

Vascular Ultrasound Vocabulary Reference

Part 5: Abdominal | Chapters 18–23

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Chapter 18: Aorta and Iliac Arteries

Term	Definition	Analogy / Example
Abdominal Aortic Aneurysm (AAA)	Dilation of the abdominal aorta to ≥ 3.0 cm or ≥ 1.5 times the normal diameter. Most occur infrarenally (below the kidney arteries). Risk of rupture increases with size.	Like a balloon weakening as it expands--the aortic wall stretches and thins, becoming dangerous when it gets too big (>5.5 cm typically requires repair).
Aortic Diameter	The measurement of the aorta from outer wall to outer wall. Normal abdominal aorta is 1.5-2.5 cm; >3.0 cm is aneurysmal.	Like measuring pipe diameter--size matters because bigger pipes are more likely to burst.
Aortic Dissection	A tear in the aortic intima allowing blood to flow between the layers of the vessel wall, creating true and false lumens.	Like wallpaper peeling off a wall as water gets behind it--blood forces its way between the layers of the aortic wall.
Aortic Occlusion	Complete blockage of the aorta, usually by thrombosis on severe atherosclerosis. Causes bilateral leg ischemia.	Like a complete road closure--the main highway is blocked, causing traffic (blood flow) problems in both legs.
Endoleak	Persistent blood flow into the aneurysm sac after EVAR. Five types exist based on the source of the leak.	Like a leak around a patch--blood finds its way back into the aneurysm despite the stent-graft.
Endovascular Aneurysm Repair (EVAR)	Minimally invasive treatment of AAA using a stent-graft inserted through the femoral arteries to exclude the aneurysm from circulation.	Like putting a new pipe inside the old broken one--a fabric-covered stent seals off the aneurysm from the inside.
Iliac Artery Aneurysm	Dilation of the common iliac artery to >1.8 cm. Often associated with AAA.	Like a bulge in the fork of the road--the iliac arteries branch from the aorta and can also develop aneurysms.
Infrarenal Aorta	The segment of the abdominal aorta below the renal arteries. The most common site for abdominal aortic aneurysms.	Like the downstream section of a river after the tributaries branch off--where aneurysms most often occur.
Stent-Graft (Endograft)	A fabric-covered metal stent used in EVAR to line the aorta and exclude the aneurysm sac from blood flow.	Like a sleeve that lines the inside of a pipe--blood flows through the graft, not the weakened aneurysm wall.
Suprarenal Aorta	The segment of the abdominal aorta above the renal arteries. Aneurysms here are more complex to repair.	Like the upstream section before the kidney branches--harder to fix surgically.
Type I Endoleak	Leak at the attachment sites (proximal or distal) of the stent-graft. Considered a high-pressure leak requiring urgent treatment.	Like a seal that didn't hold at the connection point--blood leaks around the edges of the graft.
Type II Endoleak	Backflow into the aneurysm sac from branch vessels (lumbar arteries, IMA). Most common type; often self-limited.	Like water coming in through side channels--blood flows backward from branch arteries into the sac.
Type III Endoleak	Leak between components of a modular stent-graft or fabric tear. Requires repair.	Like a gap between two pipe sections--the modular pieces didn't seal together properly.

Term	Definition	Analogy / Example
Type IV Endoleak	Leak through the porous graft fabric due to anticoagulation. Usually seen during placement and resolves.	Like water seeping through cloth--the fabric itself is too porous initially.
Type V Endoleak (Endotension)	Aneurysm sac enlargement without visible leak on imaging. May be due to ultrafiltration.	Like a mystery leak you can't find--the sac grows but no leak is visible on imaging.

