

CASE REPORT

Duodenal gastrointestinal stromal tumor presenting as pancreatic head mass – a case report

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Abstract

Duodenal gastrointestinal stromal tumors (GISTs) are uncommon. Tumors arising from the first and the second part of the duodenum (D1 and DII, respectively) can be wrongly diagnosed as pancreatic mass. We present a case of a 59-year-old woman who came with abdominal pain and severe upper gastrointestinal bleeding (hemoglobin 3.5 g/dL). A solid, heterogeneously enhancing neoplasm in the head of the pancreas was revealed preoperatively by an abdominal computed tomography scan. A diagnosis of GIST was suggested. On exploratory laparotomy, there was a large mass which appeared to be originating from duodenum or from head of pancreas. Intraoperative histopathological diagnosis was GIST. Histopathology showed spindle cell tumor with cytoplasmic eosinophilia and foci of necrosis. The mitotic count was less than 5/50 high power fields (HPFs). Tumor was involving duodenal muscularis propria, with no infiltration in the duodenal epithelial layer and the pancreas. Immunohistochemical study revealed positive staining for CD117. The tumor was finally diagnosed as GIST arising from the duodenal wall, growing exophytically and attached to the common bile duct and pancreas, without infiltrating the pancreas. Duodenal gastrointestinal stromal tumors can grow exophytically into a large mass and involve the pancreas without infiltrating microscopically and present as pancreatic head mass.

Keywords: gastrointestinal stromal tumor, duodenum, pancreatic mass, mesenchymal tumors.

Introduction

Despite the fact that gastrointestinal stromal tumors (GISTs) are the most common mesenchymal tumors of the gastrointestinal tract, with an annual incidence of 10 to 20 per million, their incidence among all gastrointestinal tumors is low (1–3%) [1].

GISTs are neoplasms arising from, or differentiating along, a line similar to the gastrointestinal pacemaker cells, the interstitial cells of Cajal (ICCs), which are located in the submucosal and myenteric plexus of gastrointestinal tract [2–4]. GISTs may occur in the entire gastrointestinal tract. Common sites are stomach (60%), small intestine (30%), rectum (5%) and esophagus (<5%) [1]. Duodenal GISTs constitute 30% of primary duodenal tumors and less than 5% of gastrointestinal stromal tumors [5, 6]. These tumors occur mostly into the second part of duodenum followed by third, fourth and first part [7].

The diagnosis of duodenal GISTs is based on: histological features (tumor arising from duodenal wall), immunohistochemical staining (positive for CD117, CD34 and alpha-smooth muscle actin) and molecular features (oncogenic c-kit mutation) [8].

We present a rare case of duodenal GIST, mimicking a tumor mass in the head of the pancreas, successfully managed by surgical treatment and consequently Imatinib administration. Through this case report, we want to emphasize the importance of preoperative differentiation, often difficult, between duodenal GISTs and pancreatic tumors. Awareness of duodenal GIST is essential for correct therapeutic management.

Case presentation

A 59-year-old woman presented with abdominal pain, upper gastrointestinal bleeding (melena) and faintness, with debut in last 24 hours. There was no significant past medical history. General physical examination showed skin and mucous membranes pallor. Clinical examination of the abdomen revealed pain in the epigastric area and right upper quadrant.

Initial investigations disclosed on full blood count severe iron deficiency anemia (hemoglobin 3.5 g/dL), but blood sugar level, urea, electrolytes, coagulation screen and liver function tests were within normal range. Electrocardiogram and chest radiograph were also normal. The

patient was transfused until hemoglobin reached 10 g/dL level.

Fiberoptic endoscopy and upper gastrointestinal radiography showed a large tumor mass (possibly inducing external compression) located at the junction of the first and the second part of the duodenum (DI and DII, respectively), exhibiting two ulcers (Figure 1). Contrast-enhanced computed tomography (CECT) revealed a tumor mass into the head of the pancreas; the mass was hypodense, hypocaptive, with ill-defined borders, having a diameter of approximately 60 mm, without any delineation from DI or DII (Figure 2). There was no evidence of liver or lungs metastases. A diagnosis of GIST was suggested.

On exploratory laparotomy, a large mass (6 cm in diameter) was evidenced, protruding through the anterior duodenum wall (DI and DII). The tumor appeared to be originating from duodenum or from head of pancreas. It was attached to the common bile duct, anterior surface and upper border of pancreatic head. There was no liver or peritoneal metastasis, nor any evidence of lymphadenopathy or large vessels invasion. The patient underwent partial resection of DII and total resection of DI, gastric antrum, distal common bile duct, and enucleation of the mass from the pancreatic head. Termino-lateral hepaticojejunostomy and termino-lateral gastrojejunostomy on a Roux-en-Y loop were performed, after tumor and surrounding tissue resection. Intraoperatively, multiple fragments were sampled and sent to the Department of Pathology. Frozen-section diagnosis was GIST.

