



Original Article

Primary small bowel tumors: A five-year surgical audit

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ABSTRACT

Objectives: Primary small bowel tumors (SBTs) are uncommon, comprising less than 5% of all gastrointestinal malignancies. Their nonspecific symptoms often lead to diagnostic delays and treatment at advanced stages. This study aimed to analyze the clinical features, surgical management, and outcomes of patients with primary SBTs treated at a tertiary care center over a five-year period.

Material and Methods: A retrospective review was conducted on 21 patients who underwent surgery for primary SBTs between January 2018 and December 2022. Data collected included demographics, presenting symptoms, imaging modalities, operative findings, histopathology, postoperative complications, and survival outcomes.

Results: The study included 13 male and 8 female patients, with a mean age of 47.8 years. The median time from symptom onset to diagnosis was 2.5 months. Abdominal pain was reported in all patients, with obstruction (57.1%) and gastrointestinal bleeding (28.5%) as common additional symptoms. The jejunum was the most frequent tumor site (66.6%). Surgical management included laparoscopic resection in 52.3% and open surgery in 47.7%. Histological subtypes included adenocarcinoma (38.1%), gastrointestinal stromal tumor (28.5%), lymphoma (14.2%), neuroendocrine tumor (9.5%), inflammatory pseudotumor (4.7%), and Ewing's sarcoma (4.7%). The mean hospital stay was 5.7 days, and postoperative morbidity occurred in 23.8% of patients. The median survival was 26 months (range 6–42 months).

Conclusion: Primary SBTs are rare and often present late due to vague symptoms. A high index of suspicion, appropriate imaging, and timely surgical intervention are essential for improved outcomes. Histological subtype significantly influences prognosis and postoperative management.

Keywords: Lymphoma, Primary small bowel tumor, Small bowel adenocarcinoma, Small intestine, Surgical treatment

INTRODUCTION

The small intestine constitutes approximately 80% of the mucosal lining of the gastrointestinal tract, yet malignancies arising from this region are notably rare. This low incidence may be attributed to the rapid transit of luminal contents, which limits mucosal exposure to potential carcinogens, along with various intrinsic protective mechanisms within the small bowel.^[1] The majority of SBTs fall into four principal histological categories: carcinoid tumors, adenocarcinomas, lymphomas, and gastrointestinal stromal tumor (GISTs), which together account for around 93% of cases. The

remaining minority encompasses a diverse group of over 40 less common histological variants. Among malignant neoplasms of the small intestine, adenocarcinoma emerges as the most frequently encountered subtype.^[2] Its prevalence tends to decline distally along the small intestine, being more common in the duodenum and less so in the ileum, whereas lymphomas more frequently localize to the distal segments. Anatomically, approximately 20% of small bowel malignancies are located in the duodenum, 30% in the jejunum, and 50% in the ileum.

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Received: 02 August 2025 Accepted: 03 November 2025 Published: 23 January 2026 DOI: 10.25259/ASJO_59_2025

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Despite advancements in diagnostic modalities, SBTs remain difficult to detect early and are frequently diagnosed at a late stage. They may present with vague, chronic symptoms such as abdominal pain and weight loss, or manifest acutely with complications like bleeding, obstruction, or perforation that necessitate emergency intervention. Among available diagnostic tools, computed tomography (CT) is regarded as the most effective technique for preoperative assessment and staging. Most malignant lesions of the small bowel produce clinical symptoms, with abdominal pain and weight loss being the most frequently reported.^[3]

Staging of small bowel adenocarcinomas is typically based on the American Joint Committee on Cancer (AJCC) classification system, which shows an inverse relationship between tumor stage and overall survival.^[4] Due to the infrequent nature of these malignancies, there is limited literature guiding optimal treatment and prognostication. The purpose of this study is to conduct a retrospective evaluation of patients diagnosed with primary SBTs who underwent surgical management at a single tertiary gastrointestinal surgery unit over a five-year period.

