

Multifocal Well-Differentiated Small Intestinal Neuroendocrine Tumor Presenting as Partial Small Bowel Obstruction in an Elderly Female: A Case Report

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Case Report

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Abstract

Background

Small intestinal neuroendocrine tumors (SI-NETs) are rare, slow-growing malignancies that frequently present with nonspecific gastrointestinal symptoms, leading to diagnostic delays averaging five to seven years. Despite the existence of blood-based biomarkers including serum chromogranin A and urinary 5-hydroxyindoleacetic acid (5-HIAA), most patients continue to present with advanced locoregional or metastatic disease. This case illustrates the diagnostic and surgical challenges of SI-NET in an elderly patient and highlights the clinical consequences of delayed biomarker utilization.

Case presentation:

A 77-year-old White female was referred to a surgical clinic after her primary care physician identified a small bowel mass on imaging ordered for chronic abdominal discomfort and a 20-pound unintentional weight loss. CT imaging demonstrated a solid mesenteric mass with adjacent adenopathy and small bowel tethering, producing the characteristic spoke-wheel sign of mesenteric desmoplasia. Serum chromogranin A and urinary 5-HIAA were not obtained prior to surgical referral. She underwent exploratory laparotomy with open small bowel resection and side-to-side anastomosis. Surgical pathology confirmed multifocal, well-differentiated neuroendocrine tumor (Grade 1, Ki-67 ~ 1%), staged pT4N1, with lymphovascular and perineural invasion and a positive mesenteric margin. Postoperative Dotatate PET identified a single PET-avid mesenteric lesion, prompting referral to a tertiary hepatobiliary center. A second exploratory laparotomy resected a 1.5 cm mesenteric nodule requiring direct repair of a superior mesenteric artery branch. Final pathology demonstrated fibrosis and chronic inflammation with no residual neuroendocrine tumor. The patient elected active surveillance with annual follow-up.

Conclusions

This case demonstrates the striking discordance between low tumor grade and advanced locoregional disease extent in SI-NETs and underscores the missed opportunity for earlier detection through routine biomarker screening in symptomatic patients. The PET-positive mesenteric nodule that yielded only fibrosis on re-resection raises important questions about functional imaging specificity in the desmoplastic postoperative mesentery. Clinicians should maintain a low threshold for obtaining serum chromogranin A and urinary 5-HIAA in patients presenting with unexplained weight loss and chronic gastrointestinal symptoms.

Background

Small intestinal neuroendocrine tumors (SI-NETs), historically called carcinoid tumors, arise from the enterochromaffin cells of the gastrointestinal tract and represent the most common malignancy of the

small bowel.^{1,2} In a retrospective population-based study of 64,971 NET patients using SEER data, Dasari et al. demonstrated a marked rise in incidence from 1.09 to 6.98 per 100,000 persons between 1973 and 2012, with the steepest rise in patients aged 65 and older.¹ Yet despite increasing detection, the average time from symptom onset to diagnosis remains five to seven years.^{6,13}

Like ovarian cancer and distal pancreatic adenocarcinoma, SI-NETs grow in anatomic locations that generate only vague symptoms until the disease is well established.^{2,13} In a population-based cohort study of 2,186 NET patients in Ontario, Hallet et al. found that despite rising overall incidence, the proportion presenting with metastatic disease did not decrease.² SI-NETs do have a well-characterized biochemical signature: serum chromogranin A and urinary 5-HIAA are established markers that may be elevated before clinical presentation.^{7,13} Yet most patients still present with nodal or distant metastases at diagnosis.¹

SI-NETs most commonly arise in the ileum and are frequently multifocal.⁵ When they involve the mesentery, they elicit a desmoplastic fibrotic reaction that tethers and kinks the bowel – often the event that finally drives a patient to imaging and care.⁶

We report a case of multifocal Grade 1 SI-NET in a 77-year-old woman with months of nonspecific symptoms, staged pT4N1 at resection. This case is notable for: (1) striking grade-stage discordance; (2) a Dotatate PET-guided second resection requiring direct superior mesenteric artery branch repair; and (3) fibrosis-only pathology at re-resection of a PET-avid lesion – raising the unresolved question of reactive desmoplasia versus true residual disease on functional imaging.

Case Presentation

Patient History and Primary Concern

A 77-year-old White female was referred to an outpatient surgical clinic in December 2025 after her primary care physician ordered CT imaging for chronic abdominal discomfort and a 20-pound unintentional weight loss and identified a small bowel mass. Her primary concern at presentation was chronic right upper quadrant (RUQ) abdominal discomfort lasting six to twelve months, described as a persistent sensation of movement in the abdomen, unrelated to meals. Associated symptoms included daily nausea, vomiting several times weekly, early satiety, and loose stools. The 20-pound weight loss was the most significant clinical red flag.

