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 review of the articles.

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Abstract

Introduction: GIST is one of the common mesenchymal tumors of GI Tract, it originates from interstitial cell of Cajal, when it presents out site GI tract it called extra gastrointestinal stromal tumors (EGIST) and it has the same morphological and immunohistochemical characteristics feature. We present 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 the last six months, it associated with mild loss of weight despite good appetite. An examination revealed distended abdomen with multiple firm nodules involving the whole abdomen, there were no organomegally or lymphadenopathy. Hematological test was normal, U/S of the abdomen showed multiple nodules of varying size in the peritoneal cavity, CT abdomen showed numerous nodules of different sizes (1-3 cm in diameter) studding peritoneal cavity & the surrounding bowel loops with intense peripheral enhancement. U/S guided biopsy was not informative. Upper and lower 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 normal liver texture. The result of the histopathology was conclusive of GIST.

Conclusion: An unusual case of a male 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.

Introduction:

Gastrointestinal stromal tumors (GISTs) are one of the most common mesenchymal tumors of the gastrointestinal tract (1-3% of all gastrointestinal malignancies). They are typically defined as tumors whose behaviour are driven by mutations in the Kit gene or PDGFRA gene, and may or may not stain positively for Kit\(^1\). Due to presence of tyrosine kinase receptors within the tumor tissue, GIST is thought to originate from gastrointestinal pacemaker cells, the interstitial cells of Cajal (ICC), but sometimes tumors with the same morphological and immunohistochemical characteristics are detected outside the gastrointestinal tract and called extra-gastrointestinal stromal tumors (EGIST). Biological characteristics of these tumors are uncertain and the malignancy rates are difficult to predict\(^2\). 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, and it shows how difficult to get R0 in such condition.

Case presentation:

A 65-year-old Sudanese male, who was previously well, presented with vague abdominal pain mainly central, it was increasing in intensity, not shifted or radiated and it associated with progressive abdominal distension for the last six months and mild loss of weight despite good appetite. An examination revealed distended abdomen with multiple firm nodules involving the whole abdomen, no organomegaly or lymphadenopathy. Hematological test was normal, U/S of the abdomen showed multiple nodules of varying size in the peritoneal cavity, CT abdomen showed numerous nodules of different sizes 1-3 cm in diameter studding the peritoneal cavity & the surrounding bowel loops with intense peripheral enhancement. U/S guided biopsy was not informative, upper and lower endoscopies were normal. Exploration of the abdomen revealed multiple firm gooseberry-like nodules of different size range between 1-5 cm, it involved the greater omentum, peritoneal cavity and the mesentery, but normal liver texture. The greater omentum and part of the mesentery were removed but it was extremely difficult to remove the whole nodules (unresectable). The patient recovered well and discharged after five days. The result of histopathology showed sheets of cellular tumor composed of spindle cells infiltrating smooth muscle fibers and positive immunohistochemistry CD117. The patient referred to oncologist and received imitanib.

Discussion:

GISTs are uncommon tumors of the GI tract, it originates from ICC and more commonly in the stomach, but it can be anywhere along the GI tract. A small number of GISTs found outside the GI tract and called extra gastrointestinal stromal tissue tumor (EGIST). GISTs can be cancerous or benign. The distribution of GISTs in the body are variable, Bülbül Doğusoy was studied 1160 cases from all gastrointestinal stromal tumors in the database and he found that a male to female ratio of 1.22 and the mean age of 56.75 years, he concluded that 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 esophagus (1.1%). \(^3\) 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 y). This tumor formed single (n=51) or multiple masses (n=39); 5 cases were equivocal in this respect, and he added that omental GISTs unattached to gastrointestinal tract often resemble gastric GISTs 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. Macroscopically, John R. Goldblum et al in their studies showed that the majority (three quarters) of EGISTs are large (>10 cm) when first detected while small (and presumably early) EGISTs are rarely encountered because they seldom produce symptoms that lead to detection. Two of his 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 GIST expressed CD117 (c-kit receptor) (100%), CD34 (50%), neuron-specific enolase (44%), smooth muscle actin (26%), desmin (4%), and S-100 protein (4%). On the other hand, Reith et al were reported that extra gastrointestinal soft tissue stromal tumors are histologically and immunophenotypically similar to their gastrointestinal counterpart and 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 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 (esophagus, stomach, small bowel, colorectum and peritoneum/mesentery/omentum), the tumor site seemed an independent prognostic factor. Esophageal tumors presented the most favorable prognosis, while peritoneal tumors had the lowest survival rate, and it seems to be due to an early diagnosis of esophageal GIST because patient develops symptom early, while in the other site especially in the abdominal cavity usually patient had slow growing onset of disease and it is 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 is extremely difficult to remove the whole nodules and the only option is imatinib.

Conclusion:
An unusual case of a male presented with vague abdominal pain and progressive abdominal distension, on laparotomy we found multiple nodules of different size gooseberry-like appearance involving the whole abdominal cavity, and it was impossible to get R 0, the histopathology showed 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 the patient clinically.
Abdulmagid M Musaad, Elsaggad Eltayeb A, Nasreeldeen Adam, and M Abdelazeem were operated on.
A M Elhassan carried out the histopathology.
Nassir Alhaboob Arabi wrote the paper.

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