

Contrast-Enhanced CT Evaluation of Metastatic Gastric Gastrointestinal Stromal Tumour Presenting with Upper Gastrointestinal Bleeding: A Case Report

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Abstract

Gastrointestinal stromal tumours (GISTs) are the most frequent type of mesenchymal neoplasm involving the digestive system. GISTs occur commonly in the stomach and display exophytic growth patterns. GISTs account for 1-2% of all gastrointestinal malignancies. GISTs carry activating mutations of the KIT gene or platelet-derived growth factor receptor alpha (PDGFRA). The patients with GISTs exhibit nonspecific symptoms like abdominal pain, dyspepsia, or weight loss. Upper gastrointestinal bleed is seen in higher-grade GISTs. We present a case of a metastatic gastric GIST presenting with hematemesis, melena, and weight loss. CECT revealed a large exophytic gastric tumour with heterogeneous enhancement and central necrosis, with hypodense hepatic lesions with peripheral enhancement. Histopathological examination revealed a tumour with spindle cells with necrosis and mitotic activity. Immunohistochemistry revealed positivity for CD117 (KIT), DOG1, and CD34, and negativity for S-100 and SMA markers. The imaging appearances, minimal lymphadenopathy, and presence of liver metastases highlight the typical radiological presentation of gastric GIST in its advanced stage. In the current patient, the significance of CECT imaging in the diagnosis and characterisation of GIST is clearly highlighted. Recognition of radiological signs is critical in the management of this disease, where surgery is required if the lesion is localised, while tyrosine kinase inhibitors are indicated for metastatic/inoperable disease.

Keywords:

Contrast-Enhanced CT, Gastric GIST, Upper Gastrointestinal Bleeding, Hepatic Metastases, Exophytic Gastric Mass, Necrosis and Cystic Degeneration, Radiologic-Pathologic Correlation, Immunohistochemistry CD117 DOG1 CD34, Tyrosine Kinase Inhibitors, Metastatic Gastrointestinal Stromal Tumour

How to cite this article: Kachewar S, Khushi, Raman D.P Contrast-Enhanced CT Evaluation of Metastatic Gastric Gastrointestinal Stromal Tumour Presenting with Upper Gastrointestinal Bleeding: A Case Report. Int J Drug Deliv Technol. 2026;16(64s):1330-1335. DOI: 10.25258/ijddt.16.64s.140

Introduction

Gastrointestinal stromal tumours (GISTs) are the most frequent mesenchymal neoplasms of the gastrointestinal tract and originate from the interstitial cells of Cajal, which are the pacemaker cells in the gastrointestinal tract that control gut motility. They make up about 1-2% of all gastrointestinal malignancies, with the stomach being the most common site of origin in almost 60% of cases. Gastric GISTs can have vague clinical presentations, such as abdominal pain, dyspepsia, or weight loss, but can also have acute presentations, such as upper gastrointestinal bleeding, hematemesis, and melena; these may be an indicator of advanced disease. GISTs have a natural history of exophytic growth, variable enhancement and cystic necrosis and degeneration of larger GISTs. The spread of gastric adenocarcinoma is often to the liver and peritoneum, but the involvement of lymph nodes is rare, unlike other tumour types.

Contrast-enhanced computed tomography (CECT) is still the main modality used in the detection, characterisation, and staging of GISTs. CT is important in terms of tumour size, morphology, pattern of tumour enhancement, and metastatic burden. In this case, axial computed tomography (CT) scans revealed a large, exophytic gastric mass with irregularity of enhancement and necrosis in the centre, which is typical of the aggressive biological behaviour of advanced GIST. Multiple hypodense liver lesions with peripheral enhancement detected by MRI suggested metastatic dissemination, which is indicative of poor prognosis. The lack of any significant lymphadenopathy also favours the diagnosis of GIST and not adenocarcinoma. Diagnostic correlation with radiology is necessary; histopathology will usually show spindle cell morphology with fascicular arrangement, and immunohistochemistry will confirm the diagnosis by the detection of CD117 (KIT), DOG1, and CD34.

