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Laparoscopic management of giant gastrointestinal stromal tumor masquerading as infected mesenteric cyst

Gastrointestinal stromal tumors (GISTs) are the most common non-epithelial (mesenchymal) tumors of the gastrointestinal tract. Although GISTs appear as solid and well-circumscribed lesions in most patients, they may also appear as solid-cystic (mixed) or pure cystic lesions due to reasons like intra-tumor hemorrhage and necrosis in a very small percentage of patients. Hence, cystic GISTs mostly lead to a diagnostic dilemma. In this paper we aimed to report a case of pure cystic giant GIST that was drained percutaneously twice after being misdiagnosed as a mesenteric cyst. An 83-year-old man was operated for a pre-diagnosis of a recurrent mesenteric cyst. The operation was started with the three-trocar laparoscopic technique. Six thousand milliliters of purulent fluid were drained from the cystic lesion. Then, a mini incision was performed above the umbilicus and the cyst and the distal ileal segment where it was originated were removed from the abdominal cavity. After the resection of a 15-cm ileal segment together with the cystic lesion, an intestinal anastomosis was performed. The histopathological and immunohistochemical findings showed that the mass was a GIST (size: 20 cm, mitosis: 3/50 HPF, Ki 67: %15, CD117: positive, DOG-1: positive). The patient was closely followed without imatinib therapy.

KEY WORDS: Abscess, Cystic Degeneration, GIST, Mistreatment

Introduction

Gastrointestinal stromal tumors (GISTs) are the most common non-epithelial (mesenchymal) tumors of the gastrointestinal tract [1-4]. They are considered to originate from the intestinal pacemaker cells called Cajal interstitial cells located in the Auerbach's myenteric plexus found in the muscularis propria of the gastrointestinal tract. Genetic studies have shown that, except for a small proportion of patients, GISTs are related to mutations of the C kit (CD117) and platelet derived growth factor receptor alpha (PDGFR) genes. The annual incidence of GISTs varies by geographical region. The annual incidence per million persons is calculated 6.8-6.9 in North America, 5.4-19 in Europe, and 7.7-22 in Asia [4]. The large-scale epidemiological studies have shown that GISTs are more common among the elderly, men, blacks, and persons living in Asia/Pacific islands [4]. The female-to-male ratio varies between 0.75 and 1.5 [4]. Although GISTs can be seen in every age group between 10 and 93 years, the median age at the time of diagnosis is between 56.3 and 69 years [4]. One or more of the diagnostic techniques of endoscopy, endoscopic ultrasonography (EUS), contrast-enhanced computerized tomography (CT), magnetic resonance imaging (MRI), 18FDG-PET CT, and histopathological staining can be used for diagnosis. Although GISTs appear mostly as a solid and well-circumscribed lesions in imaging studies, depending on lesion size, they may rarely be seen as pure cystic or solid-cystic (mixed) lesions. Cystic degeneration both causes a diagnostic dilemma and, by causing mistreatment of a lesion, and treatment delay [1]. Herein, we aimed to report a case of a huge infected cystic GIST that previously underwent percutaneous drainage twice for a diagnosis of a mesenteric cyst.

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Case Report

An 83-year-old man presented to our outpatient clinic with abdominal pain and distention. It was learned that he had been treated at our hospital for acute renal failure, ileus, and distention three years ago, when he had been detected by radiological studies to have a lesion measuring 200*180*170 mm consistent with a mesenteric cyst. At that time, his symptoms had been possibly attributed to compression by the cyst, and therefore at least 10 liters of non-purulent fluid had been drained from the cystic lesion under ultrasonographic guidance. The patient had presented to our hospital again four months ago with the complaint of abdominal distention, when a percutaneous drainage catheter was put into the cystic lesion and approximately 6 liters non-purulent fluid had been drained. Fluid's cytological examination had revealed no malignancy. The patient's physical examination was notable for severe distention of abdominal wall, and the above-mentioned lesion filled almost entire abdominal cavity (Fig. 1). Preoperative routine biochemical and complete blood count parameters were within normal limits. A contrast-enhanced abdominal CT showed a lobulated cystic lesion with a size of

