Author's response to reviews

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

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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 articles literature.

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Abstract:

Introduction: The Gastro-intestinal Stromal Tumour (GIST) is one of the common mesenchymal tumours of the Gastro-intestinal Tract (GIT). It originates from the interstitial cell of Cajal, when it presents out of the GIT, it is called extra gastrointestinal stromal tumours (EGIST), and it has the same morphological and immunohistochemical characteristics. Here we present a 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 the last six months. The pain was associated with mild loss of weight despite good appetite. An physical examination revealed distended abdomen with multiple firm nodules involving the whole abdomen.
Introduction:

organomegally or lymphadenopathy. 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) studding filling the whole peritoneal cavity and the surrounding bowel loops 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 size involving the greater omentum, peritoneal cavity and the mesentery. but normalThe liver, spleen and pancreas were normal texture. The result of the histopathology was conclusive of GIST.

Conclusion: Here we presented An unusual rare case of a male EGIST presented with vague abdominal pain and progressive abdominal distension. Laparotomy showed gooseberry-like multiple nodules of different size involving the whole abdominal cavity and histopathology result was GIST. The patient underwent debulking surgery and received imatinib.

Keywords: GIST, EGIST, extra-gastrointestinal stromal tumour, abdominal mass, nodules.
Gastrointestinal stromal tumours (GISTs) are one of the most common mesenchymal tumors of the gastrointestinal tract (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). Sometimes tumours with the same morphological and immunohistochemical characteristics are detected outside the gastrointestinal tract–alimentary canal, hence called extra-gastrointestinal stromal tumours (EGIST). The biological characteristics behaviour of these tumours is uncertain and the malignancy rates are difficult to predict. 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 and it shows how make it difficult to get R0-radical resection in such condition.

Case presentation:

A 65-year-old Sudanese male, who was previously well, presented with vague central abdominal pain. The pain mainly central, it was increasing in intensity gradually. It was constant, not shifted or radiated.
and it associated with progressive abdominal distension for the last six months and mild loss of weight despite good appetite. **Physical examination revealed distended abdomen with multiple firm nodules involving the whole in the abdomen, no organomegaly or lymphadenopathy.** Liver and spleen were not palpable. Haematological tests were within normal range. **U/S ultrasound** of the abdomen reported multiple nodules of varying size in the peritoneal cavity. **CT scan of the abdomen** showed numerous nodules of different sizes, 1-3 cm in diameter. Each studding-filling the peritoneal cavity and the surrounding bowel loops with intense peripheral enhancement. **U/S ultrasound** guided biopsy was not informative/conclusive.

Gastroscopy and colonoscopy, upper and lower endoscopies showed normal stomach and colon, were normal. Exploration of the abdomen revealed multiple firm gooseberry-like nodules of different sizes ranging between 1-5 cm in diameter, involving the greater omentum, peritoneal cavity, and the mesentery, but normal 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 greater vessels, removed but it was extremely difficult to remove the whole nodules (unresectable). The patient recovered postoperatively period was uneventful, well and discharged after five days later. The result of histopathology showed...
reported presence of sheets of cellular tumour composed of spindle cells
infiltrating smooth muscle fibres, with and positive
immunohistochemistry 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 GI tract. They originate from ICC and more commonly in the stomach, but it can be anywhere along the GI tract. A small number of Rarely, GISTs found occur outside the GI tract alimentary canal, hence, and called extra gastrointestinal stromal tissue tumour (EGIST). Behaviour of GISTs can be range from cancerous or benign to cancerous. The distribution of GISTs in the body are variable, Bülbül Doğusoy was studied 1160 cases from all gastrointestinal stromal tumours in the database of GISTs, and he found reported that a male to female ratio of 1.22 and the mean age of 56.75 years, he concluded that the stomach to be the most common location was the stomach (45.0%), followed by the small intestine (32.0%), omentum-peritoneum (12.6%), large intestine (9.3%), and oesophagus (1.1%). Miettinen et al. were analyzed 95 patients of GISTs surgically designated as the omental masses and revealed that these tumors occurred in 49 males and 46 females, with a median age of 60 years (range: 27 to 88) years. This tumour formed was found as a single (n = 51, and) or multiple masses in (n = 39 patients); 5 cases
were equivocal in this respect. Hand he added that omental GISTs unattached to gastrointestinal tract-alimentary canal often resemble gastric GISTs and suggesting that they may be gastric GISTs directly extending or parasitically attached into the omentum, whereas multiple omental GISTs more often resemble small intestinal GISTs suggesting that they may be metastatic or detached from this source. Macrosopically, John R. Goldblum et al in their studies showed reported that the majority (three quarters) of EGISTs are large i.e. (>10 cm in diameter) when first detected, while but small (and presumably early) EGISTs are rarely encountered because they seldom produce symptoms that lead to detection. Two of his their four cases were smaller than 5 cm and detected during workup for unrelated conditions were it possible to obtain a large enough group of EGIST of small size. Genetically, Extra-intestinal EGIST expressed CD117 (c-kit receptor) (100%), CD34 (50%), neuron-specific enolase (44%), smooth muscle actin (26%), desmin (4%), and S-100 protein (4%). and on histology although EGISTs arise outside the gastrointestinal tract but they share histological features with their gastrointestinal counterpart. 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 were reported that extra gastrointestinal soft tissue stromal tumours are histologically and immunophenotypically similar to their gastrointestinal counterpart, but EGIST have an aggressive course more akin to small intestinal than gastric stromal tumors. There are many questions about the association between GIST and EGIST. AbdullGaffar & 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. Synchronous occurrence with certain tumors, however, may suggest a non-random causal association; in addition to, AbdullGaffar & Badr were reported a case series study 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 clinically investigated and followed up for the possibility of coexisting GIT and extra-GIT neoplasms.

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, colorectum and peritoneum).
The tumour site seemed had an independent prognostic factor. Esophageal GISTs presented had the most favourable prognosis, while peritoneal tumours had the lowest survival rate. This seems to be due to an early diagnosis of esophageal GISTs because patient develops related to the early appearance of symptom. Early, while in contrast, in the other sites, especially in the abdominal cavity usually patient had slow-growing onset of disease and its symptoms remain vague until it become large in size.

Despite significant advances in new chemotherapeutic drugs, radical surgery remains the only method offering a chance 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 is that remained was imatinib.

**Conclusion:**

Our case was an unusual rare case of a EGIST in a male who presented with vague abdominal pain and progressive abdominal distension. On laparotomy we found Exploration revealed multiple grooseberry-like nodules of different sizes grooseberry-like that
appearance involving the whole abdominal cavity, and it was impossible to get R-0. Radical excision was not possible, the histopathology showed the tumour had positive CD117.

The patient underwent debulking surgery and received imatinib.

List of abbreviations

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

Consent

Written informed consent was obtained from the patient for publication of this 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, and Hiba Hassan were diagnosed admit the patient clinically and requested the relative investigations. Abdulmagid M Musaad, Elsaggad Eltayeb A, Nasreeldeen Adam, and Abdelazeem were operated on performed the surgery and the postoperative follow up.
A. Ahmed M Elhassan carried out processed the histopathology and its report. Nassir Alhaboob Arabi wrote the manuscript. Mohamed A. Ibnouf reviewed the paper for and English editing.

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