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**Case Report**

# Duodenal gastrointestinal stromal tumor: a rare disease in a young male patient presenting with life-threatening hemorrhage

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## ABSTRACT

Gastrointestinal stromal tumors (GISTs) are rare in the duodenum and can pose significant diagnostic and therapeutic challenges, particularly when presenting with acute gastrointestinal bleeding. A 33 years old male presented with multiple episodes of hematemesis, melena and severe anemia. Upper endoscopy revealed a duodenal nodule with overlying ulceration. CT angiography suggested a submucosal lesion consistent with a gastrointestinal stromal tumor. After stabilization, the patient underwent exploratory laparotomy with local tumor excision and omentoplasty. Postoperative recovery was uneventful. Histopathological evaluation confirmed the diagnosis of a low-grade spindle-cell type GIST. The tumor was submucosal, unifocal and fully resected with clear margins. The surgical approach was tailored to preserve duodenal integrity, given the patient's young age and tumor location. This case emphasizes the importance of recognizing duodenal GIST as a potential cause of upper gastrointestinal bleeding, even in younger adults. Prompt diagnosis and appropriate surgical intervention can lead to favorable outcomes..

**Keywords:** Duodenal gastrointestinal stromal tumor, Upper gastrointestinal bleeding, Hematemesis, Exploratory laparotomy, Spindle cell GIST

## INTRODUCTION

GISTs are the most common mesenchymal tumors of the gastrointestinal tract. Although they can arise anywhere along the GI tract, they are most commonly found in the stomach (60%), followed by the small intestine (20-30%) and the duodenum (approximately 5%). Duodenal GISTs account for roughly 10-30% of all duodenal tumors.[1] While they may occasionally present in children or young adults, GISTs most commonly affect males over the age of 50. Clinical presentations vary significantly and are influenced by the tumor's growth pattern (intramural or extramural), size location. Gastrointestinal bleeding (GIB) and generalized abdominal pain are among the most frequent symptoms. GISTs are typically classified into four risk categories: very low, low, intermediate and high. Importantly, tumor location independently influences the clinical behavior, histological features and immunohistochemical profile of GISTs and serves as a separate risk factor for recurrence. The primary goal of surgical management is complete excision of the tumor with negative margins.[1] Surgical approaches range from local excision to pancreaticoduodenectomy, depending on tumor size and location. Duodenal GISTs pose unique diagnostic and therapeutic challenges due to their location and the complexity of surgical intervention. In cases presenting with acute hemorrhage, emergency surgical management may be required, limiting the ability to perform preoperative staging and delaying the formulation of an elective surgical plan.

## CASE REPORT

A 33 years old male was admitted to the Intensive Care Unit (ICU) at Anand Multispeciality Hospital, Ahmedabad, on January 4, 2022, with chief complaints of 7-8 episodes of vomiting, along with three episodes of hematemesis and melena over the preceding two days. The patient had a two-year history of alcohol and tobacco use. On admission, his blood pressure was 90/60 mmHg

and his pulse rate was 98 beats per minute. Relevant laboratory investigations are summarized in Table 1. Symptomatic treatment was initiated and three units of packed red blood cells (PRBCs) were transfused based on the patient's hemoglobin level. Bedside ultrasonography of the abdomen was performed and found to be normal. Upper gastrointestinal endoscopy revealed a duodenal nodule with an overlying ulcer and a pigmented spot, without evidence of active bleeding at the time of examination. An additional unit of packed red blood cells (PRBCs) was administered along with standard supportive care. A contrast-enhanced CT scan of the abdomen revealed a benign-appearing mass lesion, most likely representing a GIST. The patient's thyroid profile was also evaluated and found to be within normal limits. Gradual improvement was noted in hemoglobin levels and other clinical parameters. The patient was discharged after three days of stabilization and advised to return for follow-up in 10 days. On February 2, 2022, the patient was readmitted for elective exploratory laparotomy. Preoperative blood investigations were performed and the results are summarized in Table 3.

