

## Clinical, Endoscopic, Radiological and Histological Characterization of GIST in Pediatric Patients: Case Report

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### Abstract

With recent advances in the knowledge of histopathology, radiology and molecular biology, it has been demonstrated that stromal tumors of the gastrointestinal tract are the most frequent mesenchymal neoplasms at this level. They constitute a type of tumor with very particular characteristics, such as the expression of the KIT protein. Predicting their behavior is very difficult with a high risk of late recurrence.

**Methods:** We present the case of a 15-year-old boy with a tumor located endoscopically in the stomach and treated by surgery. The histopathological study revealed a GIST.

**Results:** The most relevant aspects of this type of tumor are described, with emphasis on the recent advances that have allowed defining diagnostic criteria and introducing new therapies, with encouraging results in pediatrics.

**Conclusion:** The knowledge of the clinical, endoscopic and histological aspects of the stromal tumors in pediatrics allows us to take appropriate therapeutic behaviors and in time.

**Keywords:** Gastric stromal tumor, GIST, Gastric tumor, Pediatrics

### Introduction

The clinical features and diagnostic findings of gastrointestinal stromal tumors in children is a rare entity and can greatly affect the health of these.

The term gastrointestinal stromal tumor (GIST) was introduced by Mazur and Clark to designate non-epithelial tumors of the gastrointestinal tract devoid of structural features of smooth muscle and immunohistochemistry cells Schwann [1].

The GIST constitute 0.1-3% of tumors of the gastrointestinal tract, however they are the most common mesenchymal tumors at this level [1-5]. They are non-epithelial tumors that grow from the muscularis propria in the wall of the digestive tract. It is believed that they originate from Cajal cells, and that they are pacemaker cells that are involved in the regulation of intestinal motility [3,4,6]. They are defined by the expression of a receptor for the growth factor tyrosine-kinase, called KIT or CD-117 [1-4,6,7].

The average age of onset is approximately 40-70 years [1,2,7]. In young adults and children, its appearance has been associated with Neurofibromatosis type I, familial GIST or Carney's triad (gastric GIST, extra-adrenal paraganglioma and pulmonary chondroma). They have no predilection for sex [1-4]. In pediatric studies, the annual incidence is 0.02 per million children <14 years of age [3]. The incidence in the general population is from 10 to 20 cases per million habitants [1,2].

The most frequent localization is the stomach, constituting approximately 60-70% of the cases [1-4,7-9]. It is followed in frequency by the small intestine (20-30%), colon and rectum (5-10%) and esophagus (<5%) They account for 1-3% of gastric neoplasms, 20% of small bowel tumors and 0.2-1% of colon tumors. They can also be primary tumors of the omentum, mesentery or retroperitoneum. 70-80% of them are benign constituting mostly a chance finding. Approximately 20-30% are malignant [2].

The radiological characteristics of GIST vary depending on the size of the tumor and the organ of origin [2].

The clinic is often vague and depends on the size of the tumor, the large ones are usually symptomatic. The most frequent symptoms are: abdominal pain or distension,

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gastrointestinal bleeding, unexplained anemia, mass, weight loss, nausea or vomiting. Ascites is very rare. Duodenal tumors rarely cause duodenal obstruction or obstructive jaundice. They have a tendency to exophytic growth, most involve the muscularis propria and in 50% of the cases they produce mucosal ulceration [1-3].

Histologically, they are classified according to the type of predominant cell: fusiform cell (most common), epithelioid cell or mixed [2,6,8].

Predicting their malignant potential is a difficult task, but there are data that are associated with a worse prognosis;

1. Location; Distal intestinal
2. Size; is the most indicative characteristic of malignancy or benignity, tumors smaller than 2 cm are usually benign.
3. High mitotic activity.
4. Growth or expansion outside the gastrointestinal tract.

They do not indicate malignant potential; necrosis, cystic changes, nuclear atypia, vascularization and degree of staining for CD117 [7,8].

The typical immunohistochemical characteristics of GIST are:

1. Positivity for KIT (CD117).
2. Coexpression CD34 (70% cases).
3. They can be positive for smooth muscle actin and rarely for desmin and S-100 protein [2]. According to the consensus of pathologists, the GIST terminology applies only to gastrointestinal mesenchymal neoplasms with KIT immunoreactivity [2].

The presentation of the clinical case is intended to describe the clinical characteristics and diagnostic findings of a patient with a gastrointestinal stromal tumor.

## Case Report

Male patient, 15 years old, mestizo, with a good health history up to one month before admission that began with epigastralgia and mild anorexia. He was assisted in his health area and in the study he detected anemia of 5.6 g / L, treatment was imposed with oral iron salts and vitamin C. He was referred to the Institute of Hematology and Immunology, where a refractory ferripriva anemia was diagnosed to the treatment with iron salts, it is consulted with Gastroenterology and it is decided to perform upper digestive endoscopy.

No Allergies: Transfusions: Yes, no reactions. No Traumas

General Physical Examination: Intense cutaneous-mucosal pallor, not icterus.

BMI: 18.2 Kg / m<sup>2</sup>

## Applied studies

**Esophagogastroduodenoscopy:** Pangastritis erythematosus, gastric antrum tumor.

Comment: gastric mucosal biopsy is taken and duodenal smear.

**Gastric biopsy:** moderate chronic antral gastritis, with signs

of atrophy and inflammation, edema and regenerative cellular changes.

