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Gastric Adenocarcinoma Revealed by a Left Ventricular Thrombus: A Case Report and Literature Review

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Abstract **Case Report**

Background: Thromboembolic events are common in gastrointestinal malignancies, particularly in the context of Trousseau's syndrome. However, left ventricular (LV) thrombus as an initial presentation of gastric adenocarcinoma is extremely rare. ***Case Summary***: We report the case of a 67-year-old man with a history of chronic smoking and chronic obstructive pulmonary disease, who presented with dyspnea, dry cough, fatigue and weight loss. Diagnostic imaging revealed a mobile thrombus in the left ventricle, without underlying cardiomyopathy or arrhythmia. Further investigation, prompted by the unexplained thrombus, revealed elevated tumor markers and an antral gastric wall thickening. Upper gastrointestinal endoscopy with biopsy confirmed the diagnosis of gastric adenocarcinoma. Anticoagulation therapy with low-molecular-weight heparin was initiated, followed by long-term anticoagulation. Echocardiographic follow-up demonstrated partial regression of the thrombus. ***Conclusion***: This case highlights the importance of considering occult malignancy, particularly gastric cancer, in patients presenting with unexplained cardiac thrombi. A multidisciplinary approach is essential for timely diagnosis and optimized management.

Keywords : Gastric Adenocarcinoma, Left Ventricular Thrombus, Trousseau's Syndrome, Thromboembolism, Occult Malignancy.

INTRODUCTION

Thromboembolic events are frequently observed in patients with malignancies, particularly those involving the gastrointestinal tract. Among these, gastric adenocarcinoma is known to be associated with a hypercoagulable state. This paraneoplastic phenomenon, commonly referred to as Trousseau's syndrome, underscores the complex interplay between malignancy and coagulation pathways. While venous thromboembolism is well documented in the context of gastrointestinal cancers, intracardiac thrombus—particularly within the left ventricle (LV)—is a rare and atypical presentation. Left ventricular thrombi are typically associated with myocardial infarction, cardiomyopathy, or significant wall motion abnormalities. Their presence in patients without known structural heart disease should prompt investigation for underlying systemic conditions, including occult malignancies.

In this report, we present the case of a 67-year-old man in whom the discovery of an LV thrombus led to the diagnosis of metastatic gastric adenocarcinoma. This case highlights the diagnostic value of a thorough etiological workup in cases of unexplained cardiac thrombus and underscores the importance of multidisciplinary collaboration in managing cancer-associated thrombosis.

CASE REPORT

A 67-year-old man from Morocco, with a history of chronic tobacco use (40 pack-years) as his only modifiable cardiovascular risk factor, and a 7-year history of chronic obstructive pulmonary disease (COPD) but no cardiac history, presented to the emergency department with a dry cough, NYHA class II dyspnea, and increasing fatigue over the past three days. He also reported anorexia, rapid weight loss, and atypical epigastric pain evolving over 2.5 years.

On examination, the patient was afebrile, with a blood pressure of 135/75 mmHg and a heart rate of 110 bpm. Oxygen saturation was 93%. Cardiac auscultation revealed no murmur or signs of heart failure. The ECG showed sinus rhythm at 107 bpm with no other notable abnormalities.

Biological workup showed: moderate inflammatory syndrome, microcytic hypochromic anemia (Hb 105 g/L), moderately elevated CRP (34 mg/L), hypoalbuminemia (24 g/L), elevated BNP and D-dimers, with normal troponin levels. Renal, hepatic, and thyroid function were normal.

Thoracic CT angiography (CTPA) ruled out pulmonary embolism but revealed a spiculated 11 × 8.5 mm lesion in the left upper lung lobe, suspicious for malignancy. The lungs were emphysematous, with two small non specific pulmonary nodules and a 7 mm Barety lymph node. A left ventricular thrombus measuring 17 × 13.7 mm was also noted. Transthoracic echocardiography (TTE) confirmed a 15 mm mobile thrombus in the left ventricle, without underlying cardiomyopathy. (**Fig-1**) The cause of the thrombus was unclear. A Holter ECG performed later showed no arrhythmia.