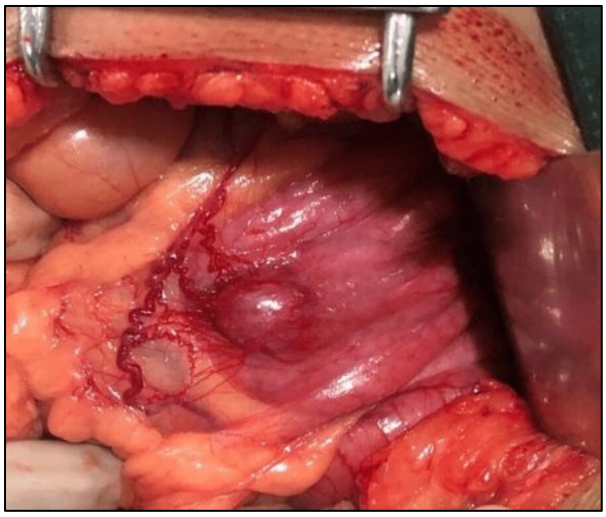

**Figure 1: Intraoperative image of duodenal gist.**

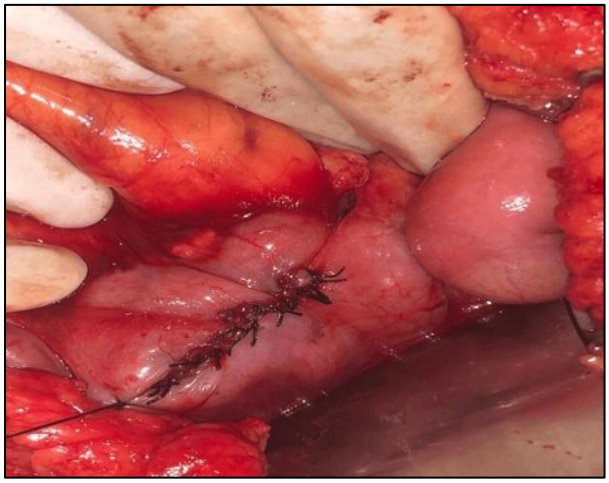

**Figure 2: Primary repair after removal of gist.**

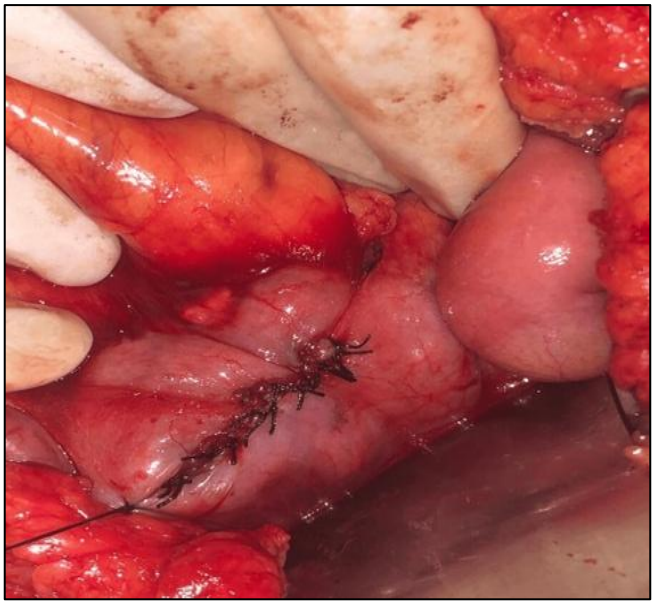

**Figure 3: H & E Stain for GIST-arrow showing spindle cells.**

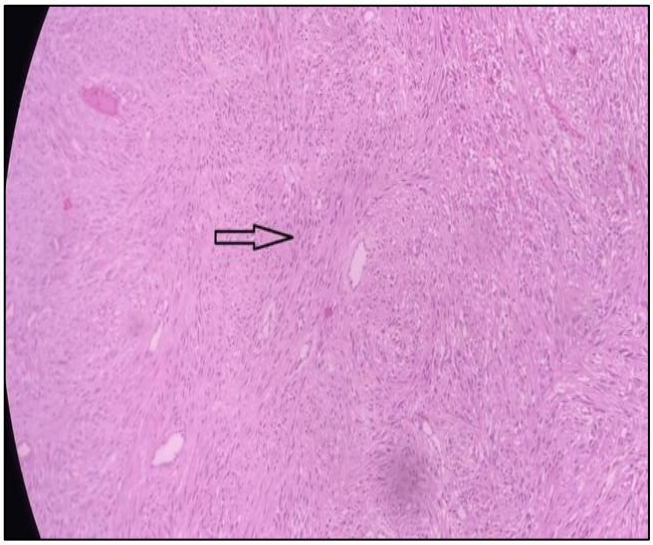

**Figure 4: CD 117 marker positive-arrow showing c-kit positive tumour.**

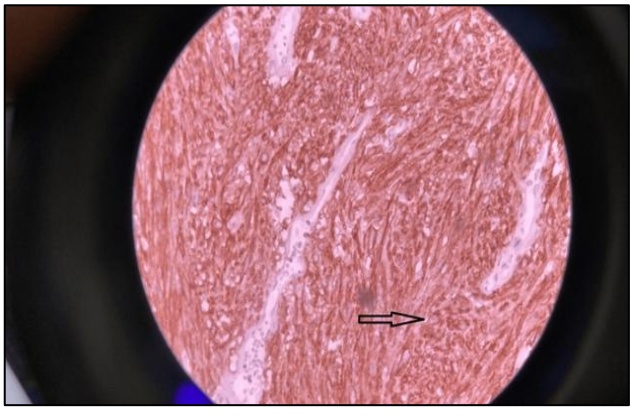

**Figure 5: DOG1 IHC marker positive.**

The chest X-ray was normal and the COVID-19 RT-PCR test was negative. Exploratory laparotomy with excision of the GIST was performed, followed by omentoplasty and primary repair. Figures 1 and 2 depict the intraoperative image of the duodenal nodule and the primary repair after tumor excision. Postoperatively, the patient was managed with intravenous fluids, antibiotics and antiemetics and was kept nil by mouth (NBM). A drain, Ryle's tube and urinary catheter were in place. Over the next few days, the patient remained