Chapter 19: The Mesenteric Arteries

Term	Definition	Analogy / Example
Acute Mesenteric Ischemia	Sudden loss of intestinal blood flow, usually from embolism or thrombosis. A surgical emergency with high mortality.	Like a heart attack of the intestines--sudden blockage threatens bowel viability and requires emergency surgery.
Celiac Artery (Celiac Trunk)	The first major branch of the abdominal aorta, supplying the liver, spleen, stomach, and pancreas via the hepatic, splenic, and left gastric arteries.	Like the main supply line to the upper abdominal organs--the first major exit from the aortic highway.
Chronic Mesenteric Ischemia (Intestinal Angina)	Recurrent abdominal pain after eating due to inadequate blood flow. Often called "food fear" because patients avoid eating.	Like angina of the gut--eating triggers pain because the intestines can't get enough blood to digest food.
Compensatory Flow	Increased flow velocity in one mesenteric artery due to occlusion of another. The open vessel works harder to supply the entire gut via collaterals.	Like one worker doing overtime when another is absent--the remaining artery speeds up to compensate.
Inferior Mesenteric Artery (IMA)	The third major branch of the abdominal aorta, supplying the distal colon and rectum.	Like the supply line to the end of the digestive tract--feeds the lower colon.
Meandering Mesenteric Artery	An enlarged collateral vessel connecting the IMA to the SMA when one is occluded. Also called the arc of Riolo.	Like a detour route that becomes a major highway--the collateral enlarges to carry significant flow.
Median Arcuate Ligament Syndrome (MALS)	Compression of the celiac artery by the median arcuate ligament of the diaphragm during exhalation. Velocities increase with exhalation.	Like a diaphragm muscle squeezing the celiac artery--the ligament presses on the artery when you breathe out.
Mesenteric Bypass Graft	Surgical bypass to restore blood flow to the intestines when mesenteric arteries are occluded. Can originate from aorta or iliac arteries.	Like creating a detour around blocked intestinal supply routes--bypass grafts restore flow to starving intestines.
Mesenteric Ischemia	Inadequate blood supply to the intestines, causing abdominal pain. Can be acute (emergency) or chronic (after eating).	Like the intestines starving for oxygen--when blood flow can't meet demand, tissue damage occurs.
SMA Stent	Endovascular treatment of SMA stenosis. Note: velocity criteria for native vessels may overestimate stenosis in stented arteries.	Like propping open the intestinal supply route--a stent keeps the SMA open, but ultrasound readings need different interpretation.
Superior Mesenteric Artery (SMA)	The second major branch of the abdominal aorta, supplying the small intestine and most of the large intestine.	Like the supply route to the middle section of the digestive tract--feeds most of the intestines.
Visceral Artery Aneurysm	Aneurysm of the mesenteric or branch arteries. Splenic artery aneurysms are most common (60%); rupture during pregnancy is catastrophic.	Like a weak spot in any of the organ supply lines--splenic artery is most commonly affected.

Chapter 20: The Renal Vasculature

Term	Definition	Analogy / Example
Arcuate Renal Arteries	Arteries arching over the base of the renal pyramids, visible on Doppler as normal low-resistance flow.	Like rainbow-shaped vessels at the kidney's corticomedullary junction--arcuate means "arched."
Fibromuscular Dysplasia (Renal)	Non-atherosclerotic disease of the renal artery wall causing stenosis, typically in young women. "String of beads" appearance.	Like beads on a string--the artery has alternating narrow and wide segments, not from plaque but abnormal wall development.
Horseshoe Kidney	Congenital fusion of the lower poles of the kidneys across the midline. Multiple renal arteries are common.	Like two kidneys holding hands across the spine--the lower poles are fused, creating unique vascular anatomy.
Interlobar Renal Arteries	Arteries running between the renal pyramids, branching from segmental arteries.	Like smaller branches between the kidney's internal structures--feed the renal lobes.
Renal Artery PSV	Peak systolic velocity in the renal artery. >180-200 cm/s suggests significant stenosis; >250 cm/s suggests severe stenosis.	Like measuring how fast blood races through the kidney's entry gate--faster flow means a tighter squeeze.
Renal Artery Stenosis (RAS)	Narrowing of the renal artery, potentially causing hypertension and kidney dysfunction. Atherosclerosis is the most common cause.	Like a kink in the kidney's supply line--reduced blood flow triggers the kidney to release hormones that raise blood pressure.
Renal Infarction	Tissue death in the kidney due to arterial occlusion, usually from embolism. Causes sudden flank pain and hematuria.	Like a stroke in the kidney--sudden blockage kills kidney tissue.
Renal Resistive Index (RI)	Calculated as $(PSV - EDV) / PSV$. Normal RI is <0.7; elevated RI may indicate parenchymal disease or obstruction.	Like measuring how much blood bounces back--higher RI means more resistance in the kidney tissue itself.
Renal Vein Thrombosis (RVT)	Clot formation in the renal vein, often associated with nephrotic syndrome, dehydration, or malignancy.	Like a clog in the kidney's drain--blood can't exit the kidney properly, causing swelling and dysfunction.
Renal-Aortic Ratio (RAR)	The ratio of renal artery PSV to aortic PSV. RAR >3.5 suggests >60% renal artery stenosis.	Like comparing the kidney's inlet speed to the main pipeline--if the kidney inlet is 3.5x faster, there's significant narrowing.
Segmental Renal Arteries	Branches of the main renal artery supplying each renal segment. Evaluated in transplant kidneys.	Like the branches of a tree after the main trunk--segmental arteries feed specific portions of the kidney.

