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CASE REPORT

Acute pulmonary artery thromboembolism in presence of large mobile right atrial thrombus and severe thrombocytopenia

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Abstract
Acute pulmonary embolism in presence of thrombocytopenia poses a challenging situation to manage. Concomitant presence of right atrial thrombus and thrombocytopenia will further complicate the situation. We hereby report a case of large right atrial thrombus with massive saddle bilateral pulmonary artery embolism with severe thrombocytopenia managed surgically with successful outcome.

Keywords Pulmonary embolism · Right atrial thrombus · Vaccine-induced thrombotic thrombocytopenia

Introduction

Acute pulmonary embolism (PE) is one of the sequelae of thrombosis with thrombocytopenia syndrome (TTS) [1]. The presence of severe thrombocytopenia with a right atrial thrombus and PE imposes a very high surgical risk and the role of surgery in this subset of patients is not yet described.

Case report

A 21-year-old female presented with complaint of sudden onset of dyspnea (New York Heart Association class IV) since one night. On examination, she was tachypneic and had tachycardia with hypotension (84/50 mmHg). Oxygen saturation was 88% on room air. Inotropic supports and fluid therapy were initiated. Before referring to our hospital, she was evaluated outside for the same and contrast-enhanced computed tomography (CECT) scan was performed. CECT scan revealed a large saddle thrombus at the pulmonary artery bifurcation with extensive thrombosis of bilateral pulmonary arteries (Fig. 1A).

Transthoracic echocardiography (TTE) showed a dilated right ventricle with moderate tricuspid regurgitation and a large freely mobile thrombus in the right atrium of size 31 × 15 mm prolapsing into the right ventricle. Her blood work up showed elevated total white blood cell count (18,500/cmm), thrombocytopenia (platelet count—30,500/cmm), and elevated D-dimer (7186 ng/ml). All other investigations were within the normal range.

Considering the presence of severe thrombocytopenia, hemodynamic instability, and large mobile intracardiac thrombus, high-risk surgery was performed, after taking the consent for the same [2]. She underwent successful removal of the intracardiac thrombus and pulmonary artery thrombus until subsegmental branches (Fig. 1B). Surgery was performed through a midline sternotomy with moderate hypothermic (32'c) cardiopulmonary bypass (CPB) using aorto-bicaval cannulation after achieving desired activated clotting time (ACT) with full heparinization.

Postoperative course was smooth. Temporary inferior vena cava (IVC) filter was kept because of persistent thrombocytopenia and inability to give any anticoagulating agents [3]. Once her platelet counts increased, she was started and discharged on oral antiplatelets and oral anticoagulant agents. On follow-up, the patient was asymptomatic and echocardiography showed normal left and right ventricular function with no evidence of any intracardiac and pulmonary artery thrombus (Fig. 2). Temporary IVC filter was removed in follow-up.

