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Surgical Treatment of Gastric Gist: Experience from the Esophagus and Stomach Service of a Teaching Hospital

Mariana Ottoboni Magalhães[1], Eumildo de Campos Júnior[1]

[1]Faculdade de Medicina de São José do Rio Preto (FAMERP), São José do Rio Preto - SP, Brazil

Abstract: Gastrointestinal stromal tumor (GIST) is a rare neoplasm, representing 1–2% of non-epithelial gastrointestinal cancers, with a gastric predominance in 60% of cases. In Brazil, an estimated 3,000 to 5,000 new diagnoses occur annually. Its clinical presentation varies from asymptomatic to nonspecific, hindering early detection. This study retrospectively analyzed cases of gastric GIST treated surgically between 2010 and 2020. **Methods** An observational, retrospective, and descriptive study was conducted involving 22 patients who underwent surgical resection. Clinical, histological, and surgical data were collected. **Results** The mean age was 66.18 years, with a predominance of females (68.2%) and individuals of white ethnicity (100%). The most common location was the gastric body (59.1%), with a higher incidence of tumors between 2 and 5 cm (50%). Most CT scans showed localized, non-metastatic lesions. Histologically, 72.7% of the tumors were grade I. The primary immunohistochemical markers were positive for C-Kit (95.5%) and Vimentin (100% of those evaluated), and negative for AE1/AE3 (100%). Laparotomy was utilized in 68.2% of cases, and 95.5% were treated with wedge gastrectomy. Only two patients received adjuvant Imatinib. There were no cases of vascular or angiolymphatic invasion, and 86.4% had free surgical margins. The survival rate ≥ 5 years was 86.4%, with no reports of recurrence in the followed patients. **Conclusion** Adequate surgical resection of gastric GIST with free margins is associated with high long-term survival and low recurrence rates, demonstrating the effectiveness of surgery in managing this neoplasm.

Keywords: Gastric GIST, Gastrectomy, Oncological surgery, Mesenchymal neoplasm, Surgical resection, Survival

Introduction

Currently, it is known that there is a heterogeneous group of stromal neoplasms of the gastrointestinal tract (GIT), such as leiomyomas, lipomas, Schwannomas, and gastrointestinal stromal tumors (GIST), among others. Among these, gastric GIST stands out as an infrequent cancer, representing only 1 to 2% of primary non-epithelial gastrointestinal (GI) cancers. However, among mesenchymal tumors of the GI tract, gastric GIST cases are the most common; in Brazil, 3,000 to 5,000 new GIST cases are diagnosed per year.

Regarding the distribution of GIST, 60% of cases occur in the stomach, 20% to 25% in the jejunum and ileum, 5% in the duodenum, and 10% to 15% in the colorectal region, while only 1% affects the esophagus. This gastric lesion is frequently asymptomatic or mildly symptomatic, depending on its size and location. When signs and symptoms appear, they include overt gastrointestinal bleeding and occult blood in the stool, characterizing an anemic syndrome. Additionally, patients may present with a palpable mass, intestinal obstruction (primarily in small intestine lesions), nausea, emesis, and abdominal distension. Due to the rare presentation of symptoms, approximately 20% of GIST diagnoses are made incidentally through exams such as upper endoscopy requested for other reasons.

In these asymptomatic cases, gastric submucosal lesions—with or without mucosal ulceration and a positive "tent sign"—become suggestive of GIST, which can be confirmed by biopsy. This tumor can also be identified by ultrasound, computed tomography (CT), magnetic resonance imaging (MRI), and positron emission tomography (PET-CT). Typically, gastric GIST arises from specific cells of the autonomic nervous system known as the interstitial cells of Cajal, which serve as the digestive system's pacemaker responsible for gastrointestinal motility.

The objective of this study is to evaluate the experience of the Hospital de Base (HB) in São José do Rio Preto in treating gastric GIST between 2010 and 2020, aiming to analyze the results of surgical treatment in patients with this tumor.

Methods

This study was approved by the Research Ethics Committee of the Faculdade de Medicina de São José do Rio Preto (FAMERP) under CAAE number: 67922523.5.0000.5415. It is an observational, retrospective, and descriptive study involving the analysis of medical records from patients admitted

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Mariana Ottoboni Magalhães (Correspondence)
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to the Esophagus and Stomach Ward of the Hospital de Base. Data collection was based on the selection of patients with gastric GIST who were surgically treated at the institution between 2010 and 2020.

