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Pulmonary Embolism with Thrombus in Transit Case Report

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ABSTRACT

A clinical case is presented at the Hospital Centenario Miguel Hidalgo with a diagnosis of pulmonary thromboembolism with a thrombus in transit and dysfunction of the right cavities, secondary to immobilization due to a history of previous spinal surgery as an ankylosing spondylitis treatment. He was admitted to the emergency room with typical symptoms of the entity, evidenced by angiotomography, later a transthoracic echocardiogram was performed, presenting the characteristic echocardiographic signs of right ventricular dysfunction and evidence of mobile thrombus in the right cavities, for which reason fibrinolytic therapy was decided with success, evidenced in transthoracic echocardiography with improvement of ventricular systolic function and strain.

KEYWORDS: Pulmonary thromboembolism, thrombus in transit, right ventricular dysfunction, thrombolysis

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INTRODUCTION

Pulmonary thromboembolism is defined as a 30-50% pulmonary artery occlusion causing increased right ventricular afterload developing ventricular failure, decreased cardiac output and hemodynamic instability [1] risk factors are associated with Virchow's triad (stasis , hypercoagulability and endothelial damage) highlighting among these immobilization, secondary to previous surgeries, deep vein thrombosis, obesity, pregnancy, antiphospholipid syndrome, antithrombin deficiency, among others. [2]

The findings in the electrocardiogram are characterized by changes in the right cavities such as right bundle branch block, inversion of T waves in right leads, sinus tachycardia has a frequency of presentation of 40% and the McGinn-White sign of 15%. echocardiogram is characterized by right ventricular dilatation, flattening of the interventricular septum, 60/60 sign, Mc Conell, dilated vena cava, systolic dysfunction (TAPSE, S Wave), and mobile thrombus in right cavities. Once diagnosed, a PESI prognostic scale is performed to individualize treatment and follow-up.[3]

A thrombus in transit is defined as one that is temporarily lodged in the right heart chambers on its way to the pulmonary artery. [4] Its composition, a variable percentage of different types of blood cells agglutinated by fibrin, explains its appearance in different imaging techniques: intracavitary masses, with lobulated and well-defined borders that cause a filling defect.

The prevalence of mobile thrombus in the right heart chambers detected by echocardiography in patients with pulmonary thromboembolism (PTE) ranges from 10 to 18%[5]. These thrombus are classified into two groups based on their morphology:

Type A: pleomorphic, elongated and extremely mobile, mainly located in the right atrium, found in transit from peripheral veins (deep vein thrombosis) to the lungs, having become stuck in cardiac structures such as the foramen ovale, tricuspid cords or in the Chiari network.

Type B: They usually form directly in the heart and are attached to the atrial or ventricular wall. The most frequent causes for its formation are: right ventricular dysfunction or foreign bodies.

Type A thrombus are associated with high mortality (44.7%), mainly due to pulmonary thromboembolism. [6] From the point of view of the echocardiogram, 25–30% obstruction of the pulmonary vascular bed is required for a significant increase in pulmonary pressure and for the typical echocardiographic findings of this syndrome to be revealed.[6]

On ultrasound, they appear as slightly echogenic masses, with defined borders, without posterior acoustic shadow, with smooth borders, and that move synchronously with the cardiac wall during the cardiac cycle. Sometimes, if they are very organized, they can be very radiolucent, with difficult to define contours. Among the advantages of thrombolytic treatment, the following stand out: being a simple, fast, widely available treatment that accelerates thrombus lysis and pulmonary reperfusion, reduces PHT, improves RV function, and can reverse cardiogenic shock. [7-9]

The recommended treatment alternatives are anticoagulation, percutaneous thrombectomy, thrombolytic therapy, and surgical embolectomy, the latter two being the ones associated with greater survival (70.45 and 81.5%), compared with anticoagulation (47.7%). Without treatment, mortality is > 90%. [9-11]

The risk of mortality in patients with thrombus in transit is significantly increased compared to the presence of isolated PE5; the mortality rate can reach up to 50%. [10-13] Protrusion and mobility are the most important predictors of embolization of intracavitary thrombus. [14- 15]