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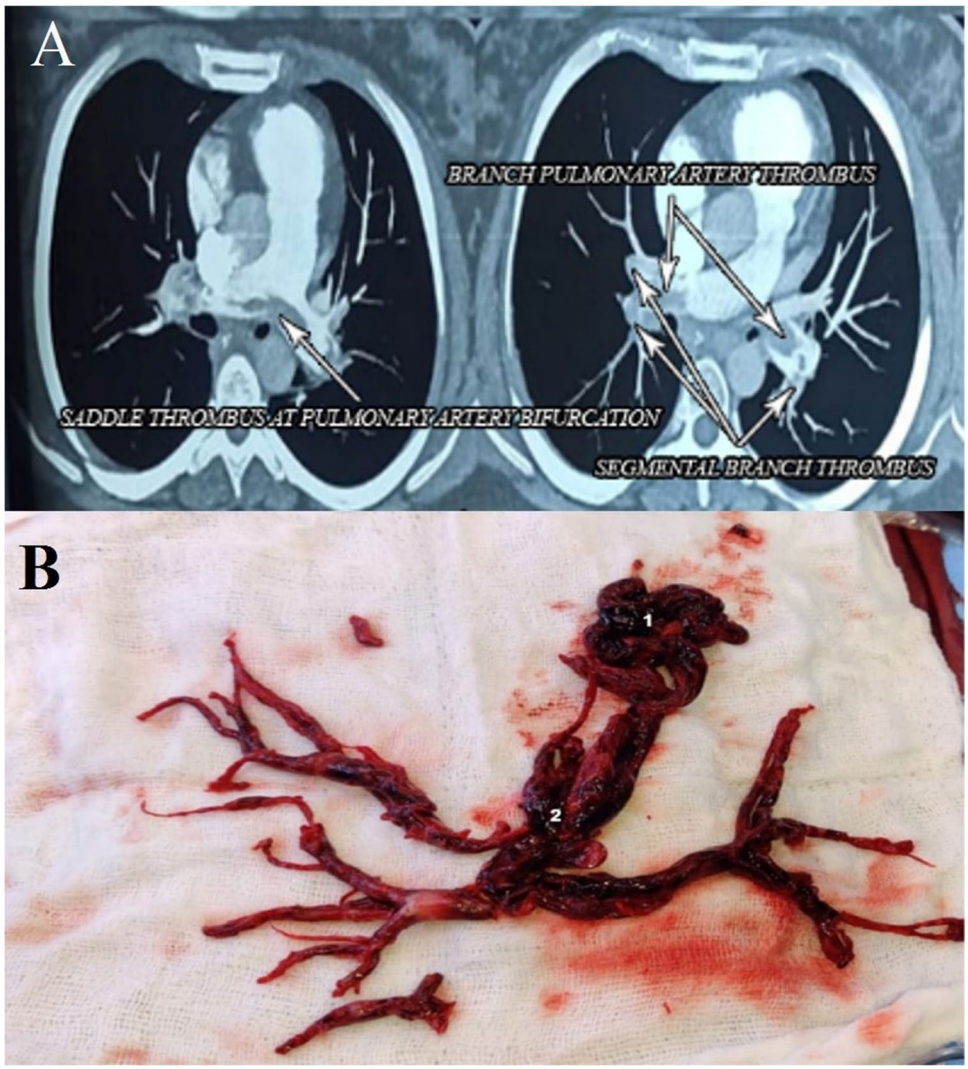

Fig. 1 (**A**) CECT scan revealing a large saddle thrombus at the pulmonary artery bifurcation with extensive thrombosis of bilateral pulmonary arteries. (**B**) Intraop image showing (1) right atrial thrombus, (2) main pulmonary artery, and branch pulmonary artery thrombus

Comment

Pulmonary thromboembolism with intracardiac thrombus in the presence of severe thrombocytopenia is a rare entity and the present literature does not offer a clear consensus for the management of the same. Recently, due to the Corona Virus Disease (COVID-19) pandemic, TTS has become one of the emerging causes of venous and pulmonary artery thromboembolism. In the index case, we think that the cause of TTS is mostly vaccine-induced thrombotic thrombocytopenia (VITT) as there was a history of COVID-19 vaccination 40 days before presentation to the hospital and other criteria described for diagnosing VITT except PF4-heparin enzyme-linked immunosorbent assay (ELISA) were fulfilled [4]. Due to requirement of urgent intervention, we could not get PF4-heparin ELISA ("HIT" ELISA) test done. All other diagnostic criteria were fulfilled [4]. Postoperative hematological work up revealed positive antib2glycoprotein IgG antibodies with otherwise negative autoimmune antibodies profile. Even her antib2glycoprotein report was negative after 12 weeks, further consolidating the possibility of VITT to be the main culprit.

The patient was explained about the risks involved in the view of severe thrombocytopenia as CPB had to be established for surgery. Guidelines suggest the use of non-heparin anticoagulants in the management of such patients [3] but there are no guidelines or common consensus for management of such patients, when they require cardiac surgery with CPB. Also because of unavailability of any antidotes for such non-heparin anticoagulants, we used heparin instead (protamine is easily available in our setup) to achieve desired ACT. We could achieve desired ACT with a heparin dose of 600 IU per kg.

Many reports are available in the literature for successful thrombolysis in cancer patients having thrombocytopenia.

