Case 15455

Mediastinal haematoma dissecting the sheath of the pulmonary arteries: A rare manifestation of acute aortic syndrome
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Section: Cardiovascular
Area of Interest: Cardiovascular system Arteries / Aorta
Procedure: Contrast agent-intravenous
Procedure: Computer Applications-General
Procedure: Computer Applications-Detection, diagnosis
Procedure: eLearning
Imaging Technique: CT-Angiography
Imaging Technique: CT
Special Focus: Acute Case Type: Clinical Cases
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Patient: 85 years, female

Clinical History:

An 85-year-old female patient was admitted to the emergency room with severe respiratory insufficiency. A transthoracic echocardiogram showed a dilated right ventricle and ventricular asynchrony as signs of right heart overload. The D-dimer test was markedly increased (63,000 ng/mL).

Imaging Findings:

Suspecting acute pulmonary thromboembolism, a computed tomography pulmonary angiography (CTPA) was performed, and based on the initial findings, a delayed phase was acquired. The CTPA revealed a soft tissue thickening along the posterior wall of the right pulmonary artery, consistent with blood, which reduced the artery lumen to a filliform strand of contrast. Dilated right heart chambers and contrast reflux to suprahepatic veins were also seen. The dilated ascending aorta (4.7 cm) had a subtle irregular contour in the posterior wall in close contact with the haematoma. On axial and sagittal CT reconstructions, an intimal flap was visible in the posterior wall of the ascending aorta adjacent to the right pulmonary artery. Extravasated blood reached the lungs by dissecting the walls of the pulmonary arterial branches, causing bilateral thickening of the peribronchovascular interstitium. Moreover, the presence of haemopericardium strengthened the diagnosis of aortic dissection involving the ascending aorta.

Discussion:

This case illustrates a very uncommon but distinctive manifestation of acute aortic syndrome. Acute dissection of the proximal aorta is a life-threatening condition in which a prompt diagnosis and surgical repair is crucial [5]. A pulmonary arterial disease can be initially suspected at presentation. This is rare and challenging but has been previously described in medical literature [1, 4]. The radiological findings, although subtle, are quite specific, so that an aortic origin can be suggested based on the CT angiography findings, as our case illustrates.

Rapid recognition of this unusual complication on CTPA also requires an understanding of the basic anatomical
pathways and pathophysiological mechanisms that lead to this phenomenon [2]. During early embryogenesis, fusion of the two endocardial tubes generally results in the primitive cardiac tube, composed of five regions: truncus arteriosus, bulbus cordis, primitive ventricle, primitive atrium, and sinus venosus [2]. The truncus arteriosus and the cranial end of the bulbus cordis are gradually separated by the aorticopulmonary septum. This septum will create a continuous bridge to form separate lumens of the aorta and pulmonary artery [2]. Thus the aorta and central pulmonary arteries share a common sheath of connective or adventitial tissue [1–4] which extends distally to the mediastinal portions of the right and left pulmonary arteries. This is why, in cases of rupture of the posterior wall of the ascending aorta, the extravasation of blood may remain confined to the wall of the pulmonary arteries [1, 2]. The higher pressure in the aorta causes extravasated blood to compress the lumen of the main pulmonary arteries. In our case this compression triggered an acute right heart failure, which mimicked an acute pulmonary thromboembolism.

Additionally, our case highlights how unexpected findings in a CT vascular study may require additional phases that should be performed immediately after the first scan in order to avoid further doses of intravenous contrast media.

To conclude, this case illustrates a very uncommon manifestation of an acute aortic syndrome. However, the radiological findings are quite characteristic. Once an intramural haematoma is identified in the right pulmonary artery, an acute aortic syndrome must be considered and signs of dissection in the adjacent aortic posterior wall must be carefully scrutinised.

**Differential Diagnosis List:** Acute dissection of the proximal aorta, Pulmonary thromboembolism, Acute cardiac insufficiency

**Final Diagnosis:** Acute dissection of the proximal aorta

**References:**


Description: The CTPA revealed a dense non-enhancing mass on the infero-posterior wall of the right main pulmonary artery, consistent with blood (*), which reduced the pulmonary artery (PA) lumen to a filiform strand of contrast. Origin: Radiology Department, Hospital General Universitario José Mª Morales Meseguer, Murcia, Spain.
Description: Delayed phase showed a dilated ascending aorta with a subtle irregular contour in the posterior wall (black arrow) in close contact with the haematoma (*). Bilateral thickening of the peribroncovascular interstitium (white arrowhead). Origin: Radiology Department, Hospital General Universitario José Mª Morales Meseguer, Murcia, Spain.
Description: Contrast reflux to suprahepatic veins (white arrow). Origin: Radiology Department, Hospital General Universitario José Mª Morales Meseguer, Murcia, Spain.
**Description:** Dilated right heart chambers (arrow) and haemopericardium (arrowhead). **Origin:** Radiology Department, Hospital General Universitario José Mª Morales Meseguer, Murcia, Spain.
Description: On axial and sagittal CT reconstructions, an intimal flap (black arrow) was visible in the posterior wall of the ascending aorta adjacent to the right pulmonary artery. Bilateral thickening of the peribronchovascular interstitium (white arrowhead). Origin: Radiology Department, Hospital General Universitario José María Morales Meseguer, Murcia, Spain.
Description: On sagittal CT reconstructions, (venous phase) an intimal flap (black arrow) was visible in the posterior wall of the ascending aorta adjacent to the right pulmonary artery (PA) that is compressed.
Origin: Radiology Department, Hospital General Universitario José Mª Morales Meseguer, Murcia, Spain.
Description: On sagittal CT reconstructions (arterial phase), an intimal flap (black arrow) was visible in the posterior wall of the ascending aorta adjacent to the right pulmonary artery (PA) that is compressed.

Origin: Radiology Department, Hospital General Universitario José Mª Morales Meseguer, Murcia, Spain.
Figure 3

a

Description: CTPA in axial plane.
We add a video showing the described findings. **Origin:** Radiology Department, Hospital General Universitario José Mª Morales Meseguer, Murcia, Spain.

b

Description: CT in axial plane (venous phase).
We add a video showing the described findings. **Origin:** Radiology Department, Hospital General Universitario José Mª Morales Meseguer, Murcia, Spain.
**Description:** Schematic drawing based on the literature. Craniocaudal view of the ascending aorta and pulmonary artery. Pulmonary arteries are severely compressed by the haematoma (*). The tear point is on the posterolateral wall (arrow) of the aorta. **Origin:** Radiology Department, Hospital General Universitario José Mª Morales Meseguer, Murcia, Spain.