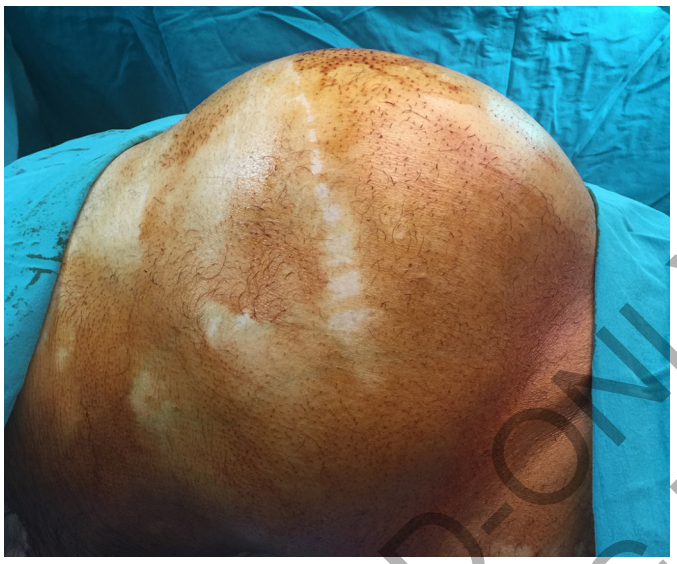

Fig. 1: Preoperative view of the lesion completely filling the abdominal cavity.

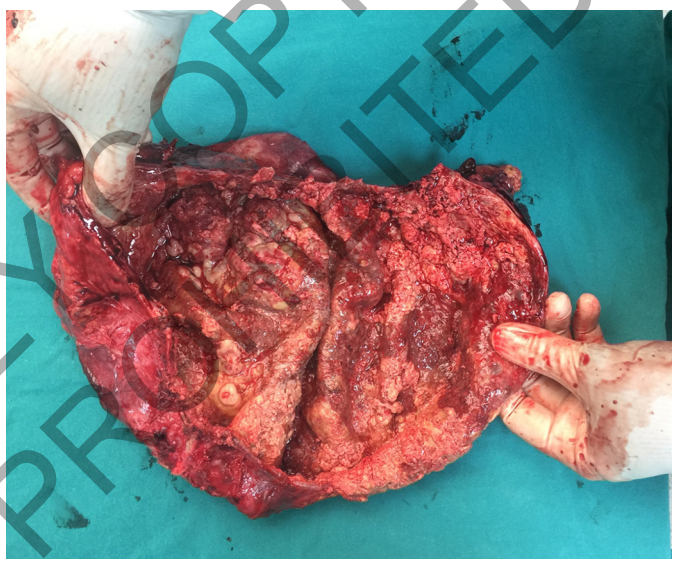

Fig. 3: The view of the resected giant cystic lesion on the back-table.

