Ashraf ALakkad\textsuperscript{1}, Anwar Adwan\textsuperscript{2}, Fadi ALmahmeed\textsuperscript{3}, and Maher Fahd Hejazee\textsuperscript{3}

\textsuperscript{1}Affiliation not available
\textsuperscript{2}Department of Internal Medicine, Madinat Zayed Hospital
\textsuperscript{3}Department of General Surgery, Madinat Zayed Hospital

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Gastrointestinal Stromal Tumor (GIST): Case Study

Anwar Kamel Adwan #, Ashraf Alakkad *, Fadi Bassam Almahameed # and Maher Fahd Hejazee

* Department of Internal Medicine, Madinat Zayed Hospital, UAE.
# Department of General Surgery, Madinat Zayed Hospital, UAE.

ABSTRACT

A 38-year-old male presented with a complaint of upper GIT bleeding. The patient is an alcoholic and a smoker for the last 5 years. The patient had vomited blood for the last three days. Endoscopy, Biopsy, Esophagogastroduodenoscopy and CT scan of abdomen and pelvis with IV contrast were recommended. After initial examination and reports, the patient was diagnosed with Gastrointestinal Stromal Tumor. Gastrointestinal stromal tumor was found that was spindle cell type, unifocal and low grade with mitotic speed of 2-3 /5 mm2. The tumor originated in the gastric submucosa and spread to the pericolic fat omentum. The tumor was large, being 9.5 cm and 6.5 x 5.5 cm in greatest dimension measurements. The tumor measured more than 5 cm, but was less than 10 cm in diameter. The overlying gastric mucosa showed focal mild chronic inflammation. Heliobacter pylori and focal intestinal metaplasia was noted. As a treatment for gastrointestinal stromal tumor, surgery was recommended to remove the large exophytic gastric mass. After surgery, heterologous fragments were received. The mass of the tumor was 0.8 cm with a mitotic rate of 2-3 /5 mm2 per 10 high-power fields (HPF). The examination and diagnosis also included some special studies such as immunohistochemistry assay. However, no mutational analysis test was performed. Immunohistochemistry assay was positive for C-KIT (CD117), CD34 and DOG1.

Keywords: GIT bleeding; gastrointestinal stromal tumor; intestinal metaplasia; immunohistochemistry.
1. INTRODUCTION

Gastrointestinal stromal tumor (GIST) is the term applied to the group of morphologically spindle cells, [1] or mesenchymal tumors of the gastrointestinal tract and abdomen [2]. It was first introduced by Mazur and Clark [2]. These tumors are the result of a mutation of the gene encoding for type III receptor tyrosine kinase [3]. These tumors are KIT positive and the main reason for the GIST pathogenesis is the signal transduction of pathologically active kit. The activated kit leads to the cellular proliferations. GISTs tumors detected by immunohistochemistry uniformly express kit protein.

The KIT-positive Cajal cells and GIST shares a phenotypic similarity. On the basis of histological and immunohistochemical similarities the Gastrointestinal autonomic nerve tumors (GANTs) are called as ultrastructural variants of GIST [4].

Patients suffering from GIST usually present with symptoms like fatigue and dyspepsia. The upper gastrointestinal bleeding and has been reported in multiple cases. Aggressive types of GIST not only metastasize to the liver but also to the lung and bone in advanced cases [5].

GISTs tumors vary greatly in size ranging from 0.6 to 25.5cm. GISTs tumors median size is 6.8cm. Usually tumor size range from 5-10 cm. GISTs tumors having size larger than 5cm are included in large GIST group.

GIST can present in the soft tissues of the GI-tract from the lower esophagus to the anus. The most common site of occurrence of GIST is the far stomach and small intestine. The probability of GISTs in the esophagus and appendix is very low. Cases of hereditary GISTs are rare while sporadic GISTS are more common [6].

Though there are no specific symptoms for GISTs, but abdominal pain, nausea, vomiting, loss of weight or appetite and anemia are the most common presentations of GISTs. So it is not wrong to conclude that GISTs are diagnosed by incidental findings usually done for other examinations. Imaging studies are performed, if the GISTs are suspected. The probability of middle-aged people being affected by GIST is low in comparison to people of old age (60-70 years) [7].