Chapter 21: The Inferior Vena Cava and Iliac Veins

Term	Definition	Analogy / Example
Inferior Vena Cava (IVC)	The large vein returning blood from the lower body to the right atrium. Formed by the union of the common iliac veins at L5.	Like the main drain pipe from the lower body--collects all venous blood below the diaphragm.
IVC Diameter	Normal IVC is 1.5-2.5 cm. Dilated IVC (>2.5 cm) suggests elevated right heart pressure or volume overload.	Like measuring pipe size--too wide suggests backup from the heart or too much fluid.
IVC Filter	A device placed in the IVC to catch emboli from lower extremity DVT before they reach the lungs.	Like a sieve in the main drain--catches traveling clots before they can cause pulmonary embolism.

Term	Definition	Analogy / Example
IVC Filter Complications	Problems including filter migration, fracture, thrombosis at the filter, or penetration of the IVC wall.	Like a sieve that moves, breaks, or clogs--the filter can cause its own problems.
IVC Respiratory Variation	Normal IVC collapses 50% with inspiration. Reduced collapse suggests elevated right atrial pressure.	Like the IVC breathing with you--normally it shrinks when you inhale; if it stays wide, the heart isn't accepting blood well.
IVC Thrombosis	Clot formation in the IVC, often extending from iliofemoral DVT. May cause bilateral leg swelling.	Like a clog in the main drain--affects both legs because the central return pipe is blocked.
May-Thurner Syndrome	Compression of the left common iliac vein by the right common iliac artery, predisposing to left leg DVT.	Like a heavy pipe sitting on a softer one--the right artery crushes the left vein underneath.

Chapter 22: The Hepatoportal System

Term	Definition	Analogy / Example
Ascites	Accumulation of fluid in the peritoneal cavity, commonly due to portal hypertension from cirrhosis.	Like fluid filling the abdominal cavity--the liver's congestion causes fluid to weep into the belly.
Budd-Chiari Syndrome	Obstruction of hepatic vein outflow, causing liver congestion, ascites, and hepatomegaly.	Like a dam at the liver's exit--blood enters but can't drain out properly.
Caput Medusae	Dilated periumbilical veins radiating from the navel in portal hypertension. Named after Medusa's snake hair.	Like snakes radiating from the belly button--visible veins spreading outward from the navel.
Cavernous Transformation	Development of periportal collateral veins around a chronically thrombosed portal vein. Creates a "cavernoma."	Like a tangle of new roads around a blocked highway--the body creates bypass channels around the clot.
Cirrhosis	Chronic liver disease causing fibrosis and nodular regeneration, leading to portal hypertension.	Like a liver turning to scar tissue--healthy tissue is replaced by fibrous scars that block blood flow.
Esophageal Varices	Dilated veins at the lower esophagus due to portal hypertension. Can bleed catastrophically.	Like varicose veins in the throat--when the liver is blocked, blood backs up into these fragile vessels.
Hepatic Artery	The artery supplying oxygenated blood to the liver from the celiac trunk.	Like the oxygen supply line to the liver--provides the oxygen the liver needs to function.
Hepatic Artery Buffer Response	Compensatory increase in hepatic arterial flow when portal flow decreases. Maintains total liver blood flow.	Like the liver's backup generator--when portal flow drops, the artery increases flow to compensate.
Hepatic Veins	Three veins (right, middle, left) draining the liver into the IVC.	Like the exit drains from the liver--carry filtered blood back to general circulation.
Hepatofugal Flow	Reversed (away from liver) flow in the portal vein, indicating severe portal hypertension.	Like traffic fleeing the liver--"fugal" means fleeing--the pressure is so high blood reverses direction.
Hepatopetal Flow	Normal flow direction in the portal vein--toward the liver.	Like traffic heading toward the liver--"petal" means seeking or moving toward.

