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CT imaging of GIST (Gastrointestinal Stromal Tumour): Retrospective study of 20 cases.

Saumil Desai*, Ashish Kharadi

Gujarat Cancer Research Institute, Civil Hospital Asarwa, Ahmedabad

ABSTRACT

GIST is a visceral sarcoma that arises from the gastrointestinal tract. The clinical features and radiologic differential diagnosis of gastrointestinal stromal tumours are discussed. Gastrointestinal stromal tumours is a rare gastrointestinal tumour. Computed tomography (CT) is an imaging modality of choice for diagnosing GIST. The aim of this Retrospective study is to evaluate CT feature of GIST in 20 cases. In this study 20 biopsy proven cases of GIST were evaluated retrospectively in our department from November 2010 to July 2012. The CT scan was performed prior to the treatment in all these patients. CT imaging feature includes, tumour location, size/diameter, degree & pattern of enhancement, intraluminal/exophytic, internal necrosis & haemorrhage, perilesional fat stranding, local spread, nodal & distant metastasis. Out of 20 patients, in 13/20 (65 %) cases tumour was found in stomach, 4/20 (20%) in small bowel (jejunum & ileum), 2/20 (10%) in omentum and mesentery; and 1 (5%) case tumour was found in transverse colon. 14/20 (70%) had exophytic tumour with communicating to lumen of gastrointestinal tract or in omentum and mesentery; rest 6/20 (30%) had polypoidal mass. Size of tumour ranges from 4 to 15 cm, with mean of 7.9 cm. 15/20 (75%) cases shows heterogeneous enhancement with necrosis and/or calcification, rest 5/20 (25%) had homogenous enhancement. The CT HU ranges from 35 to 55, with mean of 40, 14/20 (75 %) cases had well defined margins of tumour, and rest 6 (30%) cases showed perilesional fat stranding and loss of fat plane with adjacent organ. 2/20 (10%) cases showed regional nodal involvement and 3/20 (15%) cases shows distant metastasis to liver (2) & lungs (1).

Keywords: Gastrointestinal stromal tumour, GIST, Computed tomography, sarcoma.

*Corresponding Author Email: desaisaumil@ymail.com

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INTRODUCTION

GISTs are the most common mesenchymal tumour of the gastrointestinal tract; the neoplastic GIST cells appear to arise from a common precursor cell, which gives rise to the interstitial cells of Cajal in the normal myenteric plexus [1]. Gastrointestinal stromal tumours (GISTs) are rare, accounting for less than 3% of all gastrointestinal neoplasms and less than 6% of all sarcomas [2]. GISTs are defined by their expression of KIT (CD117), a tyrosine kinase growth factor receptor. Since most GISTs arise within the muscularis propria of the stomach or intestinal wall, they most commonly have an exophytic growth pattern and manifest as dominant masses outside the organ of origin. Radiologic features of GISTs vary depending on tumour size and organ of origin. Computed tomography (CT) is the imaging modality of choice in GIST [3]. 70% to 80% of GISTs are benign, and such tumours are often found incidentally at surgery and excised in the same session. Approximately 20% to 30% of GISTs are malignant. GISTs often metastasize to the liver and the peritoneum, However, pulmonary metastases are rarely seen.

This article summarizes our experience with 20 cases of GIST (13 gastric, 4 small intestinal, one colonic, 2 from the omentum and mesentery) accessioned into the Radiologic department at the Gujarat Cancer and Research Institute from November 2010 to July 2012. The radiologic spectrum of GISTs throughout the gastrointestinal tract, omentum, and mesentery on CT scan is presented.

MATERIALS AND METHOD

The study was conducted in department of radiology at The Gujarat Cancer and Research Institute from November 2010 to July 2012. There were 20 cases of GISTs. Only biopsy proven cases were included in this study, which underwent preoperative CT scan. In these 20 cases (12 males, 8 females, with ages ranging from 38 to 70 years, mean age: 55 years), We collected and analysed the CT images. The abdomen & pelvic CT scans were performed on siemens somatom emotion 6 slice scanner. Patients were scanned typically after proper bowel preparation, oral administration of 1000 mL 10% mannitol, per rectal gastrograffin and intravenous administration of 80 mL (350 mg/mL) iohexol, with a section thickness of 5 mm. The CT imaging features included tumour diameter, number and location, tumour margin (well defined, irregular or clearly invasive), location of metastasis, effect of contrast and pattern of enhancement. Details of CT scan were evaluated in MPR (sagittal and coronal) reconstruction. In addition, we also recorded the surgical findings, including complications, tumour size and location for comparison.

