

Scanning Mesenteric and Hypogastric Artery Aneurysms

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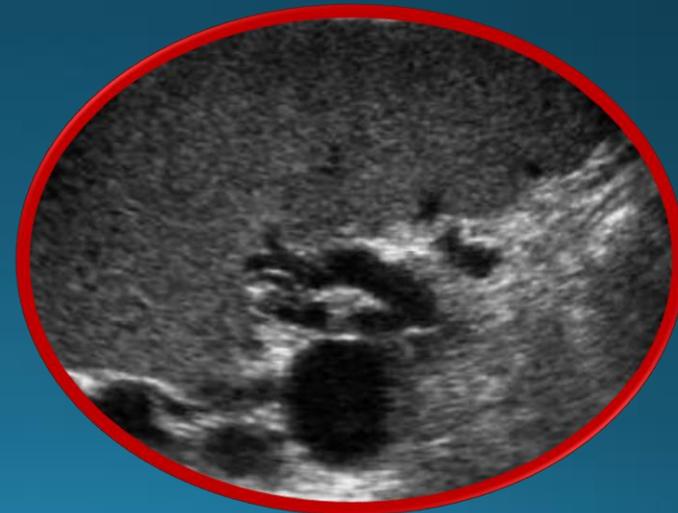
Vascular Resource Associates

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*I have no disclosures relevant to the
content of this presentation*

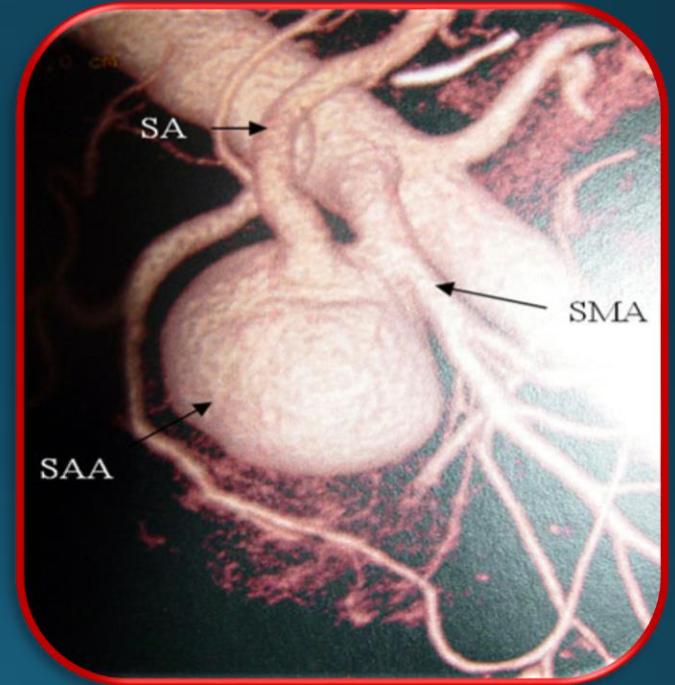
Mesenteric Duplex Scanning

- Widely accepted in the modern vascular laboratory for identification of stenosis or occlusion and for post-intervention follow-up of the
 - Celiac artery and its branches
 - Superior mesenteric artery
 - Inferior mesenteric artery
- Less commonly used for identification/confirmation of mesenteric artery aneurysms



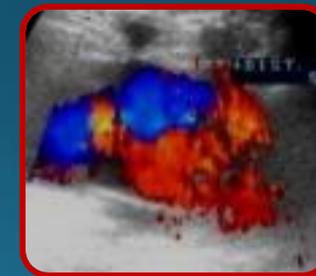
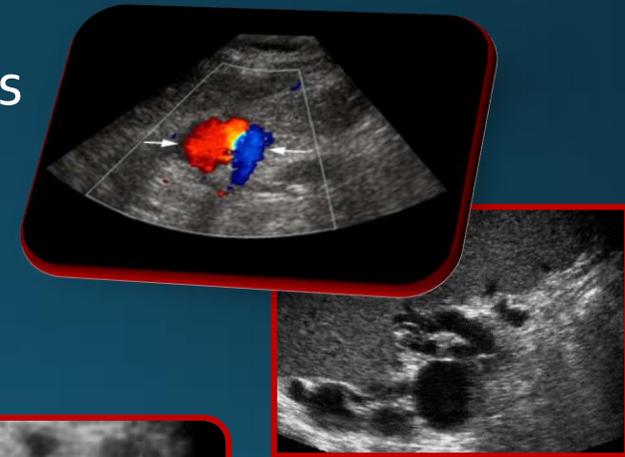
Mesenteric Aneurysms

