Primary gastric myofibroblastic tumor in an adult at Perú: Case report and literature review

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Abstract

Primary gastric inflammatory myofibroblastic tumor is a rare neoplasm developed from mesenchymal stem cells, infrequently discussed in the scientific literature. Clinical diagnosis through endoscopy and pathology is challenging for the medical team. We report the case of a female patient with gastric obstruction syndrome due to a 10 cm tumor diagnosed with this disease by histology and immunohistochemistry.

Main messages

- Primary gastric inflammatory myofibroblastic tumor is an infrequent neoplasm.
- Gastric obstruction syndrome has different etiologies.
- It is important to identify the main cause for adequate management.

Introduction

Inflammatory myofibroblastic tumors are rare mesenchymal stem cell neoplasms in the inflammatory tumors category. These tumors comprise lymphocytes, plasma cells, histiocytes, and a variable proportion of fibroblasts and myofibroblasts [1].

Inflammatory myofibroblastic tumors mainly affect children and young adults, with a mean age of 30 years. The clinical presentation is variable and depends on the location of the tumor. Approximately 15% to 30% of patients present with malaise, weight loss, and fever, and although most of these tumors are benign, aggressive forms have been described [1,2]. Inflammatory myofibroblastic tumors are mostly found in the lungs [3,4] but can also affect soft tissues [5] and internal organs [6], such as omentum [7], retroperitoneum [8], extremities, head and neck [9,10], and genitourinary tract [11,12]. In extremely rare cases, they are also found in the stomach [13,14].

Clinical and anatomopathological diagnosis of gastric inflammatory myofibroblastic tumors (GIMT) represents a challenge for the medical team since it requires histological and immunohistochemical analysis of the surgical specimen to achieve an accurate diagnosis. In this study, we report the first Peruvian case of GIMT in a young woman from Tumbes, a city located in northern Peru, who came to our hospital "Instituto Regional de Enfermedades Neoplásicas Luis Pinillos Ganoza" (IREN), for a gastric tumor and gastric outlet obstruction syndrome (GOO).

Since gastric cancer is Peru's third most frequent cancer [15], it is important to consider GIMT in the oncologic differential diagnosis. We describe this case and perform a literature review with the terms "myofibroblastic tumor" and "stomach" using PubMed and Scopus limited to the last twenty years.

Clinical case

The patient was a 52 year old woman with no history of chronic diseases. No first- nor second-degree relatives had a history of malignant disease nor deaths related to this disease in the family. She came to IREN complaining of epigastric pain, intolerance to solid and liquid food, nausea, porraceous vomiting, and melena, which started three months ago and intensified during the previous week. This intensification of symptoms led her to seek emergency treatment.

An initial upper endoscopy revealed a circular lesion 30 mm in diameter with a fibrin-covered ulcerated lesion in the distal corpus near the lesser curve of the stomach. The stomach's mucosa was pale with diffuse patchy erythema, predominantly in the distal antrum. Congestive and friable mucosa was also observed.

Biopsies revealed chronic diffuse gastritis with mild atrophy and the faint presence of Helicobacter pylori (1+/3); blood tests were normal, and the patient's blood type was O+. The patient had a distal gastric body tumor and gastric outlet obstruction syndrome (GOO).

An endoscopic ultrasound (EUS) was performed in the institution to confirm the diagnosis. This procedure additionally showed a proliferative and indurated antrum mucosa with deformation and lateralization of the pylorus, which prevented the passage of endoscopic equipment.

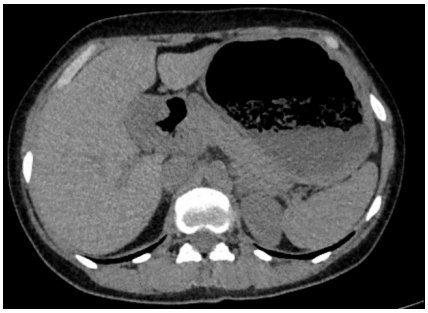
Gastric biopsies indicated moderate chronic superficial gastritis with mild atrophy, vascular congestion, eosinophils (++) presence, and focal fusocellular changes (spindle-shaped), which supported the diagnosis of gastrointestinal stromal tumor. H. pylori was not identified, mainly because the previous biopsies were done at a different site and also had faint staining.