On pathology, macroscopic examination revealed a 6.2×6 cm sized tumor. Microscopic examination revealed a fasciculate spindle cell proliferation, with relatively monomorphic elongated oval nuclei, eosinophilic cytoplasm and rare cellular atypia. The mitotic count was less than 5/50 high-power fields (HPFs). Tumor produced duodenal mucosa ulceration but it did not infiltrate this structure. Necrosis was absent. Rare vascular structures with regular lumen were noticed into the tumor mass (Figures 3 and 4).

Immunohistochemical examination showed diffuse, cytoplasm-positive staining for CD117. The tumor stained positive for Ki67, with low nuclear index; CD34 was positive in the vascular structures and negative into the

tumor mass; S100 and alpha-smooth muscle actin (α -SMA) were also negative (Figures 5 and 6).

The postoperative course was uneventful, the patient was discharged 12 days after surgery, in good condition; the patient was prescribed adjuvant Imatinib 400 mg daily. At 24-month follow-up, there were no clinical, biological, endoscopic and CT signs of recurrent disease.

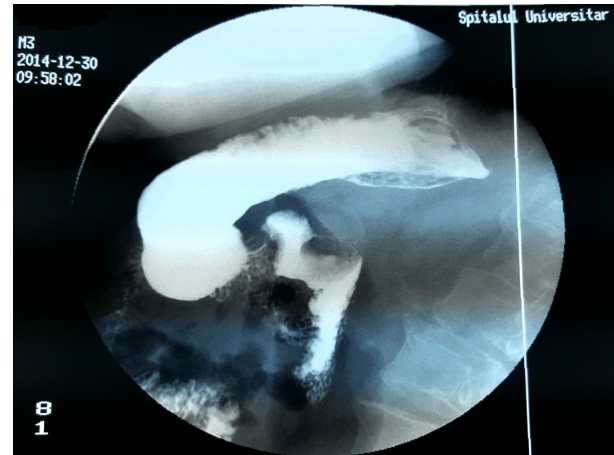


Figure 1 – X-ray examination with contrast material. Upper knee of duodenum shows heterogeneous lacunar area due to lack of filling (vegetant and ulcerated proliferating mass).

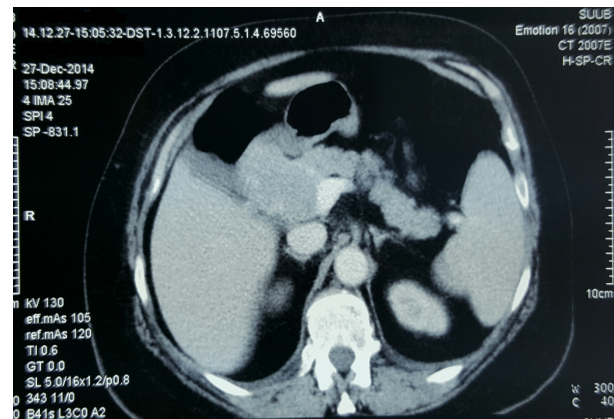


Figure 2 – Contrast-enhanced computed tomography (CECT): tumor mass located in the head of the pancreas, hypodense, hypocaptive, without demarcation line with duodenum.

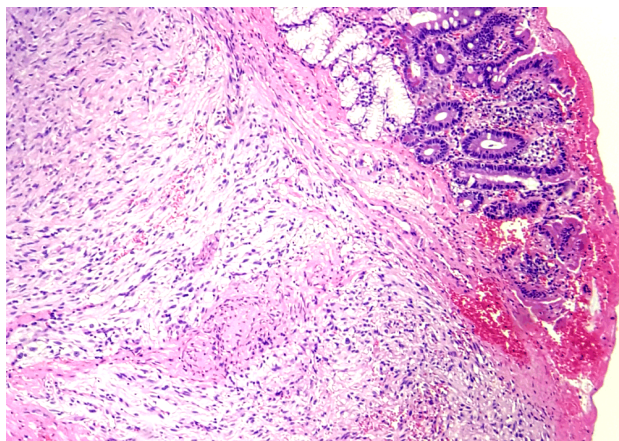


Figure 3 – Duodenal mucosa fragment and tumor mass fragment, foci of necrosis, low cell density. Hematoxylin-Eosin (HE) staining, ×100.