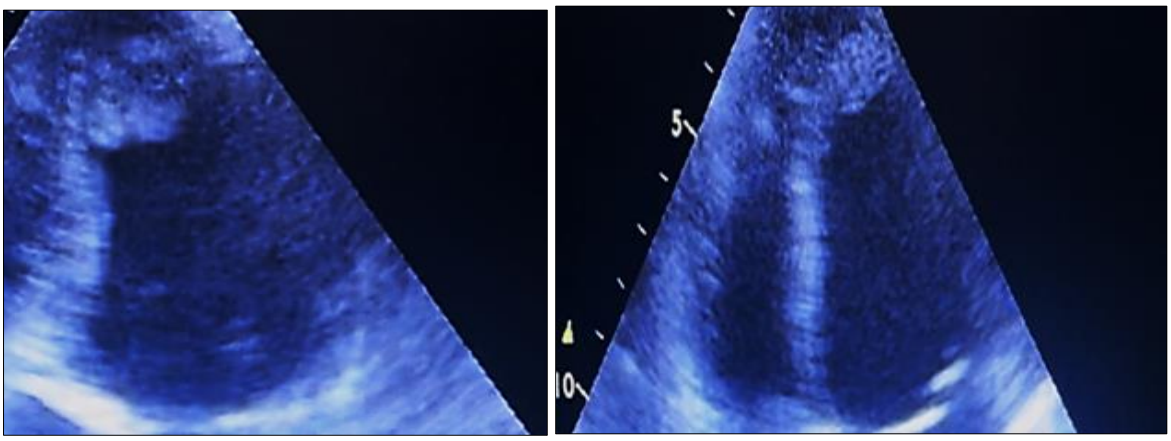

Fig. 1: transthoracic echocardiography; apical 4 chamber view showing a LV thombus

The patient was referred to internal medicine for a more thorough etiological workup, including abdominal imaging and tumor markers (ACE, CA 19-9), which showed elevated levels and suspicious thickening of the antral gastric wall. Follow-up endoscopy with biopsy revealed gastric adenocarcinoma, confirmed histopathologically.

Curative anticoagulation therapy was initiated in collaboration with the oncology team, using low-molecular-weight heparin (LMWH) initially, followed by long-term anticoagulation to reduce embolic risk. Cardiac follow-up with echocardiography showed partial and progressive regression of the thrombus under treatment.

DISCUSSION

Thrombus formation in the left ventricle is typically associated with left-ventricular-wall motion disorders and impaired left ventricular function [1-3]. Consequently, left-ventricular thrombosis mainly occurs in coronary artery disease, especially as a complication after myocardial infarction [4], as well as in dilated cardiomyopathy [5], transient apical ballooning [6], and myocarditis [7]. Neoplastic thrombi are often reported [10, 11].

It has been reported that the ability of tumor cells to activate the coagulation system can lead to a hypercoagulable or prothrombotic state in cases of malignancy [12]. This hypercoagulable state is associated with interactions between different mechanisms related to the activation of various hemostatic components, such as the coagulation and fibrinolytic pathways, vascular endothelium, monocytes, and platelets [12].

A meta-analysis by Caruso *et al*., showed a global thrombosis incidence of 6.4% in adult lymphoma patients. Although patients with hematologic malignancies are known to be at an increased risk for venous thrombosis, 16.5% of total thrombotic events were observed in the arterial system [8.] Thrombophilic disorders - for example, antiphospholipid syndrome [14], can predispose to cardiac thrombosis in the absence of heart disease. Cardiac involvement with development of intracardiac thrombosis is also described in the setting of systemic diseases, such as American trypanosomiasis [15], and amyloidosis [16].

The most frequently diagnosed cardiac masses are no neoplasms, but tumor-like lesions, such as cardiac thrombi. Intracardiac thrombi can mimic neoplasms, and despite modern imaging techniques differentiation can be difficult [17]. Echo is often one of the first tests in the evaluation of patients with cardiac symptoms. Both echo modalities, transthoracic echocardiography (TTE) and transesophageal echocardiography (TEE), have advantages for assessing the hemodynamic impact, anatomic location, and tissue characteristics of a mass lesion [18-21]. These features are especially important in differentiating between different etiologies. In most cases, TTE is the initial performed imaging technique (for the detection and diagnosis of cardiac masses [10, 2]. One the one hand, TTE can provide reliable anatomic and functional features of a detected cardiac mass, but,

on the other hand, its ability to characterize tissue is limited [17].