In order to treat GIST with specific kit tyrosine kinase inhibitor imatinib, the identification of GIST site of occurrence is necessary [8].

2. CASE PRESENTATION

2.1 History and Initial Examination

A 38-year-old male presented with the complaint of upper GIT bleeding. The patient had a complaint of vomiting blood from the past three days. He was suffering from abdominal pain and Shortness of breath. The Hemoglobin units 8.7 g/dl. Ultrasound showed epigastric mass.

The patient is an alcoholic and a smoker for the last 5 years. Endoscopy, Biopsy, Esophagastroduodenoscopy and CT Abdomen/Pelvis with IV Contrast were recommended and reports showed the following results.

2.2 Diagnosis

After initial examination and reports, the patient was diagnosed with a gastrointestinal stromal tumor.

A. Gastric mass infiltrating the transverse colon:

The low-grade spindle cell type tumor is seen arising in the lesser curvature of the stomach in the submucosa of the gastric wall and infiltrates the pericolic fat, but invasion of the transverse colonic muscularis propria or mucosa is not seen. Both proximal and distal resection margins of the stomach and transverse colon are free of tumors. No lymphovascular or perineural invasion is identified. The separate pieces of omentum are unremarkable. The tumor has a greatest dimension of 9.5 cm and Additional dimensions of: 6.5 x 5.5 cm. The primary tumor was more than 5 cm but not more than 10 cm was diagnosed.

Macroscopic examination of the specimens showed that

- Partial gastrectomy with mass at the outer surface and part of bowel segment adhered to the mass.
- The stomach measures 10 x 6.5 x 3.5 cm with a part of omental fat attached measuring 8 cm in distance from the stomach wall.
- There is an exophytic mass attached to the stomach wall along the lesser curvature measuring 9.5 x 6.5 x 5.5 cm, inked black from the outer surface.
Ulceration like area in the inner wall of the stomach measures about 1 cm in maximum diameter noted at the site of the mass. The tumor mass is 0.8 cm from the proximal gastric margin and 2 cm from the distal duodenal margin. The mass appears to be infiltrating the pericolic fat but not the colon mucosa. Proximal and distal margins are negative. The overlying gastric mucosa shows focal mild chronic inflammation. *H. pylori* and focal intestinal metaplasia is noted.

**Table 1. History and initial examination**

<p>| | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>1</td>
<td>Esophagogastroduodenoscopy</td>
</tr>
<tr>
<td>2</td>
<td>CT Abdomen/Pelvis with IV Contrast</td>
</tr>
<tr>
<td>3</td>
<td>CT of the Thorax with Contrast</td>
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</tbody>
</table>

**Fig. 1. Gastrointestinal tumor**
2.3 Treatment

As a treatment for the gastrointestinal stromal tumor, surgery was recommended to remove the mass.

Subtotal gastrectomy with en bloc resection of the invaded part of transverse colon, with Roux gastrojejunostomy and colostomy to restore GI tract continuity.

2.4 Special Studies

Some special studies such as immunohistochemistry assays are performed for examination and diagnosis of tumor. However, no cytogenetics and molecular pathology test was performed.

3. DISCUSSION

GISTs were originally viewed as smooth muscle tumor (leiomyoblastomas) [8]. They either arise from the interstitial cells of Cajal (ICCs) or ICC precursor cells. The morphologic, and immunohistochemical, features of GISTs are very similar to ICCs [9].