Data were collected from the electronic medical record platform (SoulMV) and stored in the RedCap platform, followed by descriptive statistical analysis (mean and median). A total of 22 clinical cases of patients who underwent surgical resection for gastric GIST were evaluated in detail. All surgical procedures occurred over a ten-year period, allowing for a comprehensive retrospective analysis of clinical, surgical, and pathological characteristics, as well as postoperative outcomes and clinical follow-up.

The following data were collected:

- Age at the time of surgery, sex, and ethnicity.
- Tumor location and size according to the pathology report.
- Abdominal CT findings, histological grade, and Ki67 expression percentage.
- Surgical modality (laparotomy, laparoscopic, or video-assisted laparoscopic surgery) and type of gastrectomy (segmental, subtotal, or total).
- Use of neoadjuvant or adjuvant therapy.
- Immunohistochemical panels (C-Kit, AE1/AE3, Vimentin, Desmin, and S100).
- Circumferential surgical margins, vascular or angiolymphatic invasion, perineural invasion, and presence of tumor necrosis.
- Survival time (< 5 years or ≥ 5 years) and disease recurrence.

Inclusion criteria encompassed all patients with a confirmed diagnosis of gastric GIST treated surgically at the Hospital de Base between 2010 and 2020. Exclusion criteria included patients without a GIST diagnosis, those who did not undergo surgery at the institution, cases outside the specified timeframe, and individuals with other submucosal lesions (e.g., gastric lipoma, ectopic pancreas).

Aqui está a continuação da tradução técnica, cobrindo as seções de Resultados, Discussão e Conclusão, mantendo o padrão do Inglês Americano (US) e o rigor acadêmico:

Results

The study included 22 patients who underwent surgical resection for gastrointestinal stromal tumors (GIST) with gastric involvement. The mean age of the patients was 66.18 years. The lowest ages in the sample were 50, 54, 57, 58, and 60 years, while the highest were 72, 73, and 80 years. The median was 70 years, which also corresponded to the mode of the distribution. There was a female predominance, representing 68.2% of the sample. All 22 patients (100% of the sample) self-identified as white; there were no patients who self-identified as Black, mixed-race (Pardo), Indigenous, or Asian (Amarelo).

Regarding tumor location, the most frequently affected region was the gastric body, accounting for 59.1% of cases, followed by the fundus (27.3%) and the antrum (13.6%). In terms of size, most tumors were between 2 and 5 centimeters, representing 50% of the sample. Additionally, 31.82% of the tumors were between 5 and 10 cm, 13.63% were smaller than 2 cm, and 4.55% were larger than 10 cm.

In 7 cases, tomographic examination showed no evidence of a lesion; in 11 cases, the tumor was localized, and in 3 cases, metastases were identified (hepatic metastasis in one case and locoregional lymph node involvement in two). Abdominal CT was not performed for one patient. Regarding histological classification, 72.7% of cases were Grade I, 0% were Grade II, and 4.5% were Grade III; in 22.7% of cases, the grade was not included in the pathology report.

Regarding Ki67 expression, 9.1% of cases presented less than 1%, 22.7% showed expression between 1% and 10%, and 13.6% presented expression equal to or greater than 10%. In 54.5% of cases, the expression was not listed in the immunohistochemical report. Immunohistochemical expression analysis showed that 95.5% of cases were positive for C-Kit, while 4.5% were negative. For Vimentin, 36.4% were positive, with 63.6% lacking information in the medical records. Desmin was positive in 13.6% of cases, negative in 63.6%, and absent in 22.7%. S100 protein was positive in 13.6%, negative in 59.1%, and unrecorded in 27.3%. Regarding AE1/AE3, no cases were positive, 72.7% were negative, and 27.3% had no information available.

Regarding the surgical approach, 68.2% of patients (15 cases) underwent laparotomy, while 31.8% (7 cases) underwent laparoscopic surgery. As for the type of gastric resection, 95.5% of cases (21 patients) were treated with wedge gastrectomy, and 4.5% (1 patient) with total gastrectomy. No patient received neoadjuvant treatment. Only two patients were treated with 400 mg of Imatinib after surgical resection—one due to suggestive hepatic metastasis on CT and the other due to compromised surgical margins after partial gastrectomy. Adjuvant treatment was not performed in 17 other patients, and in three cases, the record of adjuvant or neoadjuvant therapy was missing due to loss to follow-up.