RESULTS AND DISCUSSION

The CT imaging findings showed that in 13/20 (65 %) cases tumour was found in stomach, 4/20 (20%) in small bowel (jejunum & ileum), 2/20 (10%) in omentum and mesentery, and 1 (5%) case tumour was found in transverse colon. 14/20 (70%) had exophytic tumour with communicating to lumen of gastrointestinal tract or in omentum and mesentery, rest 6/20 (30%) had polypoidal mass. The size of tumour ranges from 4 to 15 cm, with mean of 7.9 cm. 15/20 (75%) cases shows heterogeneous enhancement with necrosis and/or calcification, rest 5/20 (25%) had homogenous enhancement. CT Hounsfield of 35 to 55, with mean of 40. 14/20 (75 %) cases had well defined margins of tumour, and rest 6 (30%) cases showed perilesional fat stranding and loss of fat plane with adjacent organ. 2/20 (10%) cases showed regional nodal involvement and 3/20 (15%) cases shows distant metastasis to liver (2) & lungs (1).

S. No.	Features	Details
1	Location	Stomach - 13/20 (65%) Small Bowel – 4/20 (20%) Omentum & mesentery – 2/20 (10%) Large bowel – 1/20 (5%)
2	Size	4 to 15 Cms. Mean – 7.9 Cms
3	Extophytic / Extraluminal	14/20 (70%)
4	Intraluminal / Polypoidal	6/20 (30%)
5	Necrosis	10/20 (50%)
6	Calcification	2/20 (10%)
7	Margins	Well defined – 14/20 (70%) Ill defined - 6/20 (30%)
8	CT HU	30 to 55. Mean - 38.1
9	CT Density	Heterogeneous – 15/20 (75%) Homogenous – 5/20 (25%)
10	Nodes	2/20 (10%)
11	Metastasis	3/20 (15%)

Operative findings showed that the smallest GIST was 4 cmx3.8 cmx3.4 cm and the largest was 15 cmx13 cmx10.2 cm in size. The commonest complications among our patients were gastrointestinal tract chronic inflammation, diarrhoea and wound infection. In addition, all patients underwent lymphadenectomies, in 2/20 (10%) cases metastasis to the lymphnodes was found.

GISTs are the most common mesenchymal tumours of the gastrointestinal tract. They arise from interstitial cells of Cajal and almost always express a specific tyrosine kinase growth factor receptor known as C-KIT (CD117), which helps differentiate them from true leiomyomas[5]. The older medical literature refers to these tumours as leiomyomas, leiomyoblastomas,

leiomyosarcomas or schwannomas. However, in 1983, electron microscopy and immunohistochemistry studies revealed that these lesions contain no smooth muscle or Schwann cells, and so the nomenclature was changed to "GIST"[6].