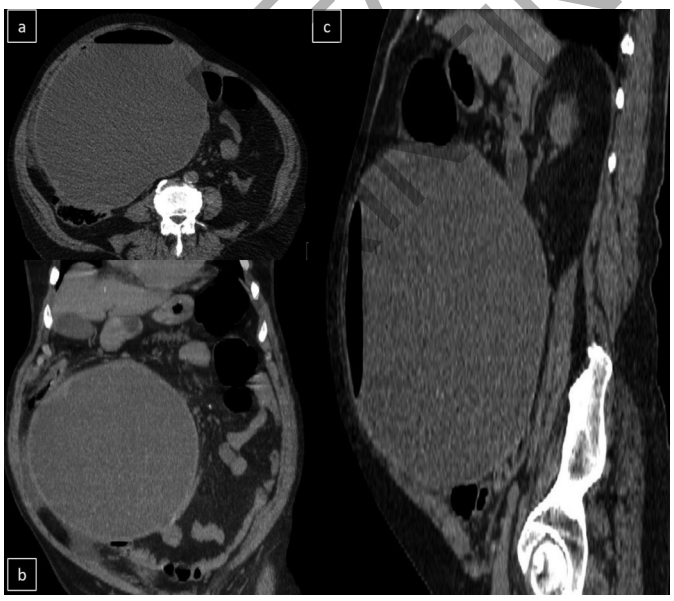

Fig. 2: The appearance of the lesion filling the abdominal cavity considerably in axial (A), coronal (B) and sagittal (C) sections.

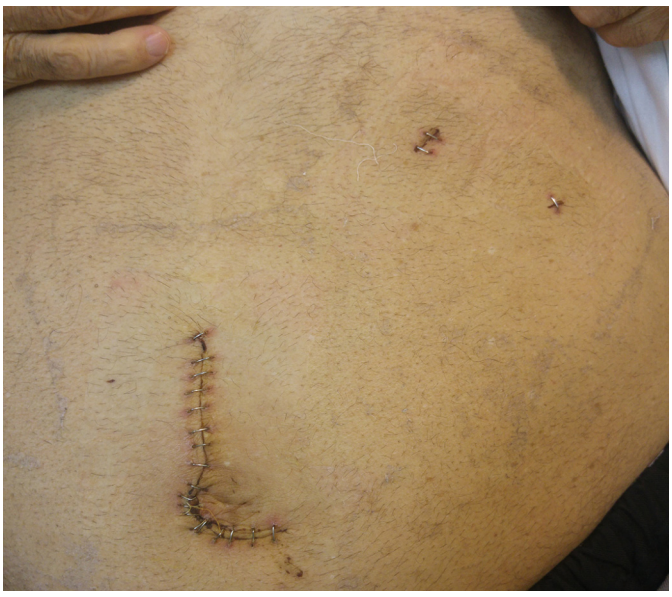

Fig. 4: Postoperative view of patient's incision scars.

205*250*230 mm, which contained air densities and had a maximum wall thickness of 24 mm, compressing the abdominal wall posteriorly. (Fig. 2 A-C). Radiologically, a duplication cyst, a mesenteric cyst, and a cystic degeneration of a tumoral lesion were considered in the differential diagnosis. A decision was made to proceed with surgery on the basis of available clinical and radiological findings. During the operation the abdominal cavity was entered using a total of three trocars, one below the umbilicus and the two in the right upper quadrant. As the cystic lesion caused both huge and severe dense adhesions, abdominal cavity could not be clearly evaluated. Therefore, first a veress needle was placed percutaneously into the cyst and approximately 6000 cc purulent fluid was drained. As no clear dissection plane could be discerned between the posterior wall of the cyst and small bowel segments, the cystic lesion and the intestinal segment from which it originated were removed from the abdominal cavity through a supraumbilical mini-incision. The cystic lesion was noted to originate from an ileal segment, 40 cm proximal to the ileocecal valve. An approximately 15- intestinal loop was excised en bloc together with the cyst (Fig. 3). Intestinal integrity was achieved with an end-to-end ileo-ileal anastomosis (Fig. 4). The histopathological and immunohistochemical findings suggested that the cystic lesion was a high-risk GIST [size: 20 cm, mitosis: 3 /50 HPF, Ki 67: %15, necrosis: none, atypia: severe, CD117 (+), DOG-1(+), CD34(-), S100(-), SMA (-)]. Patient was consulted to oncologists for medical therapy. But, they decided that the patient should be followed up without imatinib therapy.

