

CASE REPORT

Jejunal Adenocarcinoma as a Rare Gastrointestinal Tumor: A Case Report

Oswaldo Alejandro Martínez^{1*}, Rolando Alfredo Bissot¹, Karim Michelle Botello²

¹Cirugía General y Laparoscópica, Hospital Irma de Lourdes Tzanetato, Panama City, Panama

²Estudiante de Medicina, Universidad de Panamá, Panama City, Panama

Abstract: Small bowel cancers are rare and usually show nonspecific clinical manifestations. Most diagnoses of small bowel cancers are made in the late stage of the disease. We reported herein a case of 58-year-old man who experienced extensive weight loss after one month of abdominal pain and intermittent vomiting. The patient had clinical manifestations of intestinal obstruction and a sudden reduction in the diameter of the proximal jejunum according to the abdominal and pelvic computed tomography. During laparotomy, we found a jejunal obstruction in the patient. The segment was removed and anastomosed. The patient had a favorable recovery. Histopathological findings of differentiated jejunal adenocarcinoma T₃N₀M₀ are presented in this report.

Received: April 22, 2020
Accepted: June 30, 2020
Published Online: July 14, 2020

***CORRESPONDING AUTHOR**
Oswaldo Alejandro Martínez
E-mail: colmar@hotmail.com

CITATION

Martínez OA, Bissot RA, Botello KM, *et al.*, 2020, The effects of sevoflurane in the progression of solid tumors based on the evidence of preclinical studies. *Cancer Plus*, 2(3):14–19.
DOI: [10.18063/cp.v2i3.355](https://doi.org/10.18063/cp.v2i3.355)

Copyright: © 2020. Martínez OA *et al.* This is an Open Access article distributed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), permitting all noncommercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

Keywords: Small intestine jejunal tumor; Adenocarcinoma; Intestinal obstruction; Abdominal pain

1. Introduction

Small bowel cancers are rare. Globally, they account for 0.3% to 2% cases of all gastrointestinal cancers; in the United States, they account for 0.4% of gastrointestinal cancers and 0.2% of cancer-related deaths^[1]. In Panama, by 2012, due to the low reported incidence, they were classified as “other malignant causes,” and overall, the proportion was only 0.1%^[2].

Although the etiology is unclear, the incidence of small bowel cancer among black men beyond the age of 60 is higher; sometimes, the incidence could be related to the upper-class individuals, but there is still no evidence to prove the relationship^[3].

Small bowel cancer is a type of cancer with many histological subtypes. The rare occurrence of this tumor could be attributed to the protective factors that can prevent the occurrence of tumor; however, the number of studies can explain its low incidence remains scanty^[3].

Adenocarcinoma is the most common type of small bowel cancer, accounting for 30%–50%, followed by gastrointestinal stromal tumor (GIST), carcinoid tumor, lymphoma, and smooth muscle sarcoma. Half of them occurred in the duodenum and 25% in the jejunum^[4,5].

The diagnosis of jejunal adenocarcinoma should be highly suspected since it produces nonspecific symptoms; the most common symptoms are colic abdominal pain, weight loss, anorexia, and, in complex cases, bleeding and intestinal obstruction. Computed tomography (CT), contrast X-ray, endoscopy, multi-slice spiral CT virtual enteroscopy, intestinal video capsule, and double balloon total colon replication are very useful for its diagnosis^[6].

Small bowel cancer is a rare disease. Its risk factors are not clear, and its clinical manifestations are vague and unclear. It is usually diagnosed late and usually requires surgery for treatment purposes. The tumor stage at diagnosis is closely related to the survival rate, so early diagnosis is very important.

2. Case presentation

A 58-year-old man with no relevant medical history is the case subject of this report. The patient was asked about the clinical progress of the illness within the two months, including general abdominal pain, intermittent colic, weight loss of about 23 kg in two months, and improved postprandial satiety after vomiting.