hemodynamically stable. The urinary catheter was removed first, followed by gradual reintroduction of oral fluids after removal of the Ryle's tube. The drain was subsequently removed and the patient was advised to undergo biopsy and CT imaging for further prognostic evaluation.

**Table 1: Laboratory investigations at admission.**

| Parameter | Result | Reference range |
|---|---|---|
| **Haemoglobin** | 6 g/dl | 13–17 g/dl |
| **Total count** | 11500 /mm$^3$ | 4000–11000 /mm$^3$ |
| **Random blood sugar (RBS)** | 183 mg/dl | 70–140 mg/dl |
| **Serum creatinine** | 0.84 mg/dl | 0.7–1.3 mg/dl |
| **Blood urea** | 63.3 mg/dl | 10–50 mg/dl |
| **Prothrombin time (PY)** | 16.3 sec | 11–13.5 sec |
| **INR** | 1.19 | 0.8–1.2 |
| **Activated partial thromboplastin time (APTT)** | 36.6 sec | 25–35 sec |

**Table 2: Trend of haemoglobin levels.**

| Date | Time | Haemoglobin (g/dl) |
|---|---|---|
| **05 January 2022** | Morning | 8.5 |
| **05 January 2022** | Evening | 7.3 |
| **06 January 2022** | Morning | 5.9 |

