

Asymptomatic Left Ventricular Thrombus in Stage IV Pancreatic Cancer undergoing Chemotherapy

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ABSTRACT

Venous thromboembolism (VTE) is a common complication among cancer patients, whereas left ventricular thrombus (LVT) formation is rarely reported in this group. We present a case of a stage IV pancreatic cancer patient who was incidentally found to harbor a large LVT in the apex during an abdominal CT scan. An echocardiogram confirmed the presence of the thrombus, and treatment was initiated with heparin before being transitioned to Eliquis due to concerns regarding Warfarin's interactions with her chemotherapy regimen. This case adds to the limited literature on LVT in cancer patients, emphasizing the therapeutic challenges in managing this condition and the growing role of Direct Oral Anticoagulants (DOACs) as a reasonable alternative to Warfarin, the guideline-recommended anticoagulant in such cases over the past decade.

Keywords: Left ventricular thrombus (LVT), pancreatic cancer, Warfarin, Eliquis, DOACs.

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INTRODUCTION

Pancreatic cancer, the 10th most diagnosed cancer in the U.S. and third in cancer-related mortality is projected to become the second leading cause of cancer deaths by 2030 [1,2]. It is notably associated with a hypercoagulable state, increasing the risk of thrombosis, particularly venous thromboembolism (VTE) [3,4]. Despite this well-documented risk, left ventricular thrombus (LVT) formation is seldom reported and remains poorly understood in cancer patients. Traditionally, Warfarin has been the standard anticoagulant for managing this condition for over a decade [5]; however, its use in cancer patients has recently become a subject of debate due to concerns about interactions and side effects [6]. In this report, we present a rare case of LVT in a pancreatic cancer patient treated with Eliquis, supporting its role as a potential alternative to Warfarin.

CASE PRESENTATION

The patient, a 76-year-old female, presented with a 9-day history of constipation and abdominal pain. Her medical history included hypertension, diabetes mellitus, and a distant history of breast cancer treated with surgery and radiation 35 years prior. She was currently receiving chemotherapy (alternating FOLFIRI and FOLFOX, with 9 cycles completed) for Stage IV pancreatic cancer with liver metastasis, started 5 months before this visit. Her most recent chemotherapy cycle was completed two weeks prior to presentation. She had no history of heart disease and denied experiencing chest pain, shortness of breath, or reflux symptoms.

The patient was alert and in no acute distress, though she appeared pale and cachectic. Vital signs recorded a temperature of 36.6°C, pulse of 100/min, respiratory rate of 16/min, blood pressure of 110/77 mmHg, and oxygen

saturation of 94% on room air. Physical examination revealed a regular heart rhythm with tachycardia, clear lung fields, and a soft, distended abdomen with mild tenderness. Laboratory findings showed leukocytosis (WBC $15.4 \times 1,000/\text{mcL}$), mild hyperglycemia (glucose 176 mg/dL), and normal renal function (BUN 19 mg/dL, Cr 0.84 mg/dL).

A contrast-enhanced CT of the abdomen and pelvis, consistent with her pancreatic cancer history, showed a mass effect on the distal transverse colon, a large hiatal hernia with the entire stomach displaced into the chest, a

non-occlusive filling defect in the left portal vein, and a large filling defect in the left ventricular apex, measuring $2.3 \times 1.9 \times 3.2 \text{ cm}^3$, as shown in Figure 1. This incidental finding in the left ventricle was confirmed by two-dimensional echocardiography, which showed apical hypokinesis and a large echo density near the distal septal/apical wall, indicative of thrombus formation, as shown in Figure 2. Her left ventricular ejection fraction was measured at 55-60%. Given her condition, an ischemic workup for the LVT was not pursued, as agreed upon by the patient and her son. Vascular surgery was consulted for the left portal vein thrombosis, but no intervention was recommended.

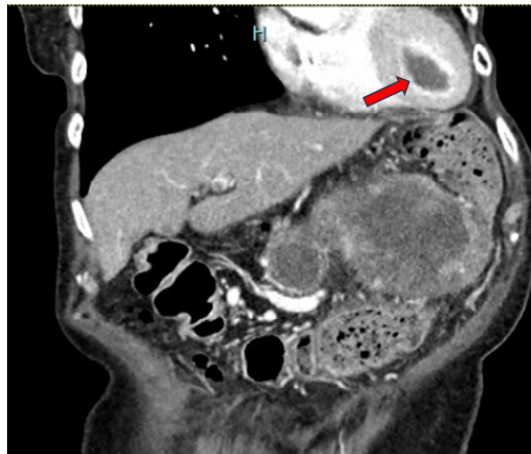


Figure 1. A contrast-enhanced CT scan of the abdomen and pelvis reveals a large filling defect in the left ventricular apex, measuring $2.3 \times 1.9 \times 3.2 \text{ cm}^3$, indicated by a red arrow.

