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Pulmonary Thromboembolism in a Patient Suspected for Myocarditis - Case Report

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Abstract

BACKGROUND: The following case presentation highlights the diagnostic and therapeutic approach to a patient with a rare disease.

CASE PRESENTATION: A 47-year-old man was hospitalized with chest pain, shortness of breath, and fatigue. Initial blood test analysis revealed elevated CRP, leukocytosis, and elevated cTn-I. Due to suspected myocarditis, cardiac magnetic resonance (CMR) imaging was performed. CMR ruled out myocarditis. In addition, there were no signs of edema or late gadolinium enhancement (LGE). However, there was evidence of enlarged right ventricular heart chambers. Cine short-axis images and LGE sequences revealed masses in the pulmonary artery, highly suspicious of thrombi. D-dimer was analyzed, showing very high values, and additionally, CTPA confirmed the diagnosis of pulmonary embolism (PE). Venous Doppler ultrasonography demonstrated DVT in the right popliteal vein. Anticoagulation with LMWH was initiated, after which a drug from the NOAC class - Rivaroxaban was given according to a PE protocol. The patient was discharged from the hospital in a hemodynamically stable condition with a recommendation to adhere to the therapy and conduct control after 1 and 3 months of hospitalization.

CONCLUSION: Thanks to multimodality imaging, we find it easier to get the specific cause of the problem, by establishing it or by ruling it out. However, the most important thing is to have a high clinical suspicion and common sense for faster diagnosis, treatment, and early recovery of the patient.

Introduction

The insidious clinical manifestation of the venous thromboembolism should be taken seriously. Globally, it is the third most common acute cardiovascular syndrome immediately after myocardial infarction and stroke [1]. Pulmonary thromboembolism (PE) is a clinical and pathophysiological condition that occurs when a thromboembolus prevents the supply of pulmonary arterial blood to a part of the lung. Most often, in 95% of cases, it is the result of a blood clot in the deep veins of the lower extremities, as shown in our case [2]. At the basis of thrombosis, it is always one or more disorders of Virchow's triad: hypercoagulability, stasis, or endothelial dysfunction [3].

Case Presentation

A 47-year-old man was hospitalized at our hospital with symptoms of fatigue, shortness of breath, and retrosternal chest pain. From cardiovascular risk factors, the patient had arterial hypertension, hyperlipidemia, obesity with BMI >30, and perennial smoking. On auscultation, he had decreased breath sounds bilaterally. From vital parameters, there were BP: 160/100 mmHg, HR: 110/min, and SaO2=88%. The ECG recorded a sinus tachycardia with a normal axis and without significant conductive abnormalities. Laboratory analysis initially showed leukocytosis (Leu=15 000) and elevated CRP (50), cTnI (1,8) and BNP (290). TTE was done in conditions of pronounced poor echogenicity, due to which an adequate assessment could not be made.

According to the symptomatology, poor echogenicity, and laboratory analysis, there was a high clinical suspicion for myocarditis. Cardiac magnetic resonance (CMR) was indicated. CMR cine images showed preserved LV function (LVEF 60%) and significant RV dilation with RV dysfunction (RV/LV>1 and TAPSE=14 mm). From valvular abnormalities, there was moderate tricuspid and pulmonary regurgitation. Furthermore, there was a small pericardial effusion noted behind the right ventricle. T1 and T2 mapping values in the left ventricle were not elevated. In addition, there was no late gadolinium enhancement (LGE) in the LV. From these, we ruled out myocarditis. However, suspected defects in the filling of the pulmonary arteries were noted. Cine short-axis images and LGE sequences revealed masses in the pulmonary artery which were highly suspicious of thrombi (Figure 1). After this, the

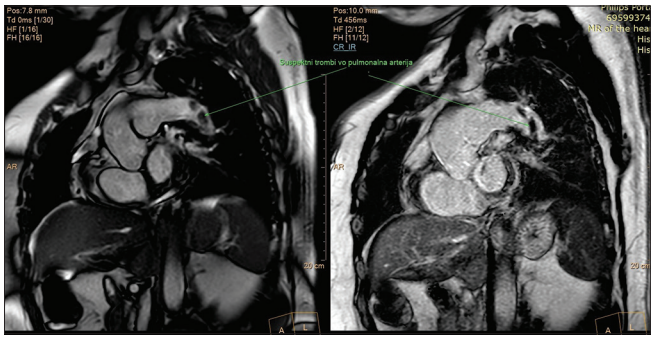


Figure 1: CMR Cine short axis images and LGE sequences revealed masses in the pulmonary artery, highly suspicious of thrombi (arrows)

CTPA was clearly indicated. CTPA's finding has shown filling defects in the main pulmonary arteries and their lobar and segmental branches (Figures 2 and 3). In addition, D-dimers were also elevated. Venous Doppler ultrasonography was performed and confirmed DVT with absent compressibility of the right popliteal vein.