Computed tomography (CT) of the chest, abdomen, and pelvis showed a 22 mm concentric thickening with a 76 x 41 mm extension from the distal portion of the gastric body into the extramural fat, making intimate contact with the body and head of the pancreas. This suggested the diagnosis of gastric adenocarcinoma. No other abnormalities were observed (Figure 1).

The patient was referred for emergency surgery due to her deteriorating condition. An exploratory laparotomy revealed a tumor located between the distal posterior surface of the stomach body and the pyloric antrum. The tumor was indurated and sized approximately four by seven centimeters. No tumor implants were observed in the parietal or visceral peritoneum or serous fluids. The serous membrane contained the tumor. However, it was found to invade the duodenum. The surgical specimen was frozen and fixed in kerosene for histopathological study. To remove the tumor, a D1 subtotal gastrectomy was performed. Subsequently, a Billroth II with Braun Enteroenterostomy was used to reconnect the remaining healthy tissue and restore function.

The excised specimen measured 17 cm in the lesser curve and 20 cm in the greater curve, was sent to an anatomic pathology laboratory for analysis. At the opening, the pyloric antrum was

Figure 1. CT of the thorax, abdomen, and pelvis. Stomach dilation was observed related to the tumor, generating gastric outlet obstruction.

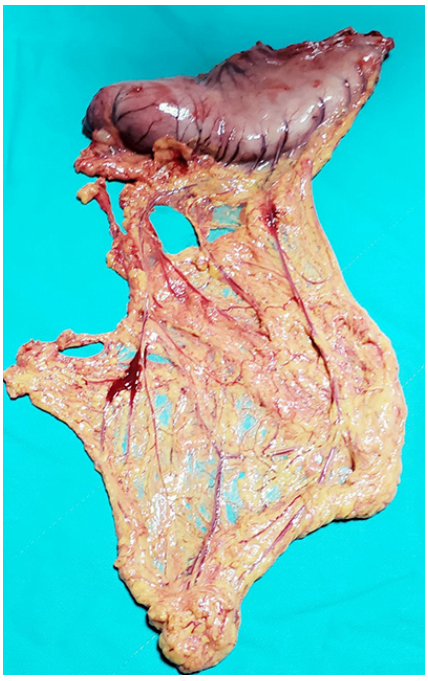


Source: IREN Radiodiagnosis Department

dominated by a tumor mass ten centimeters in greatest diameter, comprising 70% of the excised tissue Figure 2a and Figure 2b.

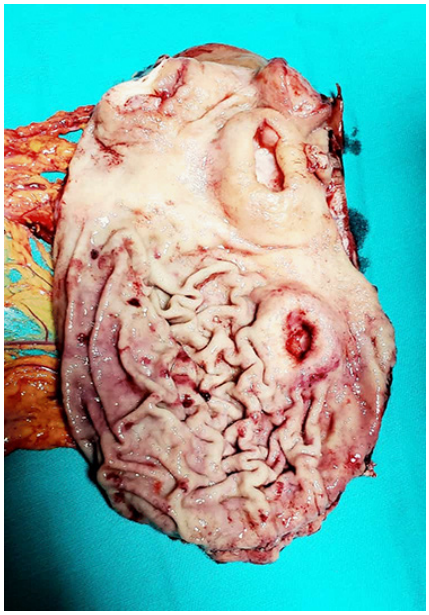
Microscopic observation of the tumor specimens stained with hematoxylin/eosin revealed a proliferation of spindle cells and epithelioid mesenchymal cells, a mixed lymphoid and plasma inflammatory infiltrate with the presence of eosinophils. Spindle cells were slightly atypical, with a vesicular nucleus and a prominent nucleolus; mitotic index was low. There was no evidence of lymphovascular embolism or perineural infiltration. The eight resected lymph nodes were negative for metastases. Immunohistochemistry reported that the cells of the tumor mass were actin positive and a subpopulation was

Figure 2A. Excised tissue: Pyloric antrum region. External side of the stomach.



Source: IREN Pathology Department

Figure 2B. Excised tissue: Pyloric antrum region. Internal side of the stomach.



Source: IREN Pathology Department

positive for CD 34. The cells were negative for pankeratin, ALK-1, and DOG-1. With these results, the patient was diagnosed with IMT (Figure 3A, Figure 3B, Figure 4A, Figure 4B, Figure 4C, and Figure 4D).