In the therapeutic context, it is clear that surgery is the primary treatment for a limited disease, while the treatment of metastatic or unresectable tumours is based on the use of tyrosine kinase inhibitors like imatinib for the treatment of mutations of KIT and PDGFRA. Hence, CECT helps with the initial diagnosis and plays a key role in the treatment planning, treatment monitoring and differentiation of GIST from other gastric malignancies. The case highlights the value of CT in making a diagnosis of metastatic gastric GIST that may present as UGIB, demonstrating its diagnostic accuracy and clinical significance.

Literature Review

Gastrointestinal stromal tumours (GISTs) are the most frequent mesenchymal tumours of the digestive system, occurring most commonly in the stomach,

affecting almost 60% of patients. They are located in the interstitial cells of Cajal and are driven by mutations that promote their oncogenic potential, namely KIT and PDGFRA (Nishida *et al.* 2024). In a clinical sense, GISTs are often associated with vague symptoms like abdominal pain, dyspepsia or weight loss, although larger or high-grade tumours may present acutely as bleeding from the upper gastrointestinal tract, either as hematemesis or melena, which correlates with the seriousness of their biological activity. In terms of radiology, contrast-enhanced computed tomography (CECT) is still the most important method for detection, characterisation, and staging. Imaging findings include exophytic growth, heterogeneous enhancement, necrosis, cystic degeneration and metastases, which are most frequently seen in the liver and peritoneum, and the lymph nodes are infrequently affected compared to other gastric malignancies. In the advanced disease, hypodense liver lesions with peripheral enhancement in CECT are highly suggestive of metastases. There must be a histopathological correlation, and classic features are spindle cell morphology and fascicular arrangement (Kumari & Kumar, 2025). GISTs can be differentiated from other mesenchymal tumours by positivity for CD117 (KIT), DOG1 and CD34 with negativity of SMA and S-100 using immunohistochemistry (Rasheed *et al.* 2023). Molecularly targeted therapy with TKIs like imatinib is the current standard of care for metastatic or inoperable disease, while surgery is the most important treatment option for localised disease, where the underlying KIT and PDGFRA mutations may be targeted. This case highlights the excellent diagnostic accuracy of CECT for the diagnosis of metastatic gastric GIST with upper gastrointestinal bleeding and stresses the need for correlation between radiology and pathology in the management of the patient. These imaging and pathological characteristics are essential to timely intervention, prognosis and differential diagnosis from other gastric malignancies, and highlight the importance of the CECT for the clinical management of GIST.

Material and Methods

A middle-aged man with 5 years history of type 2 diabetes mellitus (T2DM) presented with abdominal pain, regurgitation, nausea and upper gastrointestinal bleeding. A contrast-enhanced computed tomography (CECT) of the abdomen and pelvis was ordered in view of clinical suspicion of gastric disease. In view of clinical suspicion of gastric disease, contrast-enhanced computed tomography (CECT) of the abdomen and pelvis was ordered. Imaging procedures in both axial and coronal planes after intravenous contrast administration. The CT showed a large, well-defined exophytic gastric mass with heterogeneous

enhancement and central necrosis, but without direct invasion, indicating mass effect. Multiple hypodense hepatic lesions with peripheral enhancement were found, which is typical of metastasis. There was no significant lymphadenopathy nor any ascites. The gastric lesion was an endoscopically obtained biopsy specimen. Histopathological examination revealed spindle-cell morphology with fascicular arrangements, necrosis and mitoses. CD117 (KIT), DOG1 and CD34 were intensely positive while S-100 and SMA were negative, using standard immunohistochemistry procedures. Radiologic-pathologic correlation confirmed the diagnosis of metastatic gastric GIST.

Results

Epidemiology and Pathogenesis

Gastrointestinal stromal tumours (GISTs) are the most frequent mesenchymal tumour of the gastrointestinal tract and represent 1–2% of gastrointestinal malignancies. They arise from the interstitial cells of Cajal that control gut motility, and are caused by activating mutations in the KIT or PDGFRA genes. The stomach is the most common site (~60%) of involvement, with the small intestine also being a common site. In the clinical setting, GISTs can be asymptomatic or have vague symptoms like abdominal pain, dyspepsia or weight loss; however, when the GIST is large, the onset of symptoms may be abrupt and include acute complications such as upper gastrointestinal bleeding. This case is consistent with this epidemiological profile: middle-aged patient, abdominal pain, hematemesis, melena, and significant weight loss. Diabetes mellitus, as a comorbidity, complicates treatment, but not its basic pathogenesis (Cáceres *et al.* 2022). This case reiterates the published literature supporting the fact that GISTs are genetically initiated, biologically aggressive, and often diagnosed late because of their nonspecific early clinical symptoms.