**Table 3: Blood investigations before surgery.**

| Parameter | Result | Reference range |
|---|---|---|
| **Haemoglobin** | 13 g/dl | 13–17 g/dl |
| **Total leukocyte count (TC)** | 5300 /mm$^3$ | 4000–11000 /mm$^3$ |
| **Platelet count** | 185,000 /mm$^3$ | 150,000–450,000 /mm$^3$ |
| **Random blood sugar (RBS)** | 128.4 mg/dl | 70–140 mg/dl |
| **Blood urea** | 18.6 mg/dl | 10–50 mg/dl |
| **inr** | 0.93 | 0.8–1.2 |
| **Activated partial thromboplastin time (APTT)** | 31.3 sec | 25–35 sec |

## DISCUSSION

Approximately 1% of gastrointestinal tumors are GISTs.[2] The estimated incidence in adults ranges from 10 to 20 cases per million population.[2,3] GISTs typically present between the ages of 50 and 65, with only about 5% occurring in individuals under the age of 30.[4] Duodenal GISTs primarily affect adults aged 50 to 70 and show a slight male predominance. In large GIST cohorts, children and young adults are occasionally represented.[5] Apart from one reported case involving a 19 years old female, most published reports of GISTs with severe bleeding in patients under 30 have involved male patients aged between 7 and 29 years. In our case, the age of onset was notably younger than average. GISTs are the most common mesenchymal tumors of the gastrointestinal tract, usually subepithelial in origin and believed to arise from the interstitial cells of Cajal within the muscularis propria. The stomach and small intestine are the most frequent locations. Despite their often-benign appearance, all GISTs carry malignant potential.[6] Duodenal GISTs (DGISTs) are rare, with an average lesion size of approximately 4 cm, the tumor in our case was smaller than this average. Alcohol consumption and gastritis likely contributed to the upper gastrointestinal bleeding observed in our patient. Due to the rarity of DGISTs, diagnosis via esophagogastroduodenoscopy (EGD) can be challenging. The patient presented with melena, anemia and overt GI bleeding. Clinical suspicion, supported by imaging and endoscopic findings, guided the diagnosis. Endoscopy with ultrasound may aid detection, while contrast-enhanced CT and MRI remain the gold standards for evaluating primary lesions and distant metastases. Optimal surgical strategies for duodenal GISTs remain under debate due to the low incidence and limited available data. The anatomical complexity of the duodenum-particularly the second portion-and its proximity to critical structures like the

pancreas and biliary system complicate operative planning.[7] Depending on tumor size and location, options range from local excision to pancreatoduodenectomy. In small, laterally located tumors within the second to third portions of the duodenum, local resection is often preferred over wedge or segmental resection in the absence of clear guidelines.[8,9] In this case, laparotomy with local resection and omentoplasty was performed.

Histopathological analysis of the excised submucosal duodenal nodule confirmed a GIST of the spindle cell type, originating from the submucosa. Immunohistochemical staining demonstrated strong, diffuse positivity for CD117 and DOG1, both of which are highly sensitive and specific markers for GIST. Other markers, including CD34, H-Caldesmon, SMA, desmin and S-100, were negative, further confirming the diagnosis. Figure 3 shows the hematoxylin and eosin (H&E) stain of the tumor. Figure 4 image shows CD 117 marker positive for GIST. Figure 5 shows DOG1 marker positive for GIST.

The tumor measured 1.5×1.3×1.0 cm and was classified as low grade, with a mitotic count of 1-2 per 50 high-power fields (HPF) and no evidence of necrosis. It was a unifocal lesion and all circumferential margins were free of tumor, with the closest margin measuring between 0.2 and 0.3 cm. According to the AJCC 8th edition pTNM classification, the tumor was staged as pT1NXPX. Given its small size and low mitotic index, formal risk stratification was not applicable. Collectively, these findings suggest a favorable prognosis.

## CONCLUSION

This case highlights the importance of considering duodenal GISTs in the differential diagnosis of upper gastrointestinal bleeding, even in young adults. Timely hemodynamic stabilization followed by definitive surgical management can lead to excellent outcomes, even in rare and anatomically challenging presentations. While minimally invasive diagnostic and therapeutic options continue to evolve, surgical resection remains the cornerstone of curative treatment for localized duodenal GISTs.

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