For assessing the symptoms, abdominal and pelvic contrast CT examination was performed at another institution, and dilation of the stomach, duodenum and proximal jejunum were reported. At this level, the caliber changed suddenly, and there was no other evidence (Figures 1 and 2).



Figure 1. Enhanced CT scan of abdomen and pelvis, horizontal axial section of stomach and duodenum. The image shows the dilation of gastric cavity and jejunum.

Source: Department of Radiology, Caribbean Medical Center, Panama.



Figure 2. Abdominal CT, pelvic radiography of the axial section. The arrow points to the proximal jejunal stenosis. Abbreviations: SP: proximal lesions; SD: distal lesion.

The patient was treated in the emergency room, where he reported that he had developed extensive and persistent colic abdominal pain with mild abdominal

Physical examination of the patient showed dehydration, stable hemodynamics, abdominal expansion mainly in the upper abdomen, reduction of air noise, palpation pain and tympanic spasm, mainly in the upper abdomen, and no mass or visceral swelling was found.

Admission laboratory examination revealed leukocytosis ($14 \times 10^3 / \text{mm}^3$) and neutropenia (75%), abnormal creatinine (1.7 mg/dl) and urea nitrogen (25 mg/dl).

An emergency laparotomy was performed and a circular lesion about 3 cm long was found at 60 cm from the angle of Treitz, which was located in the proximal jejunum (Figure 3 and Figure 4). The defect was resected at 10 cm from the edge, and the peripheral side-to-side anastomosis was performed. The defect was sutured with a 3.5-mm mechanical stapler. There was no evidence of ascites, cancer, organ transplantation, liver metastasis, or gastrointestinal lesions.

The patient recovered well and received liquid diet 48 hours after the operation, and the diet was well tolerated. He was discharged on the third day with no complications developed.

According to the histopathological study of the surgical site, the tumor is a moderately differentiated, aliphatic jejunal adenocarcinoma, which invades under the serosa and has lymphatic and perineural infiltration. The surgical margin and lymph nodes were negative. It is classified as T₃N₀M₀ (Figures 5–7).



Figure 3. Trans-operative lesion. SP: dilated proximal segment; SD: collapsed distal segment (arrow).



Figure 4. Longitudinal section of the lesion. SP: proximal segment; SD: distal segment (arrow).
Source: Department of General Surgery, Irma Lourdes Tzanetato Hospital.

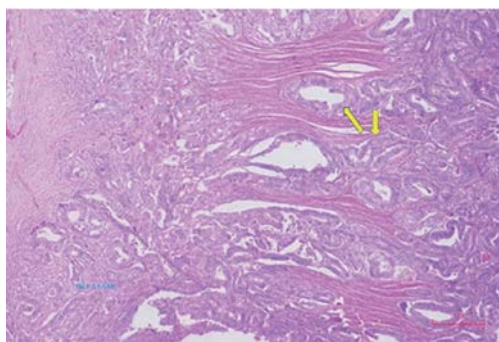


Figure 5. Disordered proliferation and different sizes of glands. The image also shows atypical epithelium, characterized by the loss of polarity, nuclear pleomorphism, nuclear hypertrophy and abundant mitosis. The section is stained by Hematoxylin and Eosin, and viewed under 100× magnification. The arrow points to the proliferating gland tumor, which affects the mucosa and submucosa, and enters the submucosa through the intact muscle wall.

Source: Department of Pathology, Irma Lourdes Tzanetato Hospital.

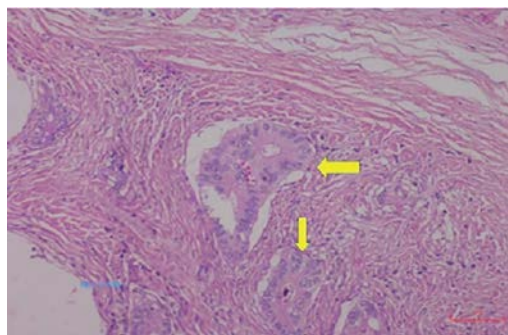


Figure 6. Absence of fibrous vascular matrix between tumor glands. The slide was stained by Hematoxylin and Eosin, and viewed under 100× magnification. The arrow points to the lymph node tumor thrombus.

