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Case Report: Pulmonary Embolism in a Young Adult

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Abstract: ***Pulmonary embolism (PE) in young adults is relatively uncommon but can have significant morbidity and mortality. This case report discusses a 20-year-old male with acute PE, emphasizing the diagnostic imaging findings and a review of the literature regarding the etiology, risk factors, and imaging modalities used in young adults.***

Keywords: Pulmonary embolism, Young adult, Acute onset, Diagnostic imaging, Computed tomography pulmonary angiography, Risk factors, Hyper coagulable states, Anticoagulation therapy, Right ventricular strain, D-dimer

1. Introduction

Pulmonary embolism is a serious condition caused by the obstruction of the pulmonary arteries, typically due to thromboembolic events. While it predominantly affects older populations, the incidence in young adults is rising, necessitating awareness of atypical presentations and risk factors.

2. Case Presentation

Patient Information

- Age: 20 years
- Sex: Male
- Medical History: No significant past medical history, non-smoker, physically active.
- Family History: No known thromboembolic disorders.

Symptoms

The patient presented to the emergency department with:

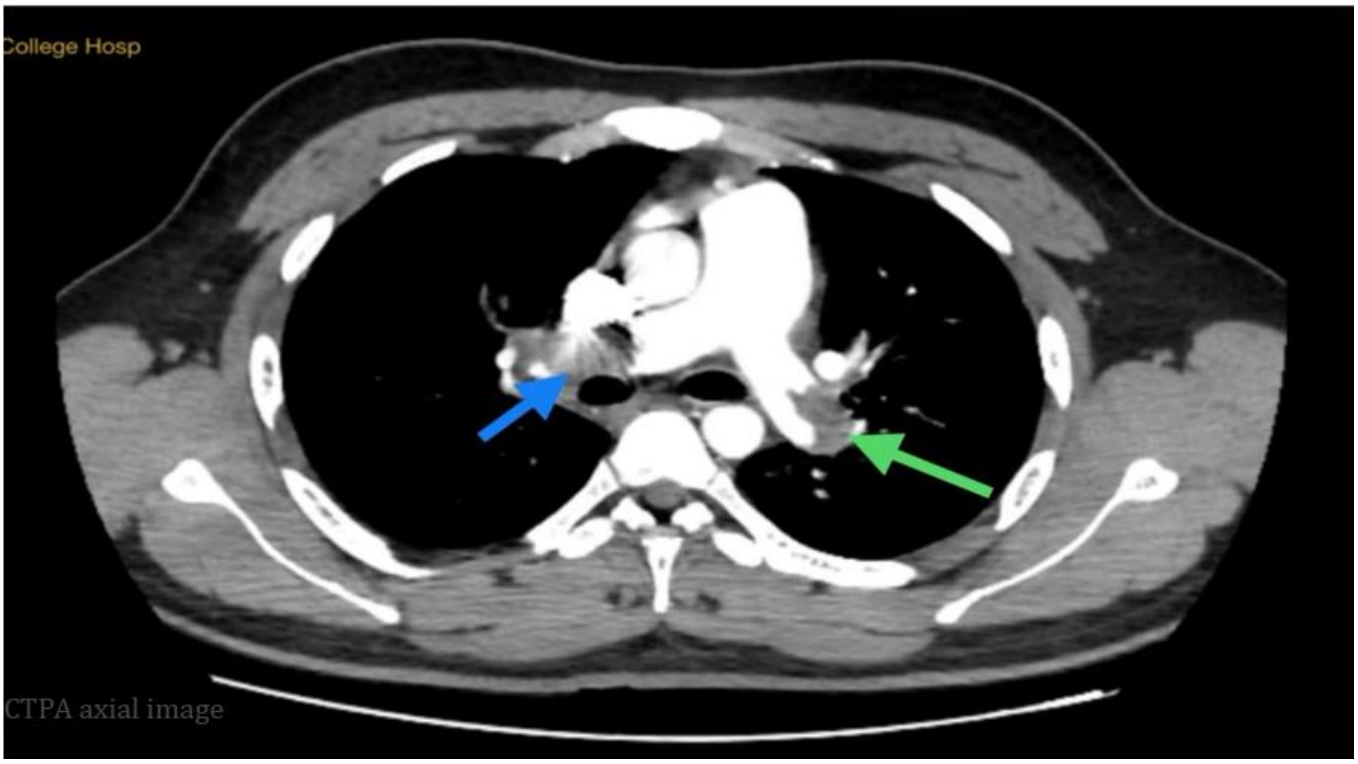
- Acute onset of pleuritic chest pain.
- Dyspnea, worsened with exertion.
- Mild hemoptysis.

