The Intercontinental Journal of
Internal Medicine

DOI: 10.51271/ICJIM-0034

Case Report

One year follow-up and literature review of three young-age cases with high risk pulmonary thromboembolism

Sümeyra Altan Çotur, Emine Bahar Kurt, Ayşe Demirkaya
Department of Chest Diseases, Ankara Etlik City Hospital, Ankara, Turkiye

Cite this article: Altan Çotur S, Kurt EB, Demirkaya A. One year follow-up and literature review of three young-age cases with high risk pulmonary thromboembolism. *Intercont J Int Med.* 2024;2(2):42-45.

Corresponding Author: Sümeyra Altan Çotur, altansumeyra@hotmail.com

Received: 01/05/2024 ◆ **Accepted**: 24/05/2024 ◆ **Published**: 29/05/2024

ABSTRACT

High-risk pulmonary thromboembolism (PTE) is an emergency clinical condition with high mortality. High-risk pulmonary thromboembolism is generally seen in immobile patients, elderly, have malignancies, and have a long-term travel history. Our aim here is to emphasize that high-risk pulmonary thromboembolism may also occur in young patients. Considering the symptoms and risk factors such as oral contraceptive use, obesity, and operation history, PTE can be detected with Pulmonary computed tomography-angiography (CTPA) or ventilation perfusion scintigraphy when necessary. It should be verified that it is not. Genetic mutation, obesity, oral contraceptive use, and previous operation history were accepted as risk factors in the young patients we treated and followed up with high-risk Pulmonary Thromboembolism presented here. After the diagnosis of pulmonary thromboembolism was made at the first stage in our patients who applied to the emergency department, the risk group was determined by taking into account the current guidelines. Three patients considered to be at high risk were evaluated for thrombolytic therapy. Two patients without contraindications were given a full dose, and one patient was given a half dose of thrombolytic. After being monitored in intensive care for the first 24 hours, they were taken to the service. Due to their young age (<45 years), their thrombophilia panel was checked. Anticoagulant treatments were started and follow-ups were planned at 3 months, 6 months, and 1 year after discharge. During the follow-up visits, CTPA, echocardiography, and lower extremity Doppler ultrasound imaging were performed.

Keywords: Pulmonary embolism, venous thromboembolism, high-risk pulmonary embolism, young-age

INTRODUCTION

Venous thromboembolism is a common term that describes two diseases, pulmonary thromboembolism (PTE) and deep vein thrombosis (DVT), with or without symptoms but often accompanying each other. Pulmonary thromboembolism is the third most common cardiovascular disease leading to acute death after coronary heart disease and stroke.[1] Another important complication is relapses, which, although rare, may result in chronic thromboembolic pulmonary hypertension (CTEPH), which is a difficult-to-treat disease that severely impairs the person's quality of life.[2] Although this disease, which has such serious complications, is preventable, prophylaxis for thrombosis is unfortunately neglected in some cases in our country and around the world.

While patients may present with complaints of chest pain and shortness of breath, they may also present with syncope, right heart failure, severe hypoxemia, and cardiac arrest. Some cases may need mechanical ventilation (MV) and need to be monitored in intensive care. In the emergency department and intensive care units (ICU), bedside echocardiography (ECHO) is a valuable imaging method in hemodynamically unstable patients.[3] In the treatment of high-risk PTE, thrombolytic agents are a life-saving treatment option in suitable patients. Although studies are showing that patients with a high risk of bleeding, especially those over the age of seventy-five, diagnosed with high-risk PTE are treated with low-dose thrombolytic agents, it has not yet been included in the guidelines.

CASE 1

A 21-year-old female patient had a history of oral contraceptive (OCS) use due to Polycystic ovary syndrome (PCOS) and was admitted to the emergency room due to shortness of breath and chest pain. She had no hemoptysis. During her first physical examination in the emergency room, his respiratory rate was 24 breaths/min, his arterial blood pressure (TA): was 87/45 mmHg, her heart rate was 120 beats/min, and his oxygen saturation in room air (SpO_2): 85%. In the first examination, the D-dimer level was 4 mg/L, and CTPA was performed with the preliminary diagnosis of PTE. CTPA revealed a filling defect compatible with PTE in both pulmonary artery lumens and all lobar and visible segmental branches (Figure 1).