Radiological Characteristics

Detection and staging of GISTs is the most reliable with contrast-enhanced computed tomography (CECT) scan. Common characteristics include a large exophytic gastric mass, variable enhancement and necrosis or cystic degeneration at the centre. Here, CECT showed a well-delineated exophytic lesion originating from the gastric wall, which was heterogeneous, with areas of necrosis. Exophytic growth is characterised by the gastric mucosa that is stretched over the lesion. Metastatic spread was confirmed by multiple hypodense hepatic lesions with peripheral enhancing, importantly. The lack of significant lymphadenopathy helps to differentiate GIST from gastric adenocarcinoma, which is often associated with nodes. The importance of radiological

recognition of these features is emphasised in the literature for diagnosis, staging and planning treatment (Wang *et al.* 2023). This case serves as an example of how accurate CECT is in the diagnosis of advanced GIST and the metastatic burden.

Histopathology and Immunohistochemistry

Histopathologic examination is still a critical step in achieving a definitive diagnosis. In this case, the biopsy showed a spindle cell neoplasm with elongated nuclei, eosinophilic cytoplasm with mild atypia, and arranged in fascicles. Necrosis and mitoses indicated aggressive biological features. Immunohistochemistry (IHC) was positive for CD117 (KIT) and DOG1 and negative for S100 and SMA. This is a very unique immunoprofile for GIST, and it helps separate GISTs from other mesenchymal tumours like leiomyomas or schwannomas. Several publications confirm that CD117 positivity is the best, and the presence of DOG1 is more specific (Ben Ismail *et al.* 2026). The case illustrates the critical need for the use of IHC in the diagnosis and to direct specific therapy, particularly in the metastatic setting, where molecular profiling directs therapy with tyrosine kinase inhibitors.

Patterns of Metastasis

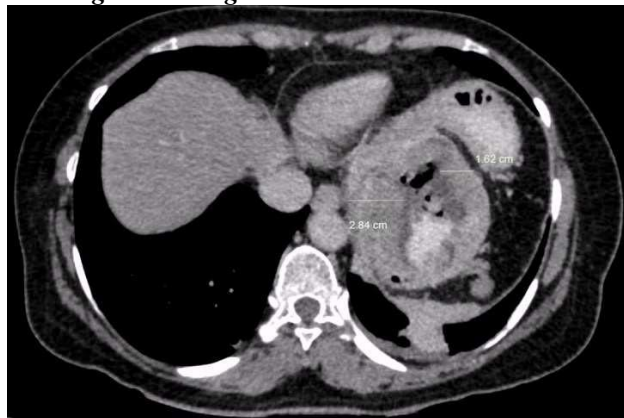
Liver and peritoneum are the common sites of metastatic spread; lymph node involvement is uncommon in GISTs. In that instance, several liver lesions with rim enhancement were found, which is a typical appearance for metastases. However, the lack of lymph node involvement further favours the diagnosis of GIST as opposed to adenocarcinoma. On CECT, metastases to the liver are frequently hypodense and have the peripheral enhancement as seen here, as emphasised in the literature. Prognostically, liver involvement is considered an advanced disease and poor prognosis; systemic therapy is indicated. This case highlights the significance of recognising how things metastasise, as it will impact treatment decisions. The results are consistent with known knowledge that advanced GIST is characterised by hepatic metastases, which are important for staging and prognosis (Hui & Sum, 2022).

Therapeutic Implications

Treatment of GISTs is determined by stage and resectability. Localised disease should be treated with surgical resection, and tyrosine kinase inhibitors (TKIs) are recommended for metastatic or unresectable disease. In this instance, the presence of hepatic metastases will not allow for curative surgery, and systemic therapy will be the primary treatment. There are reports in the literature of the effectiveness of imatinib for the treatment of GIST with KIT or PDGFRA mutations in advanced disease. Another

important role of radiology is to track how the treatment is working; sometimes, TKIs cause a decrease in density, not size, of the tumour. This case serves as a reminder of the paradigm shift in the treatment of GIST: from surgery alone to a combined molecular targeted therapy (Joensuu *et al.* 2023). Hence, the timely initiation of TKIs is instrumental for the control of the disease in metastatic gastric GIST, the hallmark of which is radiologically and pathologically recognised.

