLUSION: MDCT detects the perfect location & origin of the mass with its relation to the surrounding structures, vessels and bowels. In case of hypervascular GIST, it helps to map the vascular pedicle which is essential for the transcatheter embolization in patients who present with acute GI bleeding.

Key Words: Gastrointestinal stromal tumors (GISTs), MDCT.

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I. Introduction

GIST are distinct from the true smooth muscle and neural tumors of GIT & considered the commonest mesenchymal tumor. They account for 5% of all sarcoma and they give very good response to chemotherapy. GIST can arise anywhere from oesophagus to anus. It can also occur primarily in omentum, mesentery and retroperitoneum. GIST arise from the muscular layer (mainly muscularis propria) whereas leiomyoma and leiomyosarcoma arise from the smooth muscle layer. Leiomyomas are more common in oesophagus (75% of cases) than GISTs (25%). On histopathologically - GIST have characteristic expression of C-KIT (CD 117), CD 34 antigen and tyrosine kinase growth factor receptor. On pharmacologically basis Imatinib (tyrosine kinase receptor inhibitor) is the main drug to treat the patients. Immunoreactivity for KIT differentiates GIST from leiomyoma, leiomyosarcoma and schwannoma.

On clinical aspect small & benign tumors are usually asymptomatic and found incidentally during radiological evaluation or during surgery. Large and malignant tumors are usually symptomatic as they might have invaded the adjacent structures and metastasize.

II. Material And Methods

- This study includes 30 cases of pathologically proved GISTs (15 gastric GIST, 10 small intestinal GIST, 3 colonic cases, 1 mesenteric case and 1 anorectal case). Data was collected during 6 months duration (April 2019 – September 2019) in Dept. Of Radiodiagnosis, GCS Medical College, Ahmedabad.

- The scans were performed using a 16-slice MDCT machine (Siemens). The patients were prepared with neutral oral contrast (iso-osmotic mannitol). The study included a non-contrast series, followed by a dual-phase scan after automatic IV injection of 120 ml non-ionic contrast (Ultravist). The phases were: Enteric phase at 45s following the start of contrast injection; portal phase at 70s.

CLINICAL FEATURES:

GIST have no any association with geographic location, race, occupation or ethnicity. GIST are more commonly found in people over the age of 50 years. NF 1 have increased prevalence of GIST. GISTs are likely to be feature of CARNEY TRIAD – epitheloid leiomyosarcoma, pulmonary chondroma and para ganglioma. Occurrence of GIST more commonly seen in stomach(60 – 65 %),small bowels (30 – 35 %),anorectum(7 %), colon and oesophagus. Most common clinical feature of GIST in symptomatic patient is gastro intestinal bleeding which is due to mucosal ulceration. Patient may presented with hemetemesis , hematochezia , features of anemia , nausea , abdominal pain , vomiting and weight loss. Asyptomatic GIST of anorectum may be diagnosed during per- rectal examination.

PATHOLOGICAL FEATURES :

GIST can vary in in size from few mms to greater than 25 cm. They are well circumscribed masses and does not have true capsule. Large lesion may contain haemorrhage, necrosis or cystic degeneration. GIST usually arise from the muscularis propia (outer muscular layer), so more chance of exophytic growth with extension into peritoneal cavity. Gastric GIST are less aggressive and have less chance of malignancy as compared to small intestinal GIST of same size. Malignant GIST are more commonly seen in oesophagus, colon and anorectum.