MATERIAL AND METHODS

In total, 21 patients with primary SBTs who underwent surgery between January 2018 and December 2022 were retrospectively analyzed. The patients were evaluated in terms of age, sex, and complaints; the medical records of the patients were retrospectively reviewed to collect data, including patient characteristics (sex, age, performance status based on the Eastern Cooperative Oncology Group (ECOG) scale, diagnostic methods, operative findings, tumor localization, surgical methods, pathological findings, morbidity, mortality and average length of hospital stay). Long-term results were obtained from file records and interviews with patients. Patients aged 18 years or older who underwent emergency or elective surgery and were diagnosed with primary SBTs (benign or malignant) were included in the study. Patients with periampullary tumors, tumors located in the duodenum adjacent to the ampulla of Vater, or metastatic tumors were excluded from the study. The research was conducted in accordance with the Declaration of Helsinki and received approval from the institutional ethics committee. It is reported following the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines.

Statistical analysis

All continuous variables are reported as the mean standard deviation (SD) values. Variables with a nonnormal distribution are reported as median (range) values. Dichotomous variables

are expressed as frequencies. Statistical analyses were performed with Excel® (Office) for Windows® version 10 (Microsoft, Redmond, Washington, USA).

RESULTS

Our study included 21 patients who underwent surgical treatment for SBTs during the study period. Among the 21 patients, 13 (61.9%) were male, and 8 (38.1%) were female, with a mean age of 47.8 years (21–74 years). The median time from the onset of symptoms to diagnosis was 2.5 months (1–11 months). All patients experienced abdominal pain; abdominal distension (subacute or frank obstruction) was observed in 12 (57.1%) patients, gastrointestinal tract (GI) bleeding in 6 (28.5%) patients, recurrent bouts of vomiting and weight loss in 5 patients (23.8%), and peritonitis in 2 (9.5%) patients. Abdominal CT was used as the imaging method for all patients. Laparoscopic surgery was performed in 11 (52.3%) patients, and open surgery was performed in the remaining 10 (47.7%) patients. Small bowel resection and anastomosis are the most common surgical techniques used.

Table 1 outlines the clinical features and intraoperative findings of the patients. Tumors were found in the jejunum in 14 patients (66.6%) and in the ileum in 7 patients (33.4%). Postoperative histopathological examination revealed the following results: adenocarcinoma in 8 (38.1%) patients, GISTs in 6 (28.5%) patients, lymphoma in 3 (14.2%) patients, neuroendocrine tumor (NET) in 2 (9.5%) patients, inflammatory pseudotumor in 1 (4.7%) patient, and extraskeletal Ewing's sarcoma in 1 (4.7%) patient [Figures 1-3]. Table 2 presents the postoperative outcomes of these patients. The mean hospital stay was 5.7 days. The median survival noted was 26 months (ranging from 6 to 42 months).



Figure 1: Intraoperative image of the jejunal mass (HPE turned out to be Ewing sarcoma) HPE: Histopathological examination

Table 1: Clinical features and intraoperative findings of the patients

No.	Age/sex	Presentation	Duration of symptoms (months)	Location	Procedure	Postop HPE	Hospital stay (days)
1	43/M	Obstruction	5	Jejunum	Resection and anastomosis	Adeno CA	4
2	56/F	Weight loss+ bleeding	3	Ileum	Resection and anastomosis	Lymphoma	3
3	38/F	Subacute obstruction	6	Jejunum	Resection and anastomosis	Adeno CA	5
4	42/M	Obstruction	1	Jejunum	Resection and anastomosis	GIST	6
5	67/M	Weight loss	4	Jejunum	Resection and anastomosis	Adeno CA	3
6	52/M	Subacute obstruction	3	Jejunum	Resection and anastomosis	Adeno CA	5
7	21/F	Perforation	2	Ileum	Resection and stoma	Lymphoma	11
8	47/M	Subacute obstruction	3	Jejunum	Resection and anastomosis	Adeno CA	5
9	62/F	Weight loss+ bleeding	11	Ileum	Resection and anastomosis	GIST	4
10	74/M	Perforation+ bleeding	2	Jejunum	Resection and anastomosis	NET	9
11	41/M	Obstruction	8	Jejunum	Resection and anastomosis	Adeno CA	7
12	36/M	Subacute obstruction	4	Ileum	Resection and anastomosis	GIST	3
13	53/F	Weight loss+ bleeding	7	Jejunum	Resection and anastomosis	Ewings sarcoma	5
14	61/F	Obstruction	9	Jejunum	Resection and anastomosis	Adeno CA	6
15	47/M	Subacute obstruction	5	Ileum	Resection and anastomosis	Lymphoma	5
16	55/M	Bleeding	4	Jejunum	Resection and stoma	GIST	8
17	35/M	Obstruction	9	Jejunum	Resection and anastomosis	NET	4
18	40/F	Bleeding	2	Ileum	Resection and anastomosis	GIST	14
19	51/M	Subacute obstruction	5	Jejunum	Resection and anastomosis	GIST	5
20	46/M	Weight loss	6	Ileum	Resection and anastomosis	Inflammatory pseudotumor	4
21	37/F	Obstruction	4	Jejunum	Resection and anastomosis	Adeno CA	5