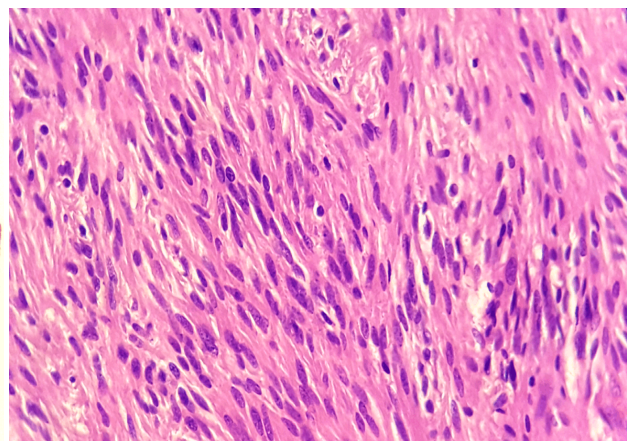


Figure 4 – Tumor fragment, spindle cells with medium density, without mitosis. HE staining, ×400.

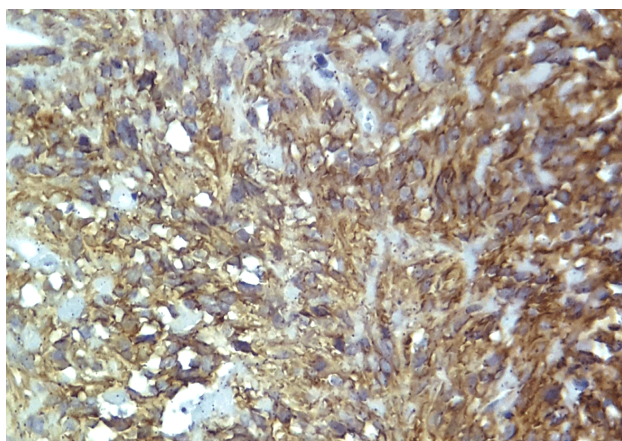


Figure 5 – Tumor fragment, cytoplasmic reactivity for CD117. Immunohistochemistry, ×400.

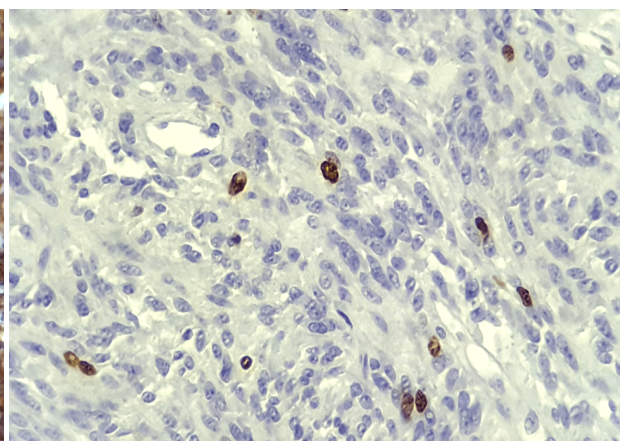


Figure 6 – Tumor fragment, few Ki67-positive nuclei. Immunohistochemistry, ×400.

Discussion

Gastrointestinal stromal tumor (GIST) arises from the intestinal cells of Cajal, located in the submucosal and myenteric plexus of gastrointestinal tract. The main mechanism in the pathogenesis of most GISTs is the mutation of one of the two tyrosine kinase receptor genes (KIT and PDGFRA).

Only 4.5–5% of all GISTs arise in the duodenum and are frequently located into the DII [7]. The mean age at diagnosis of GISTs is the fifth decade.

Usually, duodenal GIST presents with gastrointestinal bleeding, epigastric pain, palpable mass and intestinal obstruction [7, 9].

Endoscopic appearance of duodenal GISTs is as smooth submucosal bulge with ulceration; this examination is often performed for nonspecific complaints or gastrointestinal bleeding. Endoscopic ultrasound can provide information about the intramural or extramural origin of tumor and even about the layer of origin of the intramural mass [10]. Ultrasound or CT scan guided fine-needle aspiration (FNA) cytology, with large bore needle, is usually required if endoscopic ultrasound guided FNA cytology is suboptimal [11]. On CT scan, small GISTs appear as homogeneous soft tissue mass with moderate enhancement, while large tumors appear as heterogeneous masses with central necrosis [10, 11].

Preoperative diagnosis of GIST is difficult. Positive diagnosis is made only intra and postoperatively, and it is based on histological and immunohistochemical analysis.