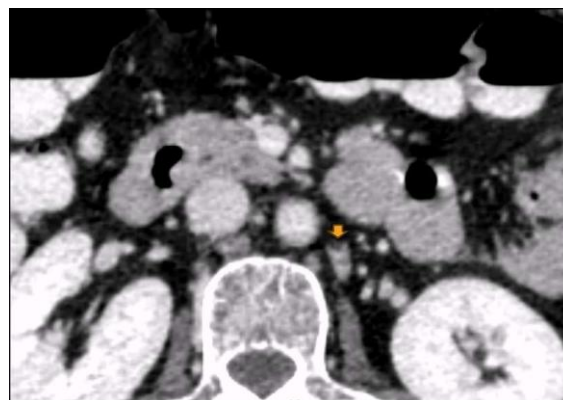
Radiological Findings



Axial CT showing heterogeneous enhancement of a mass lesion in the wall of the stomach with dimensions 2.84 cm and 1.62 cm. The growth pattern and presence of low attenuation in the lesion suggest necrosis and cystic changes.



This image shows the stomach region with an arrow indicating the site of the lesion. The lesion is seen having an exophytic growth pattern in the surrounding gastric wall tissues, typical of advanced GIST. The image shows how localization of a lesion is done by the radiologists on imaging studies.



CT scan shows hypodense lesions in the liver as marked by the arrow. Lesions showing peripheral enhancement signify that the metastasis is secondary to the GIST of the stomach.



Coronal section CT scan helps us get an idea about the anatomical locations where we can see the stomach, liver, spleen, and kidneys. Exophytic mass lesions in the stomach and hepatic lesions can be visualised in correlation with other structures.

Discussion

The case presented here highlights how important a clinical history, radiological workup and histopathological diagnosis are in making a definite diagnosis in the setting of a gastrointestinal stromal tumour (GIST) of the stomach. GISTs are a very small proportion of gastrointestinal cancers (1-2%), but their biology is aggressive, and they are often diagnosed late. The patient's abdominal pain, hematemesis, melena and weight loss are indicative of advanced disease; this is similar to literature correlations of upper gastrointestinal bleeding with high-grade tumours (Cananzi *et al.* 2022). In contrast-enhanced computed tomography, the gastric mass in GIST is

large, exophytic, and characterised by heterogeneous enhancement, central necrosis and hepatic metastases, which are pathognomonic features of advanced GIST as opposed to adenocarcinoma, for which lymphadenopathy is more common. In this case, the lack of involvement of the nodes reinforces the diagnosis. Histopathology showed spindle-cell morphology as well as necrosis and mitotic activity, and immunohistochemistry showed positivity for CD117, DOG1 and CD34, consistent with the diagnostic criteria. Importantly, the point of this case is that clinical clues alone will lead to a diagnosis only after complications occur, as the symptoms will be non-specific. The radiologic-pathologic correlation was essential in excluding the differential diagnosis and directing the management. Prospectively, the presence of hepatic metastasis excludes curative surgery and systemic therapy with tyrosine kinase inhibitors (TKIs), including imatinib, which targets KIT/PDGFR mutations (Ou *et al.* 2024). The case teaches about the paradigm shift in the management of GIST, from purely surgical to molecularly targeted therapy and the importance of recognising the radiological hallmarks early in order to achieve optimum outcomes. In summary, the case illustrates the role of CECT, not just from a diagnostic standpoint, but also in the staging, prognosis and treatment planning for metastatic gastric GIST.

Conclusion

Given its vague early symptoms and aggressive course, the diagnosis and treatment of metastatic gastric GIST is still a challenge. The use of contrast-enhanced CT in the diagnosis of typical features of an exophytic growth, heterogeneous enhancement, necrosis and hepatic metastases is shown and will be contrasted with the value of histopathology and immunohistochemistry for definitive diagnosis. The lack of any lymphadenopathy helps to distinguish GIST from adenocarcinoma and is an excellent reason to do radiologic-pathologic correlation. Systemic therapy with TKIs is the main treatment for metastatic disease, and the need for a combination of imaging, pathology, and molecular profiling for best patient care has been emphasised.

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