Author's response to reviews

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Primary extra-gastrointestinal stromal tumour of the whole abdominal cavity, omentum, peritoneum and mesentery: A rare case report and limited review of the literature.

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Abstract:

Introduction: The Gastro-intestinal Stromal Tumour (GIST) is one of the common mesenchymal tumours of Gastro-intestinal tract (GIT). It originates from the interstitial cell of Cajal, when it presents out site GIT it called extra gastrointestinal stromal tumours (EGIST), it has the same morphological and immunohistochemical characteristics. Here we describes an unusual case of EGIST presented with gooseberry-like multiple nodules of the whole abdominal cavity.

Case presentation: A 65-year-old Sudanese male presented with vague abdominal pain and progressive abdominal distension for six months. The pain was associated with mild loss of weight despite good appetite. Physical examination revealed distended abdomen with multiple firm nodules involving the whole abdomen. Hematological tests were within normal range. Ultrasound of the abdomen showed multiple nodules of varying sizes in the peritoneal cavity. CT Scan of the abdomen showed numerous nodules of different sizes (1-3 cm in
diameter) filling the whole peritoneal cavity with intense peripheral enhancement. Ultrasound-guided biopsy was not informative. Upper and lower gastrointestinal endoscopies were normal. Exploration of the abdomen revealed multiple firm gooseberry-like nodules of different sizes involving the greater omentum, peritoneal cavity and the mesentery. The liver, spleen and pancreas were normal. The result of the histopathology was conclusive of GIST.

**Conclusion:** Here we presented rare case of EGIST presented with vague abdominal pain and progressive abdominal distension. Laparotomy showed gooseberry-like multiple nodules of different sizes involving the whole abdominal cavity. The patient underwent debulking surgery and received imatinib.

**Keywords:** GIST, EGIST, extra-gastrointestinal stromal tumour, abdominal mass, nodules.

**Introduction:**
Gastrointestinal stromal tumours (GISTs) comprise 1-3% of all gastrointestinal malignancies. They are typically defined as tumours whose behaviour are driven by mutations in the Kit gene or PDGFRA gene, and may or may not stain positively for Kit gene. Due to presence of tyrosine kinase receptors within the tumour tissue, GIST is thought to originate from gastrointestinal pacemaker cells, the interstitial cells of Cajal (ICC). Sometime tumours with the same morphological and
immunohistochemical characteristics are detected outside the alimentary canal, hence called extra-gastrointestinal stromal tumours (EGIST). The biological behaviour of these tumours is uncertain and the malignancy rates are difficult to predict\(^2\). Here we present an unusual case of EGIST that presented with multiple gooseberry-like nodules involving the whole abdominal cavity; the omentum, peritoneum and small bowel mesentery that make it difficult to get radical resection.

**Case presentation:**

A 65-year-old Sudanese male, who was previously well, presented with vague central abdominal pain. The pain was increasing gradually. It was constant, associated with progressive abdominal distension for the six months and mild loss of weight despite good appetite. Physical examination revealed distended abdomen with multiple firm nodules in the abdomen. Liver and spleen were not palpable. Haematological tests were within normal range, ultrasound of the abdomen reported multiple nodules of varying sizes in the peritoneal cavity. CT scan of the abdomen showed numerous nodules of different sizes, 1-3 cm in diameter each, filling the peritoneal cavity and the surrounding bowel loops with intense peripheral enhancement. Ultrasound guided biopsy was not conclusive. Gastroscopy and colonoscopy showed normal stomach and colon. Exploration revealed multiple firm gooseberry-like nodules of different sizes ranging between 1-5 cm in diameter, involving
the greater omentum, peritoneal cavity, the mesentery, but liver texture was normal. The main bulk of the tumour was excised together with the greater omentum and part of the mesentery, however, residual tumour remained stuck to the small bowel and great vessels. The postoperative period was uneventful, and discharged five days later. Histopathology reported presence of sheets of cellular tumour composed of spindle cells infiltrating smooth muscle fibres, with positive CD117 stain. Hence the diagnosis of GIST was made. The patient was then referred to oncologist and received imitanib.