Most patients are older than 50 years at the time of diagnosis; the median age at presentation ranges from 50-60 years [7]. In our study, the age of study population is ranges from 38 – 70 YIS with mean age of 55 yrs. GISTs show no predilection for one sex over the other, although a slight male predominance has been reported [8].GISTs are uncommon in young adults and children, and when they occur in these age groups, they are sometimes associated with a syndrome such as neurofibromatosis type 1, familial GIST, or the Carney triad (gastric GIST, extra-adrenal paraganglioma, and pulmonary chondroma) [51]. GISTs can occur anywhere along the GI tract but are most common in the stomach (50%) and small bowel (25%). Colon (10%), omentum/mesentery (7%), and oesophagus (5%) are less common primary sites. A few GISTs occur within the abdomen and retroperitoneum but Show Do clear anatomic association with the GI tract (9). In our study also stomach was the most common site of tumour (65%). It is similar to the Sildy of Chi-ming Lee et al(10).Almost all the exophytic tumours showed ulceration and communication with lumen of stomach and small bowel. The size of the tumour ranges from 0.5 to 21 cm, with a mean of 6.8 cm. Imaging and operative Incidental findings are common. The most common presentation in symptomatic GISTs is gastrointestinal bleeding caused by ulceration of the overlying mucosa of the limour(11) The classical CT of MR imaging features of GIST are described as large exophytic tumour with heterogeneous contrast enhancement, arising from the stomach or small bowel (12). In our study, the tumour size ranges from 4 - 15 cm. with mean size remain 7.9 cm. 70% cases are exophytic and most of them showed ulceration & communication with gastrointestinal lumen. We analysed the enhancement pattern of the tumour. 75 % cases stowed heterogeneous enhancement with tumour size > 7 cm. We found that large tumour sizes appeared to be related to heterogeneous enhancement. In addition, we found tumours in 14 (70%) of our patients were well-defined, and in study of Chi-ming Lee more than two-thirds of patients also had well-defined GISTs. Thus, well-defined tumours appear to be a feature of GISTs on CT imaging.

Approximately 20% to 30% of GISTs are malignant, and these neoplasms are identified based on their mitotic index, tumour necrosis index, andKi-67 index (which reflects expression of the 395 kDa nuclear antigen MIB-1). According to recent pathological studies, high values for these parameters are the most important prognostic factors for metastasis

And mortality in this patient population. [13,14]

Liver metastases and/or dissemination within the abdominal cavity are the usual clinical manifestations of malignancy[4]. Lymph node metastases are extremely uncommon; Its spread to the lungs or other extra-abdominal locations is also extremely rare [15]. In our study, 15 % cases showed distant metastasis – 2 in liver and 1 in lungs. Nodal metastasis was also found in 10% cases.

Gastric adenocarcinomas and lymphomas also should be considered in the differential diagnosis of gastric GISTs. Although gastric carcinomas and lymphomas commonly have associated regional lymphadenopathy, lymphadenopathy is not a feature of malignant GISTs. The differential diagnosis for GIST in the small intestine includes adenocarcinoma and lymphoma. The presence of associated lymphadenopathy is the most important clue for the diagnosis of lymphoma. Although anorectal and colonic GISTs are rare, the differential diagnoses of these tumours are similar to those of gastric and small bowel GISTs. The most important complications of GIST are haemorrhage and spontaneous rupture into the peritoneal or endoluminal cavities caused by emergent laparotomies [4].

It is now well known that imatinib, a new molecularly targeted tyrosine kinase receptor blocker, results in a dramatic response and markedly improved long-term survival in patients with GISTs. The increasing recognition of GISTS and the prolonged survival have made imaging increasingly important not only for diagnosis but also for monitoring the effects of treatment and detecting tumour progression [16].

In conclusion, the stomach was the commonest site of GIST tumour location among our patients, with a mean tumour diameter of 7.9 cm. The CT features of GISTs included well-defined tumour margins and predominantly heterogeneous contrast enhancement, with internal necrosis and CT Hounsfield units of 35 to 55. In addition, metastasis was not related to the degree of lymph node involvement or tumour number in our study.