Discussion

GISTs were first defined by Mazur and Clark in 1983. Genetic studies have shown that a mutation develops in the C-kit (CD117) gene in 85-95% of GISTs and in platelet derived growth factor receptor alpha (PDGFRA) receptor genes in 5-7%. In a part of GISTs neither C-kit (CD117) nor PDGFRA receptor gene mutations can be detected, and this type of GISTs are designated as wild-type GIST. Histologically, 70% of GISTs feature spindle cells, 20% epithelioid cells, and the remainder 10% mixed cell types [3]. GISTs constitutes 0.1-3% of all gastrointestinal system cancers and 80% of all mesenchymal tumors of the gastrointestinal system. The most commonly involved organs, in descending order, are the stomach (55.6%), small intestine (31.8%), colorectal (6%), other locations (5.5%) and esophagus (0.7%) [3,4].

Symptoms produced by GISTs are related to tumor size and location. An 81.3 % Eighty-one-point three percent of GISTs may cause nonspecific symptoms such as pain, early satiety, and abdominal bloating [4]. Tumor does not cause bleeding, obstruction, or severe pain unless it has been ulcerated. However, 18.7% of GISTs are incidentally detected by radiological and/or endoscopic studies performed for other indications [3,4]. Endoscopic, radiological, and histopathological diagnostic modalities should be used in conjunction for both the diagnosis and differential diagnosis of GISTs. They classically appear as a submucosal mass in endoscopic studies. EUS has the advantage of better delineating the relationship of a submucosal mass with neighboring tissues and biopsy sampling whenever needed. Contrast-enhanced CT is the most commonly preferred radiological tool. It is highly effective for making the diagnosis of both primary and metastatic tumor. Oral and intravenous contrast-enhanced CT is particularly helpful for GISTs arising from gastrointestinal tractus. MRI is typically helpful for showing GISTs of anorectal origin. PET is mostly useful for GISTs of unknown primary or with uncertainties in CT. 18FDG-PET CT is also quite sensitive for showing tumor response among patients receiving tyrosine kinase treatment. Radiologically, the majority of GISTs appear as smooth-bordered, shiny, and solid masses. However, large GISTs may have a radiologically complex appearance due to intratumoral bleeding, cystic degeneration, and necrotic changes. In other words, some GISTs may appear as pure cystic or solid-cystic (mixed) lesions. The majority of large GISTs have a tendency of growing exophytically and thus too difficult to discern for their origin at preoperative studies. Despite being quite rare, cystic GISTs may almost always cause a diagnostic dilemma.

GISTs may show cystic changes in the conditions below: (i) in primary cystic GIST the tumor may directly appear as a cystic lesion; (ii) inability of blood flow perfusing tumor's center to increase proportionately to tumor's growth rate may cause liquefaction and necrosis resulting in cystic degeneration in the center of the tumor; (iii) hepatic and pancreatic metastases of GISTs mostly appear as cystic lesions. The majority of these lesions are diagnosed as cystic lesions of the liver or the pancreas and treated accordingly. A cystic degeneration may occur in the center of a tumor during the treatment with (iv) imatinib [1,2,5]. The case we presented here is the best example of how much difficulty one could face in the differential diagnosis of cystic lesions. This is because he had presented to hospital numerous times and the lesion was percutaneously drained twice for causing compressive signs. We believe that many authors experience the dilemma we have faced [5,6].

The most common cystic lesions of the abdominal cavity are mesenteric cysts, retroperitoneal cysts, duplication cysts, pseudocysts of the pancreas, cystic neoplasms of the pancreas, splenic cysts, and hepatic cysts [7]. All of the above-mentioned radiological and endoscopic diagnostic tools can be used differential diagnosis. Apart from these, cystic degeneration of tumors like GIST may also radiologically appear as cystic lesions. Hence, tumors like GIST should be definitely included in the differential diagnosis of incidentally detected cystic lesions. To our

TABLE I - *NIH Consensus Criteria (Fletcher's Criteria) for GISTs risk assessment*

Risk Group	Size (cm)	Mitotic Count (/50HPF)
Very Low	<2	<5
Low	2-5	<5
Intermediate	<5	6-10
Intermediate	5-10	<5
High	>5	>5
High	>10	Any

