

Pseudolesions as seen on multislice CT

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Introduction

The advent of multislice computerised tomography (CT) has resulted in a huge step in diagnostic accuracy due to better image quality, multiplanar capabilities and faster speed of the scans. Pseudolesions are not unknown in radiology or in CT imaging. However the observation of some artefacts, especially the flow-related ones, has increased with the faster scanning. Lack of familiarity with these new pseudolesions can lead to misdiagnoses.

Pseudolesions

The lesions described below are noted frequently during imaging. This pictorial essay aimed at highlighting them as some of these lesions still confound junior staff, especially in their early learning curve.

The commonly viewed pseudolesions are as follows:

Azygos vein

In the newer multislice scanners contrast is now routinely seen in the major thoracic arteries and veins without opacification of the azygos vein (Fig. 1). This is because of delayed filling of the azygos vein. This leads to the impression of a mass or a node in this location especially if the vein is dilated.¹ However the location, shape and the relationship to the superior vena cava are clues that the 'lesion' is the unopacified azygos vein. If there is doubt a delayed scan usually clarifies things.

Pulmonary veins

The unopacified portions of the right and left superior pulmonary veins can be mistaken for nodes in the hila (Figs 2 and 3).² The chest scan must be prolonged



Fig. 1. Partly opacified azygos vein due to reflux from superior vena cava can be mistaken for nodes if unopacified.

enough to allow these to fill (30 - 35 seconds on 4-slice CT). If the scan is performed for diagnosis of pulmonary embolus, then both arterial and venous phases must be done to confirm venous emboli.

Aorta

Motion artefacts can complicate the diagnosis of thoracic aortic dissection.³ Their position in the ascending aorta is predictable and is related to systolic aortic motion from the left anterior to the right posterior position (Fig. 4).

Oesophagus

Air or contrast in the oesophagus seen on multiple (4 or more) contiguous slices is a sign of motility disorder on single-slice CT.⁴ On newer scanners, due to fast speed, the oesophagus can be imaged during a single swallow, thus air in the oesophagus is not abnormal (Fig. 5). However large amount of intra-oesophageal air with or without fluid level can still be considered abnormal.

Scalloped or nodular appearance of muscular attachments of the diaphragm

These were occasionally noted on single-slice CT in older patients, but are now routinely observed (Fig. 6). These should not be confused with the nodularity of peritoneal deposits. Metastatic nodules change size abruptly on multiple contiguous

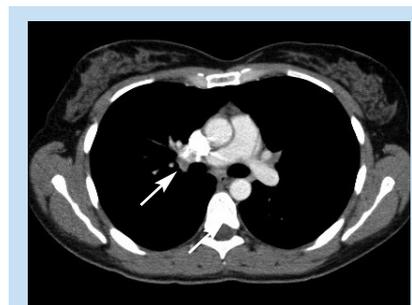


Fig. 2. Portion of the right superior pulmonary vein appearing as a lymph node on axial image.

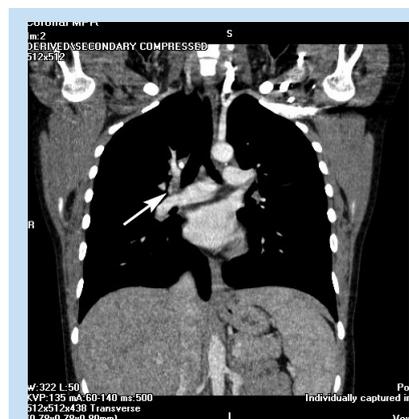


Fig. 3. Coronal image showing the normal vertical course of the partially opacified vein.

