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A Rare Complication: Aortic Thrombosis Complicating A Carcinoid Syndrome Secondary to Small Bowel Neuroendocrine Tumor: Case report

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ABSTRACT

Despite advancements in managing metastatic neuroendocrine tumors (NETs), cardiovascular complications remain a significant cause of morbidity and mortality in patients with carcinoid syndrome. We present a rare case of aortic thrombosis complicating carcinoid syndrome secondary to a small bowel neuroendocrine tumor. A 69-year-old male chronic smoker presented with treatment-resistant diarrhea, febrile sensations, and facial erythema. Imaging revealed a tissue mass in the right iliac fossa, infiltrating the ileocecal angle. Preoperative assessment was unremarkable, and the patient underwent open surgery for right ileocolectomy. Postoperatively, he developed chest pain and dyspnea, with elevated D -dimer levels and a floating aortic thrombus detected on angioscan. Management included unfractionated heparin, vitamin K antagonists, and octreotide. Pathological examination confirmed the neuroendocrine tumor. At 1-year follow-up, the patient showed no cardiovascular anomalies. This case highlights the need for further research on antithrombotic prophylaxis in NETs and underscores the complexity of managing paraneoplastic embolism.

Key Words: Carcinoid heart disease, Aortic thrombosis ,Carcinoid syndrome , Small bowel neuroendocrine tumor.

INTRODUCTION

Although advancements in the medical and surgical management of patients with metastatic neuroendocrine tumors (NETs) have led to improved symptoms and survival rates, cardiovascular complications remain a significant cause of morbidity and mortality in individuals with carcinoid syndrome. Previous reports have indicated that cardiovascular complications occur in up to 50% of patients with carcinoid syndrome, although recent studies suggest a lower prevalence of around 20%, possibly due to increased use of somatostatin analog therapy. These complications predominantly affect patients with primary small bowel NETs (72%), followed by NETs originating from the lung, large bowel, pancreas, appendix, and ovaries. There is a slight male predominance (approximately 60%), with patients typically diag-

nosed at a mean age of 59 (± 11) years.

We report in this work a rare complication of an aortic thrombosis complicating a carcinoid syndrome secondary to small bowel neuroendocrine tumor

AIM OF THE ARTICLE:

The objective of this case report is to comprehensively examine the occurrence of aortic thrombosis as a consequence of carcinoid syndrome in a patient with a small bowel neuroendocrine tumor. It aims to elucidate the patient's clinical manifestations, diagnostic methods, treatment modalities, and subsequent clinical progress.

PRESENTATION OF CASE

Here we present the case of a 69-year-old man, chronic smoker, who presented with treatment-resistant diarrhea evolving for 3 years with daytime febrile sensations and facial erythema, all occurring in the context of preserved general condition.

On physical examination, the patient was in good general condition, with marked facial erythema and normal temperature. Abdominal examination revealed palpation of a fixed mass measuring 8 cm in its longest axis occupying the right flank. Pelvic examination was unremarkable.

An abdominal CT scan showed a tissue mass in the right iliac fossa infiltrating the ileocecal angle and bulging endoluminally at the level of the cecum, heterogeneously enhancing after contrast injection and measuring 75 x 45 mm, without other associated locations. (Figure 1)

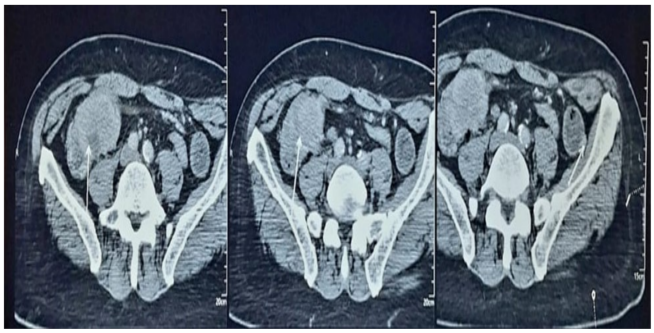

Figure 1: a CT scan slide showing the tumor (arrow)

An enteric MRI also revealed thickening of the segmental ileal wall at its cecal junction, circumferential, irregular, causing mesenteric mass development with intermediate signal intensity on T1 and T2 weighted images with diffusion restriction, early intense and heterogeneous enhancement after gadolinium injection, measuring 47 x 51 mm in anteroposterior diameter, maximum thickness, and extending approximately over 87 mm. This mass invaded the caecal pouch in a hemi-circumferential manner, which was retracted. Inferiorly, it came into intimate contact with the appendix, which showed retention and measured 14 mm in diameter. (Figure 2)