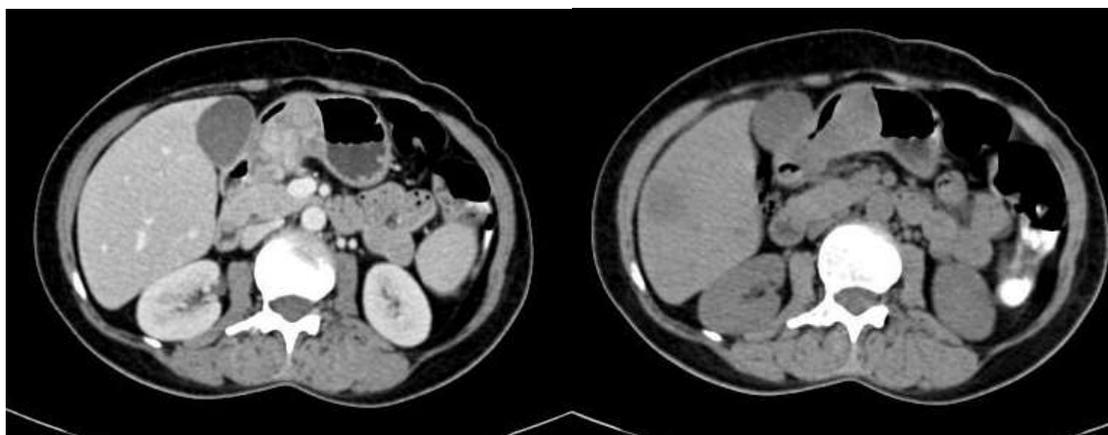
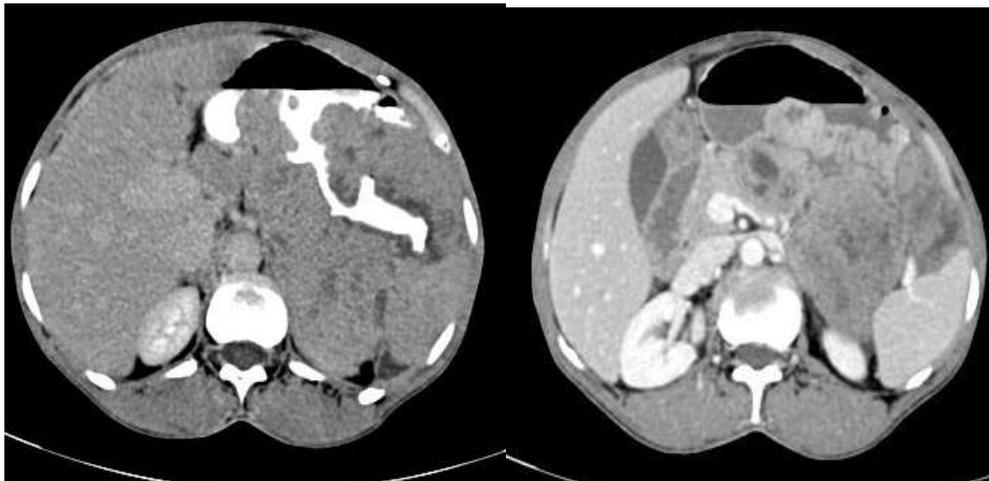
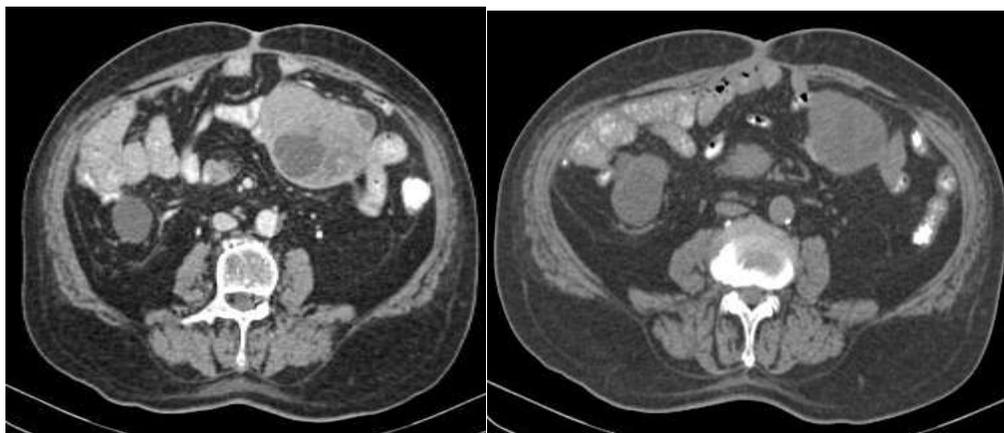


Image 1

Pre and post contrast axial images of stomach shows entophytic mass lesion which shows heterogeneous enhancement and internal necrotic areas.

**Image 2:**

Pre and post contrast axial images of stomach shows exophytic mass lesion which shows heterogeneous enhancement and internal necrotic areas

**Image 3**

Pre and post contrast images of small bowel (jejunum) shows exophytic growth which shows moderate enhancement on post contrast study.

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