CA: Carcinoma, GIST: Gastrointestinal tumour, NET: Neuroendocrine tumor, HPE: Histopathological examination

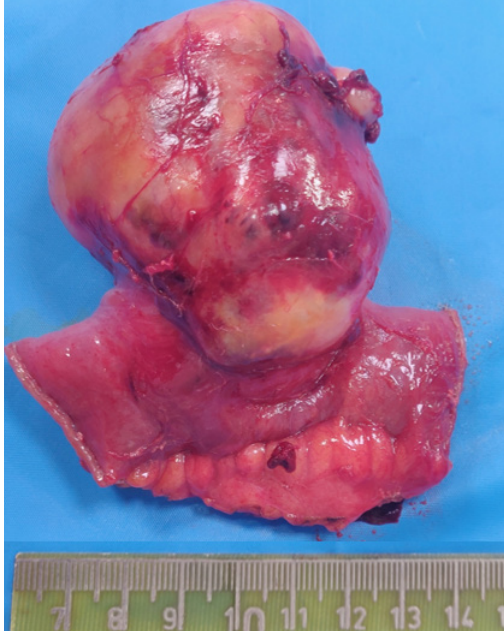


Figure 2: Resected specimen of an ileal GIST. GIST: Gastrointestinal stromal tumor

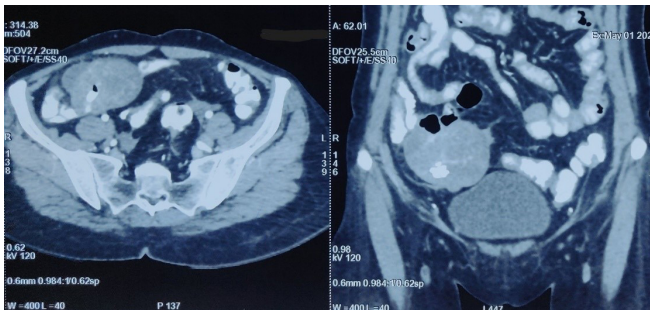


Figure 3: CECT of the abdomen showing an ileal mass CECT: Contrast enhanced computed tomography

Mean hospital stay in days (S.D)	5.7 (2.2)
Morbidity (%)	5 (23.8)
Wound infection	3
Postoperative ileus	1
Intra-abdominal abscess and AKI	1
Median survival in months (Range)	26 (6-42)
SD: Standard deviation, AKI: Acute kidney injury	

DISCUSSION

Primary SBTs are infrequent entities, constituting less than 5% of all gastrointestinal malignancies. Their rarity, combined with vague and nonspecific symptoms, often

leads to delayed diagnosis and treatment, contributing to unfavorable outcomes.^[5] Our five-year surgical audit of 21 patients with primary SBTs reflects the diagnostic challenges, histopathological diversity, and variable outcomes associated with this group of tumors.

