

Incidental finding of multiple intracardiac masses in severe trauma patient: The challenges in the diagnosis and management of these masses and its implications on patients' outcome

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Abstract

Intracardiac masses can be presented in multiple forms. Differentiating the type of the mass is often challenging but crucial to direct the management. This report describes a 31-year-old female who presented with multiple intracardiac masses after one hour of tranexamic acid administration. Multiple imaging modalities used in our patient to reach the final diagnosis of intracardiac thrombosis and to follow up the response to treatment. Tranexamic acid has been used commonly in trauma patients to reduce the risk of death with a good safety profile. Large prospective trials have failed to show a significant association of vascular occlusive events with TXA administration. This case demonstrates the need for close monitoring in post-trauma TXA recipients to avoid thrombotic complications. Heparin was used successfully to treat these thrombi, and the patient was discharged on enoxaparin to finish six months course of treatment.

Keywords: *Thrombosis, tranexamic acid, pulmonary embolism, transesophageal echocardiography, intracardiac myxoma, anticoagulants*

Highlights

- *Although the use of tranexamic has been shown to be safe and effective, this case highlights the importance of close monitoring and vigilance for thrombotic events, both arterial and venous following its use.*
- *Echocardiography can be used to differentiate various types of intracardiac masses and help guide the management.*
- *Intracardiac thrombus can result in a drastic risk of pulmonary or systemic thromboembolic disease due to its high vulnerability for dislodgement. Systemic anticoagulation with heparin can treat and prevent further progression of the thrombosis caused by tranexamic acid.*

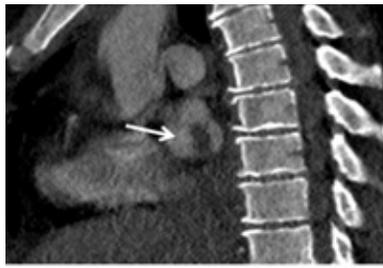
Introduction

Multiple intracardiac masses is a rare but serious condition that can lead to many complications resulting in long-term morbidities. Most commonly masses can fall under three principal categories; tumor, thrombus, and vegetation. Management of each of these categories is different from others. Masses can be identified by multiple imaging modalities including ultrasound, Computed Tomography (CT) and Magnetic Resonance Imaging (MRI). Echocardiography is an indispensable tool to help to establish the diagnosis and guide further management. Echocardiography also plays a crucial role to monitor response to treatment and screen for possible complications. Tranexamic Acid (TXA) is an antifibrinolytic that is being used commonly in trauma patients to reduce the risk of death in bleeding trauma patients [1].

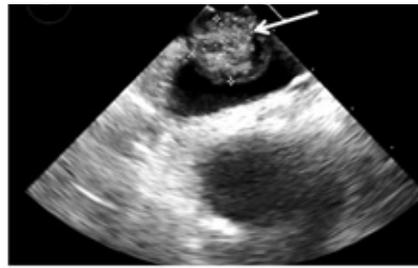
Case presentation

A 31-Year-old woman with no significant medical history who presented after a motor vehicle accident. The patient presented with multiple fractures and bleeding. She had no personal or

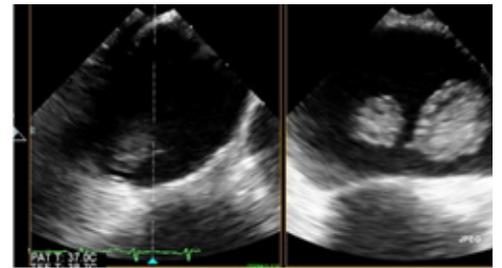
family history of thromboembolism, her Body Mass Index (BMI) was 32.2 kg/m², she was not on oral contraceptives and was not a smoker. Upon presentation, she was tachycardic, normotensive and afebrile. Physical exam revealed left upper extremity degloving injury and humeral fracture. The initial laboratory studies on presentation were remarkable for hemoglobin of 12.1, other laboratory studies were within normal limits. The patient received intravenous fluids, blood transfusion, and 2000 TXA as part of the resuscitation process for trauma patients. Due to her extensive injuries she underwent surveillance computerized tomography (CT) scans as part of trauma diagnostic evaluation. In addition to her degloving injury and humeral fracture, she found to have a 12th rib fracture, lumbar vertebral fracture, liver and kidney lacerations. CT of the chest revealed a left atrial mass measuring 1.5 cm (Figure 1a). A subsequent transesophageal echocardiogram (TEE) was performed which showed multiple masses; there were two left atrial (LA) masses; one measuring approximately 1 x 1 cm and the other approximately 1.4 x 1.4 cm, both are located in the right posterior atrium adjacent to the right upper and lower



