

Mesenteric Tuberculosis Masquerading as Carcinoid Tumor on Conventional Imaging and DOTANOC Positron Emission Tomography/Computed Tomography: Uncommon Presentation of a Common Disease

Abstract

Carcinoid tumor of the mesentery has a classical imaging morphology. A specific diagnosis can often be provided on the basis of clinical history, elevated serum neuroendocrine markers, and uptake on somatostatin receptor-based radiotracer studies. Although a number of inflammatory and neoplastic conditions may mimic carcinoid tumor on many of these modalities, uptake on ^{68}Ga -DOTANOC positron emission tomography/computed tomography (PET/CT) is considered specific. We report a case of a 28-year-old male presenting with a mesenteric mass along with elevated serum neuroendocrine markers and uptake on DOTANOC PET/CT, all suggestive of carcinoid tumor. However, the histopathologic examination after surgical resection revealed necrotizing granulomas consistent with tuberculosis (TB). This case highlights the great masquerader that TB can be and stresses the importance of keeping a high index of suspicion for TB, especially in endemic areas.

Keywords: Carcinoid tumor; gastrointestinal tuberculosis, mesenteric lymphadenitis, somatostatin receptor, radionuclide imaging

Introduction

Carcinoid tumor of the mesentery has the classical imaging morphology of an enhancing mesenteric mass with peripherally radiating soft-tissue strands.^[1] Although this appearance has a variety of differentials, both inflammatory and neoplastic, a specific diagnosis can often be provided on the basis of clinical history, laboratory investigations, and functional imaging studies.^[1,2] Elevated serum chromogranin A (CgA), a neuroendocrine marker, is reasonably sensitive (67.9%) and correlates with the tumor bulk.^[3] However, CgA is nonspecific and can be elevated in renal failure and atrophic gastritis or with the use of proton-pump inhibitors. Radiotracer studies targeted at somatostatin receptors (SSTR) (Indium-111 pentetreotide scintigraphy or Gallium-68 DOTANOC positron emission tomography/computed tomography [PET/CT]) have been used in assessing suspected neuroendocrine tumors. However, a number of inflammatory and neoplastic conditions show false-positive uptake with SSTR scintigraphy (SRS).^[4,5] Mesenteric tuberculosis (TB) is an important differential for any mesenteric mass in

an endemic area. These usually occur as conglomerate nodal masses, which rarely cause diagnostic dilemma as they are often necrotic and accompanied by other characteristic stigmata of abdominal TB. In the rare case of isolated mesenteric involvement, TB may be mistaken as carcinoid tumor since the former may also show uptake on SRS.^[4] However, in these cases, DOTANOC PET/CT may be useful since it has high specificity for the diagnosis of neuroendocrine tumors.^[6] We report a case of abdominal TB, which presented as a mesenteric mass with peripheral radiating strands and adjacent bowel thickening, thereby masquerading as a carcinoid tumor. This error was compounded by the positive uptake shown on ^{68}Ga -DOTANOC PET/CT, which resulted in the patient being operated. To the best of our knowledge, this would be the first case of TB in the current literature which showed uptake on DOTANOC PET/CT.

Case Report

A 28-year-old male presented to the outpatient department of our hospital with complaints of recurrent episodes of

**Abdul Razik,
Anand Narayan
Singh¹,
Shambo Guha Roy²,
Kumble Seetharama
Madhusudhan**

*Departments of
Radio-Diagnosis,
¹Gastrointestinal Surgery and
Liver Transplantation and
²Nuclear Medicine, All India
Institute of Medical Sciences,
Ansari Nagar, New Delhi, India*

Address for correspondence:

*Dr. Kumble Seetharama
Madhusudhan,
Departments of
Radio-Diagnosis, All
India Institute of Medical
Sciences, Ansari Nagar,
New Delhi - 110 029, India.
E-mail: drmadhuks@gmail.com*

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diarrhea for 5 years associated with bloating sensation in the abdomen after meals, loss of appetite, and weight. There was no history of fever, night sweats, vomiting, melena, prior illnesses, or surgeries. The general physical and abdominal examination as well as the routine laboratory investigations was unremarkable. Serum CgA was marginally elevated (169 ng/mL), whereas the urinary 5-hydroxyindoleacetic acid level was normal (3.6 mg/24 h).