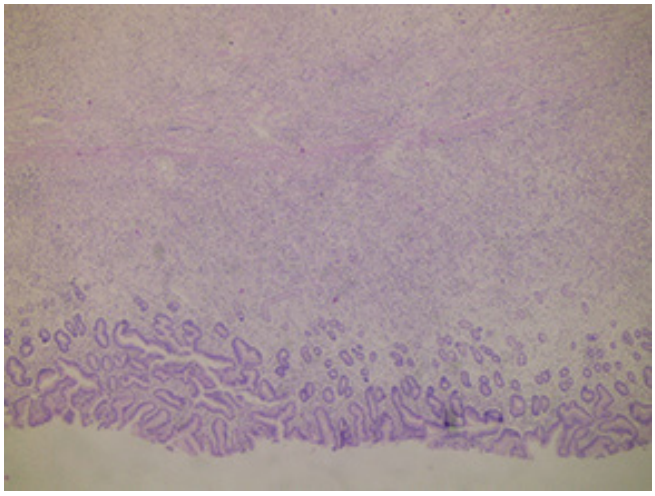
The patient is not receiving any other type of treatment. Her follow-ups, including endoscopy and CT scans, indicated no evidence of the disease's recurrence or progression.

Discussion

Inflammatory myofibroblastic tumor (IMT), a rare mesenchymal stem cell neoplasm, was first described by Umiker and Iverson in 1954 [16]. The clinical behavior of GIMT is variable and depends on its location. It can present as a benign disease, with local infiltration or distant metastasis, and can recur [16–18]. In addition, this disease has a variable number of inflammatory cells (eosinophils, plasma cells, and lymphocytes) [19]. It usually affects children and young adults, with a female-to-male ratio of 4:1. It is rarely seen in adults [20,21] as in the reported case.

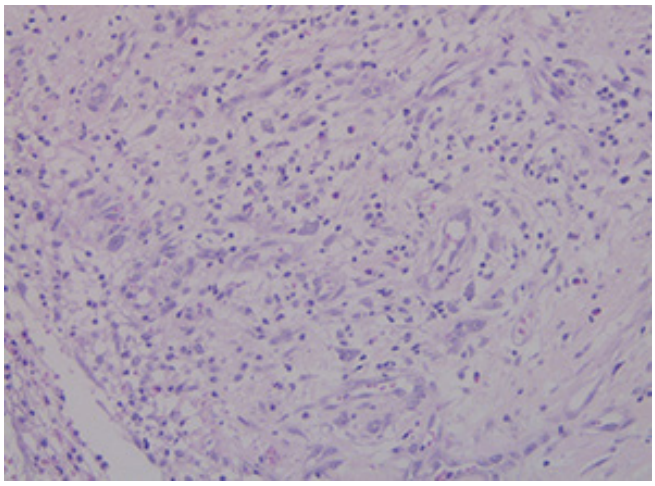
IMT has been described in different organs, such as the lungs, stomach, and bile duct [13,17,18,21]. Clinically, IMT presents as epigastric pain, melena [22], hematemesis, and a palpable abdominal mass [21], although some patients are asymptomatic or present with nonspecific symptoms such as malaise, fever, or weight loss. The etiology of IMT is uncertain, but it has been proposed that it may be secondary to an infection, trauma, biliary obstruction, or previous surgical trauma [13,19,20].

Figure 3A. Microscopic images of the tumor stained with hematoxylin/eosin a 10x image reveals fusocellular and epithelioid neoplastic proliferation.



Source: IREN Pathology Department

Figure 3B. Microscopic images of the tumor stained with hematoxylin/eosin a 20x detail to identify lymphocytes, plasma cells, and eosinophils.

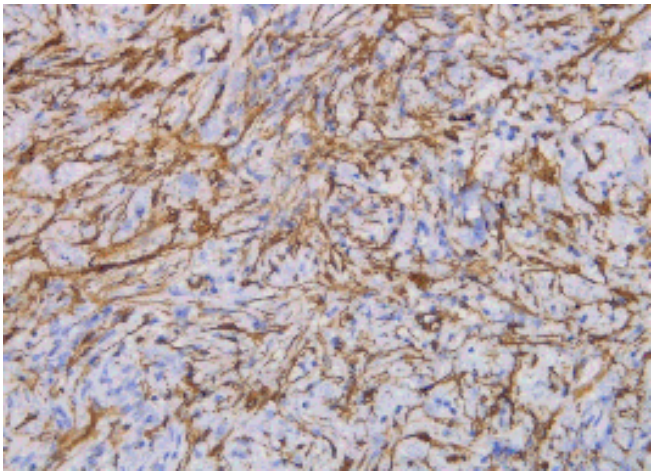


Source: IREN Pathology Department

Regarding H. pylori infection, our patient had biopsies showing faint staining on the first endoscopy but no staining on the institutional endoscopic ultrasound; this may be because the low density of H. pylori and the atrophic mucosa make it challenging to see the organism [23]. There is no evidence of an etiologic relationship between H. pylori and IMT [24].

