INTRODUCTION:

Computed tomographic angiography (CTA) is used in the evaluation of many conditions affecting the veins and arteries of the abdomen and pelvis or lower extremities. This study (Abdomen/Pelvis CTA) is useful for evaluation of the arteries/veins in the peritoneal cavity (abdominal aorta, iliac arteries) while the Abdominal Arteries CTA is more useful for the evaluation of the abdominal aorta and the vascular supply to the legs. It is not appropriate as a screening tool for asymptomatic patients without a previous diagnosis.

Initial Clinical Reviewers (ICRs) and Physician Clinical Reviewers (PCRs) must be able to apply criteria based on individual needs and based on an assessment of the local delivery system.

INDICATIONS FOR ABDOMEN/PELVIS CTA:

For evaluation of known or suspected abdominal vascular disease:
- For known large vessel diseases (abdominal aorta, inferior vena cava, superior/inferior mesenteric, celiac, splenic, renal or iliac arteries/veins), e.g., aneurysm, dissection, arteriovenous malformations (AVMs), and fistulas, intramural hematoma, and vasculitis.
- Evidence of vascular abnormality seen on prior imaging studies.
- For suspected aortic dissection.
- Evaluation of known or suspected aortic aneurysm (Khosa, 2013; Chaikof, 2018)**:
  - Known or suspected aneurysm > 2.5 cm AND equivocal or indeterminate ultrasound results OR
  - Prior imaging (e.g. ultrasound) demonstrating aneurysm >2.5 cm in diameter OR
  - Suspected complications of known aneurysm as evidenced by signs/symptoms such as new onset of abdominal or pelvic pain.
- Suspected retroperitoneal hematoma or hemorrhage (To determine vascular source of hemorrhage in setting of trauma, tumor invasion, fistula or vasculitis; otherwise CT (rather than CTA) is sufficient and the modality of choice for diagnosing hemorrhage).
- Lower gastrointestinal hemorrhage: Active bleeding in a hemodynamically stable patient or non localized intermittent bleeding as an alternative to Tc-99m RBC scan when colonoscopy did not localize the bleeding, is contraindicated or unavailable (ACR, 2014; Clerc, 2017).
- Venous thrombosis if previous studies have not resulted in a clear diagnosis.
- For evaluation of suspected mesenteric ischemia (ACR, 2012).
• Vascular invasion or displacement by tumor (Conventional CT or MRI also appropriate) (Certik, 2015; Kaufman, 2005).

• For evaluation of known or suspected renal artery stenosis or resistant hypertension in the setting of normal renal function or impaired renal function unrelated to recent medication (ACR, 2017) demonstrated by any of the following (Hartman, 2009; Tullus, 2010):
  o Unsuccessful control after treatment with 3 or more (>2) anti-hypertensive medication at optimal dosing.
  o Acute elevation of creatinine after initiation of an angiotensin converting enzyme inhibitor, (ACE inhibitor) or angiotensin receptor blocker, (ARB).
  o Asymmetric kidney size noted on ultrasound.
  o Onset of hypertension in a person younger than age 30 without any other risk factors or family history of hypertension.
  o Significant hypertension (diastolic blood pressure > 110 mm Hg) in a young adult (i.e., younger than 35 years) suggestive of fibromuscular dysplasia.
  o Diagnosis of a syndrome with a higher risk of vascular disease, such as neurofibromatosis, tuberous sclerosis and Williams’ syndrome.
  o New onset of hypertension after age 50.
  o Acute rise in blood pressure in a person with previously stable blood pressures.
  o Flash pulmonary edema without identifiable causes.
  o Malignant hypertension.
  o Bruit heard over renal artery and hypertension.

Pre-operative evaluation:
• Evaluation of interventional vascular procedures for luminal patency versus restenosis due to conditions such as atherosclerosis, thromboembolism, and intimal hyperplasia.

Post-operative or post-procedural evaluation:
• Evaluation of endovascular/interventional abdominal vascular procedures for luminal patency versus restenosis due to conditions such as atherosclerosis, thromboembolism and intimal hyperplasia.

• Evaluation of post-operative complications, e.g. pseudoaneurysms, related to surgical bypass grafts, vascular stents and stent-grafts in the peritoneal cavity.

• Follow-up for post-endovascular repair (EVAR) or open repair of abdominal aortic aneurysm (AAA) or abdominal extent of iliac artery aneurysms. Routine, baseline study (post-op/intervention) is warranted within 1-3 months (Chaikof, 2018: Uberoi, 2011).
  o Asymptomatic at six (6) month intervals, for one (1) year, then annually.
  o Symptomatic/complications related to stent graft – more frequent imaging may be needed.

• Follow-up study may be needed to help evaluate a patient’s progress after treatment, procedure, intervention or surgery. Documentation requires a medical reason that clearly indicates why additional imaging is needed for the type and area(s) requested.

Chest CTA/Abdomen/Pelvis CTA combo:
• For evaluation of extensive vascular disease involving the chest and abdominal cavities such as aortic dissection, vasculitic diseases such as Takayasu’s arteritis, significant post-traumatic or post-procedural vascular complications, etc.
• For preoperative or preprocedural evaluation such as transcatheter aortic valve replacement (TAVR).