- A rare occurrence (0.1% -0.2%)
- Most are identified incidentally during CT scan or MRI
- Primary causes
 - Medial degeneration (arterial mediolysis)
 - Connective tissue disorders
 - Fibromuscular dysplasia
 - Portal HTN with splenomegaly
 - Chronic pancreatitis
- Rupture can be catastrophic



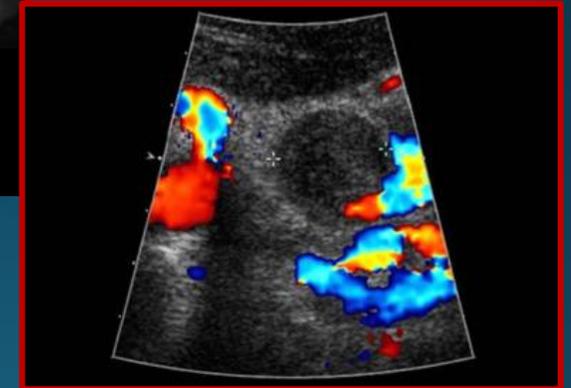
Mesenteric Aneurysms

- Hepatic artery aneurysms
 - Male to female ratio is 2:1
 - Account for approximately 20% of mesenteric aneurysms
 - Pseudoaneurysms are more common
- Splenic artery aneurysms account for approximately 60% of cases
 - Female to male ratio is 4:1
 - Commonly saccular
 - Chronic pancreatitis and multiple pregnancies
- Superior mesenteric and celiac artery aneurysms
 - Males and females equally affected (Incidence – 4% to 5%)
- Inferior mesenteric aneurysms
 - Occurrence is rare



Mesenteric Aneurysms

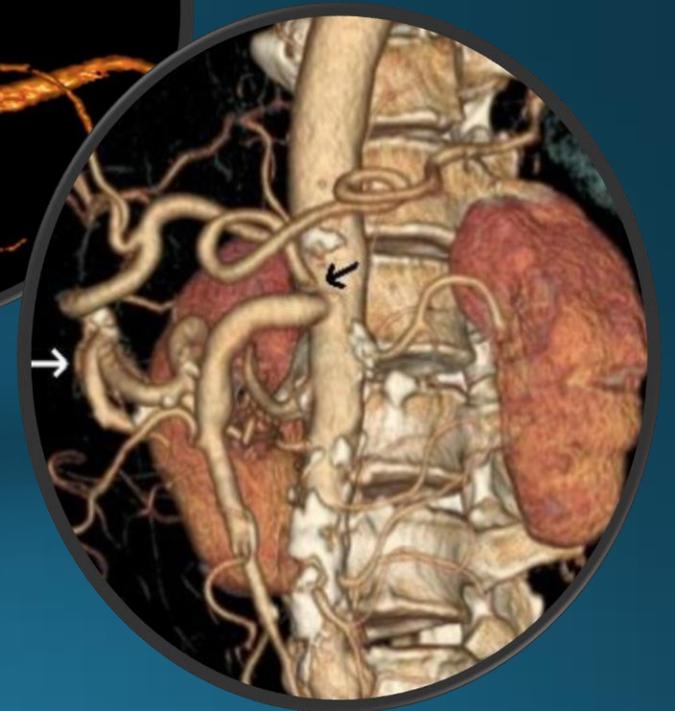
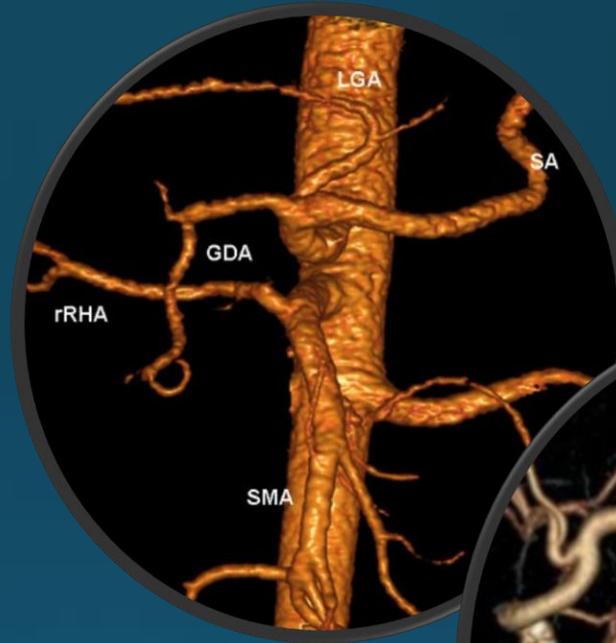
- Incidence of aneurysms in other visceral locations
 - Gastric and gastroepiploic arteries – 4%
 - Jejunal ileal colic – 3%
 - Pancreaticoduodenal – 2%
 - Gastroduodenal – 1.5%
- Treatment options
 - Open surgical revascularization
 - Endovascular repair
 - Thrombin injection – selective use



What are the best techniques for identifying visceral aneurysms with ultrasound?