Risk assessment: recurrence, distant metastasis, aggressive behaviour, mortality due to GIST

TABLE II - *Modified NIH Criteria (Joensuu Criteria) for GISTs risk assessment*

Risk Group	Size (cm)	Mitotic Count(/50HPF)	Primary tumor site
Very Low	<2	≤5	Any
Low	2.1-5	≤5	Any
Intermediate	2.1-5	>5	Gastric
Intermediate	<5	6-10	Any
Intermediate	5.1-10	≤5	Gastric
High	Any	Any	Tumor rupture
High	>10	Any	Any
High	Any	>10	Any
High	>5	>5	Any
High	2.1-5	>5	Non-gastric
High	5.1-10	≤5	Non-gastric

Risk assessment: recurrence, distant metastasis, aggressive behaviour, mortality due to GIST

TABLE III - *AJCC/UICC TNM classification for GISTs*

Group	T (cm)	N	M	Mitotic Count (/50HPF)
Stage I	T1 (≤2)	N0	M0	≤5
	T2 (>2 T ≤5)	N0	M0	≤5
Stage II	T3 (>5 T ≤10)	N0	M0	≤5
Stage IIIA	T1 (≤2)	N0	M0	>5
Stage IIIA	T4 (>10)	N0	M0	≤5
Stage IIIB	T2 (>2 T ≤5)	N0	M0	>5
Stage IIIB	T3 (>5 T ≤10)	N0	M0	>5
Stage IIIB	T4 (>10)	N0	M0	>5
Stage IV	Any T	N1	M0	Any
Stage IV	Any T	Any N	M1	Any

M: distant metastasis, N: lymph node metastasis, T: primary tumor size.

TABLE IV - *Meittinen's Criteria (AFIP) for risk of disease progression in GISTs*

Group	Size (cm)	Mtotic Count (/50HPF)	Jejenum/Ileum (disease progression rate)
I	≤ 2	≤ 5	None
II	>2 to ≤5	≤ 5	Low (4.3%)
IIIa	>5 to ≤10	≤ 5	Moderate (24%)
IIIb	>10	≤ 5	High (52%)
IV	≤ 2	> 5	High (50%)
V	>2 to ≤5	> 5	High (73%)
VIa	>5 to ≤10	> 5	High (85%)
VIb	>10	> 5	High (90%)

opinion, diagnostic laparoscopy may be highly useful for these lesions.

Some risk groups have been described to predict a tumor's risk of aggressive behavior (metastasis, recurrence, GIST related mortality) on the basis of some parameters like tumor size, mitosis number, tumor localization, and tumor perforation [3]. The most commonly used risk classification systems to assess malignancy potential of GISTs are NIH consensus criteria (Fletcher's criteria), Modified NIH criteria (Joensuu criteria), Mittinen's criteria (AFIP criteria) and AJCC/UICC criteria (TNM classification) (Table I-IV). These risk classification systems have been developed to predict a tumor's aggressive behavior potential and to determine the duration of medical therapy. While Fletcher's and AFIP criteria are used to assess non-metastatic tumors, TNM classification is used to assess both primary and metastatic tumors' behaviors. In the case presented here, tumor size was >10 cm and thus it was a high-risk tumor, with a tumor progression risk of 52% according to the AFIP criteria. We believe that this patient should receive imatinib therapy because patient was in the high-risk group according to the risk stratification systems. But, oncologists did not give imatinib therapy considering the age and performance of the patient.