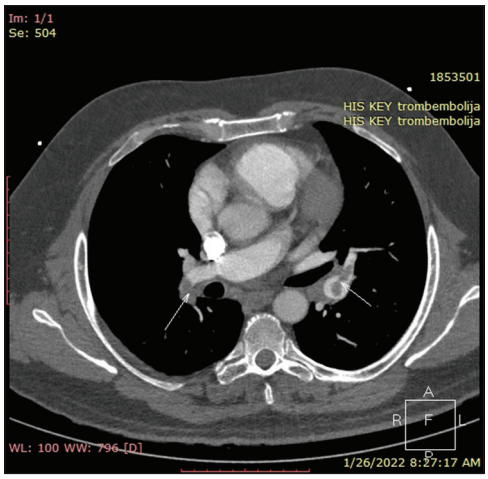


Figure 2: CTPA filling defects in the main pulmonary arteries and their lobar and segmental branches (arrows)

After this, anticoagulation was initiated. In addition to the oxygen support (with nasal mask), anticoagulant initial choice was LMWH for 7 days, after which a drug from the NOAC class - Rivaroxaban was given according to a PE protocol (15 mg b.i.d 21 days, then 20 mg o.d during 3–6 months). Additional regular therapy was optimized and lifestyle changes were advised. In terms of early mortality risk, the patient had an intermediate-high risk, based on the hemodynamic stability, sPESI = 2, RV dysfunction and elevated cTn-I. The patient was discharged from the hospital in a hemodynamically stable condition with a recommendation to adhere to the therapy and conduct control after 1 and 3 months of hospitalization.

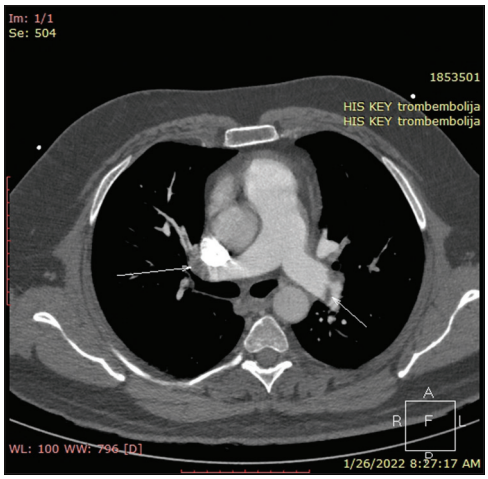


Figure 3: CTPA filling defects in the main pulmonary arteries and their lobar and segmental branches (arrows)

Discussion

In our case, the patient had weak risk factors for VTE, which highlights the importance of considering VTE as a possible diagnosis even in patients with low risk factors. Previous studies have shown that up to 30% of patients with VTE have no identifiable risk factors, making it essential to maintain a high index of suspicion [4].

Cardiac Magnetic resonance imaging (MRI) has been shown to be an effective diagnostic tool for identifying pulmonary embolism. A study by Konstantinides *et al*. found that cardiac MRI had a sensitivity and specificity of 96% and 100%, respectively, for detecting acute pulmonary embolism (PE) [5]. In addition, cardiac MRI has been shown to have high diagnostic accuracy in detecting right ventricular dysfunction, which is a predictor of poor outcomes in patients with PE [6].

Non-invasive multimodality imaging may provide a better solution to overcome the limitations of the independent techniques. In our case, cardiac MRI was used as an alternative to transthoracic echocardiography (TTE), which was not feasible due to poor echogenicity. Cardiac MRI allowed us to rule out myocarditis and identify filling defects in the main pulmonary arteries, which led to the diagnosis of pulmonary embolism.

In terms of treatment, anticoagulation is the standard of care for patients with pulmonary embolism. Direct oral anticoagulants (DOACs) have been shown to be non-inferior to traditional anticoagulants, such as warfarin, in the treatment of PE and have the added benefit of not requiring regular laboratory monitoring [7]. In our case, the patient was treated with LMWH for 7 days followed by rivaroxaban, a DOAC, according to a PE protocol.

Conclusion

Overall, our case highlights the importance of maintaining a high index of suspicion for PE in patients

with non-specific symptoms, even in those with low risk factors. It also demonstrates the utility of cardiac MRI as a diagnostic tool for PE when TTE is not feasible. Finally, our case illustrates the efficacy of DOACs in the treatment of pulmonary embolism.

References

1. Wendelboe AM, McCumber M, Hylek EM, Buller H, Weitz JI, Raskob G, *et al*. Global public awareness of venous thromboembolism. J Thromb Haemost. 2015;13(8):1365-71. https://doi.org/10.1111/jth.13031
   PMid:26084415
2. Kucher N, Rossi E, De Rosa M, Goldhaber SZ. Prognostic role of echocardiography among patients with acute pulmonary embolism and a systolic arterial pressure of 90 mm Hg or higher. Arch Intern Med. 2005;165(15):1777-81. https://doi.org/10.1001/archinte.165.15.1777
   PMid:16087827
3. Tintinalli JE, Ma OJ, Yealy DM, Meckler GD. Tintinallier Emergency Medicine: A Comprehensive Study Guide. United States: McGraw Hill Professional; 2020.
4. Koskinas P, Intas G, Stergiannis P, Polikandrioti M, Prezerakos P, Platis C, *et al*. Incidence of deep vein thrombosis and its effect on health-related quality of life among nurses of greek public hospitals: A multicenter study. In: GeNeDis 2020. Advances in Experimental Medicine and Biology. Cham: Springer; 2021. p. 37-45. https://doi.org/10.1007/978-3-030-78771-4_5
5. Konstantinides S, Geibel A, Olschewski M, *et al*. Importance of cardiac magnetic resonance imaging in patients with pulmonary embolism. Am J Cardiol. 2001;88(12):1244-8. https://doi:10.1016/s0002-9149(01)02155-5
6. Notohamiprodjo G, Horger M, Schwab F, *et al*. Right ventricular dysfunction in acute pulmonary embolism: Evaluation with spiral CT. Eur Radiol. 2005;15(3):524-30. https://doi:10.1007/s00330-004-2498-y
7. Dentali F, Riva N, Crowther M, *et al*. Efficacy and safety of the direct oral anticoagulants compared to warfarin for the treatment of acute venous thromboembolism. J Thromb Haemost. 2018;16(7):1354-65. https://doi.org/10.1111/jth.14196