First, know the anatomy!

- Anatomic variants occur in approximately 20% of the population
- Replaced right hepatic artery
 - Most common anomaly (17%)
 - Usually originates from the proximal SMA
- Common hepatic artery
 - May originate from SMA or aorta
- Common origin of the celiac artery and SMA (*celiacomesenteric artery*)



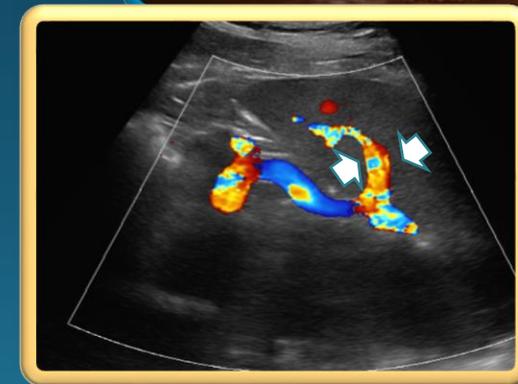
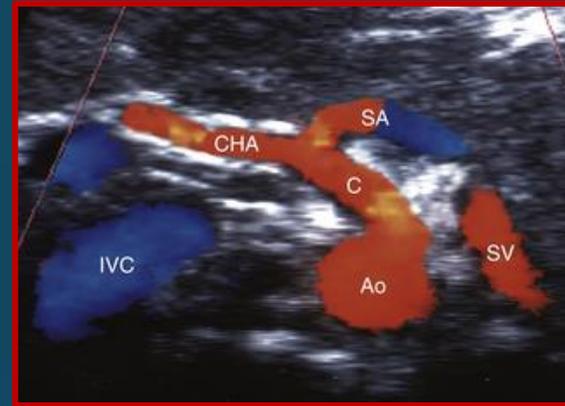
Patient Preparation and Positioning

- Essential for patients to fast for a minimum of 8 hours prior to examination
- Have patients lie supine on exam table placed in reverse Trendelenburg position
 - Allows visceral contents to descend into the abdomen
- May need to use lateral decubitus position to access tortuous arterial segments



Celiac, Hepatic, and Splenic Arteries

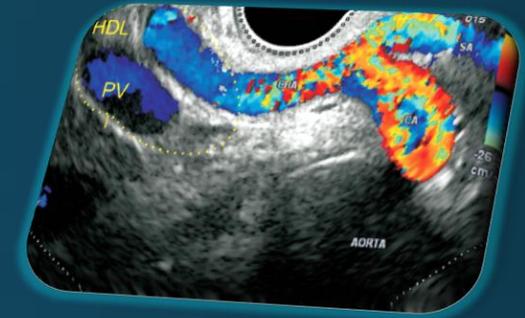
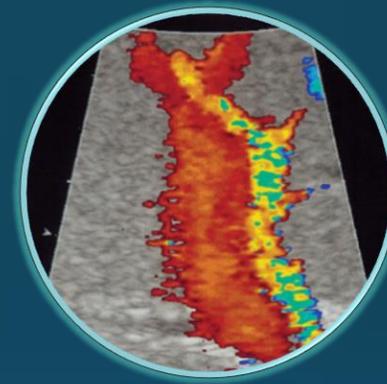
- Celiac artery
 - Origin-transverse aortic image
 - Axis – sagittal throughout length
 - Color and Grayscale
- Common Hepatic artery
 - Sagittal along its length
 - Heel-toe maneuver with lateral oblique tilt
 - Color and Grayscale
- Splenic artery
 - Sagittal along its visualized length (1-2 cm)
 - Heel-toe maneuver with anterior oblique tilt
 - Include sagittal image from the splenic hilum
 - Color and Grayscale