CT enterography was done which showed a single spiculated mass of dimensions 5 cm × 4 cm in the mesentery, encasing the ileocolic artery. The mass was hypoenhancing compared to the skeletal muscle but did not show necrotic areas or calcification [Figure 1]. There was contiguous involvement and thickening of short segments of the duodenum at the junction of its second (D2) and third (D3) parts, as well as of the proximal transverse colon. No lymph node enlargement, liver lesions, or ascites were present. Subsequently, the mass showed uptake on ⁶⁸Ga-DOTANOC PET/CT and ¹⁸F-fluorodeoxyglucose PET [Figure 2]. In view of the findings, a working diagnosis of neuroendocrine (carcinoid) tumor of the mesentery was made. Since imaging was convincing, image-guided sampling was not performed.

The patient was operated, and the mass was resected along with right hemicolectomy and side-to-side ileotransverse anastomosis. A sleeve resection of D2/D3 was done, followed by primary anastomosis and placement of 16 French T-tube in the duodenum. A feeding jejunostomy (FJ) was performed 15 cm distal to the duodenojejunal flexure.

Gross examination of the resected specimen showed a circumscribed, gray-white mesenteric mass encasing the ileocolic vessels. On sectioning, the lesion consisted of multiple matted lymph nodes showing necrosis as well as calcification. The proximal transverse colon showed

multiple pseudopolyps over a length of 7 cm. The resected duodenum was unremarkable. Histopathologic examination of the mass as well as the colonic pseudopolyps showed necrotizing epithelioid cell granulomas; however, both were negative for acid-fast bacilli. No evidence of malignancy was present. The above findings were highly suggestive of TB of the colon with mesenteric lymph node involvement. Culture for TB or fungal staining was not done.

Enteral feeding was initiated through the FJ, and the patient was discharged on the 20th postoperative day. Standard oral antitubercular therapy was started and advised for 1 year. The FJ was removed after 2 months, and oral feed was started. At 1.5-year follow-up, he was asymptomatic with normal laboratory investigations. The follow-up CT was normal.

Discussion

The first imaging differential of any solitary mesenteric mass with peripherally radiating strands is a mesenteric carcinoid tumor, which usually represents metastatic lymph nodal spread from an occult bowel primary, most commonly in the terminal ileum.^[1] The primary bowel mass is usually inapparent on CT due to its small size; however, may be visualized as a small nodular lesion on arterial phase images with optimal bowel distension. Desmoplasia induced by the primary tumor may cause acute focal kinking and hairpin loop morphology of the bowel. Other sclerosing entities that can mimic mesenteric carcinoid include desmoid tumors (fibromatosis) and chronic sclerosing (retractile) mesenteritis.^[7] Metastatic adenocarcinoma or lymphoma may also involve the mesenteric nodes.^[8] Nodes in lymphoma are usually large and rarely undergo calcification or necrosis. Hematogenous spread is most common with melanoma and breast cancer which may also present with intraluminal bowel metastasis, closely resembling carcinoid.

Mesenteric TB is an important differential in endemic areas.^[9] The nodes are often necrotic with rim enhancement and accompanied by other characteristic stigmata of abdominal TB, including bowel thickening,

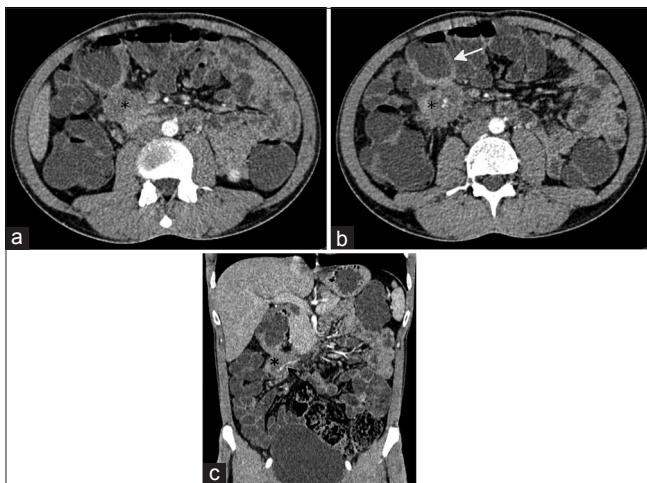


Figure 1: Contrast-enhanced computed tomography enterography (a and b) axial and coronal (c) sections showing a hypoenhancing mesenteric mass having spiculated margins (asterisk) causing contiguous involvement and thickening of the duodenum as well as the proximal transverse colon (white arrow). The mass is encasing the ileocolic artery (black arrow)