Analysis of surgical margins showed that 86.4% of patients (19 cases) had neoplasm-free circumferential margins, while 13.6% (3 cases) had compromised margins. No cases presented vascular or angiolymphatic invasion. Perineural invasion and tumor necrosis were each observed in only 4.5% of cases (1 patient each), while these findings were absent in the remaining 95.5%. Regarding survival, 86.4% (19 cases) presented survival ≥ 5 years, 4.5% (1 case) had survival < 5 years, and 9.1% (2 cases) were lost to follow-up. No cases of tumor recurrence were observed in the patients followed during the study period.

Discussion

The present study exclusively evaluated cases of gastric GIST, the most frequent presentation of this tumor type. Globally, GIST diagnosis is distributed equally between men and women. However, the data obtained here showed a predominance of females treated at the teaching hospital. It is noteworthy that this study only analyzed operated gastric GISTs, unlike broader literature that includes other gastrointestinal sites.

The mean age of prevalence for this neoplasm is approximately 60 years globally, whereas the mean in this study was 66.18 years. Because these tumors are often asymptomatic and identified incidentally, underdiagnosis may contribute to scarce reports in some regions and divergent epidemiological data. Although GIST incidence is significantly higher among African Americans compared to other ethnicities, 100% of the patients at this institution were white. This discrepancy may be explained by local demographics, sample size, or healthcare access inequalities.

Regarding tumor size, 50% were between 2 and 5 cm, a smaller size compared to international cohorts where 49% are over 5 cm. This smaller size likely contributed to the favorable outcomes, as smaller neoplasms tend to have better therapeutic responses and prognoses. Most patients presented localized, non-metastatic tumors on CT, with 72.72% having Grade I histological tumors, facilitating successful surgical outcomes.

The Ki67 marker is an indicator of cellular proliferation, with high levels generally associated with a poor prognosis, although its risk stratification in GIST is not yet fully defined. In this study, 3 cases showed Ki67 ≥ 10%, aligning with traditional risk classifications for intermediate or high risk. Molecularly, GISTs express the KIT protein in over 95% of cases, which was corroborated by this study's 95% C-KIT positivity.

While literature describes most GISTs as negative for desmin and S100 protein, testing these is essential to differentiate GISTs from schwannomas or leiomyosarcomas. The cases analyzed confirmed a predominance of negative results for these markers. Regarding Vimentin, all evaluated cases were positive, consistent with reports of 88.9% positivity in GISTs. AE1/AE3 markers, typically associated with high-risk tumors, were 100% negative in the tested samples, likely reflecting the milder histological profile and better prognosis of the cohort.

Surgical management of GIST aims for complete resection with free margins (R0 resection). While laparotomy was historically the standard, there has been a shift toward minimally invasive techniques. In this study, 68.18% were open surgeries, reflecting older standards within the 2010–2020 period, but 31.81% utilized minimally invasive approaches. Unlike gastric adenocarcinoma, GIST surgical management usually involves wedge resection without lymphadenectomy.

Imatinib, a tyrosine kinase inhibitor, has revolutionized GIST treatment for metastatic, unresectable, or high-risk cases. In this study, over 90% of patients did not receive Imatinib because their lesions were not high-risk. Postoperative outcomes showed over 85% with free circumferential margins and a 5-year survival rate above 86%. No recurrences were noted, suggesting that most cases were localized and relatively indolent.

Conclusion

The data indicate that when gastric GISTs are appropriately resected, patients tend to have a highly favorable prognosis, characterized by high long-term survival rates and low recurrence. While early detection is challenging due to the asymptomatic nature of the disease, timely identification combined with R0 resection and systematic follow-up is critical for optimal outcomes.

Risk stratification—considering tumor size, mitotic index, and primary site—is fundamental in defining appropriate therapy and classifying patients for adjuvant interventions. Most cases in this study were not high-risk, which directly influenced the clinical decision to forgo Imatinib in over 90% of patients. Ultimately, the strategic combination of timely diagnosis, meticulous surgical resection, and continuous clinical follow-up remains the most effective approach for managing gastric GISTs, ensuring high survival rates and preserved quality of life.

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