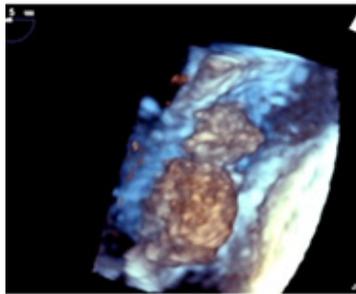
a) CT scan with filling defect in LA



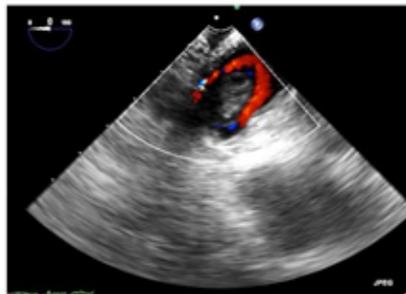
(b) LA mass near right pulmonary veins



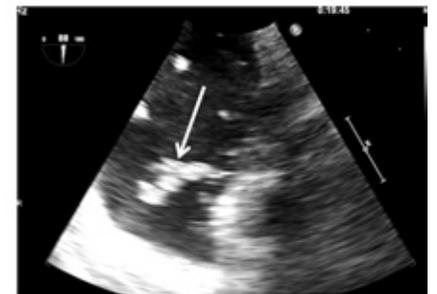
(c) Mass adjacent to posterior part of LA



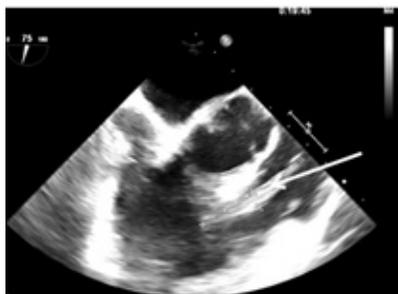
(d) 3D image of LA masses



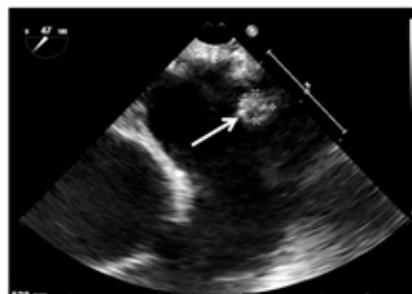
(e) Color doppler showing laminar blood flow



(f) Mass attached to tricuspid chordae



(g) Extension of the tricuspid mass



(h) At the bifurcation of main PA



(i) CT scan showing distal PA emboli

pulmonary veins confluence. The masses were attached to the atrial wall without a stalk, and the larger mass was attached to a ridge of tissue between the pulmonary veins (Figure 1b- 1d). Laminar blood flow was seen around the masses, and they did not appear to be obstructive (Figure 1e). There was a third mass attached the tricuspid chordae tendineae. The mass was approximately 5 cm in length and 0.5 cm in width. The mass was highly mobile and during right ventricular (RV) ejection passes through the pulmonary valve (PV) into the main pulmonary artery (PA). The final mass was seen at the bifurcation of the main pulmonary artery. The mass was well circumscribed and echo-bright. The mass is fan-shaped, approximately 1 cm long, 1 cm deep, and 0.5 cm wide (Figure 1h). Masses in the left atria thought to be atrial myxoma initially based on their appearance on TEE. The right-sided masses were highly suspicious for thrombosis, giving the high likelihood of thrombosis the patient was started on systemic anticoagulation with heparin drip. At day five of her hospital admission, the patient developed shortness of breath and unexplained tachycardia for which she underwent CT of the chest which revealed right pulmonary artery thrombi extending into lobar arteries (Figure 1i) as well as