In this case, the patient presented with gastric outlet obstruction (GOO) syndrome, defined as an obstruction of the passage between the stomach and the small intestine. Gastric outlet obstruction is usually caused by peptic ulcer, pancreatitis, and tumors of the pancreas and stomach. Its association with gastric and pancreatic adenocarcinoma has been reported [25,26].

Figure 4A. Immunohis–chemical study of tumor cells (20x): Alfa actin positive.

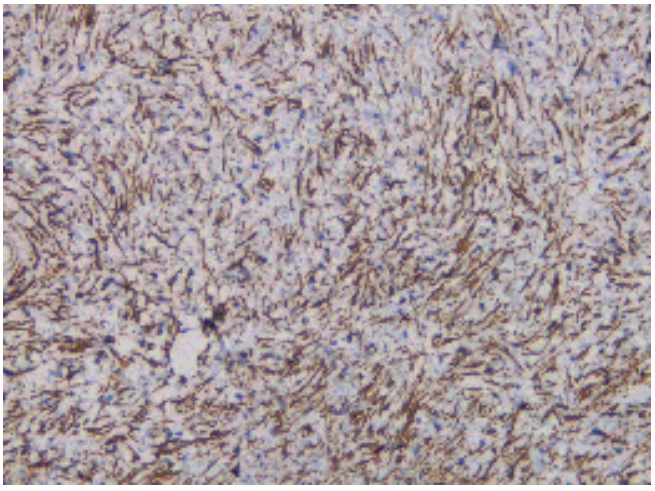


Source: IREN Pathology Department

Other benign neoplasms, such as gastric polyps and pyloric stenosis, have been described as causes of GOO [27]. Knowledge of the most common causes is important to rule out IMT as a differential diagnosis in this case.

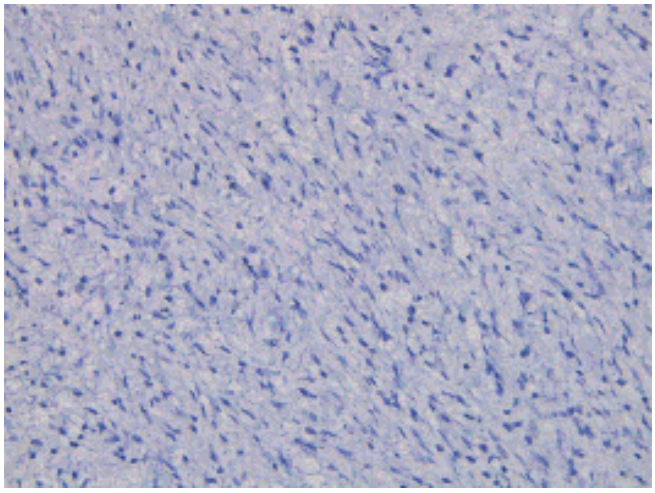
Tumor location is a factor to consider in GOO syndrome. The IMT involved the entire antral region in this patient, which explains the clinical presentation. A scientific report by Lee et al. described five cases of stomach-related IMT: two in the cardia, two in the body, and one in the antrum, which was about three centimeters. Jadhav et al. summarized 34 cases of GIMT reported in the English-language literature. The report found that GIMT was most commonly found in the body of the stomach, with a mean size of 6.9 cm [28,29]; in contrast, our patient had a tumor diameter of ten centimeters.

Figure 4B. Immunohis–chemical study of tumor cells (20x): CD 34 positive.



Source: IREN Pathology Department

Figure 4C. Immunohis–chemical study of tumor cells (20x). Pankeratin negative.