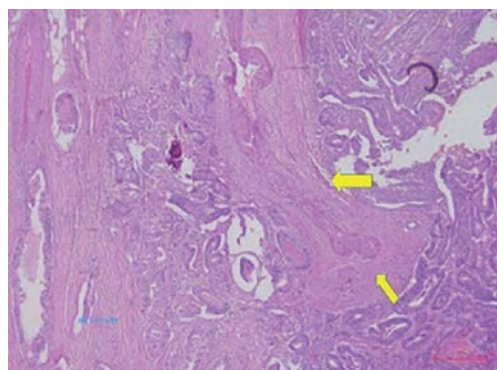


Figure 7. Perineural infiltration. The slide was stained by Hematoxylin and Eosin, and viewed under 100× magnification. Source: Department of Pathology, Irma Lourdes Tzanetato Hospital.

During the six-month follow-up, the patient showed good progress in recovery and his condition was stable and asymptomatic.

3. Discussion

The overall incidence of small bowel cancer is very low, less than one in every 100,000 people. As a result, the studies, understanding and preoperative diagnosis concerning this cancer are very limited^[3].

Small bowel cancer may be primary or metastatic. The most common primary tumors are adenocarcinoma, gastrointestinal stromal tumor, cardiac cancer and lymphoma, while melanoma is the most common cause of metastasis^[7,8].

Adenocarcinoma, which is the most common small bowel cancer, is mainly located in the duodenum and proximal jejunum, while other types of cancer are located in the distal end. It can lead to nonspecific symptoms and signs, so it is usually diagnosed as late-onset cancer^[9].

Very limited attempts have been made to explain this but some assumptions have surfaced, such as its long length, large liquid volume, reduced irritation, short contact time with carcinogens, and production of immunoglobulin A (IgA) and microsomal enzymes,

which can prevent carcinogens^[10,11]. Various risk factors may affect its occurrence; however, due to its unusual frequency and lack of written reports, no specific reasons were found. The following are considered relevant risk factors: environmental toxins, smoking, alcohol abuse and excessive consumption of refined sugar, red meat or bacon, while consumption of coffee, fish, fruits and vegetables is considered low-risk factors^[10].

The exact pathophysiology of small intestinal tumors is unclear, but some studies have proposed an adenoma-to-cancer sequence in which normal epithelium transitions to adenoma and cancer through molecular events. *APC* gene mutation leads to poor regulation of β -catenin, which accumulates in the nucleus and is the trigger of the disease. In some cases, the following events have been reported: (i) reduced expression of epithelial cadherin (e-cadherin); (ii) p53 overexpression; (iii) *SMAD4* gene expression deletion; (iv) *KRAS* gene mutation; (v) inactivation of DNA repair protein (DNA mismatch repair, MMR); (vi) expression of *HER2* gene.

Therefore, familial adenomatous polyposis (*APC* gene mutation), lynch syndrome (MMR-related gene mutation) and other inflammatory diseases, such as Crohn's disease and celiac disease, may be the etiology of small bowel cancer^[10].

The disease is usually asymptomatic at onset, but in the late stage, up to 90% of patients are symptomatic and 35% to 40% may have metastasis^[12]. It usually occurs between the ages of 60 and 70, but in cases of Crohn's disease, it may have early onset^[13].

Although tumors cause nonspecific abdominal pain, they are usually located in a lower position, and anemia occurs when ulcerative lesions exist. Due to their typical circular growth, they can lead to intestinal obstruction, postprandial pain and even perforation in complex cases^[13,14]. Only 25% of patients may have obvious masses, and up to 25% of patients may have clinical manifestations of abdominal obstruction. Therefore, the general physical examination may not show important data that are indicative of significant manifestations. Jaundice, ascites, hepatomegaly and cachexia can occur in advanced patients^[15].