Her symptom complex – chronic RUQ discomfort, nausea, early satiety, and weight loss – is entirely nonspecific and overlaps with irritable bowel syndrome, gastroparesis, and functional dyspepsia. A colonoscopy and EGD in May 2022 identified colon polyps but revealed no other abnormality. Past surgical history included laparoscopic cholecystectomy (2014) and prior hysterectomy. She denied melena or hematochezia. She was managed with atorvastatin, escitalopram, and ondansetron as

needed. Penicillin allergy noted. Lifelong non-smoker, no alcohol use, retired, living independently with her spouse.

Physical Examination

On examination she was alert and oriented, in no acute distress. Blood pressure 120/60 mmHg, heart rate 93 bpm, temperature 97.2°F, respiratory rate 18, oxygen saturation 94% on room air. BMI 22.73 kg/m². Abdominal examination demonstrated a palpable mass in the right upper quadrant with tenderness. No lymphadenopathy, no scleral icterus, lungs clear, no peripheral edema.

Investigations

Laboratory evaluation was unremarkable with no evidence of anemia. Serum chromogranin A and 24-hour urinary 5-HIAA were not obtained at the time of initial evaluation – a notable diagnostic gap addressed in the discussion. CT abdomen and pelvis with IV contrast (December 19, 2025) demonstrated a solid mesenteric mass with adjacent adenopathy and tethering of adjacent small bowel loops producing the spoke-wheel sign, worrisome for a carcinoid tumor, with associated focal small bowel dilation (Fig. 1).

First Surgical Intervention

After informed discussion, the patient elected surgical intervention. She was admitted to Montgomery Regional Hospital on December 29, 2025. B. Smith, MD performed an exploratory laparotomy with open small bowel resection, indocyanine green (ICG) fluorescence assessment of bowel viability, and side-to-side anastomosis. A large mesenteric mass caused matting and partial obstruction. The involved segment was resected and the anastomosis confirmed viable under ICG. Estimated blood loss 25 mL. No complications.

Pathological Findings – First Specimen

Gross examination: 73 cm small bowel segment, 3.5 cm diameter, tan-pink serosal surfaces with matted mesentery. Two masses identified: Mass #1 (2.0 × 2.0 cm) involving the full bowel circumference and extending into mesentery, 28 cm from the nearest margin; Mass #2 (1.8 × 1.5 cm) involving approximately half the circumference, 15 cm from Mass #1. Mesenteric margin grossly involved; 14 lymph nodes submitted.

Microscopy: multifocal, well-differentiated neuroendocrine tumor, Grade 1. Invasion through visceral peritoneum (serosa). Lymphovascular invasion present. Perineural invasion present. Mesenteric margin positive. Three of 14 lymph nodes positive for metastatic NET. Other margins free.

Immunohistochemistry: strong chromogranin A and synaptophysin positivity; pancytokeratin positive; Ki-67 approximately 1%. Final pTNM staging (AJCC Version 9): pT4N1.

Postoperative Functional Imaging

A ^{68}Ga -DOTATATE PET/CT was performed for postoperative staging, given its established role as the preferred functional imaging modality for well-differentiated SI-NETs per current ENETS guidelines.^{7,14} The scan demonstrated a single PET-avid lesion in the small bowel mesentery suspicious for residual disease, with no hepatic or distant metastases. The patient was referred to the University of Virginia Health System hepatobiliary surgical oncology service.

Second Surgical Intervention

She was admitted to the University of Virginia Health System on April 1, 2026. T.W. Bauer, MD performed a second exploratory laparotomy. The bowel was run from the ligament of Treitz to the ileocecal valve – no peritoneal or hepatic metastases identified. A 1.0–1.5 cm nodule was palpated in the mesentery just right of midline, between the aorta and vena cava, at the lower border of the duodenum. Circumferential dissection revealed the mass was adherent to a branch of the superior mesenteric artery (SMA), requiring division and direct primary repair with 4 – 0 Prolene suture. Mass completely excised. No additional lesions. Estimated blood loss 5 mL. No complications.

Pathological Findings – Second Specimen

University of Virginia Medical Laboratories: soft tissue with abundant peripheral nerve fibers, chronic inflammation, and fibrosis. No residual neuroendocrine tumor identified. The patient was discharged on postoperative day 2. She experienced mild transient postoperative delirium resolving with conservative reorientation. Physical and occupational therapy cleared her for home discharge with family support.