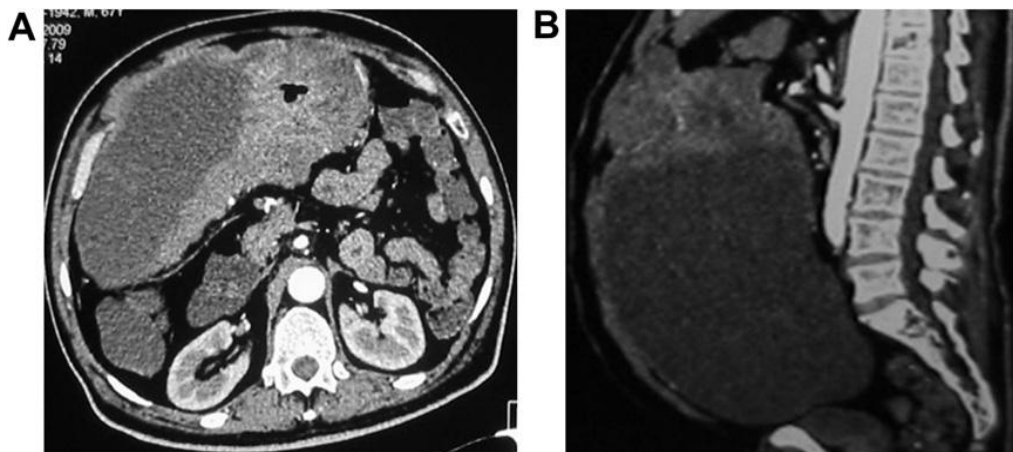
III. Discussion:

This study includes 30 cases of pathologically proved GISTs(15 gastric GIST , 10 small intestinal GIST , 3 colonic cases , 1 mesenteric case and 1 anorectal case).We demonstrate their characteristics findings, organ of origin , their tumor size , their extension, vascular supply and any metastasis by using MDCT.

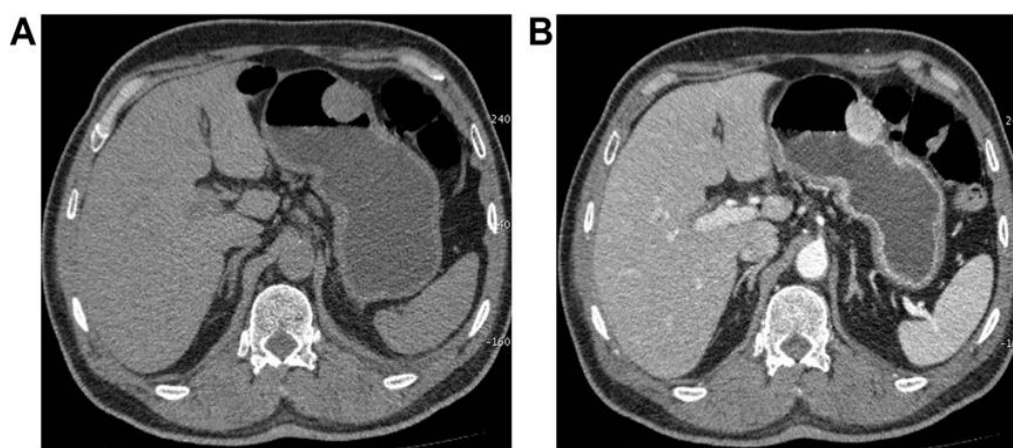
RADIOGRAPHIC FEATURES :

STOMACH :

It is the most common site for GISTs (2-3 % of all gastric tumors). In our study,15 cases (50 % of cases) were found in stomach. Size of the tumor can vary from the 3 cm upto 22 cm. Largest lesions may extend into the pelvic cavity and involves the surrounding structures. There is no correlation established between its radiographic appearance & malignant potential on regard of size, haemorrhage and contrast enhancement. Out of 15 cases, 4 cases have intra luminal component and 11 cases have extra gastric extension which makes it difficult to appreciate the origin of the tumor from gastric wall. In some cases GIST may be attached to the gastric wall by a thin pedicle. On MDCT 75 % cases show peripheral enhancement of the tumor with focal central low attenuating areas whereas small lesion shows homogeneous enhancement (25 % cases). On pathological point of view it indicates the central area of necrosis, haemorrhage or cystic degeneration. Calcification is a rare feature of GIST, seen only in 3 % of cases. MDCT easily demonstrates the extension of the tumor (liver metastasis, peritoneal spread and invasion of adjacent organ). Metastatic lymphadenopathy is usually not associated with GIST. Differentials diagnosis could be lymphoma, Leiomyosarcoma, schwannoma, Neurofibroma and neuroendocrine neoplasms. Patients of lymphomas and advanced gastric carcinoma usually have lymphadenopathy which is not seen with the patients of malignant GISTs.