In order to make a differential diagnosis, many aspects need to be considered in the evaluation, and many entities need to be suspected in cases of small intestinal cancers. The most common benign cause is adenoma. Fibroma, hemangioma, leiomyoma, lipoma, hamartoma or hard tissue tumor should also be suspected. When histological findings indicate malignancies other than adenocarcinoma, non-Hodgkin's lymphoma, sarcoma, squamous cell carcinoma, neuroendocrine or carcinoid, and gastrointestinal stromal tumor (GIST)^[16,17] should be considered. Among primary tumors,

melanoma and lung, breast, gastric and colon cancers that metastasize to the small intestine should be considered^[13]. In the current case, the patient's diagnosis was late; it is believed that an interval of 6 to 7 months may be required for diagnosis since the appearance of initial symptoms^[18]. Usually, 20% to 50% of symptomatic cases are diagnosed before surgery^[19].

A few types of examinations can be considered and performed for making a diagnosis for this kind of rare cancer. Traditionally, radiological examination of small intestinal transport is carried out under the sequential fluoroscopic observation of the passage of contrast medium (barium). However, this method has many disadvantages, such as the presence of overlapping handles that do not allow good vision, low chances of small tumor detection, compromised evaluation of the degree of disease, and operator-dependence; all of which would contribute to very low negative predictive value^[20].

Therefore, CT is a very sensitive method to detect primary tumors. It is usually characterized as focal, irregular and heterogeneous cancer with stenosis and thickened wall, along with enhancement in enhancement phase. Sometimes, it can reduce light and even lead to intestinal obstruction; ulcers or polypoid lesions can sometimes be observed. In addition, CT is helpful to evaluate the local and distant range of the tumor; metastasis is most common in the liver, manifested as low-density subvalvular aortic stenosis (SAS) lesions with good enhancement in the portal venous phase^[21,22].

Due to its difficult diagnosis, new technologies are being applied to improve the preoperative discovery of these lesions, regardless of their location and size. This is the case with enteric CT, which includes an abdominal and pelvic CT in arterial and venous phases, in which the intestine is dilated with water or solution of transnasal mesenteric catheterization. This results in a low optical density of the small intestine, wall capture contrast, increased sensitivity to 85% to 95% and specificity to 90% to 96%. The tumor could be observed as a narrow ring lesion of at least 3 mm long^[20,23].

In terms of diagnostic imaging, there are other tools with more advanced technology and better reconstruction software, such as multi detector CT virtual endoscopy, multi detector CT virtual endoscopy, magnetic resonance enterolysis and multiplanar reconstruction^[24].

Video capsule is an innovative, non-invasive tool that allows the assessment of the gut through a special camera, which is ingested by the patient and transmits signals through the digestive tract. This technique has limitations for patients with intestinal obstruction or rapid transport, and histological sampling is not allowed; although it has been used to screen susceptible patients, it has not shown any efficacy^[23].

Table 1. Staging of small bowel cancer^[26]

T _x : Primary tumors cannot be evaluated	Local lymph nodes
T ₀ : No primary tumor	N _x : Lymph nodes cannot be evaluated
Carcinoma in situ	N ₀ : Lymph node metastasis
T _{1a} : Invasion of lamina propria	N ₁ : 1a 3 lymph node metastasis
T _{1b} : Invaded the submucosa	N ₂ : Metastasized to more than 4 lymph nodes
T ₂ : Invaded the proper muscle	Distant metastasis
T ₃ : Penetrates the proper muscle into the perimuscular tissue, does not invade the peritoneum, and extends less than 2 cm.	M ₀ : No transfer
T ₄ : Penetrates the visceral peritoneum or directly invades other organs or structures (e.g. Other handles of the small intestine, mesentery or retroperitoneum >2 cm, invades the abdominal wall through the serosa; only the duodenum invades the pancreas or bile duct).	M ₁ : Distant metastasis

Flexible balloon-assisted endoscopy with sensitivity up to 90% can obtain high-resolution images and histological samples, which can be used as reference diagnostic methods^[5,23,25].