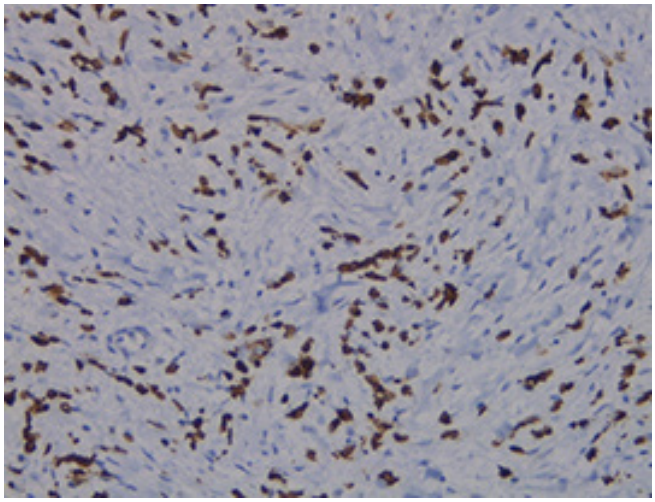


Source: IREN Pathology Department

Microscopic examination of IMT reveals three histologic patterns: myxoid, vascular, and inflammatory areas; compact spindle cells mixed with inflammatory cells (predominantly lymphocytes), plasma cells, and eosinophils; and dense collagen matrix [20,28,30].

These diverse patterns make differential diagnosis difficult, especially in biopsies, which present many cells with reactive or regenerative proliferation to neoplasms with variable risks of recurrence and metastasis. Gastrointestinal stromal tumors, inflammatory fibroid polyps, smooth muscle neoplasm, peripheral nerve sheath tumors, solitary fibroid tumors, fibromatosis, and, rarely, follicular dendritic cell sarcoma have similar histologic patterns [31]. Our patient presented with the second of the three histologic patterns described above, which was confirmed by immunohistochemistry.

Figure 4D. Immunohis–chemical study of tumor cells (20x): ALK negative.



Source: IREN Pathology Department

IMT is a kinase fusion-related neoplasm; ALK (anaplastic lymphoma kinase) overexpression is observed in approximately half of the cases [1,5,10,32,33]. In the immunohistochemical study, ALK expression was not observed in our patient [34]; A possible explanation for this is that some other kinases were affected. The literature mentions that ALK-negative IMT tumors are associated with the fusion of ROS-1 and PDGFRb genes [32].

The presence of actin is characteristic of GIMT because of myofibroblasts in the myofilaments [12,35,36]. This histopathologic feature was observed in our patient.

A proper differential diagnosis of the patient is a gastrointestinal stromal tumor (GIST) due to the presence of spindle cells. However, the patient's tumor was negative for DOG-1, which eliminates this possibility [37]. The combination of negative DOG-1 with negative CD117 or negative PS100 should be considered to rule out GIST [38] better.

As described above, in many cases, the primary treatment is surgery, as in our patient. Other treatments, such as chemotherapy, radiotherapy, or immunotherapy, may be reserved for unresectable diseases [39].

Currently, a tyrosine-related kinase inhibitor, Crizotinib, has been used for unresectable cases of IMT [40]. The presence of p53 and aneuploidy is associated with aggressive behavior [41].

Although post-treatment recurrence of GIMT is between 18 and 40% [1,4], our patient has had no recurrence in her follow-ups over the last year.

Conclusion

This case demonstrates the need to consider inflammatory myofibroblastic tumors as a potential cause of gastric outlet obstruction syndrome. The natural evolution of these tumors is unpredictable, as they can grow rapidly, become malignant and metastasize, or disappear spontaneously.

Notes

Contributor roles

FTG, ALM, DPJ: conception, data collection, design, analysis and interpretation of data, review of the article, and approval of the final version. CZS, VMH, APJ: critical review of the article and approval of the final version.

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Competing interests

The authors declare no conflicts of interest.

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Ethics

This study was conducted in accordance with the International Ethical Guidelines for Health-Related Research with Humans, Fourth Edition. Geneva. It has the approval of the Ethics committee, with the code 382-2021-GRLL-GGR-GRS

Data sharing statement

The data used for the study are available upon request to the corresponding author.

Origin and refereeing

Not commissioned. Externally peer-reviewed by three reviewers, double-blind.

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Tumor miofibroblástico primario gástrico en un adulto en el Perú: reporte de caso y revisión de la literatura

Abstract

El tumor miofibroblástico inflamatorio primario gástrico es una neoplasia rara desarrollada de células madre mesenquimales, e infrecuentemente discutido en la literatura científica. El diagnóstico clínico a través de endoscopia y patología es desafiante para el equipo. Nosotros reportamos el caso de una paciente mujer con síndrome de obstrucción gástrica por un tumor de 10 cm diagnosticado con esta enfermedad usando histología e inmunohistoquímica.