In our series, the median time from symptom onset to diagnosis was 2.5 months, which aligns with literature estimates suggesting a diagnostic delay of 8–12 weeks due to the nonspecific nature of symptoms such as abdominal pain, weight loss, and anemia.^[6,7] Abdominal pain was universal among our patients, with a substantial subset presenting with

obstructive symptoms (57.1%) or gastrointestinal bleeding (28.5%), reflective of the common clinical presentation of small bowel malignancies.^[5]

The jejunum was the most commonly affected site (66.6%), followed by the ileum (33.4%). This is consistent with previous studies indicating that while the ileum accounts for up to 50% of malignant SBTs, jejunal involvement is also significant, particularly in tumors such as adenocarcinomas and GISTs.^[8,9] Notably, duodenal tumors were excluded from our study cohort as periampullary lesions often follow different clinical and therapeutic paradigms.

Adenocarcinoma was the most frequent histologic subtype in our cohort (38.1%), consistent with population-based data indicating a rising incidence of small bowel adenocarcinomas, particularly in the jejunum [Figure 4].^[10,11] These tumors typically arise de novo, although predisposing factors such as Crohn’s disease, familial adenomatous polyposis, and celiac disease are recognized in Western populations.^[12] In our cohort, none of the patients had such predisposing conditions documented, reflecting a likely sporadic etiology.

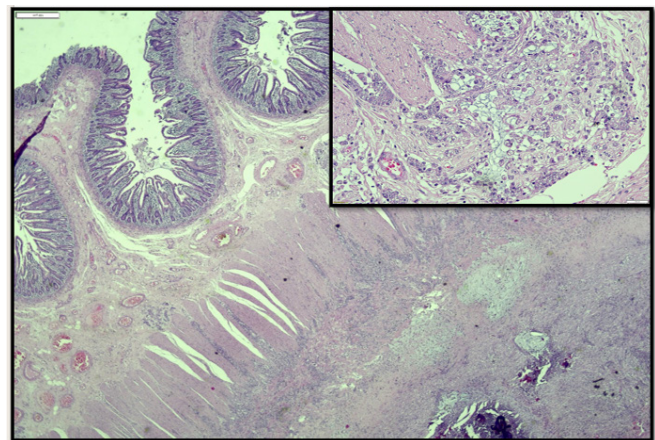


Figure 4: Jejunal resected specimen showing infiltration by a poorly cohesive carcinoma (Inset: Signet ring cells are also noted with occasional pools of extracellular mucin) Scale bar- 200 micrometer. Hematoxylin and eosin, 40X magnification.

Neuroendocrine tumors (NETs) accounted for 9.5% of cases. These tumors most frequently affect the ileum and are notorious for their ability to cause mesenteric fibrosis, carcinoid syndrome, and hepatic metastases.^[13] Interestingly, none of our patients exhibited classic carcinoid symptoms, although one patient had liver metastasis at diagnosis. All NET patients underwent curative resection, and long-term outcomes will depend on tumor grade and Ki-67 index, which were not detailed in this audit.

GISTs comprised 28.5% of cases. GISTs are the most common mesenchymal tumors of the gastrointestinal tract, with the small intestine accounting for approximately 20–40% of cases.^[14,15] The majority of GISTs in our study were diagnosed incidentally following imaging or during exploration for obstruction or bleeding. Given the tumor's submucosal growth pattern, preoperative diagnosis remains difficult unless the tumor attains a large size or ulcerates into the lumen. Complete surgical excision remains the mainstay of treatment, with adjuvant imatinib therapy reserved for high-risk cases based on tumor size and mitotic index.

Lymphomas were diagnosed in 14.2% of cases and predominantly involved the ileum, in accordance with known anatomical predilections. Primary small bowel lymphomas, although rare, have a strong association with immunosuppression and chronic inflammation, such as that seen in celiac disease or HIV.^[16] Our patients with lymphoma were relatively younger and presented with perforation or severe anemia. Segmental resection was the treatment of choice, as is standard for resectable lesions; however, the role of chemotherapy remains essential for long-term disease control.

Our series also included one case each of extraskeletal Ewing's sarcoma and inflammatory pseudotumor. Ewing's sarcoma of the small bowel is extremely rare and often presents with an acute abdomen. Diagnosis is typically confirmed with immunohistochemistry and molecular studies. Inflammatory pseudotumors, though benign, are often mistaken for malignancy preoperatively due to their mass-forming nature.^[17,18] Both patients underwent complete surgical resection with good postoperative recovery.