Hepatic Artery and Branches

- Hepatic artery can be followed to the porta hepatis

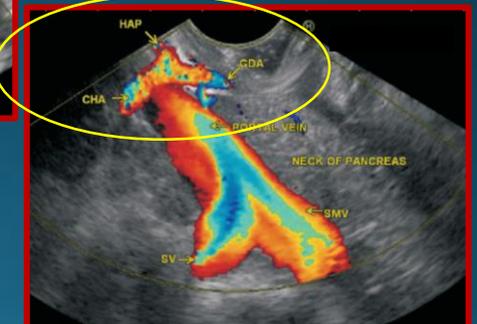
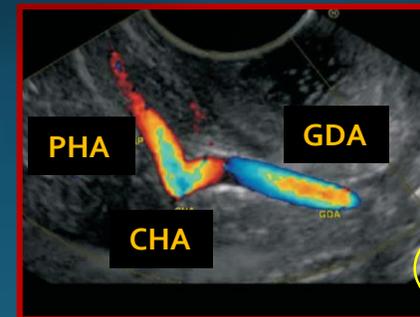
- Normal diameter – 0.5 to 0.7 cm
- Grayscale and color



- Gastroduodenal artery branches from common hepatic artery

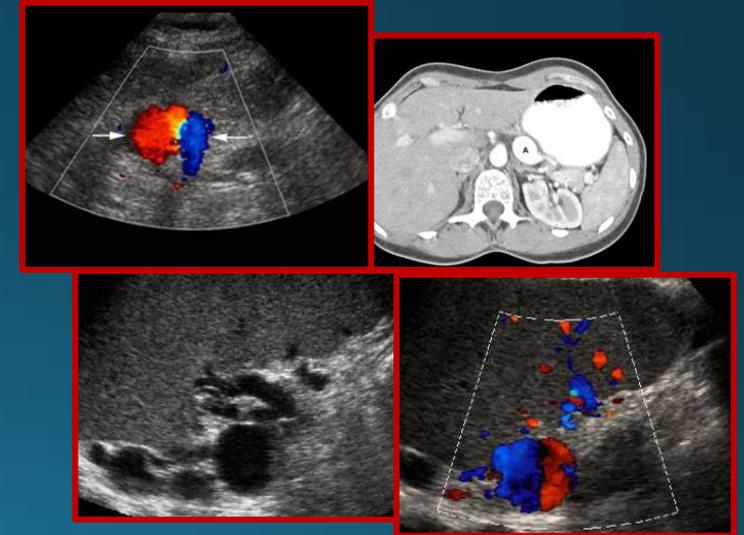
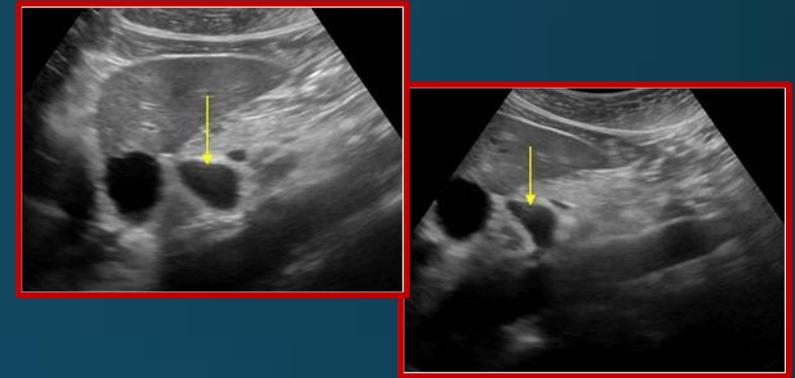
- Located superior to the head of the pancreas and the portal splenic confluence

- Best imaged in sagittal plane just beyond the portal confluence by angling anterolaterally to patient's left



