Hot Clot, Cold Truth: The Radiologic Trail to Tumor Embolus

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Purpose

- The purpose of this case-based educational exhibit is to explore the radiologic basis, clinical context, and significance of the hot quadrate sign.

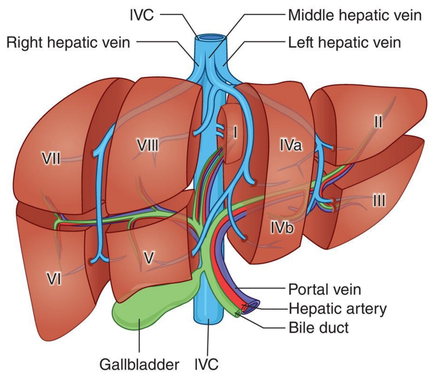

Figure 1: Anatomical Diagram of the Couinaud lobes of the liver

Materials and Methods

- We present a case of a 54-year-old female with no significant past medical history who presented with worsening facial swelling and right greater than left bilateral upper extremity swelling.
- A contrast-enhanced CT of the abdomen and pelvis demonstrated a large anterior mediastinal mass causing narrowing of the superior vena cava (SVC) with tumor thrombus extending into the SVC and bilateral upper extremity deep veins.
- Pathology from biopsy of the mediastinal mass revealed poorly differentiated non-small cell carcinoma.

Results

- Initial CT abdomen and pelvis revealed features highly suspicious for SVC syndrome.
- The medial aspect of segment IVb (quadrate lobe) showed geographic, focal hyperperfusion consistent with the hot quadrate sign. This occurs from venous obstruction and altered hepatic perfusion, most commonly associated with type IV SVC obstruction.
- This subtype involves both SVC and azygos venous system obstruction, rerouting venous blood through anterolateral thoracoabdominal collaterals that ultimately drain into the left branch of the portal vein supplying the quadrate lobe.
- On arterial phase CT, this manifests as focal wedge-shaped hyperenhancement, favoring a hepatic pseudolesion secondary to SVC obstruction.

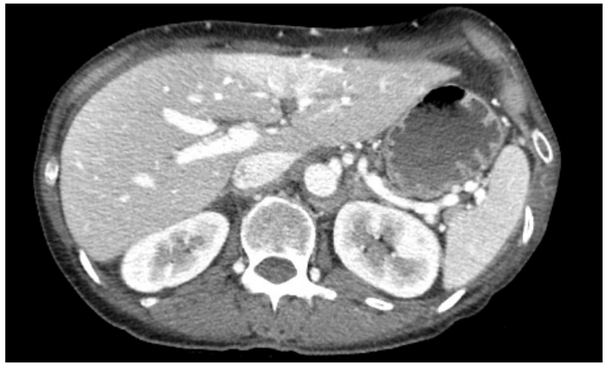

Figure 2: CTV Chest axial image: hyperenhancement of hepatic segment 4 compatible with hot quadrate sign.

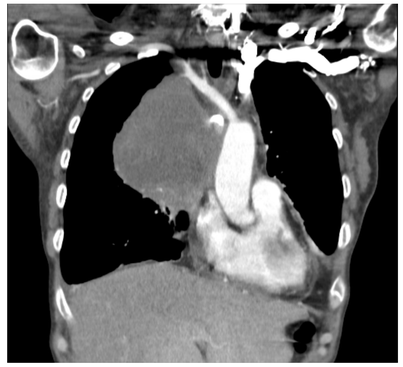

Figure 3: large soft tissue mass along the right anterolateral margin of the mediastinum that extends form the medial aspect of the right upper lung inferiorly along the right lateral margin of the cardiophrenic border. Portions of the mass extend into the mediastinum with resultant mass effect on and severe luminal narrowing of the involved superior vena cava.

Intervention

- Venography of bilateral upper extremities showed near-occlusive thrombus extending centrally to severe SVC narrowing. Following thrombectomy, angioplasty, and stenting of the SVC into bilateral brachiocephalic veins, repeat venography confirmed wide patency with markedly improved flow.

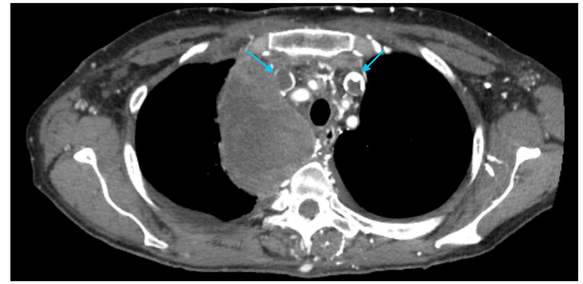

Figure 4: CTV Chest: axial image. Hypodense filling defects (arrows) in bilateral brachiocephalic veins

Conclusion

- The hot quadrate sign on CT is a radiologic hallmark highly specific for SVC obstruction. While clinical suspicion of SVC syndrome in this case was high, recognition of the hot quadrate sign on abdominal CT can serve as a critical diagnostic clue. It should prompt further chest imaging, even in patients without overt symptoms, ensuring timely diagnosis and intervention.

References

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