

Non-bacterial thrombotic endocarditis in a patient with pancreatic carcinoma

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Abstract

Nonbacterial thrombotic endocarditis (NBTE) is a rare condition that most often accompanies a malignant disease and involves a hypercoagulable state. We report the incidental finding of a rare case of an NBTE affecting the tricuspid valve in a patient with metastatic pancreatic carcinoma complicated by severe venous and arterial thromboembolisms.

KEY WORDS

Nonbacterial thrombotic endocarditis (NBTE)

1 | INTRODUCTION

Pancreatic carcinoma has the worst prognosis of any malignancy. Despite advances in adjuvant chemotherapy, the 5-year survival rate is only approximately 8%.¹ It is known that pancreatic cancer induces a hypercoagulable state as individuals with pancreatic cancer carry the highest risk of venous thromboembolism (VTE) compared to all other cancer patients.^{2,3} Non-bacterial thrombotic endocarditis (NBTE) is also intricately linked to hypercoagulable states,⁴ especially disseminated intravascular coagulation (DIC). However, whereas VTE is a common finding, NBTE is a very rare diagnosis. We present a case of the incidental finding of nonbacterial thrombotic endocarditis of the tricuspid valve in a patient with metastatic pancreatic carcinoma detected by point-of-care echocardiography on a non-cardiological ward.

2 | CASE REPORT

A 67-year-old female patient with metastatic pancreatic carcinoma was admitted to the department of gastro-oncology in our university medical center for the initiation of palliative chemotherapy. The carci-

noma had been diagnosed 2 weeks prior to the admission. In addition to the primary tumor, multiple liver metastases had been detected, and palliative chemotherapy with FOLFIRINOX (oxaliplatin, irinotecan, leucovorin, and fluorouracil) was recommended.

On admission, the patient reported that a deep vein thrombosis of the left lower leg had been diagnosed 10 days before, but anticoagulant treatment with apixaban was discontinued by her hematologist due to progressive severe thrombocytopenia and intracutaneous bleedings. Laboratory findings confirmed severe thrombocytopenia (platelet count on admission 10/nl) and highly elevated D-dimer levels (22 mg/l FEU) reflecting a hypercoagulable state.

For chemotherapy, a central venous catheter was inserted into the right internal jugular vein. Following insertion, bedside ultrasound was used for confirmation of the central venous placement by visualizing bubble artifacts in the right atrium after injection of agitated saline through the distal port.⁵ Unexpectedly, during visualization of the right atrium and right ventricle in subcostal view, transthoracic echocardiography (using a Philips Affinity 70 ultrasound system) revealed large masses adherent to the tricuspid valve leaflets (Figure 1 A/B). The differential diagnosis included thrombi, bacterial vegetations, and metastases. The immediate CT scan demonstrated a hypodense lesion of

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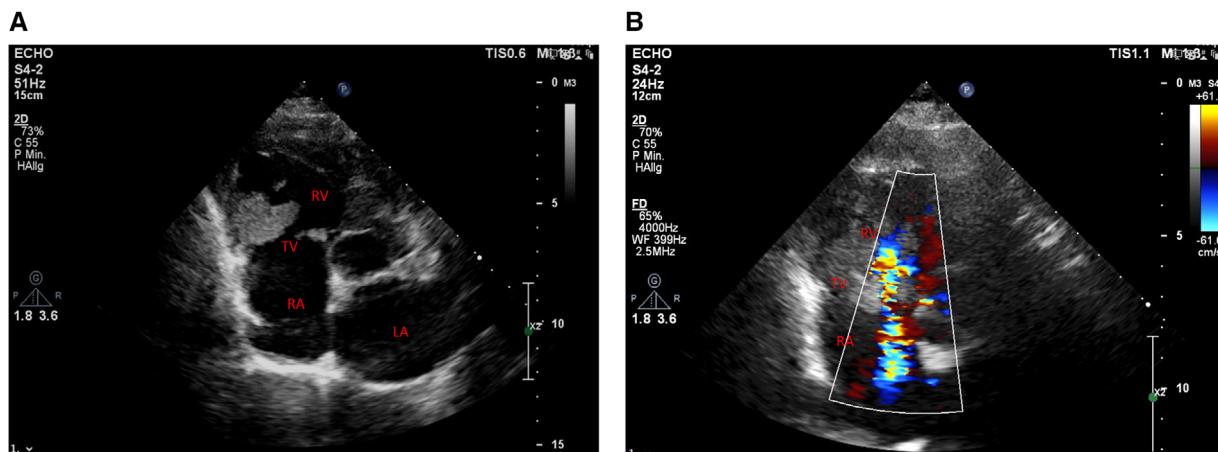