In a minority of cases, like in our case, duodenal GISTs can present as a pancreatic head tumor [10, 12–14].

Macroscopically, most tumors are relatively of small size and a neuroendocrine mass of the pancreas is suspected. In our case, tumor was of medium/large size and was attached to the pancreas in a larger extent than to the duodenum, thus it appeared to be a duodenal or a pancreatic head tumor. The duodenal origin was demonstrated only after histopathological examination.

Macroscopic mucosal ulceration is common in duodenal GIST without tumor invasion into the epithelial layer. Invasion of epithelial layer was seen in tumors which are more than 5 cm in size or mitotically active [7].

Although, in our case, the tumor was of medium size (6 cm in diameter) and mitotically low active, it did not infiltrate the epithelial layer.

The diagnosis of GIST is based on histological, immunohistochemical and molecular features.

Duodenal GISTs are similar in terms of histological appearance with GISTs from another location. There are three main histological cell types of GIST: spindle cell type (most common), epithelioid cell type and the mixed spindle-epithelioid type [15]. Spindle cell GISTs are composed of proliferations of elongated cells with oval nuclei and eosinophilic cytoplasm, which are arranged in fascicular or storiform pattern, with limited nuclear atypia and low mitotic count (<5/50 HPFs). Epithelioid GISTs are represented by sheets of polygonal cells with central round nucleoli and perinuclear cytoplasm, minimum nuclear pleomorphism and mitotic count less than 5/50 HPFs [7].

On immunohistochemical staining, 95% are CD117 positive, 70% are CD34 positive and 40% stains positive for α -SMA [15, 16]. Another tumor marker is represented by DOG1, which is considered more sensitive compared to CD117 [9].

In our case report, the tumor was arising from the muscularis propria of duodenum and grown exophytically into the superior border of the pancreatic head, also causing microscopic pressure changes into the pancreas, without infiltration. This is in accordance with findings noted by Miettinen *et al.*, who observed that duodenal GISTs, which extend close to the pancreas, are limited by a pushing border [7]. Reported tumor in our case was of spindle type and stained positive for CD117 and CD34.

The differential diagnosis for spindle cell GISTs includes leiomyoma, leiomyosarcoma, schwannoma, fibromatosis, inflammatory fibroid polyps, solitary fibrous tumor, inflammatory myofibroblastic tumor and dedifferentiated liposarcoma [17]. For epithelioid GISTs, differential diagnosis is made with carcinoma, melanoma, clear cell sarcoma, endocrine tumors, glomus tumor, gangliocytic paraganglioma [17].

Surgical resection, with tumor free margin, is the mainstay of treatment for the patients with primary GISTs without distant metastases. Surgical approach may consist either in wedge resection of duodenum, with primary

closure or segmental duodenectomy, with duodenal jejunostomy reconstruction or pancreaticoduodenectomy [18]. Limited resection should be done whenever possible, pancreaticoduodenectomy should be considered for large tumors in first and second part of the duodenum or tumors involving the papilla of Vater or the pancreas [6, 19]. Lymphatic spread of GISTs is uncommon, therefore a systematic lymph node dissection is not included in standard surgical management. GISTs exhibit a broad spectrum of clinical behaviors, with some low-risk lesions remaining stable for years, while others progress rapidly to metastatic disease.

Various parameters are described to predict the malignant potential of GISTs, such as tumor size, mitotic activity, tumor location, non-radical resection, tumor rupture, peritoneal dissemination, metastases and invasion into adjacent organs.

National Institute of Health (NIH) consensus criteria (Fleischer's criteria) [20] proposed risk stratification of tumor behavior into risk categories (very low, low, intermediate and high risk of metastasis) based upon its size and mitotic activity. Tumors larger than 10 cm in size with any mitotic count or of any size with mitotic count more than 10/50 HPFs are at high risk of aggressive behavior [18, 21–23].

Conventional chemotherapy and radiation therapy have been reported to be ineffective in the treatment of GISTs [20].

Adjuvant therapy with Imatinib has been recommended in patients with substantial risk of relapse. Risk of relapse is increased in large tumors, increased mitotic activity and resection with positive margins. Adjuvant therapy with Imatinib has been shown to increase the relapse-free survival but not the overall survival [16, 18, 24].

✉ Conclusions

Duodenal GISTs are rare digestive tumors, which can masquerade different pathologies due to the vicinity with other organs. They are often misdiagnosed as pancreatic head mass. The mainstay of therapy is the surgical management.

Conflict of interests

The authors declare that they have no conflict of interests.

Author contribution

George Simion and Radu Constantin Ciuluvică equally contributed to the manuscript.

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