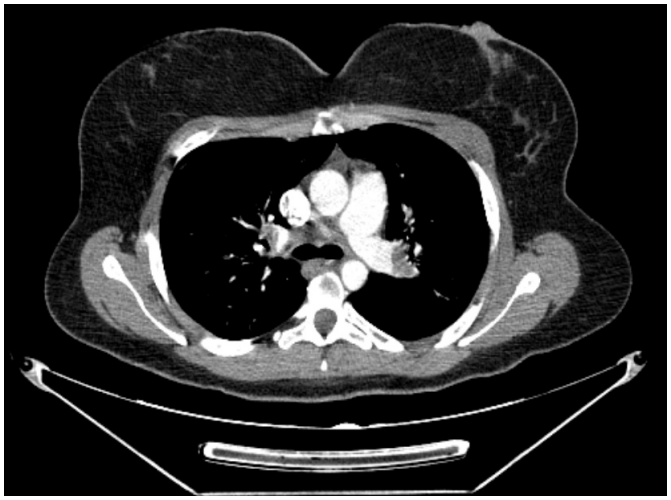

Figure 1. Emergency department admission moment BTPA

After the patient was followed up in the intensive care unit for the first 24 hours, he was taken to the service as his hemodynamics were stable. During the service follow-ups, collagen tissue markers and genetic thrombophilia panel were checked due to the young age of the patient (under 45 years of age). Anti-nuclear antibody and Anti-dense fine spotted 70 (Anti-DFS70) results were positive. Genetic tests resulted in MTHFR (methylenetetrahydrofolate reductase) heterozygous mutant and Factor 13 heterozygous mutant. Lifelong anticoagulant treatment was planned with the recommendation of the hematology department.

The patient was started on Warfarin Sodium and DVT treatment. No PTE was observed in the patient's 3rd monthly follow-up (Figure 2). DVT was continuing in lower extremity Doppler ultrasonography.

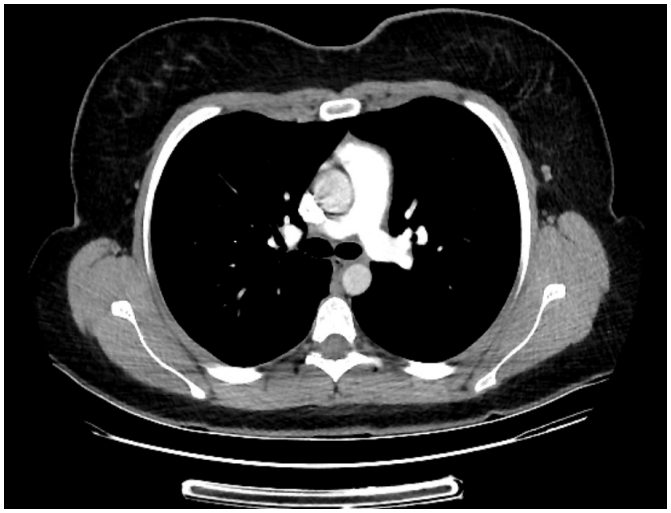

Figure 2. 3rd month BTPA

PTE was not observed at her 6th month follow-up (Figure 3). The Doppler ultrasound evaluation was noted to be suboptimal and no thrombus was detected.

The patient's radiological appearance was normal in terms of PTE at his 1-year follow-up. ECHO findings were normal, but the DVT continued in the left popliteal vein of the lower extremity in Doppler ultrasonography. Cardiovascular surgery was consulted and it was decided to continue treatment with Warfarin Sodium by ensuring the effective INR level of the patient.All follow-ups of the patient have been summarized in the table below