FIGURE 1 (A) Bedside two-dimensional transthoracic echocardiography. Parasternal short-axis view showing a large mass adhering to the tricuspid valve. TV, tricuspid valve; RA, Right atrium; RV, Right ventricle; LA, Left atrium. (B) Color doppler echocardiography reflecting tricuspid insufficiency which was estimated as non-severe by the given limited quality of the imaging in the point-of care setting



FIGURE 2 Cardiac CT scan demonstrating a 28 × 20 mm measuring hypodense lesion with predominantly intra-ventricular and a small intra-atrial proportion. TV, tricuspid valve; RA, Right atrium; RV, Right ventricle; LA, Left atrium; LV, Left ventricle; PA, Pulmonary artery

28 × 20 mm with predominantly intra-ventricular and only a small intra-atrial proportion (Figure 2).

After interdisciplinary discussion, we interpreted the tricuspid mass as most consistent with NBTE. Chemotherapy and therapeutic anticoagulation with low-molecular-weight heparin were started. Unfortunately, anticoagulation with low-molecular-weight heparin had to be interrupted multiple times due to persistent severe intra-

cutaneous and catheter-related bleedings requiring transfusions. Several days later, the patient developed arterial thromboses in both lower extremities with critical ischemia, reflecting an overall deranged coagulation with parallel hypercoagulation and bleeding disorder, again consistent with DIC. We switched the anticoagulatory treatment to aPTT-guided continuous infusions of unfractionated heparin. The following days, thrombocyte counts (Figure 3) normalized without further bleeding events. We performed an echocardiographic follow-up shortly after the first course of chemotherapy. Unfortunately, the masses covering the tricuspid valve leaflets slightly increased with signs of valve dysfunction and severe tricuspid insufficiency (Figure 4A/B).

We discharged the patient on low molecular-weight heparin and continued palliative chemotherapy in the outpatient department. Unfortunately, the patient died a few weeks later due to tumor-related liver failure.

3 | DISCUSSION

Nonbacterial thrombotic endocarditis (NBTE, formerly known as marantic endocarditis) has first been described by Ziegler in 1888, as fibrin thrombi on normal or degenerated cardiac valves.⁶ Postmortem, the histological diagnosis of NBTE is defined by the presence of a mixture of platelets and fibrin on the valvular leaflet without detecting microorganisms destructing the valve. In clinical routine, NBTE is rarely diagnosed antemortem and is likely to be underdiagnosed and overlooked⁷ as a definitive histological diagnosis is not possible in most cases. In the presented case, a histological confirmation was also not feasible as it would have endangered the patient without affecting the further management. So, the diagnosis was based on appropriate imaging (echocardiography and CT) combined with the clinical findings. We abstained from additional MRI imaging as it would not have changed the clinical management of the patient.

A large autopsy study from 1976 reports an incidence of 1.6 % of NBTE in the adult autopsy population.⁸ Coagulation

Thrombocytes (/nl)