CLINICAL CASE

44-year-old man with a history of intestinal occlusion at 5 years of age that warranted management with colostomy and intestinal reconnection at 6, 19 and 28 years of age, currently with colostomy, diagnosis of ankylosing spondylitis 2 months after diagnosis without treatment, with fracture -dislocation C5-C6 ASIA D, undergoing surgical treatment with anterior fusion with cervical plate and posterior corpectomy with transfacet screws and two cervicothoracic transition bars and crosslink system with taking and applying graft and bone chip 2 days prior to the current condition, El which begins with sudden dyspnea on small efforts, accompanied by a feeling of fatigue, the dyspnea becomes progressive, limiting walking and exacerbating to standing with partial improvement at rest, for which he clinically came to our institution with a heart rate of 122 bpm, hypotension 85 /64 mmHg, without data of low output or vascular or tissue congestion, an electrocardiogram was performed showing sinus tachycardia and left ventricular hypertrophy due to 35mm peguero-lopresti, left pulmonary branch angiotomography of 80%, inferior and middle lobar artery partially at Same filling defect in right pulmonary artery bifurcation and upper, middle, and lower lobar branches. An echocardiogram was performed to assess the right ventricle, evidencing systolic dysfunction of the right ventricle with mobile thrombus in the right cavities TAPSE 13mm, peak systolic velocity of the tricuspid annulus 7cm/s, FAC 14%, sign 60/60, dilation of the right ventricle 64 x 58 x 87 mm and flattened interventricular septum (Figure 1).

Given the time of evolution and the high intermediate risk, thrombolysis was performed with alteplase 100mg with adequate clinical response. After thrombolysis, echocardiographic monitoring was performed without evidence of thrombus in transit. 4 days later, angiotomography was performed with a filling defect in the distal segment of the right interlobar pulmonary artery and proximal portion of middle lobar artery in less proportion with previous study, left pulmonary artery with filling defect in the distal portion, left lower interlobar and lobar pulmonary artery similar to the previous study; 7 days after thrombolysis, an echocardiogram with strain was performed, evidencing significant improvement in right ventricular systolic function 44 x 36 x 71 mm, TAPSE 25 mm, S wave 18cm/s, FAC 34%, singo 60/60 negative, Mc Conell negative with global Strain -25 (Figure 2); It was decided to continue with anticoagulant treatment with NOAC for 6 months and is currently an asymptomatic patient with improvement in functional class.

In conclusion, in patients with high intermediate risk with thrombus in transit or high risk, thrombolysis is recommended to reduce the risk of mortality, ventricular dysfunction, and long-term pulmonary hypertension.