The staging of small bowel cancer follows the principle of TNM system (**Table 1**).

The only treatment is R₀ surgical resection, usually with an edge of at least 5 cm, plus local and regional lymph node resection. Adjuvant chemotherapy has not been shown to improve survival, although FOLFOX sometimes responds to palliative chemotherapy in addition to irinotecan and gemcitabine. When lesions are adjacent to the tumor, it is recommended to perform overall resection. If it is impossible to remove the tumor, it is recommended to perform shunt surgery in the case of intestinal obstruction, perforation or uncontrollable bleeding^[25,27,28]. In this case, the patient underwent surgical resection of the tumor and lymph nodes and jejunostomy.

In general, small bowel cancers have a poor prognosis because they are diagnosed at an advanced stage. The main factors of poor prognosis were lymph node infiltration, duodenal localization, smoking, old age, poor differentiation and non-r0 resection. The 5-year survival rate depends on the stage of the tumor: (i) 50%–60% in stage I; (ii) 39%–55% in stage II; (iii) 10%–40% in stage III; and (iv) 3%–5% in stage IV^[23,25,29].

Conflict of interest

Authors declare no conflict of interest.

References

- Schottenfeld D, Beebe-Dimer JL, Vigneau FD, 2019, The Epidemiology and Pathogenesis of Neoplasia in the Small Intestine. *Ann Epidemiol*, 19:58–69. DOI: 10.1016/j.annepidem.2008.10.004.
- Department of Health Planning, Department of Health Statistics and Records, Ministry of Health of the Republic of Panama. Registro Nacional del Cáncer en Panamá, Boletín Estadístico; 2012 [Panama National Cancer Register, Statistical Bulletin; 2012]. Available from: <http://www.minsa.gob.pa/informacion-salud/estadisticas-de-salud>.
- Pan SY, Morrison H, 2011, Epidemiology of the Cancer of Small Intestine. *World J Gastrointest Oncol*, 3:33–42. DOI: 10.4251/wjgo.v3.i3.33.
- Terada T, 2012, Malignant Tumors of the Small Intestine: A Histopathologic Study of 41 Cases among 1,312 Consecutive Specimens of Small Intestine. *Int J Clin Exp Pathol*, 5:203–9.
- Lee HJ, Cha JM, Lee J Il, *et al.*, 2009, A Case of Jejunal Adenocarcinoma Diagnosed by Preoperative Double Balloon Enteroscopy. *Gut Liver*, 3:311–4.
- Lee C, Ng W, Lin K, 2008, Adenocarcinoma of the Duodenum. *Hong Kong Med J*, 14:67–9.
- Flint L, 2015, Small Bowel Neoplasia. *Selected Readings in General Surgery, Small Intestine*. Chicago: American College of Surgeons, 41:34–40.
- Han SL, Cheng J, Zhou HZ, *et al.*, 2010, Surgically Treated Primary Malignant Tumor of Small Bowel: A Clinical Analysis. *World J Gastroenterol*, 16:1527–32. DOI: 10.3748/wjg.v16.i12.1527.
- Ruiz E, Vargas R, Haní A, *et al.*, 2009, Tumor of Small Bowel. *Rev Colomb Gastroenterol*, 24:180–9.
- Aparicio T, Zaanán A, Svrcek M, *et al.*, 2014, Small Bowel Adenocarcinoma: Epidemiology, Risk Factors, Diagnosis and Treatment. *Dig Liver Dis*, 46:97–104. DOI: 10.1016/j.dld.2013.04.013.