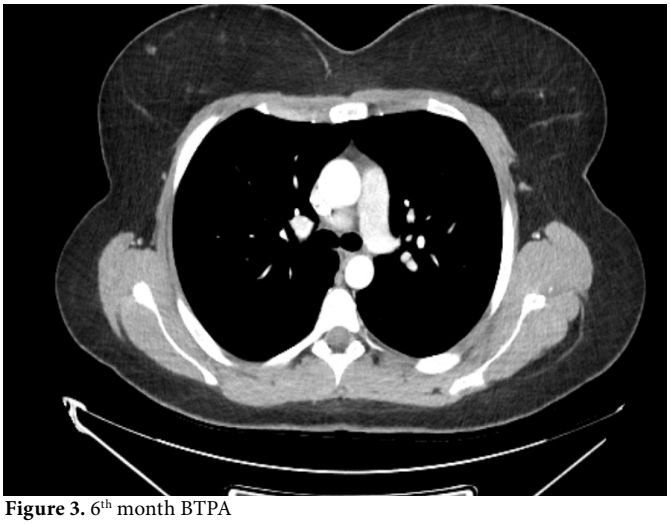

Figure 3. 6th month BTPA

CASE 2

A twenty-three-year-old female patient, who had no risk factors other than that condition, was admitted to the emergency room with a complaint of sudden shortness of breath. She had no hemoptysis. On physical examination in the emergency room, TA: 70/45 mmHg, pulse 115 beats/min, respiratory rate 20 breaths/minute, SpO_2: 94%. CTPA was performed in the emergency department due to the difference in diameter between legs and the D-dimer level being 2.9 mg/L. In the pulmonary CT angiography, it was observed that thromboembolism material was found within the lumen of the left main pulmonary artery, causing partial occlusion in the artery, and the identified embolic material extended to the right main pulmonary artery and causing partial occlusion (Figure 4).

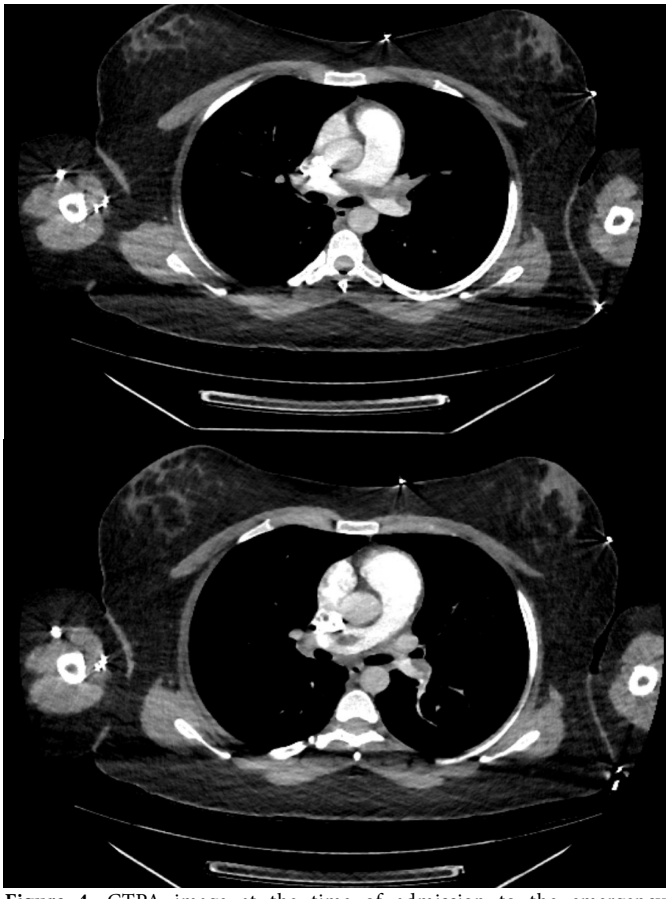

Figure 4. CTPA image at the time of admission to the emergency department

EF in bedside echo; 60% was seen as Spab: 20, and the right structures were evaluated as normal. It was planned to give full dose thrombolytics to her, whose systolic blood pressure was <90 mmHg, hemodynamically unstable, and considered high risk due to Pulmonary embolism severity index (PESI) class 3 and cardiac troponin positivity. After receiving a total of 40 mg of thrombolytic, the thrombolytic infusion was stopped due to bleeding from the vascular access. After 24 hours of follow-up in the ICU, she was taken to the service when his hemodynamics remained stable.

Lower extremity Doppler USG performed for possible DVT in the left lower extremity; the femoral vein and popliteal vein were observed to be thrombosed and DVT treatment was started. Due to her young age, a thrombophilia genetic panel was sent for genetic screening. It resulted in a factor 2 homozygous mutant. In the patient's 3rd and 6th-month follow-ups, PTE was not observed in CTPA, ECHO, and lower extremity Doppler USG was normal.

Anticoagulant treatment was terminated at the sixth-month follow-up. No pathology was detected in the patient at the first-year follow-up.All follow-ups of the patient have been summarized in the table below.

