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Bi-Atrial Thrombus via Patent Foramen Ovale with Medical Noncompliance: A Case Report

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Abstract

Numerous diagnoses in the hospital setting require anticoagulation. With different etiologies, certain specific assessments may not have a treatment plan that is studied extensively in evidence-based medical texts. In these uncommon situations, management may not have clear medical guidelines for successful treatment. We present a case of bi-atrial thrombus via PFO with concurrent pulmonary embolism, extensive clot burden history, and the plan to move forward with Angiovac. In patients with this specific history and pathology, modern procedures like Angiovac should be considered and discussed.

Keywords

Bi-atrial, Thrombus, Noncompliance

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Conflict of Interest Statement

The authors declare there is no conflict of interest.

CASE REPORT

Bi-Atrial Thrombus via Patent Foramen Ovale With Medical Noncompliance: A Case Report

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Abstract

Numerous diagnoses in the hospital setting require anti-coagulation. With different etiologies, certain specific assessments may not have a treatment plan that is studied extensively in evidence-based medical texts. In these uncommon situations, management may not have clear medical guidelines for successful treatment. We present a case of bi-atrial thrombus via PFO with concurrent pulmonary embolism, extensive clot burden history, and the plan to move forward with Angiovac™. In patients with this specific history and pathology, modern procedures like Angiovac™ should be considered and discussed.

Keywords: Bi-atrial, Thrombus, Noncompliance

1. Introduction

With an extensive etiology and epidemiology, thrombosis is a complex, but necessary, topic to understand and treat. Deep vein thrombosis and pulmonary embolism are common pathologies that are prophylactically treated within the hospital with day-to-day protocols. Treatment protocols for acute pulmonary embolisms for stable vs. unstable patients can be found in a myriad of literatures. However, there is limited literature on the treatment for bi-atrial thrombus via patent foramen ovale (PFO) with bilateral pulmonary embolisms in currently stable patients. In this case report, we present a medically non-compliant patient with a bi-atrial thrombus via PFO and bilateral pulmonary embolism and discuss the use of well-known embolism protocols versus a modern resource, AngioVac™, and its potential for similar patients in the future.

2. Case presentation

Patient is a 29-year-old African-American male who stated a past medical history of congestive

heart failure and originally reported to the emergency room for chest pain and shortness of breath. The chest pain began suddenly earlier in the afternoon while he was sitting down watching television. It was located on the left side of his chest, worse with exertion and better with rest, described as sharp, and rated 7/10 on pain scale. His shortness of breath came shortly after the chest pain, so he proceeded to the ER. The patient endorsed having similar symptoms three weeks prior to this admission that required him to be admitted to a different hospital. However, he did not recall the visit or findings, only remembers being discharged with Lasix, and was scheduled for an appointment with a cardiologist. Patient reported no other medical history, no surgical history, denied smoking, drinking, and any illicit drug use, and his only positive family history was a grandmother with congestive heart failure. However, after further questioning and speaking with family, it was found that the patient had an extensive history of blood clots and had been admitted to the hospital several times within the past three years. He was prescribed Eliquis multiple times and given a LifeVest, for which he was non-

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compliant. With this information, records from this outside hospital were requested but never received during his time of visit.

In the emergency room, his BP was 131/86, HR 107, RR 24, SpO₂ 94%, and BMI 43.05 (300 lbs). On physical exam, patient's only pertinent positives were tachycardia and bilateral lower extremity edema. His shortness of breath had improved after receiving breathing treatments and supplemental oxygen in the ER. His high-sensitivity troponin (hsTroponin I) levels read 45,535, 91,790, and 82,978 and BNP was 688.7. EKG showed a sinus rhythm with no signs of acute ischemia. Chest x-ray was negative. Creatinine was 1.55. He was admitted to the hospital for Non-ST Elevation Myocardial Infarction and Acute Kidney Injury and started on a heparin drip.

Upon admission to the hospital, an echocardiogram revealed a thrombus in the left and right atrium that crossed the intra-atrial septum, LVEF <15%, moderate dilation of the left atrium, severe dilation of the right atrium, and moderate to severe tricuspid and mitral regurgitation. Doppler ultrasound of bilateral lower extremities showed no evidence of DVT. Within the first few hours of admission to the hospital floor, patient was found to have a poor urine output, up-trending creatinine levels, and down-trending blood pressures. Due to patient's TTE findings and worsening vital signs, he was ultimately placed in the ICU. With the use of IV Lasix, his AKI improved and no longer required supplemental oxygen. This led to an assessment of cardiorenal syndrome. His blood pressure gradually returned to within normal limits. Once stabilized, a transesophageal echocardiogram confirmed a thrombus in the right atrium attached to the septum extending through the PFO into the left atrium (Fig. 1). It should be noted that blood cultures did not show any growth. Additionally, once the kidney function had stabilized, a chest CTA revealed bilateral pulmonary embolisms.