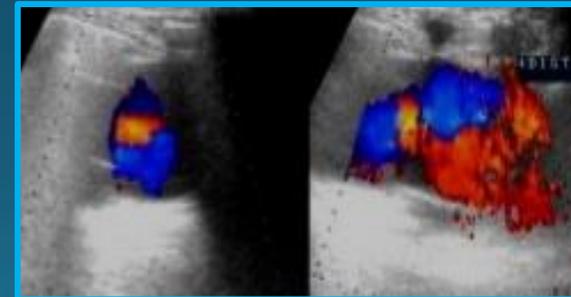
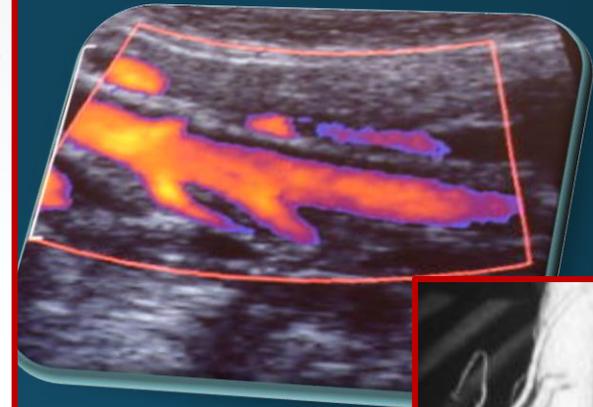
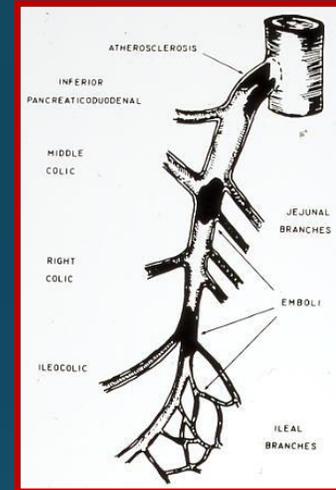
Celiac and Splenic Artery Aneurysms

- Celiac artery
 - Normal diameter – 0.6 to 0.8 cm
 - Aneurysm - > 1.8 cm
 - Grayscale - Measure outer wall-to-outer wall
 - Color - Confirm “swirling” flow pattern
- Splenic artery
 - Normal diameter – 0.5 to 0.8 cm
 - Aneurysmal - > 2 cm; usually distal segment of the artery
- Calcification and mural thrombus commonly seen



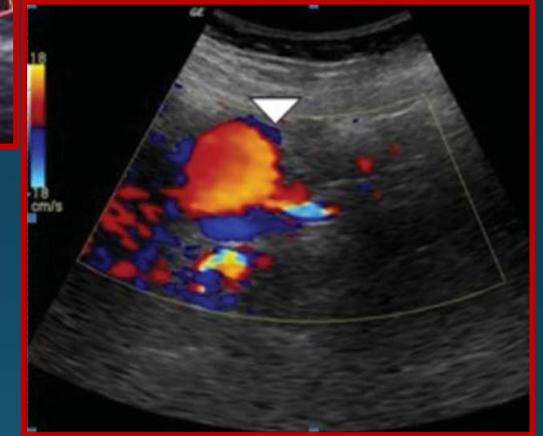
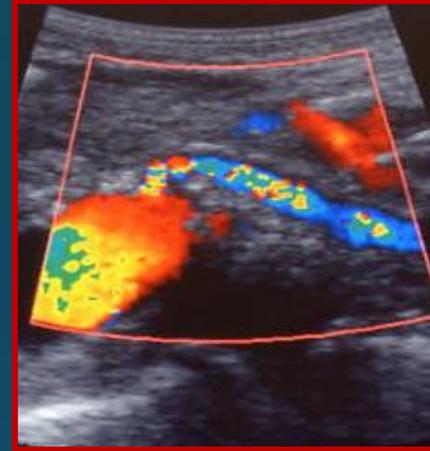
Superior Mesenteric Artery

- Image in the sagittal plane along its length
- Normal diameter – 0.6 to 0.8 cm
 - Aneurysmal - > 1.5 cm
- Measure outer wall –to-outer wall
- Confirm aneurysmal flow pattern with color



Inferior Mesenteric Artery

- Located about 3 finger widths above the aortic bifurcation
- Image from a transverse aortic plane; then rotate to sagittal plane
- Normal diameter – 0.3 to 0.5 cm
- Measure outer wall –to-outer wall
- Confirm aneurysmal flow pattern with color