CASE 3

A twenty-seven-year-old female patient with no chronic disease and a cesarean section 2 months ago was admitted to the emergency department due to stabbing chest pain. She described chest pain radiating to the back and had hemoptysis the size of 1 teaspoon. CTPA was performed on the patient with a history of surgery and hypoxia, as PTE was suspected. CTPA revealed a filling defect extending from the left main pulmonary artery to the lingual segment and branches of the inferior lobar artery (Figure 5).

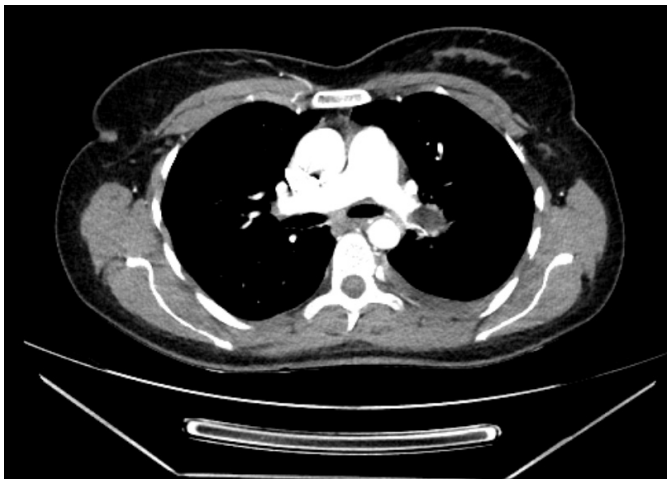

Figure 5. CTPA image at the time of admission to the emergency department

As the patient's hemodynamics were unstable, an ECHO was performed at the bedside. EF was found to be 60% spab 20 mmHg. On his physical examination: TA: 78/55 mmHg, pulse 138 beats/min, SpO2: 83%. She whose pulmonary embolism severity index (PESI) corresponded to class 3 and whose systolic blood pressure was below 90 mmHg, was classified as a high-risk patient. She was admitted to the intensive care unit. The hemodynamically unstable patient was administered a half dose of thrombolytic agent. She was monitored in the ICU for 24 hours and was transferred to the service after his vital signs improved. The Doppler USG of the lower extremities, which was examined for a possible DVT, showed no DVT.

The department of obstetrics and gynecology was consulted regarding the availability of anticoagulant treatment during lactation. Treatment with low molecular weight heparin (LMWH) was decided. In the thrombophilia panel, the heterozygous mutation MTHFR-A1298c and the heterozygous mutation of factor 13 were positive. In consultation with the hematology department, it was decided that lifelong anticoagulation was not necessary.

At the patient's 3rd month follow-up, the PTE was still visible on CTPA. The results of ECHO and Doppler USG of the lower extremities were assessed as normal. The patient was treated with anticoagulants for 6 months, but then stopped coming for follow-up visits at his request. He did not receive any treatment.

The CTPA performed at the first-year follow-up examination revealed that the thrombus in the pulmonary arteries had become chronic. The patient underwent an ECHO to test for CTEPH. On ECHO, Spab: 24 mmg and right ventricles were found to be normal.Doppler USG examination of the patient's lower extremities, which was evaluated for possible DVT, did not reveal DVT. The patient, who had completed the breastfeeding period, was given medical treatment and a follow-up examination was scheduled.All follow-ups of the patient have been summarized in the table below

If we need to summarize the cases, the similar and different aspects of 3 cases, along with the findings during follow-ups, have been presented in the Table below

DISCUSSION

Pulmonary thromboembolism is a disease whose incidence, prevalence, morbidity and mortality increase with age.[4] For this reason, it is not considered in most young age patients, and the diagnosis of medium and high risk PTE in the young population becomes difficult.

In patients with pulmonary thromboembolism who do not have cardiopulmonary comorbidities, sudden dyspnea and tachypnea are the most common clinical symptoms. Pleuritic pain often accompanies dyspnea and tachypnea.[5] Our patients presented to the emergency room with complaints of sudden onset of dyspnea and chest pain, which are consistent with the most common presenting symptoms of patients diagnosed with PTE. There was tachypnea on physical examination. When risk factors were questioned, a genetic mutation causing thrombus susceptibility was detected in one of our patients. Obesity was accepted as a risk factor in two of our patients . One of our patients had a history of surgery within the last three months.

High-risk pulmonary thromboembolism may also occur in young patients . In cases where there are symptoms and risk factors that suggest PTE, it should be confirmed whether PTE is present with CTPA or V/Q scintigraphy.

