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Case Report

CT-Angiogram Appearance of Iatrogenic Azygos Vein Perforation

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ABSTRACT

An elderly woman underwent placement of a pacemaker lead which was complicated by accidental azygos vein cannulation and perforation. However not a very uncommon complication, we report here several findings on CT-angiogram which highlight imaging pitfalls of this entity. We also review how the case was clinically managed.

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Case Report

We report an 80-year-old woman with sick sinus syndrome undergoing placement of a pacemaker lead. During catheterization of the superior vena cava, unusual curvature of the tip of the lead toward the medial line was noted, rising suspicion of azygos vein cannulation [1]. The lead was replaced and correct positioning in the right ventricle was achieved. However, in the post-anesthesia care unit, the blood pressure transiently dropped to 100/60mmHg and a chest X-ray showed a right pleural effusion. A CT-angiogram was obtained and demonstrated a right sided hemothorax (Figure 1A) from an azygos vein perforation. Abnormal appearance of the azygos vein was observed and was initially misinterpreted (Figures 1B-1D, Video 1). Retrospectively, those findings corresponded to accumulation of contrast under leaflets of the venous valvulae, not to be confound with active extravasation of blood nor pseudoaneurysm. A 72-hours CT-angiogram depicted the same image which confirms the non acute nature of this appearance. The patient was treated conservatively, and the post-operative course was however uneventful.

Rarely documented on angio-CT, azygos vein perforation is an occasional complication of pacemaker lead placement. Accidental azygos vein cannulation, when extrapolating to central venous access literature, is seen in 1.2 % of cases [1]. It is thought to be more frequent when accessing from the left side and in dilated condition of the heart [1]. Usually contained rapidly since azygos vein is a low-pressure system, significant bleeding can occur when the tear connects to a lower pressure cavity such as the pleural space [2]. When bleeding occurs in the context of a small tear, in contrast to a large traumatic avulsion, conservative treatment can usually be achieved [3].

If the patient is intubated, high levels of positive-end expiratory pressure (PEEP) can increase pressure in the pleural space during the respiratory cycle, promoting tamponade of the bleeding. For the same reason, drainage of the pleural blood effusion should be delayed if possible. Turning the patient of his left side is also believed to decrease venous pressure in the right sided azygos vein [2].

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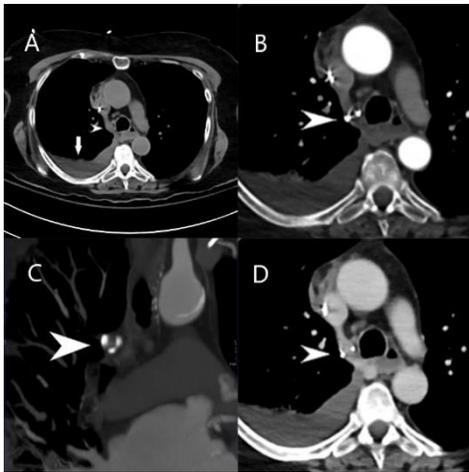


Figure 1: CT-Angiogram of the case.

Non contrast axial image **A**) demonstrating a dense right-sided pleural effusion consistent with a hemothorax (arrow) and an enlarged but isodense and homogenous azygos vein (arrowhead). After bolus pressured contrast injection from the right upper arm, reflux in the azygos vein from the superior vena cava occurred (not imaged). Few seconds later, contrast enhanced arterial phase acquisition was obtained with axial **B**) and coronal **C**) images showed here. Not visible on non-contrast images, a ring of dense contrast is now seen at the periphery of the azygos vein (arrowhead), which corresponds to accumulation of contrasted under leaflet of venous valvulae, not to be confound with active extravasation of blood nor pseudoaneurysm. The site of the iatrogenic perforation is not visible, probably clogged. The contrast accumulation is denser than the contrast in the vessel, which is different

from a pseudoaneurysm, where the contrast would be the same in the vessel and in the defect on all phases. On axial contrast enhanced image in venous phase **D**), the ring is still denser than the vessel (arrowhead) and keeps the same shape, which confirm that there is no active extravasation of blood since ongoing bleeding will tend to increase in size from arterial to venous phase. These findings suggest that the contrast is contained and trapped under the valvulae leaflets since veins, by their anatomic constitution, do not dissect. A 72-hours CT-angiogram (not shown) depicted the same image which confirms the non-acute nature of this appearance.

Conflicts of Interest

None.

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