However on many occasions, the diagnosis is not straightforward and requires collaboration with colleagues in radiology, interventional cardiology, cardiac surgery, and cardiac pathology. This often leads to further imaging like cardiac magnetic resonance (CMR), cardiac computed tomography (CCT), or fusion imaging (e.g., PET-CT/MRI). Despite great advances in imaging, histopathologic examination of the tissue is necessary for definitive diagnosis [22-24]. In the present case, the TTE was performed after ruling out pulmonary embolism by Thoracic CT angiography (CTPA). The TTE showed that cardiac function was preserved as well as the presence of an imovable intramural thrombus in LV cavity which was incidentally found in CTPA.

CCT scans are also increasingly used for evaluation of a cardiac mass. CCT has very high spatial resolution in a 3-dimensional (3D) volumetric acquisition, and can assess tumor features including calcification, fat content, perfusion, and enhancement. CCT can depict tumor margins, indicating tissue invasion which can point toward malignancy. Hybrid imaging techniques such as combining CCT and positive emission tomography (PET) in cardiac mass work-up can be very impactful [25, 26].

CMR is often the second-line imaging modality due to excellent tissue characterization. These findings may narrow the differential diagnosis, sometimes lead to a conclusive diagnosis, and be useful for staging [27].

Additionally, CT and MR images can provide information about extracardiac conditions that can help with the identification and diagnosis of cardiac masses. Ideally, after imaging, one has confidence to determine if the mass needs further intervention or can be followed longitudinally. The imaging sequence may help to differentiate whether the mass is a neoplasm, thrombus, or vegetation. However, if uncertainty about the diagnosis remains, transcatheter biopsy or CT-guided biopsy or surgical removal may be warranted [28].

A movable LV thrombus is more likely to be associated with embolization compared with an immovable LV thrombus [3]. Similarly, a thrombus that protrudes into the LV cavity (ball-like thrombus) is more likely to be associated with embolization compared with a flat thrombus (mural-type thrombus) [3].

Systemic thromboembolism constitutes a much feared complication of left ventricular thrombi, especially in cases where it triggers cerebral events. It is reported that protrusion and mobility of a thrombus are indicators for an increased risk of embolism [29].

Table 1: Relative strength of different imaging modalities in evaluating certain characteristics of cardiac masses

Modality **Strength** **Tissue**	**ECHO** **Temporal resolution; motion patterns, small structures**	**CMR** **Tissue characterization (edema, fat, infiltration, fibrosis and LGE)**	**CT** **Temporal resolution; fat, calcium, foreign body**
Fat	++	++++	+++
Calcium	+++	+	++++
Thrombus	++	++++	+++
Mobile mass	++++	++	++
Foreign body	+++	+	+++
Extra-cardiac extent	+	+++	++++

CMR, cardiac magnetic resonance; CT, computed tomography; ECHO, echocardiography; LGE, late gadolinium enhancement [9].

The treatment of LV thrombi remains controversial. Anticoagulation therapy has been shown to be effective in reducing the risk for embolic events after thrombus formation in patients with myocardial infarction [30]. Anticoagulation therapy is currently the mainstay in the treatment of cardiac thrombi. However, because of the great variety of possible underlying causes and processes, a general therapeutic recommendation is lacking [1]. Thrombolysis [1], or surgical treatment [1-31], might be considered in high risk patients. Careful evaluation of risks and benefits is necessary for both interventions [1-31]. Surgery is recommended if the general condition of the patient is sufficient and the thrombus is markedly protruding or is a floating-type thrombus. As fibrinolytic therapy may cause fresh LV thrombi to become fragmented and subsequently form emboli, anticoagulant therapy is used frequently [2]. In the current case, anticoagulation therapy was selected. However, the LV thrombi had regressed in size after 3 months of therapy.

CONCLUSION

The appearance of a left ventricular thrombus without apparent cause should prompt suspicion of an underlying condition, particularly malignancy. This case underscores the importance of thorough investigation in atypical thrombotic events to detect potentially treatable cancers early. Multidisciplinary management (oncology, cardiology, hematology) is crucial for optimal patient outcomes.

Conflicts of Interest: The authors declare no conflict of interest.

Contributions of the Authors

All authors contributed to the conduct of this research work. All authors have read and approved the final version of the manuscript.

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