**Duodenal smear:** Negative

**Laparoscopy:** (Figure 1)

**Freezing biopsy:** GIST of low degree of malignancy.

**Behavior:** It was decided to surgically intervene gastrojejunostomy (Billroth II). Distal gastric resection of antrum and gastric body, which macroscopically measured 3.5 cm × 3 cm × 3 cm, with fibroelastic consistency, rough surface and brown color. No invasion of the mucosa or gastric serous.

**Anatomy Surgical Piece:** Tumor completely resected, edges of surgical section free (Figure 2).

**Immunohistochemical study:** GIST, KI 167 positive in 1% of the tumor nuclei, CD 117 and CD 34 positive +++, negative alphactin and S 100 negative.

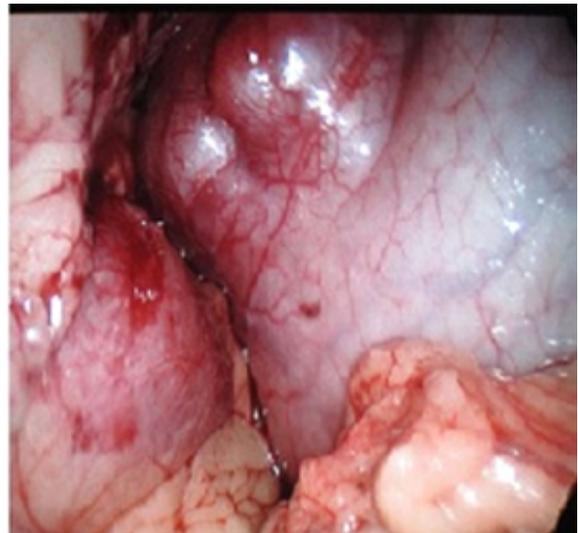


Figure 1: Laparoscopic GIST image

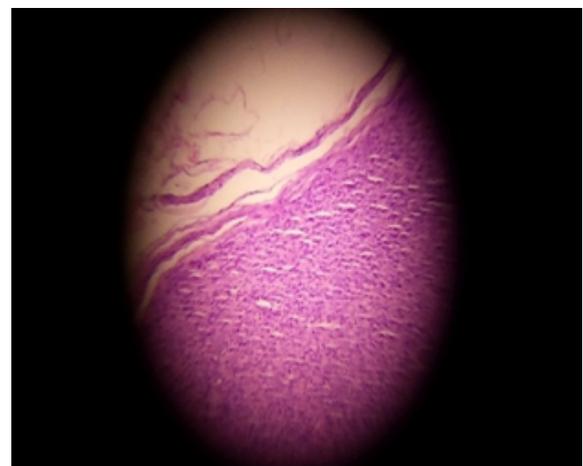


Figure 2: Histological study

The postoperative recovery was very good, antibiotic treatment was imposed with ceftriaxone, amikacin and intravenous metronidazole. The oral route was started with liquids on the sixth day after surgery, with very good tolerance and the patient was discharged 15 days after surgery fully recovered.

**Followup:** It was decided not to initiate the treatment with Imatinib (Gleevec) due to its toxicity in pediatric age, and to follow-up by consulting Gastroenterology and Oncopediatrics, initially with a monthly frequency during one year. Then, the follow-up will be quarterly in the second year, and semi-annually in the third year. Thereafter, it will be annual, until the completion of five years, in order to detect any manifestation of tumor recurrence.

## Discussion

Gastrointestinal stromal tumors are currently considered the most common mesenchymal neoplasm [8,10] with a potential impact of around 10-20 cases per million inhabitants [1,2]. These tumors are arousing great interest nowadays in the medical and scientific community, because after the clarification of their peculiar genetic mechanisms (changes in the tyrosine kinase receptors KIT and PDGFRA) they have become the model of targeted therapy with tyrosine kinase inhibitors such as imatinib or sunitinib [1,3,8,10].

Pediatric GISTs are extremely rare. Given its recent identification (until 10 years ago, most GISTs were classified as visceral leiomyosarcomas, leiomyomas, or leiomyoblastoma) and in the absence of a registry dedicated to pediatric GIST, there is no precise epidemiological database. A recent review of the literature has described 21 familial cases (one association with type I neurofibromatosis or the Carney triad, with paraganglioma, lung chondritis, and esophageal leiomyoma) and 113 sporadic cases under 21 years [3,11].

In this study a male patient was observed, according to some authors the female sex is the predominant one in the pediatric age [3,7]. The gastric localization was the most frequent in the literature consulted [1-4,7-9,11-15], data that corresponds to the case. It is often multifocal, with slow and perhaps better evolution than that seen in adults [2,7].

The imaging studies performed in the patient presented findings that correspond to those of the consulted bibliography [2].

It is important to bear in mind that according to some authors [3,7], pediatric GISTs have a low incidence of CD-117 positivity. In this study, the patient presented a positive CD-117 +++.

The endoscopic characteristics of this tumor correspond to those cited in the literature [13]. Surgical treatment was the one of choice in the majority of the literature consulted [11-13,16].

The "European Working Group on pediatric GIST", recently constituted under the auspices of the SIOP (International Society of Pediatric Oncology), is activating clinical and research collaborations with the groups to which sarcomas and cancers refer. Unusual childhood and, above all, with adult groups of

medical oncology dealing with GIST, to unify the forces and take advantage of the huge body of biological and clinical knowledge developed in the field of adult GIST in the last decade [3].

## Informed Consent Statement

Informed consent was obtained from the patient.

## Conflict-of-interest Statement

No potential conflicts of interest relevant to this article were reported.

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