Follow-Up and Outcomes

Following multidisciplinary review, active surveillance was elected over immediate systemic therapy – consistent with ENETS and NANETS guidelines for completely resected low-grade SI-NETs without distant metastatic disease.^{7,14} Follow-up was arranged at the Emily Couric Cancer Center, University of Virginia, within one year or sooner if symptoms arise. Surveillance includes serum chromogranin A, 24-hour urinary 5-HIAA, and periodic functional imaging.⁷

Discussion and Conclusions

The Central Diagnostic Failure

The most important lesson in this case is not surgical – it is diagnostic. This patient had symptoms for six to twelve months before her workup began, and by the time she reached the operating room she was staged pT4N1.^{1,2,13} Serum chromogranin A and urinary 5-HIAA were not obtained prior to CT imaging – both are inexpensive, widely available, and may be elevated in patients with locoregional SI-NET before radiologic detection.^{7,13} In a retrospective analysis of 2,186 NET patients, Hallet et al. found that metastatic presentation rates did not decline despite rising overall NET incidence, suggesting biomarker-based earlier detection has not been widely implemented.²

Emerging multi-analyte assays such as the NETest, measuring expression of 51 NET-specific circulating transcripts, have demonstrated improved sensitivity over single-marker approaches in early detection research.¹⁴ Whether systematic integration of these tools into primary care evaluation of patients with unexplained weight loss and chronic gastrointestinal symptoms could shift the stage at diagnosis warrants prospective investigation.

Radiologic Features

The spoke-wheel sign – a solid mesenteric mass with radiating fibrous strands and adjacent small bowel tethering – is the CT hallmark of SI-NET with mesenteric desmoplastic involvement, driven by tumor-derived serotonin, TGF- β , and connective tissue growth factor.⁶ CT has approximately 80–90% sensitivity for detecting the primary tumor and regional nodal disease in SI-NETs.⁶

Multifocality and ICG

Two synchronous tumor foci were identified. In a five-decade analysis of 13,715 carcinoid tumors, Moertel et al. established multifocality as a defining feature of ileal NETs, occurring in 20–30% of cases.⁵ Thorough intraoperative small bowel inspection is essential to avoid leaving a synchronous lesion behind.¹¹ ICG fluorescence angiography confirmed anastomotic viability – a valuable tool in elderly patients with potentially compromised mesenteric vasculature.¹²

Grade-Stage Paradox

Under the WHO 2022 classification, a Ki-67 of approximately 1% defines Grade 1.^{3,4} Yet this patient had pT4 disease with serosal invasion, lymphovascular invasion, perineural invasion, a positive mesenteric margin, and 3/14 positive lymph nodes.^{1,2} In the SEER dataset of 64,971 NET patients analyzed by Dasari et al., a substantial proportion of well-differentiated, low-grade tumors still presented with regional or distant metastases.¹ Tumor grade alone is insufficient for prognostication; comprehensive pathologic staging is essential.^{4,7}

The PET-Positive Desmoplastic Nodule

Perhaps the most clinically novel aspect of this case is the postoperative course. Dotatate PET identified a single PET-avid mesenteric lesion. A second operation requiring SMA branch repair was performed, and final pathology showed no viable neuroendocrine tumor – only fibrosis and chronic inflammation.

This raises a clinically important question: can a purely desmoplastic mesenteric nodule generate a false-positive Dotatate PET signal in the postoperative setting? SI-NETs induce dense fibrotic reactions that can persist after tumor resection, and whether somatostatin receptors are expressed at meaningful levels in reactive fibrous tissue remains uncertain. Both explanations – reactive desmoplasia versus microscopic residual disease below pathologic detection threshold – are plausible. What this case establishes is that a postoperative Dotatate PET-positive mesenteric lesion should prompt hepatobiliary surgical oncology consultation and consideration of re-resection, even when final pathology is benign.

Carcinoid Syndrome

Carcinoid syndrome was absent, consistent with locoregional disease without hepatic metastases – hepatic involvement is required for tumor-derived serotonin to bypass first-pass metabolism.^{7,13} Chromogranin A and urinary 5-HIAA should form the basis of long-term surveillance regardless of symptom status.^{7,14}

Management

Surgical resection with mesenteric lymphadenectomy remains the cornerstone of treatment for locoregional SI-NET.^{7,11} In the PROMID trial of 85 patients with metastatic midgut NETs, octreotide LAR improved time to tumor progression from 6.0 to 14.3 months.⁸ In the CLARINET trial of 204 patients, lanreotide significantly prolonged progression-free survival.⁹ In the phase 3 NETTER-1 trial of 229 patients, lutetium-177 dotatate markedly improved progression-free survival in progressive midgut NETs.¹⁰ Active surveillance was elected in this patient, consistent with guidelines for completely resected low-grade SI-NETs without distant disease.^{7,14} Long-term biochemical and imaging surveillance is essential given the known risk of late recurrence.^{1,2,14}

In conclusion, this case demonstrates that tumor grade and disease extent do not move together in SI-NETs. A Ki-67 of 1% did not prevent pT4N1 disease, and months of nonspecific symptoms preceded diagnosis. The absence of pre-referral biomarker testing represents a missed opportunity. The PET-positive desmoplastic nodule requiring SMA repair at re-resection with no residual tumor on pathology adds novel clinical data on functional imaging specificity in the postoperative mesenteric setting. Clinicians encountering patients with unexplained weight loss and chronic gastrointestinal symptoms

should consider early integration of serum chromogranin A and urinary 5-HIAA into their diagnostic evaluation.