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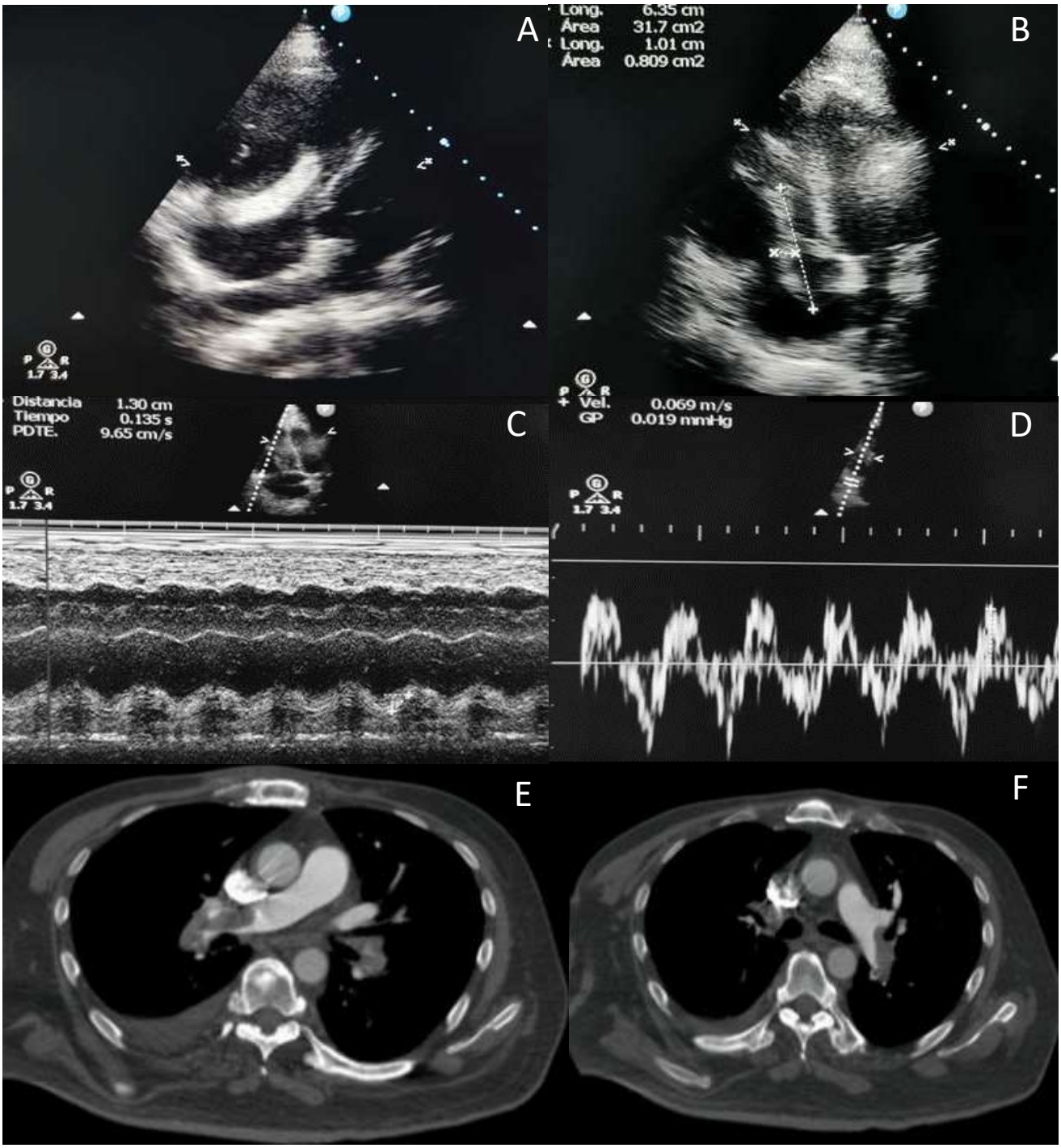

Fig.1 Parasternal short-axis transthoracic echocardiogram with image of a mobile thrombus from the right atrium to the right ventricle (A), apical four chambers with evidence of thrombus in the right cavities of 63x10mm (B), apical four chambers with systolic dysfunction of the right ventricle TAPSE of 13mm and wave S of 6cm/s (C and D), CT angiography with filling defect in the right pulmonary artery and right pulmonary artery bifurcation. (E and F)