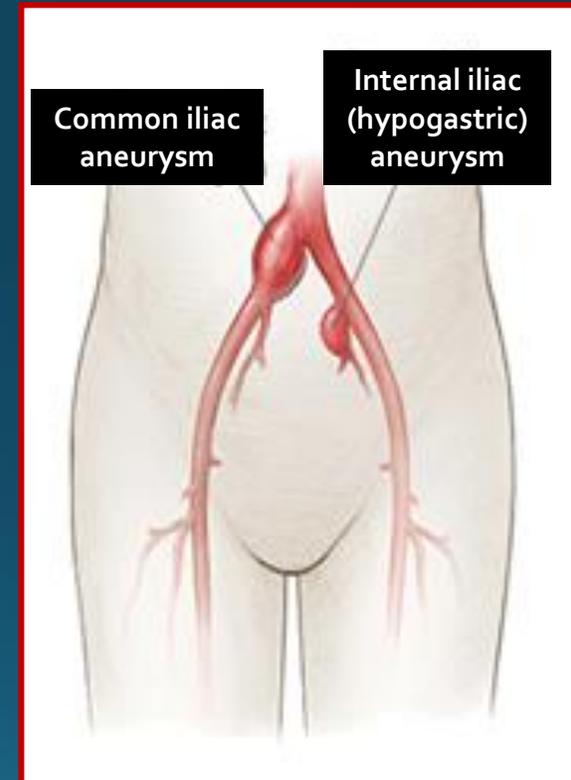


Courtesy-J Clin Imaging Sci

Hypogastric (Internal Iliac) Artery Aneurysms

Hypogastric Artery Aneurysms

- Isolated internal iliac artery aneurysms are also rare
 - Incidence is 0.04% of all aorto-iliac aneurysms and less than 20% of all isolated iliac aneurysms
 - Fewer than 170 reported in the literature to date
- Shared etiology with other arterial aneurysms
- Male to female ratio is 6:1
 - Average male age is 67.2 years



Hypogastric Artery Aneurysms

- They are often asymptomatic or not diagnosed until quite large
- Most often diagnosed as a result of screening or other imaging studies
- Incidence of rupture approaches 38% with a 58% mortality rate



Courtesy of: Hèla BJ,, et al. (2017) Complications of Endovascular Management of Isolated Internal Iliac Artery Aneurysm. J Clin Exp Cardiology 8:533.



Courtesy of: Dr. DL Smoger, Media, PA

What are the best techniques for identifying internal iliac artery aneurysms with ultrasound?

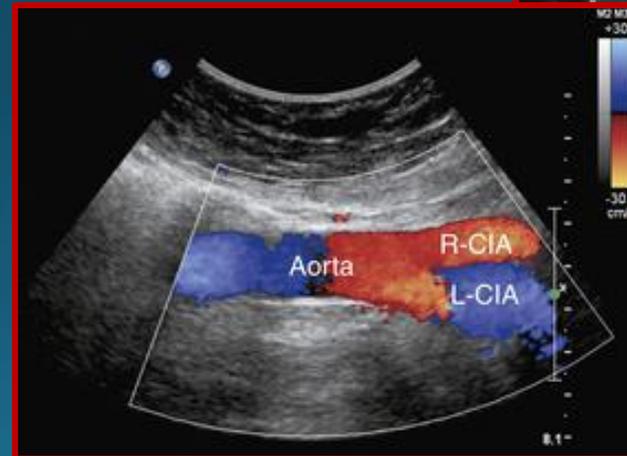
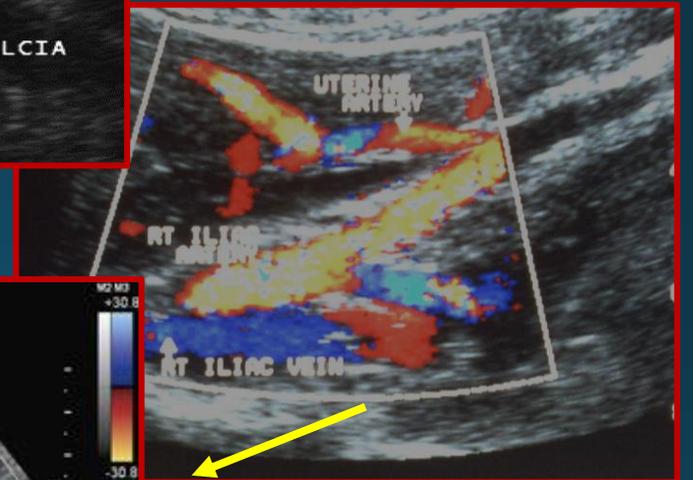
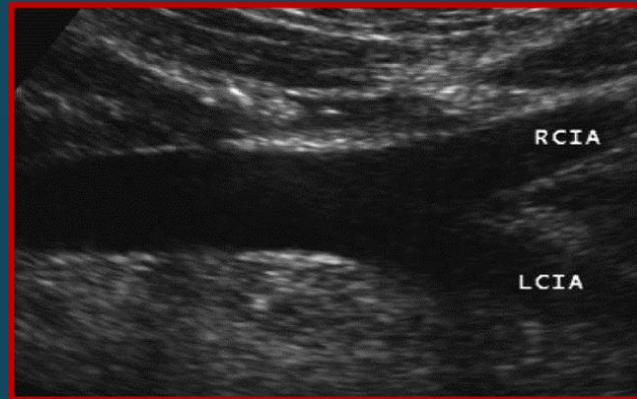
Patient Preparation and Positioning

