Intrahepatic arterioportal shunt

- Abnormal flow between the portal venous system and a hepatic arterial system within the liver. They can be a reversible cause of portal hypertension.
- Small shunts can be asymptomatic.

Arterioportal shunt

- **tumorous shunt**
  - occurs with hepatocellular carcinoma and to a lesser extent hepatic hemangioma
  - trans-tumoural shunt is due to abnormal communication between the feeding artery and draining vein of the tumor which results in increased vascularity around the tumor manifested as peritumoral transient hepatic attenuation differences (THAD)
  - portal vein may show early enhancement in dynamic arterial scan without enhancement of its main tributaries the splenic and superior mesenteric veins
- **non tumorous shunt**
  - mainly due to liver biopsy and other hepatic intervention
  - Cirrhosis itself owing to deformation of hepatic sinusoids which increases arterial pressure or portal vein extrinsic compression that also lead to increased arterial pressure
  - congenital intrahepatic arterioportal fistula

Imaging

- Best diagnostic clue
  - Wedge-shaped area of hyperattenuation with straight margins seen during arterial phase of CECT or MR
  - Becomes isodense to hepatic parenchyma during portal venous phase of CECT or gadolinium-enhanced MR
- Peripherally within hepatic segment or lobe
- Usually ≤ 1.5 cm (e.g., cirrhotic arterioportal [AP] shunts)
  - Larger in some cases of post-biopsy AP shunts
  - Early enhancement of peripheral portal vein (PV) branches prior to visualization of main PV

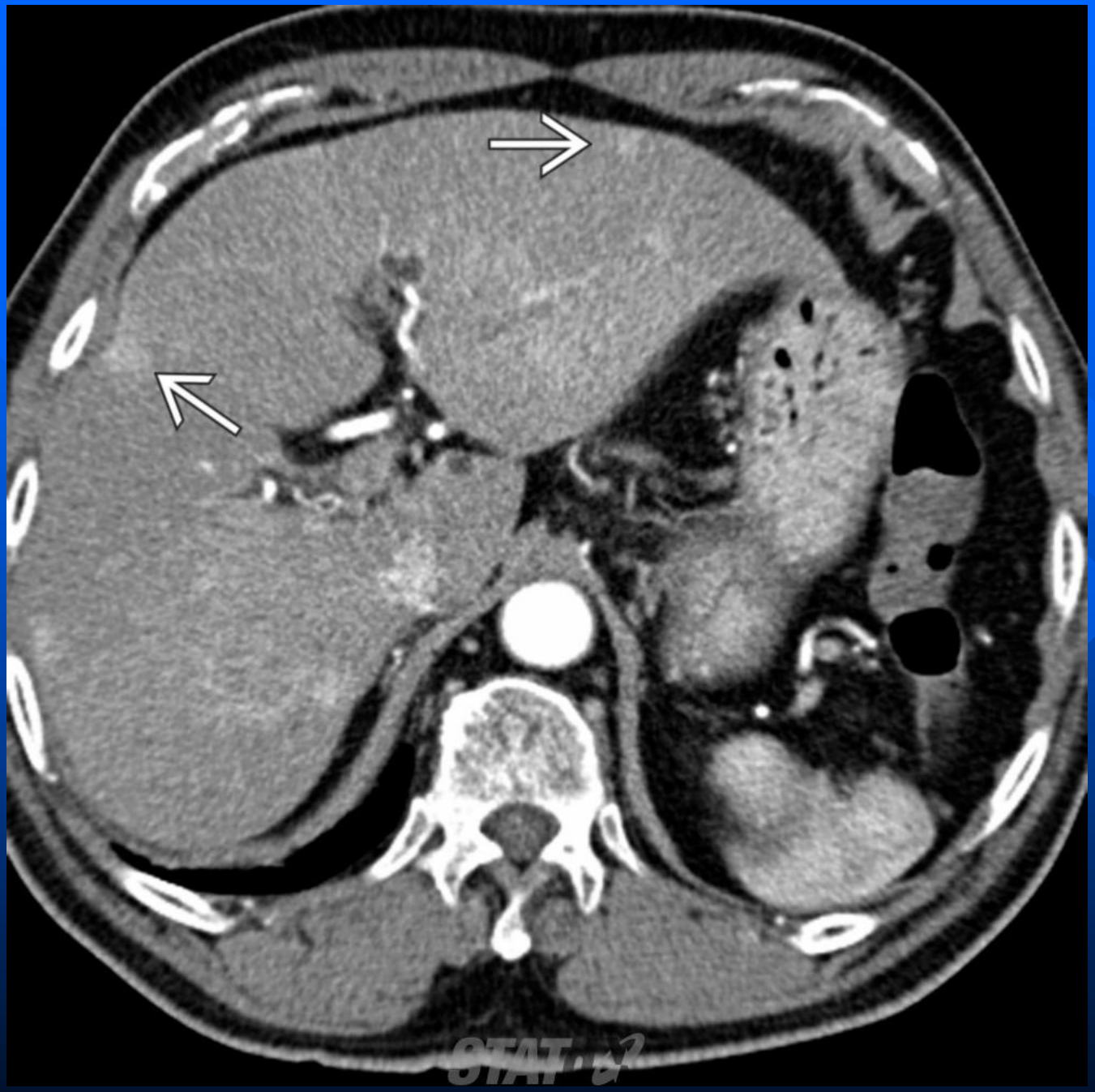
Checklist

- **Consider**
  - For segmental or lobar AP shunt or THAD
    - » Usually due to portal vein branch occlusion
    - » Look for bland or tumor thrombus or occlusion
- **Image Interpretation Pearls**
  - Small (< 1.5 cm) AP shunts are common in cirrhosis
    - » If unassociated with focal lesion on MR, it is probably insignificant
    - » Follow-up in ~ 6 months is indicated and adequate
- **Reporting Tips**
  - Do not mistake multiple small AP shunts for multifocal HCC