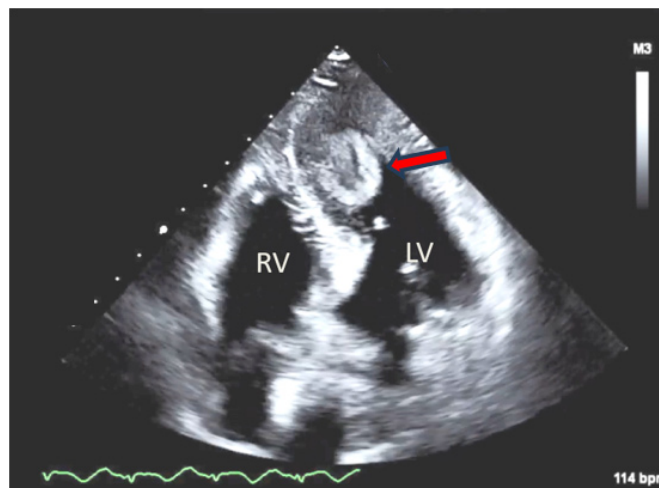


Figure 2. A 2D echocardiogram illustrates a large filling defect in the left ventricular apex, indicated by the red arrow. LV: left ventricle; RV: right ventricle.

In addition to an aggressive bowel regimen for constipation, treatment of the LVT was a key focus during hospitalization. Cardiology recommended starting a heparin drip followed by Warfarin, a Vitamin K antagonist (VKA). However, due to concerns about potential interactions with chemotherapy, the patient and her son declined warfarin. Hematology-oncology also shared reservations about using warfarin, and the patient was ultimately transitioned to Eliquis (Apixaban, one of the Direct Oral Anticoagulants or DOACs) 5 mg twice daily for anticoagulation. Upon improvement of her constipation, the patient was discharged with Eliquis for

the left ventricular thrombus and did not experience major cardiovascular events following discharge. Unfortunately, she passed away one month later under home hospice care due to the progression of her pancreatic cancer. Consequently, we could not evaluate the long-term impact of Eliquis on thrombus resolution.

CASE DISCUSSION

Pancreatic cancer is well-known for its link to venous thromboembolism (VTE) due to the cancer-induced hypercoagulable state [7]. However, its association with

left ventricular thrombus is not well known. A case reported 8 years ago identified three different types of cardiac thrombi in the left heart of a patient with pancreatic cancer metastasized to the liver, including large thrombi in the left ventricular apex, the left atrial appendage, and papillary-shaped vegetation on the aortic valve, which led to multiple embolic brain infarcts and death [8]. In our patient, who had no previous cardiac history, the incidental finding of a large, asymptomatic LVT in the apex represents a rare occurrence of stage IV pancreatic cancer with this condition. While the exact prevalence of left ventricular thrombus in pancreatic cancer remains unclear, we anticipate that its prevalence will be better delineated with the increasing use of echocardiography and advanced imaging technologies such as cardiac magnetic resonance (CMR).

The apical thrombosis in the left ventricle of a cancer patient may arise from various factors, including a cancer-induced hypercoagulable state, chemotherapy-induced cardiotoxicity [9,10], and cancer-associated Takotsubo cardiomyopathy [11]. Due to apical akinesis demonstrated by echocardiography, an ischemic workup was discussed with the patient but not pursued due to the patient's overall condition. Nevertheless, our patient likely experienced a combination of these contributing factors.

Although our patient was incidentally found to have a left ventricular thrombus without cardiovascular symptoms, left untreated, severe arterial thromboembolism, such as stroke, could occur and carry a high mortality rate [12]. However, managing anticoagulation for an LVT in the context of cancer and chemotherapy presents significant challenges. The standard approach starts with intravenous heparin infusion, followed by oral anticoagulants. The decision between Warfarin and DOACs remains debated [6]. While warfarin has been the traditional standard of care, the 2022 AHA Scientific Statement highlights DOACs as a promising alternative [5]. Moreover, the 2023 ASCO guideline update on VTE prophylaxis and treatment in cancer patients favors longer-term anticoagulation (at least 6 months) with LMWH, edoxaban, rivaroxaban, or apixaban over VKAs due to improved efficacy [13]. Despite a cardiology consultant's preference for Warfarin, Eliquis was selected for our patient due to difficulties in managing warfarin dosing during chemotherapy. The patient's death one month after discharge precluded a longer-term assessment of thrombus resolution and anticoagulation effects.

The use of anticoagulants in cancer patients carries a higher risk of thrombotic recurrences and bleeding complications compared to the general population [14]. This underscores the importance of careful consideration when prescribing

anticoagulation therapy for left ventricular thrombi (LVTs) in patients with stage IV cancer. Having an open dialogue with patients and their families about treatment goals is crucial before initiating any anticoagulant therapy.

Nevertheless, our case represents the first reported instance of using DOACs to treat cancer-associated LVTs. According to the American Cancer Society's Cancer Facts & Figures 2024 Report [15], the five-year survival rate for pancreatic cancer has steadily increased to 13% and is projected to reach 20% by 2030. As more patients with this debilitating disease survive longer, comprehensive management, including anticoagulation therapy for left ventricular thrombosis, will positively impact their long-term welfare.

CONCLUSION

The incidence of left ventricular thrombosis poses a rare yet clinically important challenge in managing cancer patients. This case exemplifies the necessity of individualized therapeutic strategies that address the delicate balance between the risk of thrombosis and the potential complications of treatment. Ongoing research is crucial to determine optimal anticoagulation protocols tailored for cancer patients undergoing chemotherapy to improve patient outcomes.

Conflict of interest

The authors declare that there are no conflicts of interest.

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