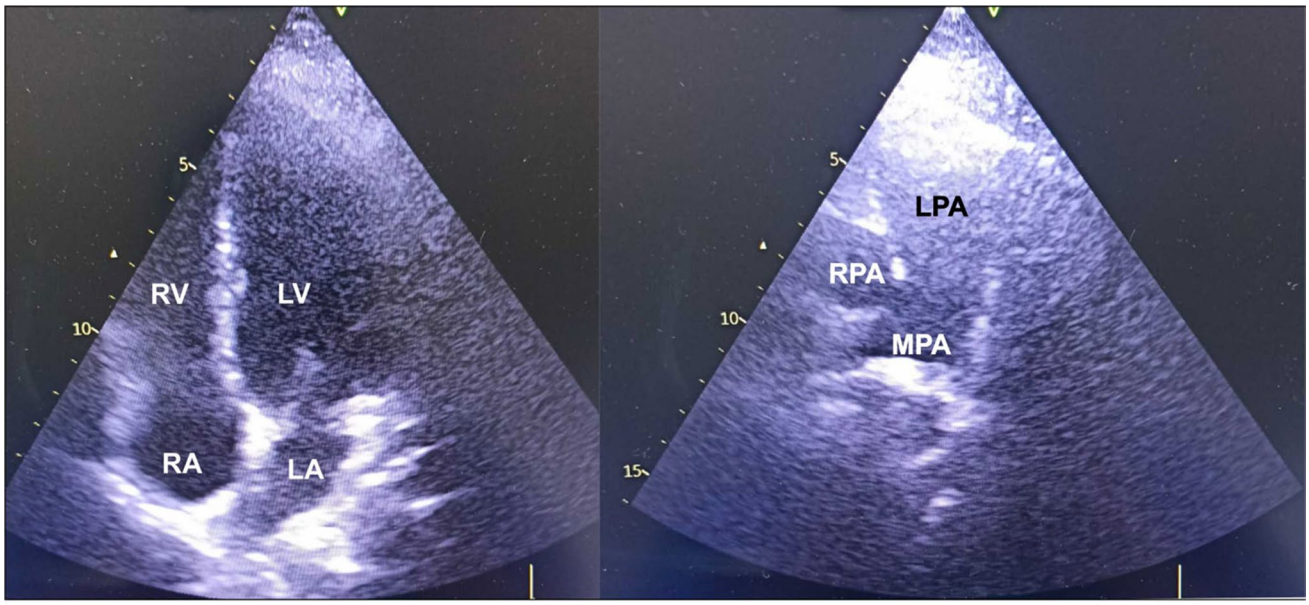

Fig. 2 Transthoracic echocardiography showing no evidence of any intracardiac and pulmonary artery thrombus

Surgical embolectomy is often considered as first-line therapy for patients with thrombus in the right heart or across a patent foramen ovale (clot-in-transit) [2, 5]. However, the optimal management of PE-associated right heart thrombi and thrombocytopenia remains unclear owing to the low number of cases. Report from Tovar et al. suggests thrombolysis remains the first line of management in this group of patients. However, authors advised surgical/open embolectomy in patients with hemodynamic instability as was the scenario in the present case [2]. This is probably a rare case with a successful outcome with surgical management.

Limitation

The main limitation of our manuscript is etiopathology of TTS was based on indirect correlations and not on confirmatory test to exclude heparin-induced thrombocytopenia and support VITT.

Conclusion

Presence of PE with right atrial thrombus and severe thrombocytopenia poses a challenge in deciding management strategy. This case illustrates the difficulty in the management of such high-risk patients in the absence of solid evidence and highlights the importance of fruitful use of available resources as well as importance of individual, technical, and institutional factors when defining the treatment strategy.

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Data availability Data sharing not applicable to this article as no datasets were generated or analysed during the current study.

Declarations

Human and animal rights statement Not Applicable as no experimental procedure was done.

Ethical statement As per our institute protocol, we do not have to take approval for publication of image and case reports.

Conflict of interest None.

Informed Consent The patient consented to publish this report.

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