High-risk pulmonary thromboembolism is an urgent and serious clinical condition with high mortality, which may present with sudden onset dyspnea, hypotension, signs of right heart failure, presyncope or syncope, and cardiac arrest, and whose treatment must be started quickly after diagnosis.[6]

Table. Summary table for 3 cases

	CASE 1	CASE 2	CASE 3
Age	21	23	27
Gender	Woman	Woman	Woman
Risk factors	Genetics, obesity	Morbid obesity	Genetics, history of previous surgery
Wells	4.5 points: medium risk	7.5 points: high risk	10 points: high risk
PESI	91: class 3	73: class 2	117: class 4
CTPA	In both pulmonary artery lumens, lobar and some segmental branches	Partial occlusion within the lumen of the left main pulmonary artery extending to the right main pulmonary artery	Filling defect extending from the left main pulmonary artery to the lingual segment and lower lobar artery branches
Is it accompanied by DVT?	Yes	Yes	No
Treatment	Alteplase 100 mg (full dose) + Lifetime anticoagulant	Alteplase 40 mg+warfarin (6 months) and diosmin+hesperidin 2*500 mg	Alteplase 50 mg (half dose)+LMWH 2*1 due to lactation; Patient not complying with treatment
Complication after treatment	None	Treatment could not be completed due to bleeding.	None
Follow-up			
3 months	PTE was not observed. DVT was ongoing	PTE was not observed. DVT was not observed.	It was observed that the appearance of PTE continued.
6 months	PTE was not observed. DVT was not observed(The evaluation was made suboptimal)	PTE was not observed. DVT was not observed.	She didn't come to check.
1 year	PTE was not observed. DVT continued	PTE was not observed. DVT was not observed.	CTPA showed that the thrombus in the pulmonary arteries had become chronic.

PESI: Pulmonary embolism severity index, CTPA: Computed tomography pulmonary angiography, DVT: Deep vein thrombosis, LMWH: Low molecular weight heparin, PTE: Pulmoner tromboemboli

High risk. Pulmonary thromboembolism is generally seen in patients who are immobile, elderly, have comorbidities, have malignancies, and have a long-term travel history.[7] However, it can also occur at young ages, as it did here. When diagnosing PTE in people under the age of forty-five, it is important to investigate the risk factors in detail, question the history of previous operations, the medications used, check genetic tests, and eliminate predisposing factors such as obesity that will require life changes.

CONCLUSION

High-risk pulmonary thromboembolism is an urgent and serious clinical condition with high mortality. However, it can also occur at young ages, as it did here. In clinically suspected patients, rapid diagnosis should be made and treated.

ETHICAL DECLARATIONS

Informed Consent

All patients signed and free and informed consent form.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

The authors declared that this study has received no financial support.

Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

REFERENCES

1. Turkish Thoracic Society Pulmonary Thromboembolism Diagnosis and Treatment Consensus Report, 2021.
2. Gölbaşi Z. Kronik tromboembolik pulmoner hipertansiyon: Tanısı, tıbbi tedavisi ve takibi [Chronic thromboembolic pulmonary hypertension: diagnosis, medical therapy and monitoring]. *Anadolu Kardiyol Derg.* 2010;10 Suppl 2:56-60.
3. Konstantinides SV, Meyer G, Becattini C, et al. 2019 ESC Guidelines for the Diagnosis and Management of Acute Pulmonary Embolism Developed in Collaboration with the European Respir atory Society (ERS) The Task Force for the diagnosis and management of acute pulmonary embolism of the European Society of Cardiology (ESC). *Eur Heart J.* 2020;41(4):543-603.
4. Şen N, Ermiş H, Altınkaya N, Ermiş N, Karataşlı M, Ulubay G. Pulmonary embolism in young and elderly patients: clinical characteristics, laboratory and instrumental findings and differences between age groups. *Thorac Res Pract.* 2010;11:160-166. Doi: 10.5152/ttd.2010.26
5. Olçum GG, Akbaş S, Basat S. 27 Patients with pulmonary thromboembolism. *Med Bull Sisli Etfal Hosp.* 2015;49(4):260-265.
6. İpekci A. Pulmonary embolism 2019. *Phnx Med J.* 2019;1(1):51-63.
7. Anderson FA Jr, Spencer FA. Risk factors for venous thromboembolism. *Circulation.* 2003;107(23 Suppl 1):I9-I16.