- Helpful for patient to fast for a minimum of 8 hours prior to examination
 - Reduces the amount of abdominal/pelvic gas
- Have patients lie supine on exam table with hip rotated outward
 - May also have patient in lateral decubitus position



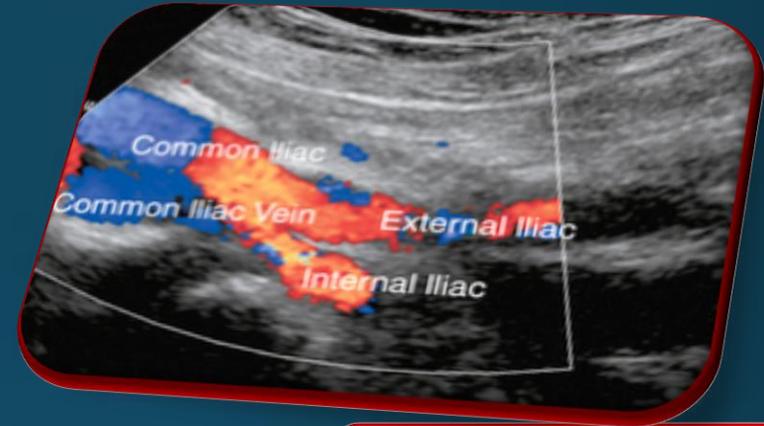
Aortic bifurcation and Common Iliac Artery

- Low frequency curvilinear or sector transducer
- Locate aorta slightly left of midline and follow in sagittal and transverse planes to the bifurcation
- Locate the common iliac artery and follow in sagittal imaging plane along its course
 - Helpful to use a coronal approach and scan from patient's right side
 - Normal diameter – 0.8 to 1.0 cm



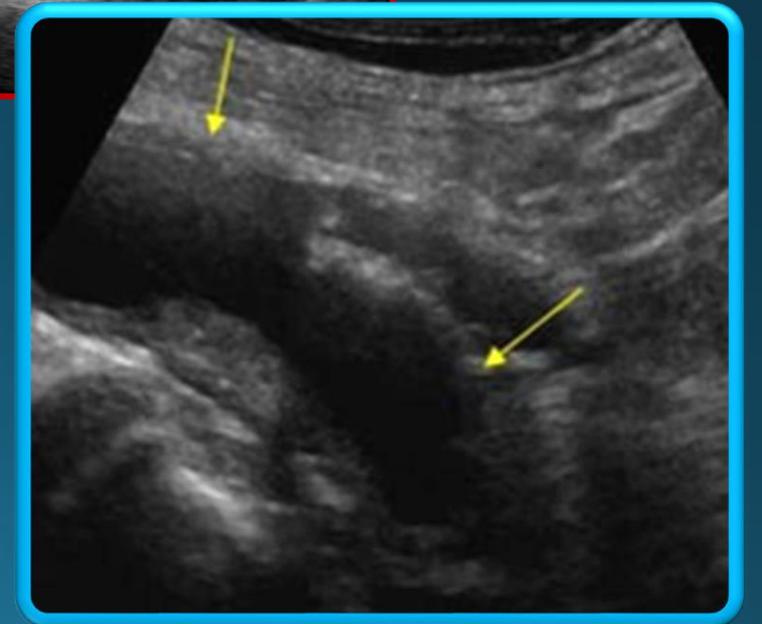
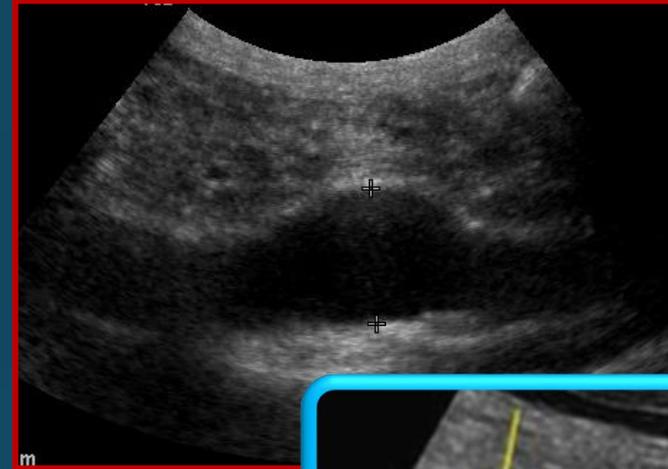
External and Internal iliac Arteries