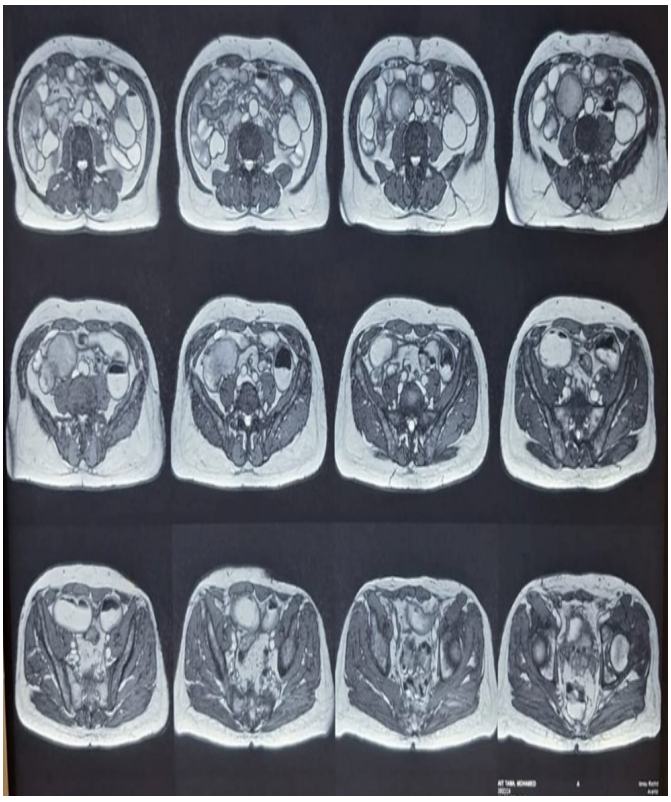

Figure 2: MRI slide showing the right flank tumor and it's characteristics

A 5-hydroxyindole acetic acid assay was performed and returned normal.

Preoperative assessment, including normal ECG and echocardiography showing a normal left ventricular ejection fraction of 62%, revealed no anomalies.

Preoperative octreotide injection at a dose of 150 µg was administered the day before the procedure.

The patient underwent open surgery, a right ileocolectomy with side-to-side hand-sewn ileocolic anastomosis and a pelvic drainage performed. (Figure 3 and 4)

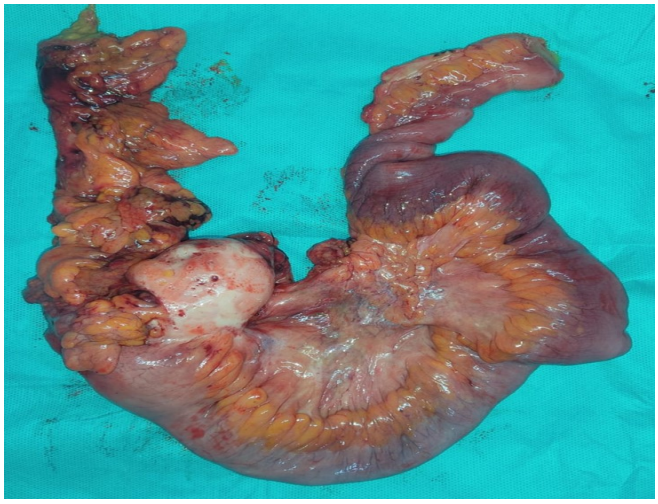

Figure 3: Anterior view of the specimen

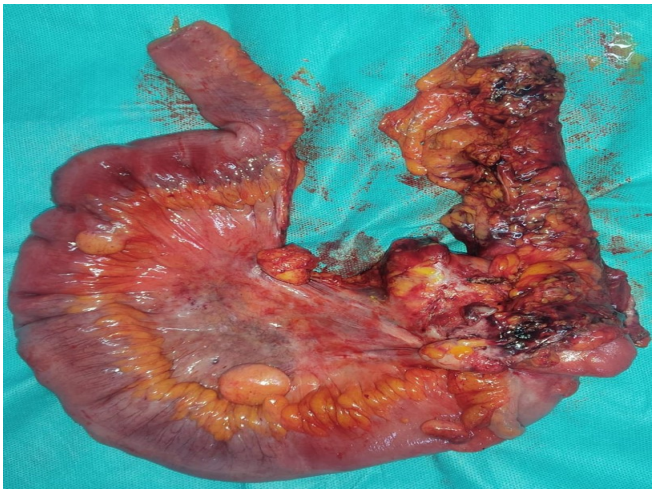

Figure 4: Posterior view of the specimen

On postoperative day 3, the patient experienced chest pain with dyspnea. A D-dimer assay revealed elevated levels at 3960 µg/L, complemented by a thoracic angioscan showing a floating aortic thrombus measuring 23x14 mm. (Figure 5)