**ADDITIONAL INFORMATION RELATED TO ABDOMEN/PELVIS CTA:**

**Abd/Pelvis CTA & Lower Extremity CTA Runoff Requests:** Only one authorization request is required, using CPT Code 75635 Abdominal Arteries CTA. This study provides for imaging of the abdomen, pelvis, and both legs. The CPT code description is CTA aorto-iliofemoral runoff: abdominal aorta and bilateral ilio-femoral lower extremity runoff.

**Bruit** - blowing vascular sounds heard over partially occluded blood vessels. Abdominal bruits may indicate partial obstruction of the aorta or other major arteries such as the renal, iliac, or femoral arteries. Associated risks include but are not limited to: renal artery stenosis, aortic aneurysm, atherosclerosis, AVM, or coarctation of aorta.

**Peripheral Artery Disease (PAD)** – Before the availability of computed tomography angiography (CTA), peripheral arterial disease was evaluated using CT and only a portion of the peripheral arterial tree could be imaged. Multi-detector row CT (MDCT) overcomes this limitation and provides an accurate alternative to CT and is a cost-effective diagnostic strategy in evaluating PAD. **Abdominal Arteries CTA (including runoff to the lower extremities) is the preferred study when evaluation of arterial sufficiency to the legs is part of the evaluation**

**CTA and Abdominal Aortic Aneurysm** – Endovascular repair is an alternative to open surgical repair of an abdominal aortic aneurysm. It has lower morbidity and mortality rates and is minimally invasive. In order to be successful, it depends on precise measurement of the aneurysm and involved vessels. CTA with 3D reconstruction is useful in obtaining exact morphologic information on abdominal aortic aneurysms. CTA is also used for the detection of postoperative complications of endovascular repair.

**CTA and Abdominal Aortic Aneurysm** **–** The normal diameter of the suprarenal abdominal aorta is 3.0 cm and that of the infrarenal is 2.0 cm. Aneurysmal dilatation of the infrarenal aorta is defined as diameter >/= 3.0 cm or dilatation of the aorta >/= 1.5x the normal diameter.

**Recommended intervals for initial follow-up imaging of ectatic aortas and abdominal aortas (follow up intervals may vary depending on comorbidities and the growth rate of the aneurysm) from the white paper of the ACR Incidental Findings Committee II on vascular findings (Khosa, 2013):**

- 2.5-2.9 cm: ...............5yr
- 3.0-3.4 cm: ..............3yr
- 3.5-3.9 cm: ..............2yr
- 4.0-4.4 cm: .............1yr
- 4.5-4.9 cm: .............6 mo
- 5.0-5.5 cm: ............3-6 mo
The Society of Vascular Surgery has different follow up intervals for AAA (SVS 2018):

- >2.5 cm - <3 cm...........10 yr
- 3.0 - 3.9 cm................3 yr
- 4.0 - 4.9 cm.................12 mo
- 5.0 - 5.4 cm.................6 mo.

The Society of Vascular Surgery recommends elective repair of AAA >/= 5.5 cm in patients at low or acceptable surgical risk (Chaikof, 2018).

**CTA and Renal Artery Stenosis** – Renal artery stenosis is the major cause of secondary hypertension. It may also cause renal insufficiency and end-stage renal disease. **Abdomen CTA (limiting evaluation to the aorta above the bifurcation and including the abdominal arteries) is the preferred study.** Atherosclerosis is one of the common causes of this condition, especially in older patients with multiple cardiovascular risk factors and worsening hypertension or deterioration of renal function. CTA is used to evaluate the renal arteries and detect renal artery stenosis.

**CTA and Thoracic Aorta Endovascular Stent-Grafts** – CTA is an effective alternative to conventional angiography for postoperative follow-up of aortic stent grafts. It is used to review complications after thoracic endovascular aortic repair. CTA can detect luminal and extraluminal changes to the thoracic aortic after stent-grafting and can be performed efficiently with fast scanning speed and high spatial and temporal resolution.

**MRI/CT and acute hemorrhage:** MRI is not indicated and MRA/MRV (MR Angiography/Venography) is rarely indicated for evaluation of intraperitoneal or retroperitoneal hemorrhage, particularly in the acute setting. CT is the study of choice due to its availability, speed of the study and less susceptibility to artifact from patient motion. Advances in technology have allowed conventional CT to not just detect hematomas but also the source of acute vascular extravasation. In special cases finer vascular detail to assess the specific source vessel responsible for hemorrhage may require the use of CTA. CTA in diagnosis of lower gastrointestinal bleeding is such an example (Clerc, 2017).

MRA/MRV is often utilized in non acute situations to assess vascular structure involved in atherosclerotic disease and its complications, vasculitis, venous thrombosis, vascular congestion or tumor invasion. Although some of these conditions may be associated with hemorrhage, it is usually not the primary reason why MRI/MRA/MRV is selected for the evaluation. A special condition where MRI may be superior to CT for evaluating hemorrhage is to detect an underlying neoplasm as the cause of bleeding (Abe, 2010).
REFERENCES


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