Term	Definition	Analogy / Example
Portal Hypertension	Elevated pressure in the portal venous system, usually due to cirrhosis. Causes varices, ascites, and splenomegaly.	Like a traffic jam at the liver entrance--blood backs up because it can't flow through the scarred liver.
Portal Vein	The vein carrying blood from the intestines to the liver. Formed by the union of the splenic and superior mesenteric veins.	Like a special delivery route--nutrient-rich blood from digestion goes directly to the liver for processing.
Portal Vein Thrombosis (PVT)	Clot formation in the portal vein, often due to cirrhosis, malignancy, or hypercoagulable states.	Like a clog at the liver's main entrance--blocks the special delivery route from the intestines.
Portosystemic Collaterals	Abnormal venous connections that develop to bypass the liver in portal hypertension (esophageal varices, caput medusae).	Like unauthorized detours around a roadblock--blood finds alternate routes to avoid the congested liver.
Splenic Vein	Vein draining the spleen, joining the superior mesenteric vein to form the portal vein.	Like the drainage pipe from the spleen--carries blood to the portal system.
Splenomegaly	Enlargement of the spleen due to portal hypertension or other causes.	Like a spleen swollen from backup pressure--the portal congestion causes the spleen to enlarge.
Superior Mesenteric Vein (SMV)	Vein draining the small intestine and proximal colon, joining the splenic vein to form the portal vein.	Like the drainage from the intestines--collects blood from the digestive tract to the liver.
TIPS (Transjugular Intrahepatic Portosystemic Shunt)	A stent connecting the portal vein to a hepatic vein within the liver, bypassing the scarred liver tissue.	Like building a shortcut through the liver--a stent creates a new route for blood to bypass the congested liver.
TIPS Occlusion	Complete blockage of the TIPS shunt. No flow detected; requires intervention.	Like the shortcut closing completely--the TIPS is clotted off.
TIPS Stenosis	Narrowing of the TIPS shunt, indicated by low velocities (<50 cm/s) or high velocities (>200 cm/s) within the stent.	Like the shortcut getting clogged--the TIPS can narrow and need revision.

Chapter 23: Evaluation of Kidney and Liver Transplants

Term	Definition	Analogy / Example
Biliary Complications	Problems with the bile duct connections after liver transplant, including leaks and strictures.	Like problems with the drainage pipes--bile can leak or the ducts can narrow.
Delayed Graft Function (DGF)	Failure of the transplanted kidney to function immediately, often due to acute tubular necrosis from ischemia during transplant.	Like the new kidney being "stunned" after surgery--it needs time to wake up and start working.
Hepatic Artery Thrombosis (HAT)	Clotting of the hepatic artery after liver transplant. A serious complication that can cause graft failure.	Like the oxygen supply line clamping shut--the liver's arterial blood supply is blocked.
Liver Transplant	Replacement of a diseased liver with a donor liver. Can be whole liver (deceased donor) or partial (living donor).	Like swapping out the entire chemical processing plant--a new liver takes over all liver functions.
Liver Transplant Vascular Anastomoses	Connections made during liver transplant: hepatic artery, portal vein, IVC (supra- and infrahepatic).	Like reconnecting all the pipes to the new chemical plant--multiple vascular connections must be made.