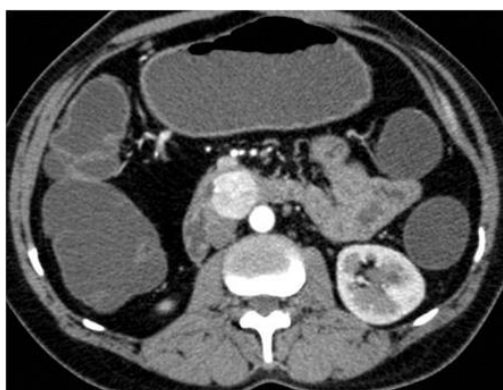
Large gastric GIST arising from the lesser curvature with extension into the pelvic cavity (exophytic component) & heterogeneous enhancement on contrast study.



Gastric GIST of anterior wall with homogeneous enhancement, no exophytic component.

SMALL INTESTINAL GISTS:

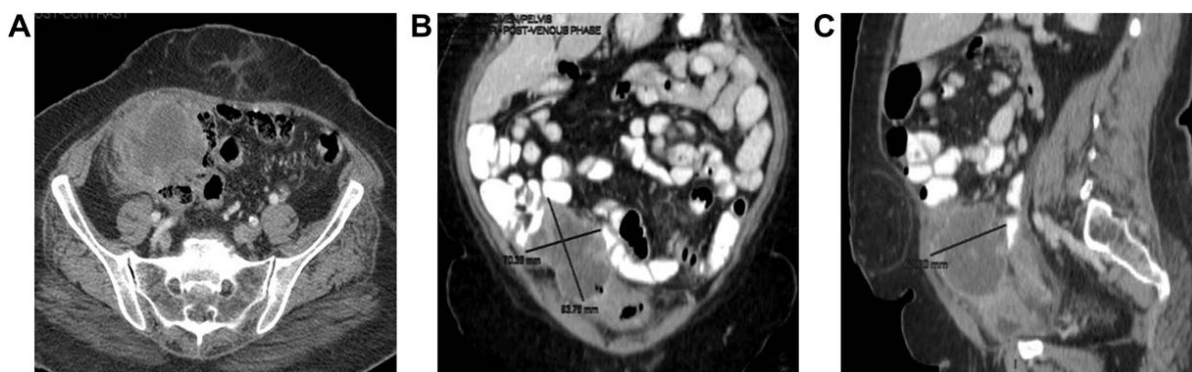
GIST can occur throughout the small intestine. Out of 10 cases of small intestinal GIST, 4 were located in duodenum, 4 in jejunum and 2 in ileum. Size of the tumor can vary from 2.5 cm to 16 cm in our study. These tumors may have intra luminal growth or extra luminal extension. Extra serosal component may cause mass effect in adjacent organs, vessels, bladder, ureter or adjacent intestines. Large lesion may cavitate and forms the fistulous tract with the intestinal lumen. Small tumors usually presents as intra luminal mass or as polyp. MDCT findings typically shows peripheral enhancement and central low attenuating areas. CT angiography easily detects the vascular supply of the lesion. Malignant GIST may present with metastasis to liver, omentum or peritoneum. Differential diagnosis could be primary or metastatic small intestinal tumor. Adenocarcinoma is most common small intestinal neoplasm. Lymphoma can also cavitate, ulcerate or extend into abdominal cavity but has typically lymphadenopathy which is not seen in GIST.



Duodenal GIST with homogeneous contrast enhancement.