Laparoscopic resection was feasible in 52.3% of patients, reflecting a growing trend toward minimally invasive management in select cases. Open surgery was reserved for patients with larger tumors, suspected perforation, or diagnostic uncertainty. Small bowel resection with adequate margins and regional lymphadenectomy remains the standard of care for most malignant lesions.^[8] In our series, anastomotic integrity was preserved in most patients, with only one case requiring a stoma due to intraoperative findings.

Postoperative outcomes in our study were encouraging, with a mean hospital stay of 5.7 days and low rates of severe morbidity. Wound infection was the most common complication (14.2%), followed by one case each of postoperative ileus and intra-abdominal abscess with acute kidney injury. No in-hospital mortality was recorded. These findings suggest that timely surgical intervention, even in emergency settings, can be carried out safely with acceptable short-term morbidity.

Survival outcomes varied based on histology and stage. The overall median survival in our cohort was 26 months (range 6–42), comparable to reported data for small bowel adenocarcinomas and GISTs.^[4,10] As expected, patients with low-grade tumors such as NETs or resected GISTs had better outcomes than those with high-grade adenocarcinomas or lymphomas with systemic involvement. The absence of long-term oncologic follow-up data limits more granular survival analysis in this cohort.

The strengths of our study include the homogeneous surgical management within a single tertiary care center and the inclusion of a broad spectrum of histological subtypes. However, several limitations merit discussion. The retrospective nature and small sample size limit statistical power and generalizability. Moreover, the lack of detailed pathological staging, mitotic index for GISTs, and Ki-67 for NETs restricts risk stratification.

Despite these limitations, our findings reinforce several important themes in the management of SBTs. First, a high index of suspicion and early use of cross-sectional imaging in patients with chronic or unexplained abdominal symptoms may reduce diagnostic delay. Second, CT remains the diagnostic modality of choice, but its sensitivity for early or small lesions remains suboptimal, highlighting the need for adjunct modalities like capsule endoscopy or enteroscopy in select cases.^[5,9] Third, surgery remains the cornerstone of treatment for most SBTs and is feasible even in emergency scenarios, as reflected by our perioperative outcomes.

In conclusion, primary SBTs are a heterogeneous group of neoplasms that continue to pose diagnostic and therapeutic challenges. Our audit underscores the importance of clinical vigilance, appropriate imaging, and timely surgical intervention in optimizing patient outcomes. Future prospective, multi-institutional studies are required to better define prognostic factors and the role of adjuvant therapies in these rare but impactful tumors.

CONCLUSION

SBTs are a rare group of tumors that are often diagnosed at an advanced stage because of their nonspecific symptoms.

The clinical presentation of these tumors is diverse and nonspecific, requiring a high level of suspicion for timely diagnosis and treatment. The primary treatment for small bowel cancers is surgical resection with negative margins and adequate lymph node dissection. However, owing to the rarity of the disease, there is a lack of prospective data. Prompt surgery is crucial, as delayed treatment significantly affects the prognosis of these tumors.

Author contributions: MK, TR, VBG, and AKA: All authors contributed to the study conception and design. They commented on previous versions of the manuscript and approved the final version; MK and TR: Were responsible for material preparation, data collection, and analysis, and they prepared and wrote the first draft of the manuscript.

Ethical approval: The Institutional Review Board has waived the ethical approval for this Retrospective analysis study. Waiver number: IEC-223/23.

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent.

Financial support and sponsorship: Nil.

Conflicts of interest: There are no conflicts of interest.

Use of artificial intelligence (AI)-assisted technology for manuscript preparation: The authors confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the writing or editing of the manuscript, and no images were manipulated using AI.

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How to cite this article: Naik M, Theakarajan R, Vageesh B G, Agarwal AK. Primary small bowel tumors: A five-year surgical audit. 2026;12:3. doi: 10.25259/ASJO_59_2025