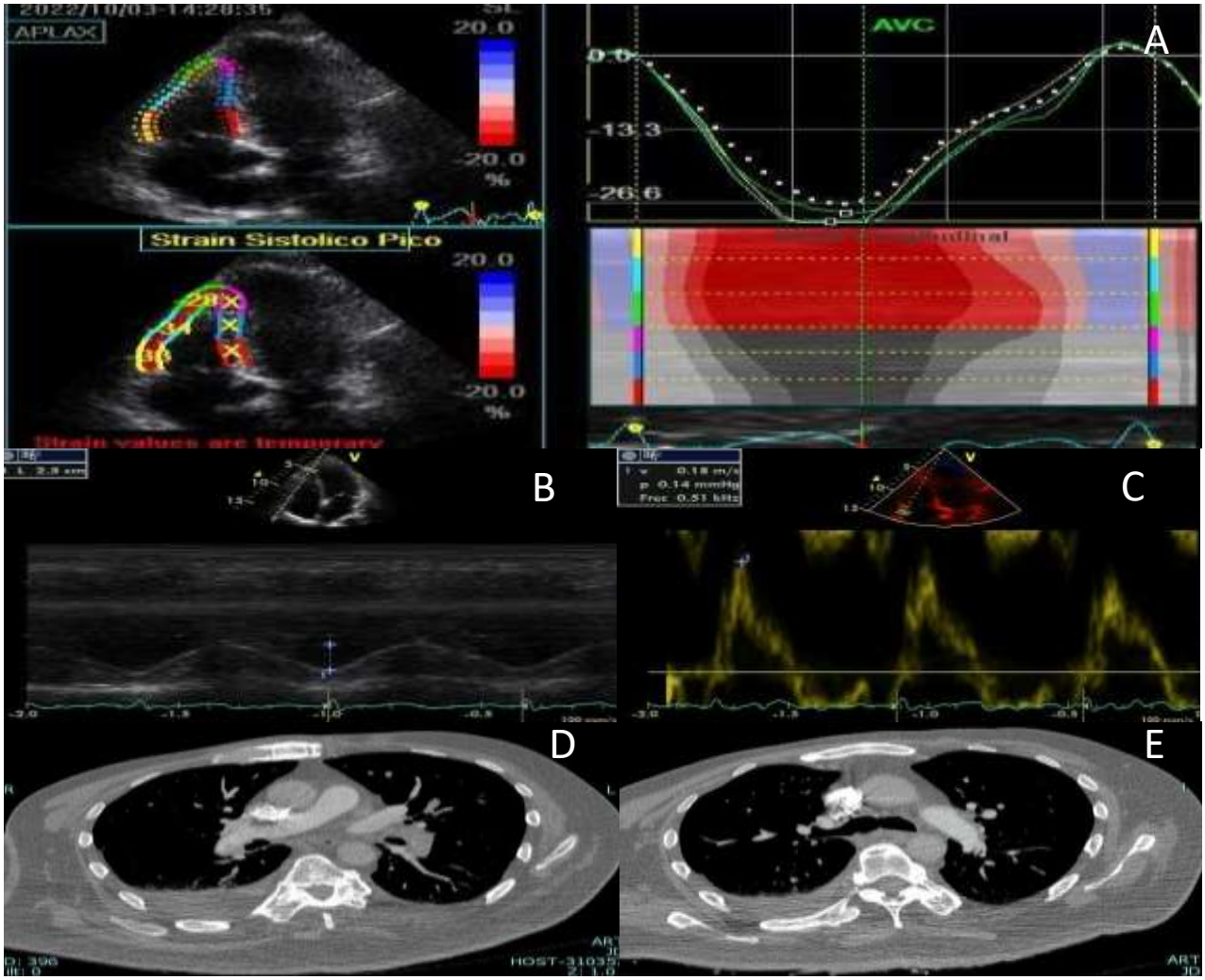

Fig. 2 Strain echocardiogram of the free wall of the right ventricle (A), right ventricular systolic function TAPSE 25mm and S wave 18mm (B and C), Angiotomography filling defect in the distal segment of the right interlobar pulmonary artery and left pulmonary artery in the distal portion. (D and E)

DISCUSSION

Pulmonary thromboembolism is a very frequent entity in patients with risk factors for embolism and has a prevalence of approximately 6% in post-surgical patients who require immobilization, despite treatment with thromboprophylaxis, it is suspected due to the presence of sudden dyspnea, deterioration of the pattern respiratory and confirmed with angiotomography, transthoracic echocardiography is indicated to assess right ventricular systolic function, in addition to high-sensitivity troponins and NT-pro BNP to assess whether there is hemodynamic repercussion, within the echocardiographic signs described above, they are not specific for pulmonary thromboembolism, they only refer to right ventricular dysfunction, the only sign that suggests pulmonary thromboembolism is transit thrombus, therefore if it is visualized it is highly suggestive of pulmonary thromboembolism in case of not having angiotomography and this infers a high risk of mortality, therefore, with level of evidence IA, treatment with fibrinolysis is recommended, which was carried out successfully in the clinical case, with improvement of symptoms, hemodynamic status, systolic function of the right ventricle and disappearance of the thrombus in the right cavities

Conclusions:

1 Pulmonary thromboembolism with thrombus in transit has a low prevalence, however the risk of morbidity and mortality is high by up to 90% due to occlusion of the main branches.

2 The diagnosis is made by transthoracic echocardiography in 2D mode, observing echogenic masses with defined borders, mobile during the cardiac cycle and the risk of migrating to the lungs depends on the characteristics of the thrombus.

3 Treatment for pulmonary thromboembolism without thrombus transit depends on the risk of PESI that is given to the patient; high-risk patients opt for pharmacological or invasive thrombolysis while low- or intermediate-risk patients with anticoagulation; however, in the As soon as thrombus in transit is documented by transthoracic echocardiography, the classification changes to high risk and the effective treatment is thrombolysis as long as there are no contraindications for it, regardless of the previously obtained PESI risk.

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