COLON:

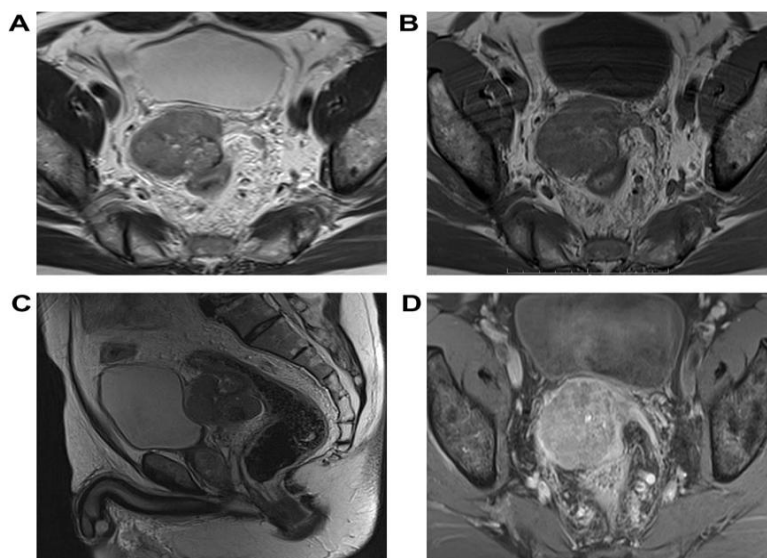
Colonic GISTs are less common than gastric and small intestinal GISTs. They are equal in presentation to anorectal and oesophageal GIST. In our study we have 3 case of colonic GIST. They are well circumscribed, nodular and have central areas of necrosis/haemorrhage /cystic degeneration. These tumors may be found intra luminally or have extra serosal extension. Size of the lesion ranged from 12-16 cm in our study. Differentials diagnosis could be lymphoma, adeno carcinoma, metastatic melanoma and leiomyosarcoma.



Cecal GIST with necrotic & exophytic component.

ANORECTUM :

Anorectal GIST presents as well circumscribed mass on CT images. In our study we have 1 case of anorectal GIST. External spread may occur in ischiorectal fossa. Ct findings are same as gastric and small intestinal GISTs. Differential diagnosis could be rectal adeno carcinoma, lymphoma, malignant melanoma, carcinoids, Leiomyosarcoma.



Anorectal exophytic GIST with inhomogeneous enhancement.

MESENTERY AND OMENTUM:

In our study we have 1 case which measures 8 x 9 cm. MDCT findings are complex mass which have peripheral enhancement and central low attenuating area present in pre sacral region. GISTs from gastrointestinal tract may metastasize to mesentery or omentum. Differentials diagnosis could be peritoneal carcinomatosis, lymphomatosis, the benign condition leiomyomatosis peritonealis disseminate.



Mesenteric GIST – Mildly peripherally enhancing soft tissue lesion with internal non enhancing necrotic area.

OESOPHAGUS:

Oesophageal GIST are very rare. In our study we had no any case of oesophageal GIST. Leiomyomas are more common seen in oesophagus (75 % of cases) than GIST. Oesophageal GIST more commonly occur in distal third of the oesophagus. They present with intra luminal mass or large mass which may extend into the oesophageal lumen or into the proximal part of the stomach. Differentials could be papilloma, adenoma, inflammatory polyp, fibrovascular polyp and oesophageal cancer.

IV. Conclusion

GIST are more commonly involving the muscularis propria of the stomach and small intestinal wall. They may have extra serosal extension or intra luminal growth. GIST with extra mural extension have extensive behavior that majority of the tumor found outside the organ of origin. On MDCT they have typically peripheral enhancement of the tumor with focal central low attenuating areas which indicate necrosis, haemorrhage or cystic degeneration. MDCT detects the perfect location & origin of the tumor with its extension & involvement to adjacent structures. It also helps to map the vascular pedicle in case of hypervascular GIST, which is essential for transcatheter embolization in patient who presenting with acute gastro intestinal bleeding.

Reffernces

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