Conclusions

The ideal therapy for localized/resectable GISTs is tumor resection with clear surgical borders [3]. There is no difference at all between laparoscopic and open surgery provided that oncological surgical principles be complied with. After resection, a decision should be made as to how a tumor is to be followed, depending on risk criteria and genetic mutations. Clinical follow-up should be performed in the very low risk group; adjuvant imatinib therapy for about three years in the intermediate risk group; and adjuvant imatinib for at least three years in the high-risk group. As for metastatic/unresectable GISTs, imatinib therapy is started either as palliative or neoadjuvant therapy. Three

months later, surgical therapy is performed if the tumor becomes resectable. If no change occurs in tumor size, or if it grows in size or develops drug resistance, sunitinib or regorafenib may be considered in their respective order [3].

Riassunto

I tumori stromali gastrointestinalei (GIST) sono I più frequenti tumori non epiteliali, mesenchimali, del tratto digerente. Sebbene si presentino in genere come lesioni solide e ben delimitate nella maggior parte dei casi, possono anche presentarsi come masse miste solido-cistiche o come lesioni puramente cistiche a seguito di emorragie intratumorali e necrosi in una piccola percentuale di pazienti. Per queste ragioni I GIST cistici pongono per lo più delle difficoltà di diagnosi.

In questo articolo si riferisce il caso di un gigantesco GIST puramente cistico, che è stato drenato due volte per via percutanea sulla falsa diagnosi di cisti mesenterica. Si trattava di un anziano paziente di 83 anni sottoposto ad intervento per un'errata diagnosi di cisti mesenterica recidivante. L'intervento è stato iniziato con la tecnica laparoscopice dei tre trocar, e dalla formazione cistica sono stati drenati 6 litri di fluido purulento. Quindi è stata eseguita una mini incisione al di sopra dell'ombelica ed è stata asportata dalla cavità addominale la cisti ed il tratto ileale terminale di 15 cm sede di origine della lesione. Completando l'intervento con l'anastomosi intestinale.

Il reperto istopatologico e immunoistochimico hanno dimostrato la natura GIST della massa, delle dimensioni di 20 cm (3/50 mitosi per campo di osservazione, Ki 67: %15, CD117: positive, DOG-1: positive). Si trattava di un paziente ad alto rischio secondo il sistema di stratificazione, e pertanto è stato destinato al trattamento con intimab.

References

1. Tamhankar AS, Tamhankar TA: *A large cystic gastrointestinal stromal tumor within lesser sac: A diagnostic dilemma*. South Asian J Cancer, 2018; 7:4-10.

2. Okasha HH, Amin HM, Al-Shazli M, Nabil A, Hussein H, Ezzat R: *A duodenal gastrointestinal stromal tumor with a large central area of fluid and gas due to fistulization into the duodenal lumen, mimicking a large duodenal diverticulum*. Endosc Ultrasound, 2015; 4:253-56.

3. Lim KT, Tan KY: *Current research and treatment for gastrointestinal stromal tumors.* World J Gastroenterol 2017; 23(27): 4856-866. doi:10.3748/wjg.v23.i27.4856

4. Soreide K, Sandvik OM, Soreide JA, Giljaca V, Jureckova A, Bulusu VR: *Global epidemiology of gastrointestinal stromal tumours (GIST): A systematic review of population-based cohort studies.* Cancer Epidemiol. 2016; 40:39-46. doi: 10.1016/j.canep.2015.10.031.

5. Hamza AM, Ayyash EH, Alzafiri R, Francis I, Asfar S: *Gastrointestinal stromal tumour masquerading as a cyst in the lesser sac*. BMJ Case Rep. 2016; 2016. pii: bcr2016215479. doi: 10.1136/bcr-2016-215479.

6. Hansen Cde A, José FF, Caluz NP: *Gastrointestinal stromal tumor (GIST) mistaken for pancreatic pseudocyst - case report and literature review*. Clin Case Rep. 2014; 2(5):197-200. doi: 10.1002/ccr3.92.

7. Sun KK, Xu S, Chen J, Liu G, Shen X, Wu X: *Atypical presentation of a gastric stromal tumor masquerading as a giant intra-abdominal cyst: A case report*. Oncol Lett, 2016; 12(4):3018-20.