bilateral renal infarcts. Bilateral upper and lower extremity doppler ultrasound was negative for deep venous thrombosis. The patient was continued on a heparin drip and was scheduled to undergo surgical removal for what was thought to be LA myxoma; TEE was performed at day 15 of her hospital stay just before her scheduled surgery. TEE showed total resolution of the masses described above. Systemic anticoagulation was continued, and the patient was discharged on a six-month course of enoxaparin, the patient was able to recover from her thromboembolic events.

Discussion

The differential diagnosis of intracardiac masses is a broad, diagnosing the mass type is challenging but crucial to determine the management and prevent complications. Three principle intracardiac masses are present; tumor, thrombus, and vegetation. Echocardiography has advanced enormously since its appearance in the 1950s and grow as an indispensable tool for characterization of the intracardiac masses and providing high-quality images, furthermore, seeing these masses in real time enables us to watch its effects on hemodynamics.

Our patient presented with multiple intracardiac masses that was discovered by CT scan done for trauma surveillance one hour after TXA injection. TXA is an antifibrinolytic that is commonly used in trauma patients to reduce the risk of death in bleeding trauma patients [1]. However, the consequence of tranexamic acid on thromboembolic events and mortality remains questionable [1,2]. Our patient presented with a rare complication of TXA treatment of multiple intracardiac thrombi. The patient was asymptomatic prior to her trauma, and she did not have any personal or family history of blood clots. Furthermore, she responded well to the treatment without recurrence in the follow-up period. We have no reason to suspect the presence of the thrombi prior to her trauma. Thrombi are likely formed shortly after TXA administration. The combination of CT and TEE images provided a characterization of the images; LA masses were initially thought to be myxomas giving its appearance. However right heart masses were highly suspicious for thrombosis secondary to TXA injection. Multiple imaging modalities are helpful in the characterization of intracardiac masses. Transthoracic echo (TTE) remains the standard and the proffered method for initial evaluation of the intracardiac masses. However, contrast-enhanced CT is more sensitive than TTE for detecting ventricular and atrial thrombi, but the CT has been shown to be inferior to TEE for illustrating atrial thrombi [3]. Further imaging with gadolinium enhancement cardiac MRI is typically the most sensitive tool in detecting thrombosis [3,4] but was difficult to obtain in our patient giving her multiple fractures.

Our patient posed a management dilemma as right heart thrombosis (RHT) is associated with significant mortality and morbidity. Moving right heart thrombus carries a high risk of becoming PE within 24 hours, and may lead to massive PE in 40% of cases, which reaches a mortality rate of 45% [5,6]. However, the patient presented with significant bleeding and organ damage making her management challenging. We contemplated the option of surgical intervention for her right atrial thrombus extraction and suspected left atrial myxoma removal and other treatment options including percutaneous catheterization to retrieve her RHT or systemic anticoagulation. Systemic anticoagulation seemed to be the safest route at that time giving high surgical risk giving her

acute condition and the risk the risk of thrombus dislodgment or fragmentation during mechanical extraction. Unfortunately, thrombus dislodgment resulted in PE and renal infarction in our patient which occurred five days after the thrombus was diagnosed.

Conclusion

Although the use of tranexamic has shown to be safe and effective, this case highlights the importance of close monitoring and vigilance for thrombotic events, both arterial and venous following its use. Echocardiography played an invaluable role in the evaluation of these intracardiac masses. Intracardiac thrombus carries a considerable risk of dislodgment causing pulmonary or systemic thromboembolic disease.

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