Because of increasing diagnostic reliability of the GISTs they are considered to be the most common human sarcomas [10]. The annual incident of GISTs in a population-based study estimated is to be 10 cases in one million [11]. GISTs effect people of all ages but with highest number of people of 64-year-old [10].
Table 3. Case summary (soft tissue resection)

<table>
<thead>
<tr>
<th>Pre resection Treatment</th>
<th>No known pre resection treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Procedure</td>
<td>Partial gastrectomy with part of transverse colon</td>
</tr>
<tr>
<td>Tumor focality</td>
<td>Unifocal</td>
</tr>
<tr>
<td>Tumor site</td>
<td>Lesser curvature of stomach</td>
</tr>
<tr>
<td>Tumor size</td>
<td>Greatest dimension: 9.5 cm</td>
</tr>
<tr>
<td></td>
<td>+ Additional dimensions: 6.5 x 5.5 cm</td>
</tr>
<tr>
<td>Histologic type</td>
<td>Gastrointestinal stromal tumor, spindle cell type</td>
</tr>
<tr>
<td>Histologic grade</td>
<td>G1: Low grade</td>
</tr>
<tr>
<td>Mitotic Rate</td>
<td>Specify: 2-3 /5 mm2</td>
</tr>
<tr>
<td>Necrosis</td>
<td>Absent</td>
</tr>
<tr>
<td>Distant Metastasis (pm)</td>
<td>Not Known</td>
</tr>
<tr>
<td>Margins</td>
<td>Proximal and distal margins are negative</td>
</tr>
<tr>
<td>Regional lymph nodes</td>
<td>Number of Lymph Nodes Involved: 0</td>
</tr>
<tr>
<td></td>
<td>Number of Lymph Nodes Examined: 10</td>
</tr>
<tr>
<td>Risk Assessment</td>
<td>Low risk</td>
</tr>
<tr>
<td>Regional lymph nodes (pN)</td>
<td>pN0: No regional lymph node metastasis</td>
</tr>
<tr>
<td>Distant Metastasis</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Molecular Genetic Studies (eg, KIT or PDGFRA mutational analysis)</td>
<td>Not performed</td>
</tr>
<tr>
<td>Pathological staging pTNM</td>
<td>pT3: Tumor larger than 5 cm but not more than 10 cm</td>
</tr>
<tr>
<td>Regional Lymph Nodes (pN)</td>
<td>pN0: No regional lymph node metastasis</td>
</tr>
</tbody>
</table>

Table 4. Immunohistochemistry profile

| C-KIT (CD117) | Positive |
| CD34          | Positive |
| DOG1          | Positive |
| CKAE1/AE3     | Negative |
| Desmin        | Negative |
| S100          | Negative |
| S100          | Negative |

Fig. 4. Radiological finding in the CT scan
A case of 62-year-old man having GIST tumor of size 4.5cm was reported. The symptoms were abdominal pain, anemia, nausea and palpable mass in abdomen.

GISTs can consist of spindle cell in 70% cases, epithelioid cells in 20% cases and a combination of both in 10% cases [11]. Spindle cell GISTs usually arrange in the form of fascicles while, epithelioid GISTs arrange in a sheetlike pattern [12].

A case of 47-year-old man with gastric tumor of size 10cm was reported. The symptoms were similar to the above reported case. The tumor also constituted the large gastrointestinal stromal tumor group.

Immunohistochemistry assays of GISTs are usually positive (CD117, c-kit) [6]. Normally in 99% of the cases of GISTs the DOG1 expressed. This assay is specific to the GISTs diagnosis and confirmation [13]. This reported case is also about a complaint of gastrointestinal stromal tumor in 38-year-old male. In the reported case, the C-KIT, DOG1 and CD34 gave positive results. The spindle cell gastrointestinal tumor arising from submucosa of gastric wall growing and infiltrating into the pericolic fat and partially indenting the opposing pancreatic body and tail portion without apparent pancreatic parenchymal changes. For non-metastatic lesions, the surgery is considered to be the standard therapy [14]. Normal GISTs tumor size ranges from 8.78 to 5.6cm. In this case the tumor was of unusual size of 9.5cm with additional dimensions of 6.5 x 5.5 cm. This tumor constituted the large GIST group. In case of metastatic or large sized lesions with pain and bleeding the therapy, imatinib mesylate is suggested before surgical interventions [13].

4. CONCLUSION

The case represents the presence of gastrointestinal stromal tumor in a 38-year-old patients. The gastrointestinal tumor in this case is 9.5cm at the largest dimension. The patient was suffering from abdominal pain and upper Git bleeding. The primary tumor of the gastric submucosa was diagnosed.

CONSENT

As per international standard or university standard, patients’ written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES


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