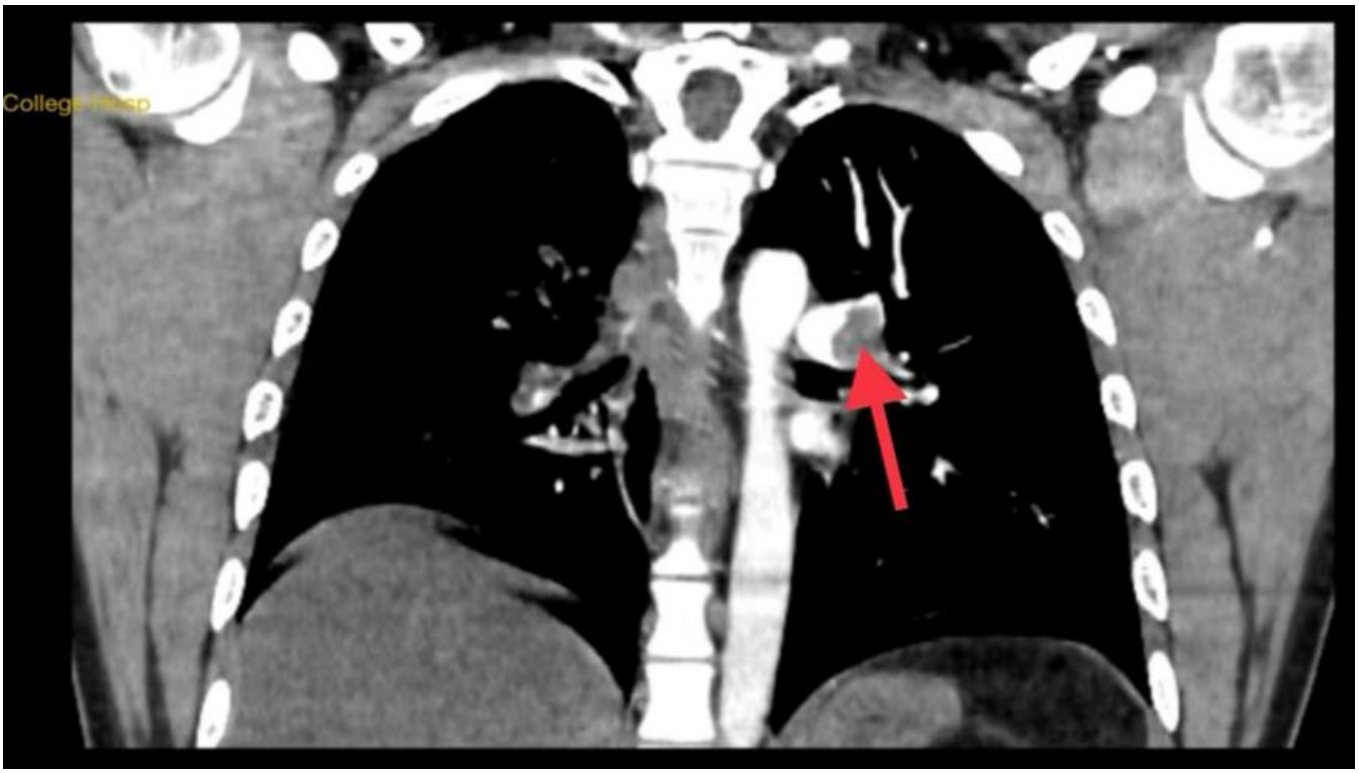
3. Clinical Findings

Upon examination, the patient was tachycardic (heart rate 102 bpm) and exhibited mild hypoxia (SpO2 92% on room air). D-dimer levels were elevated at 1,500 ng/mL, prompting further investigation.

Imaging Studies

Computed Tomography Pulmonary Angiography (CTPA): CTPA was performed to assess for PE, revealing:





CTPA coronal image:

- CT pulmonary angiography shows thrombus in right and left pulmonary artery
- Right ventricular strain with enlargement, indicated by a right ventricular-to-left ventricular diameter ratio >1.

Additional Investigations

- Lower Extremity Ultrasound: Revealed no signs of deep vein thrombosis.
- Laboratory Tests: Normal renal function, elevated troponin I levels, and normal complete blood count.

4. Discussion

Etiology and Risk Factors

PE in young adults can be attributed to various factors:

- Hypercoagulable States: Genetic predispositions such as Factor V Leiden mutation, prothrombin gene mutation, or antiphospholipid syndrome.
- Situational Risks: Recent surgery, prolonged immobilization, or travel.
- Other Considerations: Obesity, oral contraceptive use, and

smoking, though this patient was a non-smoker and physically active.

Radiological Review

The primary imaging modality for diagnosing PE is CTPA, which provides detailed visualization of pulmonary vasculature. Key findings include:

- Bowing
- Filling Defects:
- The presence of intraluminal filling defects in pulmonary arteries. Right Ventricular Strain: Enlargement of the right ventricle and interventricular septal
- Secondary Signs: Pleural effusions or lung infarcts may also be noted.

5. Literature Review

Recent studies indicate an increasing incidence of PE among younger populations, especially those with risk factors. The following points summarize relevant findings:

1) Incidence: A meta-analysis revealed a rising trend in PE among patients aged 18-45, highlighting the importance of awareness and early diagnosis.
2) Diagnostic Challenges: Symptoms in young adults may be atypical, leading to delayed diagnosis. Radiologic findings, especially on CTPA, are crucial for timely intervention.
3) Prognosis: Young patients generally have better outcomes post-PE than older adults, provided there is timely diagnosis and management.

Management

The patient was started on anticoagulation therapy (unfractionated heparin followed by warfarin). Close monitoring and follow-up imaging were arranged to assess the resolution of emboli and any potential complications.

6. Conclusion

This case illustrates the importance of recognizing pulmonary embolism in young adults, particularly in those with recent immobilization. Prompt diagnosis through CTPA and appropriate management can lead to favorable outcomes. Continued education and awareness are essential to address this growing concern in younger populations.

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