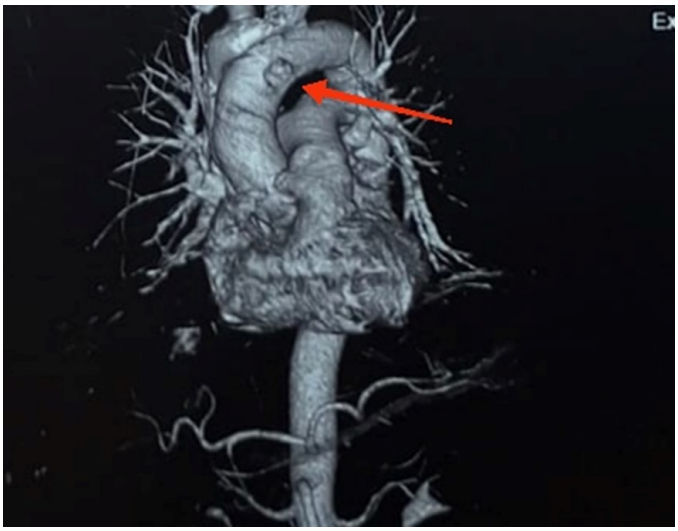

Figure 5: Angio-CT scan slide showing the aortic thrombus

Management was initiated with unfractionated heparin followed by vitamin K antagonists, along with emergency administration of octreotide at 100 µg/day for 6 days with progressive reduction.

Diet was allowed on postoperative day 4, withdrawal of drainage on postoperative day 5 and discharge was declared on postoperative day 7.

Pathological examination of the specimen revealed...

At 1-year follow-up, the patient showed no particularities with effective smoking cessation and absence of cardiovascular anomalies under effective vitamin K antagonist therapy.

DISCUSSION:

Small intestinal neuroendocrine tumors (siNETs), originally termed carcinoid tumors by Oberndorfer in 1907, arise from serotonin-producing enterochromaffin cells and have an incidence of approximately 0.67–0.81 cases per 100,000 individuals per year(1). These tumors often present with nonspecific symptoms such as abdominal pain or weight loss, and around 20–30% of patients with liver metastases develop carcinoid syndrome due to serotonin or tachykinin production(2).

Paraneoplastic syndromes occur in about 10% of malignant diseases and manifest as symptom complexes not readily explained by local or distant cancer spread or specific secretory products (3).Thromboembolism, a recognized complication of malignancy, has long been observed concurrently with aggressive malignancies(4,5). Tumor growth is associated with hypercoagulability, with constitutive overexpression of procoagulant factors such as tissue factor and phosphatidylserine implicated in arterial and venous embolism(6–8). Oncogene activation and tumor suppressor gene inactivation, such as PTEN, MET, or p53, are believed to upregulate clotting pathways(9). The activated endothelium in melanoma patients further promotes platelet activation(10). The neural crest cell origin of NETs may explain the involvement of various pathways leading to coagulation disorders (6,11).

Hormonally active serotonin-producing NENs, primarily in the small intestine with liver metastases, are associated with carcinoid syndrome development(12,13). Elevated serotonin levels contribute to endothelial fibrosis, potentially promoting thrombosis by activating platelets(14). NENs with carcinoid syndrome and carcinoid heart disease have been reported to be at increased risk of thrombosis(15).

This case represents the first instance of aortic thrombosis following siNET resection despite prophylactic low molecular weight heparin administration and octreotide administration.

There are currently no specific guidelines for antithrombotic prophylaxis in NENs, necessitating further research to establish its role.

Regarding anticoagulant therapy for paraneoplastic embolism, low-molecular-weight heparin (LMWH) appears superior to unfractionated heparin (UFH) and vitamin K antagonists based on studies in patients with deep vein thrombosis. However, there is a lack of substantial clinical evidence or guidelines for arterial embolism. Some authors recommend UFH or LMWH in combination with the direct thrombin inhibitor fondaparinux. UFH affects more sites in the coagulation cascade than LMWH, while the role of platelet inhibition remains unclear(6).

CONCLUSION:

This case underscores the significant cardiovascular risks associated with carcinoid syndrome in patients with neuroendocrine tumors. Despite prophylactic measures, such as low molecular weight heparin and octreotide, complications like aortic thrombosis can occur postoperatively. The lack of specific guidelines for antithrombotic prophylaxis in NETs necessitates further research. Additionally, the optimal anticoagulant therapy for paraneoplastic embolism remains unclear, with low-molecular-weight heparin showing promise but requiring more clinical evidence. This case emphasizes the need for a multidisciplinary approach to manage the cardiovascular complications of car-

cinoid syndrome effectively.

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CONSENT

As per international standard or university standard, patient(s) written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

CONFLICTS INTERESTS

Authors have declared that no competing interests exist.

SOUCE OF FUNDING: None

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