Abbreviations

SI-NET

Small intestinal neuroendocrine tumor

NET

Neuroendocrine tumor

CT

Computed tomography

ICG

Indocyanine green

PET

Positron emission tomography

5-HIAA

5-hydroxyindoleacetic acid

SMA

Superior mesenteric artery

ENETS

European Neuroendocrine Tumor Society

NANETS

North American Neuroendocrine Tumor Society

IHC

Immunohistochemistry

AJCC

American Joint Committee on Cancer

PRRT

Peptide receptor radionuclide therapy

SEER

Surveillance, Epidemiology, and End Results

TGF- β

Transforming growth factor-beta

CTGF

Connective tissue growth factor

WHO

World Health Organization

GI

Gastrointestinal

RUQ

Right upper quadrant
EGD
Esophagogastroduodenoscopy
BMI
Body mass index

Declarations

Ethics Approval and Consent to Participate

Ethics review was waived for this case report by the Institutional Review Board of Edward Via College of Osteopathic Medicine – Carolinas Campus, Spartanburg, South Carolina, United States, in accordance with institutional policy applicable to de-identified case reports. All procedures performed were in accordance with the ethical standards of the Institutional Review Board of Edward Via College of Osteopathic Medicine – Carolinas Campus and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. The patient provided written informed consent to participate in this case report.

Consent for Publication

Written informed consent for publication of clinical details and imaging was obtained from the patient prior to submission. A copy of the written consent form is available for review by the Editor-in-Chief upon request.

Availability of Data and Materials

The datasets used and/or analysed during the current study are available from the corresponding author on a reasonable request.

Competing Interests

P.A., B.S., and B.P. declare that they have no competing interests.

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Authors' Contributions

P.A. identified the case, collected and reviewed all clinical data, performed the literature review, and drafted the manuscript. B.S. provided primary surgical care, operative records, and critical manuscript review. B.P. and B.S. supervised the research project, provided academic oversight, critically revised the manuscript, and gave final approval of the version to be published. All authors read and approved the final manuscript.

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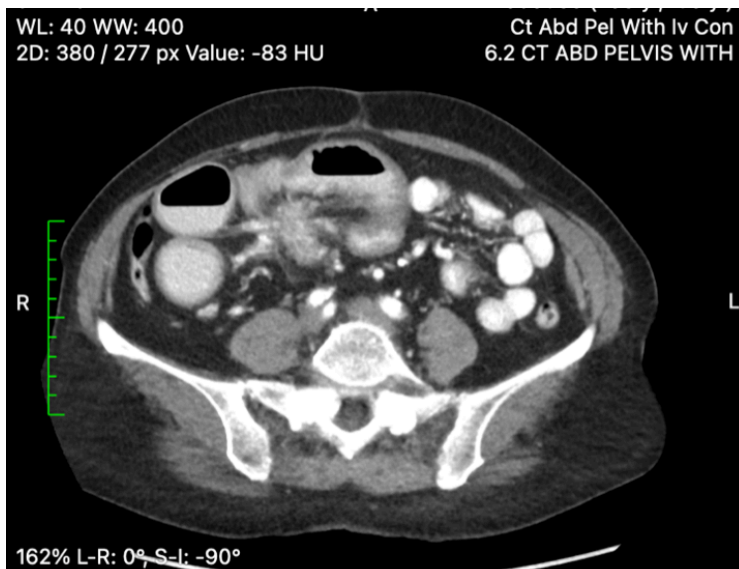
P.A. is an OMS-IV student at Edward Via College of Osteopathic Medicine – Carolinas Campus, United States, and a Health Professions Scholarship Program (HPSP) scholar.

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Figures



A



B

Figure 1

CT abdomen and pelvis with intravenous contrast (December 19, 2025). **(A)** Anteroposterior view demonstrating disorganized clustering and tethering of small bowel loops in the right mid-abdomen, consistent with mesenteric desmoplastic reaction and partial small bowel obstruction. **(B)** Coronal view demonstrating a central mesenteric soft tissue mass with adjacent enlarged lymph nodes and radiating fibrous strands producing the characteristic spoke-wheel sign, suggestive of small intestinal neuroendocrine tumor with mesenteric involvement. Arrow indicates mesenteric mass.