- At the iliac crest, identify the common iliac bifurcation and the proximal external and internal iliac arteries
- Alternatively, begin at the common femoral artery and scan proximally, in the sagittal plane, to image the external iliac artery as it dives deep into the pelvis. This is best accomplished by rocking the probe anterolaterally so that it is against the rectus muscle
 - The internal iliac artery arises medially from the bifurcation at approximately 45 degrees
 - Normal diameter – 0.4 to 0.6 cm



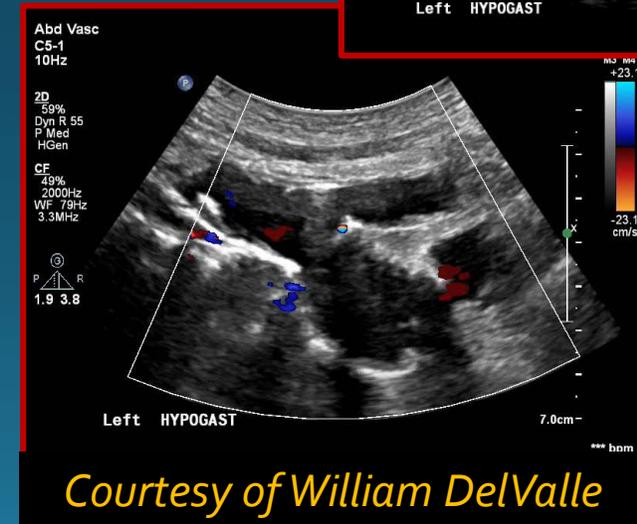
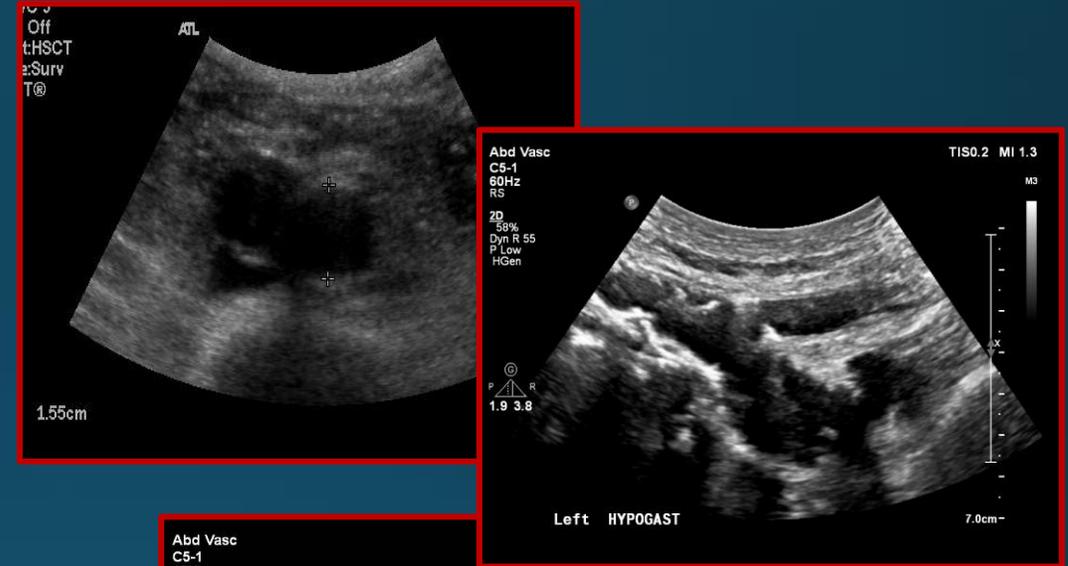
Hypogastric (IIA) Aneurysms

- Occur most often in conjunction with common or external iliac artery aneurysms
- Important to show delineation and spatial relationship of arteries



Hypogastric (IIA) Aneurysms

- Measure outer wall-to-outer wall
- Gray scale and color
 - Demonstrate yin-yang flow
- Exclude to-fro flow to rule out pseudoaneurysm



Courtesy of William DelValle

Summary

- Mesenteric artery aneurysms are very uncommon and often remain asymptomatic until quite large.
- Ultrasound identification may be complicated by variant anatomy, abdominal gas, vessel depth and tortuosity.
- The occurrence of isolated hypogastric aneurysms is quite rare.
- In all cases, the sonographer must be aware of spatial relationships, vessels diameters, and normal blood flow patterns