11. Gaitán M, Cadena M, Vergara A, 2005, Neuroendocrine Tumors of the Small Intestine: A Unique Case Report. *Rev Colomb Cir*, 20:222–7.
12. Rodríguez R, Rangel R, Ruíz M, 2006, Tumores de intestino delgado: Diferentes formas de presentación de una misma entidad [Small Intestinal Neoplasms: Different Manifestations of the Same Entity]. *Revista Venezolana de Gastroenterología*, 60:128–33.
13. Marín J, Osorio M, Arango A, 1994, Adenocarcinoma primario del duodeno [Primary Duodenal Adenocarcinoma]. *Rev Colomb Cir*, 9:72–6.
14. Bannura G, Barrera A, Melo C, 2012, Jejunoileal Primary Tumors. Experience in 24 Patients. *Rev Chil Cir*, 6:264–73.
15. Brunikadi C, Anderson D, Billiar T, 2015, Small Bowel Neoplasms. In: *Schwartz's Surgical Principles* (10th edn.). New York: McGraw Hill, pp.1159–62.
16. Tadashi T, 2012, Malignant Tumors of the Small Intestine: A Histopathologic Study of 41 Cases among 1,312 Consecutive Specimens of Small Intestine. *Int J Clin Exp Pathol*, 5:203–9.
17. Galindo F, 2009, Tumores del intestino Delgado [Small Intestinal Tumor]. *Cirugía Digestiva*, 261:1–17.
18. Martínez M, Mingol F, Vaqué J, et al., 2008, Adenocarcinoma de yeyuno: una entidad de difícil diagnóstico; cartas científicas [Jejunal Adenocarcinoma: A Difficult Entity to Diagnose; Scientific Charts]. *Cir Esp*, 83:212–9.
19. Townsend C, Mattox K, Beauchamp D, 2004, *Sabiston Textbook of Surgery* (17th edn.). Philadelphia, Pennsylvania: Elsevier, pp.1355–63.
20. O'Brien A, 2006, Enterocolitis por tomografía computada [Computed Tomography Enterolysis]. *Rev Chil Radiol*, 12:70–5. DOI: 10.4067/s0717-9308200600026006.
21. Spina J, Cúneo L, Dutruel S, et al., 2007, Primary Tumors of Small Bowel. Computed Tomography with Pathologic Correlation. *Revista Argentina de Radiología*, 71:83–92.
22. Giménez S, Raichholz G, Froullet C, et al., 2016, Hallazgos en TC de Las Neoplasias de Intestino Delgado [CT Findings of Small Intestinal Tumors Argentine]. *Revista Argentina de Diagnóstico por Imágenes*, 5:7–15.
23. Aparicio T, Zaanán A, Mary F, et al., 2016, Small Bowel Adenocarcinoma. *Gastroenterol Clin North Am*, 45:447–57.
24. Su X, Ge Y, Liang B, 2012, Small Intestinal Tumors: Diagnostic Accuracy of Enhanced Multi-Detector CT Virtual Endoscopy. *Abdom Imaging*, 37:465–74.
25. Ruiz-Tovar J, Martínez-Molina E, Morales V, 2009, Primary Small Bowel Adenocarcinoma. *Cir Esp*, 85:354–59.
26. Edge SB, Byrd DR, Compton CC, et al., 2010, Treatment of Small Bowel Cancer; Health Professional Edition. Cancer Institute, National Institutes of Health, April 2017; Small intestine. In: *AJCC Cancer Staging Manual* (7th edn.). New York, NY: Springer, pp.127–32.
27. Li J, Wang Z, Liu N, et al., 2016, Small Bowel Adenocarcinoma of the Jejunum: A Case Report and Literature Review. *World J Surg Oncol*, 14:177. DOI: 10.1186/s12957-016-0932-3.
28. Echenique-Elizondo M, Amondaraín-Arratibel J, Lirón C, 2004, Malignant Neoplasms of the Small Bowel: Analysis of a Series. *Gac Med Bilbao*, 101:5–9. DOI: 10.1016/s0304-4858(04)74455-8.
29. Moreno-Loaíza O, Neira-Rojas D, 2013, Primary Duodenal Adenocarcinoma: Case Report of an Infrequent Tumor. *Medwave*, 13:e5821. DOI: 10.5867/Medwave.2013.09.5821.