Term	Definition	Analogy / Example
Portal Vein Thrombosis (Post-Transplant)	Clotting of the portal vein after liver transplant. Less common than HAT but still serious.	Like the nutrient supply line clamping shut--the portal vein to the new liver is blocked.
Post-Biopsy Arteriovenous Fistula	Abnormal connection between artery and vein created by needle biopsy of a transplant kidney.	Like a shortcut accidentally created by a needle--the biopsy needle poked through both artery and vein.
Post-Biopsy Pseudoaneurysm	A contained rupture of an artery wall after needle biopsy, appearing as a pulsatile cyst with to-and-fro flow.	Like a balloon on the side of the artery--the needle puncture didn't seal properly.
Renal Transplant	A kidney surgically implanted in the lower abdomen (iliac fossa) to replace failed native kidneys.	Like installing a new kidney in the pelvis--the transplanted kidney sits in the lower abdomen, connected to iliac vessels.
Renal Transplant Arterial Anastomosis	Connection of the transplant renal artery to the recipient's external or internal iliac artery.	Like connecting the new kidney's supply line to the local highway--the artery is sewn to an iliac artery.
Renal Transplant Stenosis	Narrowing at the arterial anastomosis or within the transplant artery. PSV >200-250 cm/s suggests stenosis.	Like a kink at the connection point--the surgical join can narrow over time.
Renal Transplant Thrombosis	Sudden occlusion of the transplant artery or vein. A surgical emergency requiring immediate intervention.	Like the new kidney's blood supply suddenly clamping shut--immediate threat to the graft.
Renal Transplant Venous Anastomosis	Connection of the transplant renal vein to the recipient's external iliac vein.	Like connecting the new kidney's drain to the local drainage system--the vein is sewn to the external iliac vein.
T-Tube	A tube placed in the bile duct after liver transplant for bile drainage and cholangiography.	Like a temporary drainpipe for bile--allows access to the biliary system.
Transplant Rejection	Immune attack on the transplanted organ. Can be hyperacute, acute, or chronic.	Like the body's security system attacking the new organ--the immune system recognizes it as foreign.
Transplant Resistive Index	RI >0.8 in a transplant kidney may suggest rejection or other pathology. Normal is <0.7.	Like measuring how much blood bounces back in the new kidney--high resistance suggests problems.
Transplant Uretero-neocystostomy	Connection of the transplant ureter to the bladder for urine drainage.	Like connecting the new kidney's drainpipe to the bladder--the ureter is implanted into the bladder wall.

Quick Reference: AAA Size and Intervention

Diameter	Recommendation
3.0-3.9 cm	Surveillance every 2-3 years
4.0-4.9 cm	Surveillance every 6-12 months
5.0-5.4 cm	Surveillance every 3-6 months
≥5.5 cm	Intervention recommended

Quick Reference: Renal Artery Stenosis Criteria

Finding	Suggests Stenosis
PSV >180-200 cm/s	>50% stenosis
PSV >250 cm/s	Severe stenosis
Renal-Aortic Ratio >3.5	>60% stenosis
Renal Resistive Index >0.7	Parenchymal disease

Quick Reference: Mesenteric Artery Stenosis Criteria

Artery	Criterion	Stenosis
Celiac	PSV $\geq$ 200 cm/s	$\geq$ 70%
Celiac	EDV $\geq$ 55 cm/s	$\geq$ 50%
SMA	PSV $\geq$ 275 cm/s	$\geq$ 70%
SMA	EDV $\geq$ 45 cm/s	$\geq$ 50%

Quick Reference: TIPS Normal Values

Parameter	Normal Range
Stent velocity	90-190 cm/s
Main portal vein	30-47 cm/s
Stent velocity <50 cm/s	Suggests stenosis
Focal velocity >200 cm/s	Suggests stenosis

Quick Reference: Endoleak Types

Type	Source	Pressure
I	Attachment site leak	High (urgent)
II	Branch vessel backflow	Low (common, often self-limited)
III	Modular disconnect/tear	High (needs repair)
IV	Graft porosity	Low (transient)
V	Endotension (no visible leak)	Variable

This vocabulary reference covers Part 5: Abdominal (Chapters 18-23) from "Diagnostic Medical Sonography: The Vascular System" by Ann Marie Kupinski, 3rd Edition.