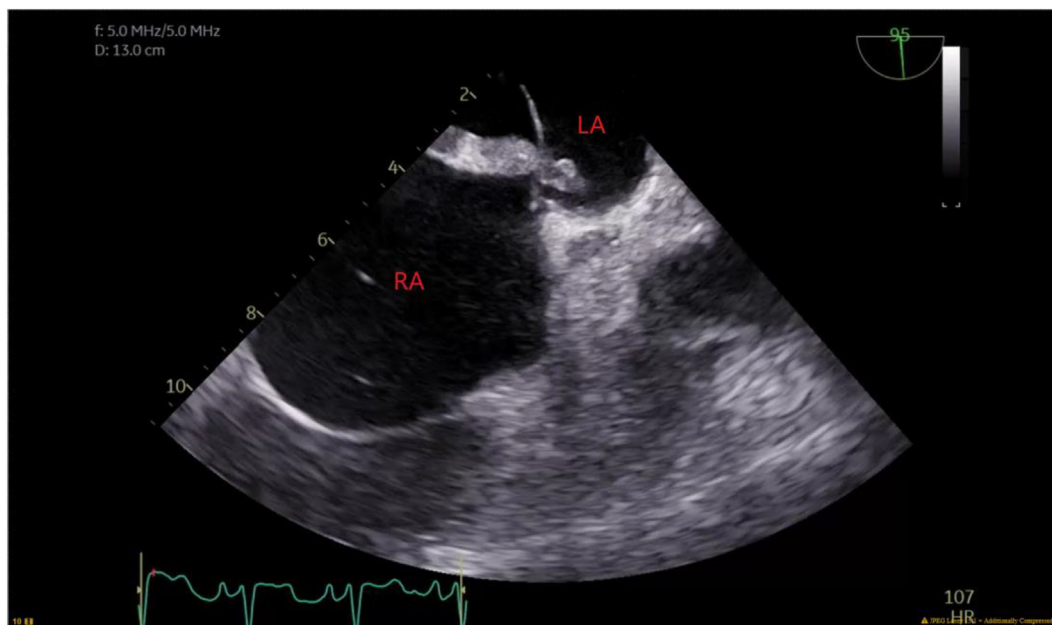
All of these findings were discussed with the cardiologist on board. It was unclear whether this was a de-novo left-to-right or right-to-left thrombus. However, it was more likely a right-to-left thrombus due to increased pressure pushing the atrial septum towards the left (Fig. 1). With either result, potential of worsening clot burden or paradoxical clot could lead to life-threatening cardiac function, pulmonary embolism, or stroke. From here, it was determined that the patient would likely benefit from an AngioVac™ procedure. However, he would need to be transferred to an outside facility, as our hospital did not have the resources to offer this service. He was transferred at this time.

Based on documentation from the outside facility, imaging was repeated and no longer showed evidence of this previously-seen bi-atrial thrombus. It was then decided that AngioVac™ would not benefit a completely stable patient without clear evidence of a current intra-cardiac thrombus. With the patient stabilized and capable of exerting himself on room air, he was heavily educated on the importance of DOAC compliance and strict follow-up and ultimately discharged from the outside facility.

3. Discussion

The treatment plan for confirmed acute embolisms/thromboses in stable patients is commonly practiced using anticoagulants like heparin, warfarin, and DOACs. In the unstable patient, depending on whether it is contraindicated, thrombolytics can be used. Surgical embolectomy can be used in the acute, unstable patient, but can further complicate outcomes due to the surgical site being highly thrombogenic with the injured endothelium.¹ Furthermore, most patients who require surgical embolectomy expire before making it to the operating room.² Contrastingly, in a prior summary of fourteen separate case reports with TEE/TTE diagnosed embolisms travelling through a PFO vs ASD, 8/14 cases underwent surgical removal with a 87.5% survival rate and 3/14 received heparin therapy with a 66.7% survival rate.³ More recently, the use of catheter-directed embolectomy has been practiced in the removal of thrombi and emboli. AngioVac™ is the first aspiration catheter device that does not require the supplemental use of lytics.⁴ Recent reports show AngioVac™ to be a viable and successful option for right atrial vegetation and thrombi retrieval.^{5,6} Even more specifically, a study done in 2020 shows that AngioVac™ was a successful replacement for surgical embolectomy for patients with larger intra-cardiac and intravascular thrombi at risk for concurrent or worsening pulmonary embolisms.⁷ While the patient in our case report was stable, he would have fit the criteria of potential worsening pulmonary embolism without aspiration treatment. Moreover, our patient was unique with a right atrial and left atrial thrombus that would lean towards the concern of possible stroke without complete aspiration treatment.

Our patient ultimately did not undergo an AngioVac™ procedure due to repeat imaging not re-confirming a bi-atrial thrombus according to outside hospital records. Anticoagulation with heparin was the final inpatient management for his bi-atrial thrombus, and he was discharged with Eliquis. However, it should be noted that concerns for



1. Mid-esophageal bicaval view. LA – left atrium; RA – right atrium

Fig. 1. 2D Transesophageal Echocardiogram showing evidence of a bi-atrial thrombus.

only anti-coagulation therapy, even in a stable patient, could potentially lead to worsening of pulmonary embolism or initiation of an acute stroke or other systemic embolus. Moreover, a minimum three-month anticoagulant therapy for this patient would most likely be unsuccessful with his reported non-compliance history. The non-compliance history of this patient made this case even more unique and created a scenario where anti-coagulation, even with DOACs, was unlikely to be successful. Furthermore, the patient requested to leave AMA, so a quicker, definitive therapy like AngioVac™ was much more likely to be successful for this case. Nonetheless, patient would have still required outpatient anti-coagulation therapy for his pulmonary embolisms. Ultimately, the patient gave consent to receive the procedure, but the bi-atrial clot resolved following transfer to an outside facility before AngioVac™ retrieval could be used.

Conflict of interest

The authors declare there is no conflict of interest.

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