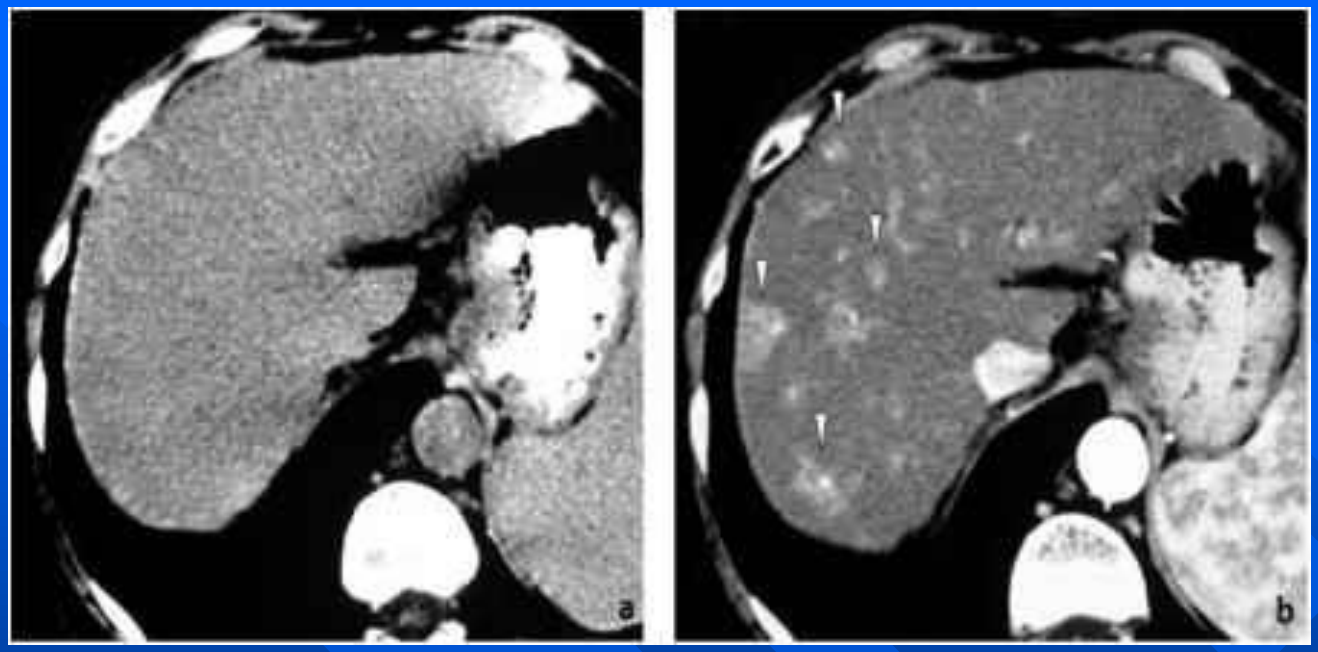
DDx:

- **Hypervascular Liver Mass**
  - Hepatocellular carcinoma, focal nodular hyperplasia, or hypervascular metastases
    - Carcinoid, neuroendocrine most common mets
  - Usually round or oval, not wedge-shaped
  - May show washout on portal venous phase imaging
  - May be associated with AP shunting
    - Due to hypervascularity (sump effect)
    - Or due to compression or occlusion of PV branch
    - Or shunting within malignant tumor
- **Focal Confluent Fibrosis**
  - Common feature of advanced cirrhosis
  - Usually large, wedge-shaped area of decreased density on NECT, increased intensity on T2WI
  - Capsular retraction
  - Retention of contrast on 10-minute delayed images (CECT or C+ MR)
  - Often occurs in segment 4 of liver
- **Hemangioma**
  - Usually spherical lesion
  - Nodular discontinuous peripheral enhancement
  - Capillary or "flash fill" hemangiomas may appear uniformly hyperdense on arterial phase imaging
  - Attenuation tracks blood pool on all phases
  - May rarely have associated AP shunting
- **Focal Sparing With Fatty Liver**
  - Relatively high-attenuation areas of "normal" liver surrounded by low-attenuation fatty liver
  - Not really hypervascular foci
  - Most often in segments 4A and 4B
  - Often around gallbladder fossa

HCC



Axial arterial phase CECT shows arterioportal (AP) shunts as multiple, small, wedge-shaped, peripheral hypervascular lesions (white solid arrow).



- On the pre-contrast CT scan (a) no focal lesions are visible.
- During the arterial phase (b) after contrast medium administration numerous, hyperdense areas (arrowheads) of variable size are appreciable. In the portal venous phase (c) these areas demonstrate rapid contrast medium wash-out resulting in isodensity.
- Unlike HCC, these lesions are not hypo-dense and there is no indication of a pseudocapsule on the portal venous phase scan

- Arterio-portal shunt: The arterial phase CT image shows a large enhancing lesion (m) in the segments 3 and 4 of liver with contrast in the left hepatic artery (arrow) and left branch of portal vein (arrow head) suggesting arterio-portal shunting