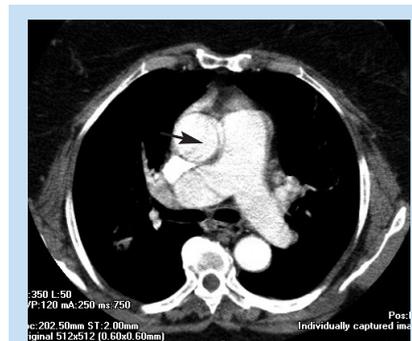


Fig. 4. Aortic pulsation imitating dissection in the ascending aorta.

ous scans, while diaphragm-related nodular invaginations remain smooth on sequential slices.⁵

Inferior vena cava

Laminar flow within the inferior vena cava (IVC) can cause artefacts that may simulate thrombus.⁶ A 'pseudothrombus' artefact within the suprarenal inferior vena cava produced by rapid infusion of contrast material is believed to be from laminar flow of renal venous effluent of increased opaci-

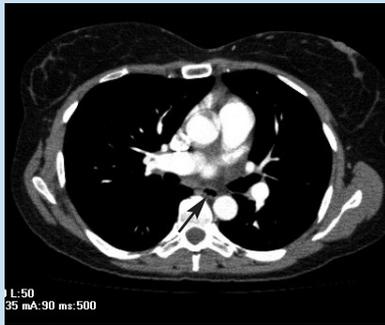


Fig. 5. Air in the oesophagus is routine on multi-detector CT.

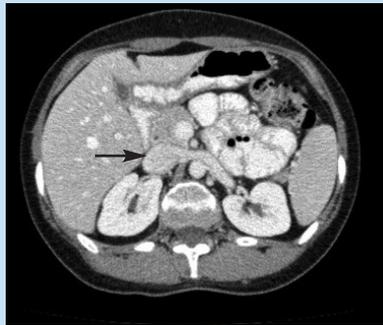


Fig. 8. A later scan at the same table position. The IVC flow artefact has disappeared.

ty around less opacified infrarenal caval contents (Figs 7 and 8). This artefact, seen in 21% of older CT scans, is now noted routinely. Similar appearances may be encountered in the iliac and femoral veins.



Fig. 6. The anterior diaphragm can look quite thick as it becomes continuous with the anteriolateral diaphragm.

mal perfusion abnormality (e.g. Budd-Chiari syndrome). Similarly, the hepatic veins are hypodense on the arterial phase and can be mistaken for low-density lesions (Figs 9 and 10). The liver study should routinely include triphasic examination for complete evaluation.

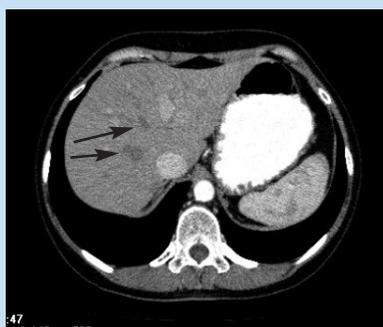


Fig. 9. Unopacified hepatic veins appearing as hypodense lesions. Note the heterogeneous enhancement of the spleen.



Fig. 7. Pseudothrombus in the IVC.

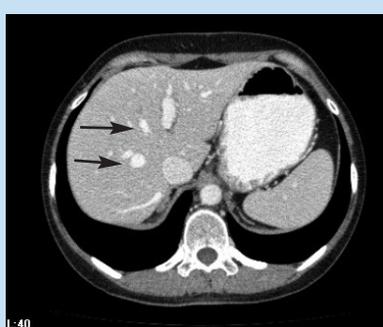


Fig. 10. Delayed scan at the same level showing the filling of hepatic veins. Spleen now has uniform enhancement.

Liver and spleen

Heterogeneous enhancement in the early arterial phase is normal. The pattern becomes more pronounced with the faster rate of injection.⁷

Portal venous phase studies should be used to confirm any suspected parenchy-

scan). This is followed by diffuse enhancement on delayed scan (3 minutes or more). These patterns depend on variables such as the menopausal status and age of the patient.⁸ Knowledge of these normal findings might help when confronted with unusual uterine enhancement during routine studies obtained with CT (Fig. 11).



Fig. 11. Unusual early uterine enhancement.

Conclusion

We have noted some of these common artefacts since the introduction of multislice CT in our hospital. Familiarity with these pitfalls and optimal procedural protocols will result in fewer misdiagnoses and prevent radiological embarrassment.

References

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Uterus

There may be transitory subendometrial and /or myometrial enhancement (in the arterial and parenchymal phase of the