**Discussion:**

GISTs are uncommon tumours of the GIT. They originates from ICC in the stomach, but it can be anywhere along the GIT. Rarely, GISTs occur outside the alimentary canal, hence, called extra gastrointestinal stromal tumour (EGIST). Behaviour of GISTs range from benign to cancerous. Bülbül Doğusoy studied 1160 cases of GISTs. He reported a male to female ratio of 1.22 and the mean age of 56.75 years. He found the stomach to be the most common location (45.0%), followed by the small intestine (32.0%), omentum-peritoneum (12.6%), large intestine (9.3%), and oesophagus (1.1%).\(^3\) Miettinen et al. analyzed 95 patients of GISTs designated as the omental masses in 49 males and 46 females, with a median age of 60(range: 27 to 88) years. This tumour was found as a single in 51, and multiple masses in 39 patients. He added that omental
GISTs unattached to alimentary canal often resemble gastric GISTs and multiple omental GISTs often resemble small intestinal GISTs suggesting that they may be metastatic. John R. Goldblum et al reported that the majority of EGISTs are large i.e. >10 cm in diameter when first detected, but small (and presumably early) EGISTs are rarely encountered because they seldom produce symptoms. Two of their four cases were smaller than 5 cm and detected during workup for unrelated. Genetically, EGIST expressed CD117 (c-kit receptor) (100%), CD34 (50%), neuronspecific enolase (44%), smooth muscle actin (26%), desmin (4%), and S-100 protein (4%). The clinical, pathological and prognostic features of GISTs are widely known, while data about EGISTs are very few and the incidence, histogenesis and histological predictors of outcome are not yet defined. There were many studies done to identify the origin of the EGIST, Miettinen and Lasota reported that omental and mesenteric EGISTs are derived from stomach and small intestine respectively, representing tumours that, for some reason, have detached from their gastrointestinal original site during their development. On the other hand, Reith et al reported that extra gastrointestinal soft tissue stromal tumours are histologically and immunophenotypically similar to their gastrointestinal counterpart, but EGIST have aggressive course more akin to small intestinal than gastric stromal tumors. There are many questions about the association
between GIST and EGIST. AbdullGaffar and Badr showed that the association between non-incidental GISTs and the extra-GIT tumors is difficult to determine and in the majority of cases. This association is most likely a coincidental finding. AbdullGaffar and Badr reported case series of possible association of GISTs with extra-GIT tumors in female patients and like other studies, they suggested that patients—especially women—with GISTs should be investigated and followed up for the possibility of coexisting GIT and extra-GIT neoplasms.10

Regarding the prognosis in relation to the site of origin, a study of more than 1000 GIST cases subdivided into five locations (oesophagus, stomach, small and large bowels, versus peritoneum, mesentery, and omentum). The tumour site had an independent prognostic factor. Oesophageal tumours had the most favourable prognosis, while peritoneal tumours had the lowest survival rate.11 This seems to be due to the early diagnosis of oesophageal GISTs related to the early appearance of symptom. In contrast, in the other sites specially the abdominal cavity patient had slow onset of disease and symptoms remain vague until it become large in size.

Despite significant advances in new chemotherapeutic drugs, radical surgery remains the only method for long-term survival. Although further data are required to evaluate its use in the adjuvant and neoadjuvant settings, imatinib mesylate currently provides the most
effective treatment option in the management of advanced cases. In our case R0 remains a dilemma because it was extremely difficult to remove the whole nodules and the only option that remained was imatinib.

**Conclusion:**

Our case was rare case of EGIST in a male who presented with vague abdominal pain and progressive abdominal distension. Exploration revealed multiple gooseberry-like nodules of different sizes that involved the whole abdominal cavity. Radical excision was not possible. On histopathology the tumour had positive CD117, the patient underwent debulking surgery and received imatinib.

**List of abbreviations**

GIT: gastrointestinal tract  
GIST: gastrointestinal stromal tumour  
EGIST: extra-gastrointestinal stromal tumour  
ICC: interstitial cells of Cajal

**Consent**

Written informed consent was obtained from the patient for publication of his case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

**Competing interests**

The authors declare that they have no competing interests.
Authors' contributions

Abdulmunem A. Abdo AA, and Hiba Hassan HH admitted the patient and requested the relative investigations. Abdulmagid M Musaad AM, Elsaggad Eltayeb A EE, Nasreeldeen Adam NE, and M Abdelazeem MA performed the surgery and the postoperative follow up. Ahmed M Elhassan AE processed the histopathology and its report. Nassir Alhaboob Arabi NA wrote the manuscript. Mohamed. A. Ibnouf MI participated in its design and coordination and helped to draft the manuscript and reviewed the paper for English editing. All authors read and approved the final manuscript.

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