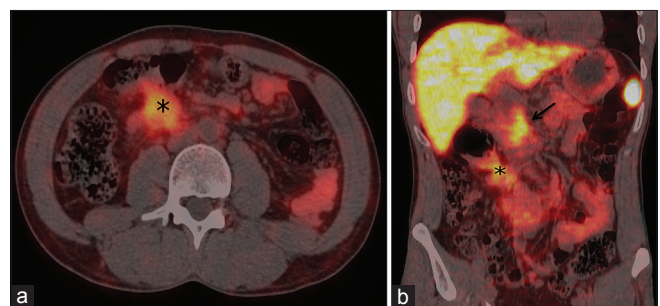


Figure 2: DOTANOC positron emission tomography/computed tomography (a) axial and (b) coronal sections showing intense uptake within the mass (asterisk). Intense physiologic uptake is also seen in the uncinate process of the pancreas (arrow), which is a normal finding

peritoneal involvement, periportal, or retroperitoneal lymphadenopathy.^[10] TB presenting as isolated mesenteric mass is rare, and only a few anecdotal case reports are available in the current literature.^[11-14] All these cases on histopathology showed conglomerate necrotic mesenteric lymph nodal masses with granulomatous inflammation.

Radiologic differentiation of infectious, inflammatory, and neoplastic mesenteric masses from carcinoid tumor is possible when other associated intra-abdominal findings characteristic of each of these entities are present. In cases of isolated mesenteric masses, a morphologic differentiation may not be possible. Elevated serum neuroendocrine markers or uptake on SSTR-based imaging studies points toward carcinoid tumor; however, cautious interpretation is required since these findings can be nonspecific.^[15,16] Immunohistochemistry studies have established that activated human lymphocytes in germinal centers, and monocyte-derived macrophages can express SSTRs-2.^[17] Somatostatin Receptor Scintigraphy (SRS) is well known to show uptake in a number of inflammatory (TB, Crohns, and sarcoidosis) as well as neoplastic (lymphoma, sarcoma, melanoma, and renal cell carcinoma) conditions.^[5-7] However, ⁶⁸Ga-DOTANOC PET/CT is considered highly specific for neuroendocrine tumors with a large meta-analysis showing pooled specificity of 96% for the same.^[6] False-positive findings usually result from misinterpretation of the physiologic pancreatic uptake; however, the physiologic uptake is usually lesser than the liver uptake and would not show any morphologic correlate on the trace CT images.^[18] Among pathologic uptake, reactive lymph nodes have been observed to be the most common cause.^[19] DOTANOC PET also has been reported to show uptake in some variants of lymphoma (nodular sclerosing Hodgkin's and diffuse large B-cell lymphoma).^[8] Till date, there has been no reported case of DOTANOC PET/CT uptake specifically in TB. However, theoretically, it is possible for tuberculous lymph nodes, as in our case, to express SSTR-2 receptors and show uptake on DOTANOC PET/CT.

Our case showed typical findings of a carcinoid tumor, having elevated serum CgA and uptake on ⁶⁸Ga-DOTANOC PET/CT. However, the pathologic diagnosis turned out to be TB. This would be the first case of TB in the peer-reviewed literature which has been reported to show uptake on DOTANOC PET/CT.

Conclusion

TB can be a great masquerader and can manifest in many different ways. Although carcinoid tumor remains the primary differential for any mesenteric mass showing stellate morphology and DOTANOC PET/CT uptake, TB may rarely have a similar appearance. Hence, it becomes prudent to consider TB as a differential in any patient presenting with mesenteric mass in endemic areas.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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