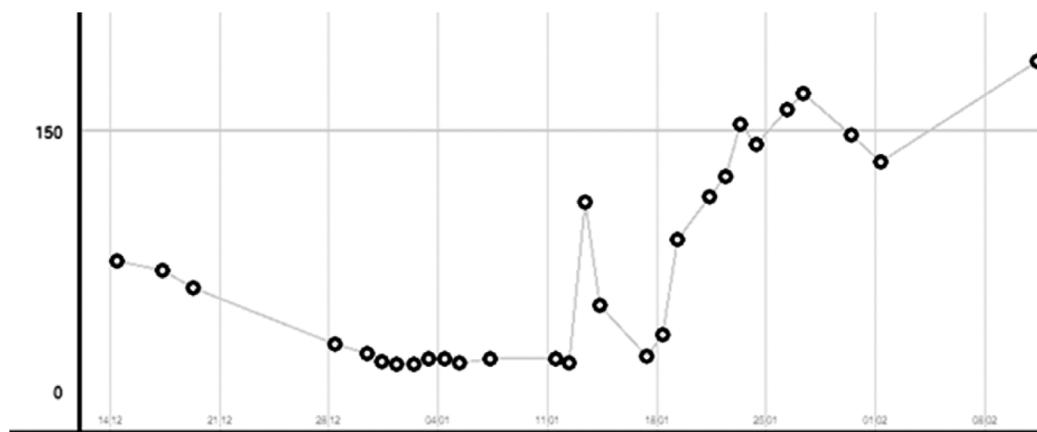


FIGURE 3 Thrombocyte counts during treatment

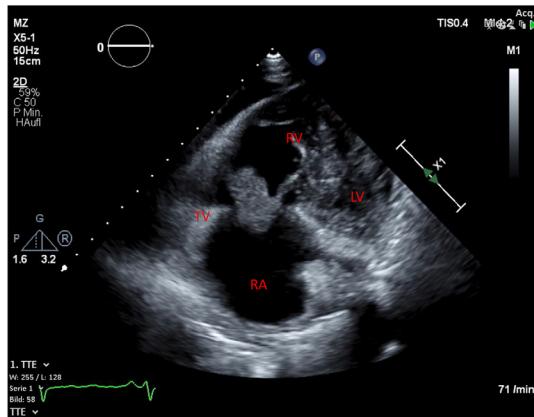
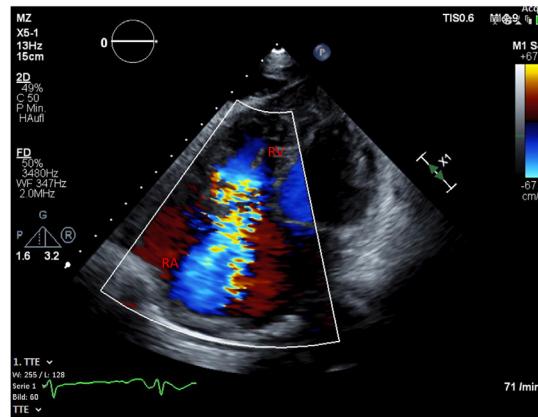
A**B**

FIGURE 4 (A) Two-dimensional transthoracic echocardiography, (B) color doppler echocardiography. Optimized apical four chamber view to demonstrate the NTBE of the tricuspid valve. TV, tricuspid valve; RA, Right atrium; RV, Right ventricle; LA, Left atrium; LV, Left ventricle

abnormalities suggestive of DIC were present in 18.5% of the cases.⁸ Other autopsy studies described the significantly higher prevalence of NBTE in patients with malignancies than in patients without cancer.^{9,10} The condition is predominantly seen in patients suffering from pancreatic cancer in comparison with other carcinomas. As exemplified by our case, NBTE is significantly more common with more than 10% of all pancreatic cancer patients presenting histological features of the disease in autopsy studies.⁹

Regarding the anatomical site, the aortic valve is most often affected, followed by the mitral valve and a combination of both the aortic and mitral valves. Affections of the tricuspid or pulmonary valve are very rare reflecting only 3.6% (tricuspid valve) or .9% (pulmonary valve) of all cases.¹¹ When the tricuspid valve is affected, the vegetations are typically present on the atrial surface and occurring at the coapting edge of the leaflets but without altering valve function.¹¹ In the first echocardiography, our patient did not suffer from severe tri-

cuspid insufficiency, but unfortunately in a noticeably short span of time, the regurgitation increased, indicating functional impairment of the valve by the growing mass.

DIC is an important and life-threatening condition that is associated with NBTE (and DVT as in this patient). In fact, the referring hematologist had initially suspected DIC, but had been forced to discontinue anticoagulation as platelet counts continued to drop and the patient experienced bleeding complications. Whether the resolution of the hypercoagulable state that eventually occurred was a consequence of chemotherapy, of the reinstated anticoagulant treatment, or both, cannot be determined.

4 | CONCLUSION

We present a rare case of severe nonbacterial thrombotic endocarditis affecting the tricuspid valve. We want to highlight the benefit of

bedside ultrasound for non-cardiological patients with malignancies associated with hypercoagulatory states. Our case might emphasize that bedside echocardiography helps to improve management of these patients especially by early initiation of adequate anticoagulant treatment.

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AUTHOR CONTRIBUTIONS

Johannes Wild: Imaging, concept and drafting of the article; Simon Distelmeier: Imaging, critical revision of the article; Philip Keil: Imaging; Arndt Weinmann/Thomas Münzel/Julia Weinmann-Menke: Critical revision of article; Daniel Kraus: Drafting and revision of the article.

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