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National Imaging Associates, Inc.	
Clinical guidelines	Original Date: September 1997
CHEST CTA	
CPT Codes: 71275	Last Revised Date: March 2022April 2023
Guideline Number: NIA_CG_022-1	Implementation Date: January 20234

GENERAL INFORMATION

- It is an expectation that all patients receive care/services from a licensed clinician. All
 <u>appropriate supporting documentation, including recent pertinent office visit notes, laboratory
 data, and results of any special testing must be provided. If applicable: All prior relevant imaging
 results and the reason that alternative imaging cannot be performed must be included in the
 documentation submitted.

 </u>
- Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.

INDICATIONS FOR CHEST CTA

Chest Computed Tomography Angiography (CTA) is ordered for evaluation of the intrathoracic blood vessels. Chest CT and Chest CTA should not be approved at the same time.

Suspected Pulmonary Embolism (PE)¹⁻⁵¹⁻⁵

- High risk for PE based on shock or hypotension, <u>OR a validated pre-test high probability</u> score (such as Well's >6, Modified Geneva score >11 -see Background),(D dimer is NOT needed for hi risk; can approve hi risk even with normal D dimer)
- Intermediate or high risk as determined by the parameters detailed in Overview section
- Positive D-dimer^{2, 4}
 - Intermediate and Low risk require elevated D dimer(see Background)⁶ (NOTE: A normal D-dimer obviates the need for PE imaging in hemodynamically stable patients with a low or intermediate clinical likelihood of PE.)

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Vascular Disease

- Superior vena cava (SVC) syndrome⁶Superior vena cava (SVC) syndrome⁷
- Subclavian Steal Syndrome after positive or inconclusive ultrasound 7, 88, 9
- Thoracic Outlet Syndrome^{9, 1010, 11}
- Takayasu's arteritis¹¹¹²
- Clinical concern for Acute Aortic dissection^{12, 13}
 - \odot Sudden painful ripping sensation in the chest or back and may include
 - New diastolic murmur
 - Cardiac tamponade
 - Distant heart sounds
 - Hypotension or shock
 - Clinical concern for Acute Aortic dissection^{13, 14}
 - o Sudden painful ripping sensation in the chest or back and may include
 - New diastolic murmur
 - Cardiac tamponade
 - Distant heart sounds
 - Hypotension or shock

Initial/Screening for Thoracic Aortic Disease¹⁴⁻¹⁶¹⁵⁻¹⁷

- Echocardiogram or chest x-ray show aneurysm
- Initial study for a suspected aneurysm
- Screening of first-degree relatives of individuals with a <u>known</u> thoracic aortic aneurysm (defined as > 50% above normal) or <u>known</u> dissection
- KnownEvaluation in patients with known or suspected connective tissue disease or genetic

conditions that predispose<u>s</u> to aortic aneurysm or dissection <u>(e.g., Marfan syndrome, such</u> <u>as Marfan's</u>, Ehlers

Danlos-or, get a one-time study or for Loeys-Dietz syndromessyndrome- allow imaging at diagnosis and then every two years, or more frequently if abnormalities are found (Imaging may include head, neck, chest, abdomen and pelvis)14, 20 (MRA preferred due to cumulative radiation risk)

- Screening of the thoracic aorta after a diagnosis of a bicuspid aortic valve (dilation of the ascending aorta may not be seen on echocardiogram)¹⁷⁸
 - o If normal, re-image every three to five years
- Screening of first-degree relatives of patients with a bicuspid aortic valve
- Turner's syndrome Screen for coarctation or aneurysm of the thoracic aorta
 - o If normal results, screen every 5-10 years
 - If abnormal, screen annually
- Suspected vascular cause of dysphagia or expiratory wheezing with other imaging is suggestive or inconclusive





Follow-up after established Thoracic Aneurysm¹⁴⁻¹⁶Aortic Aneurysm (TAA)¹⁵⁻¹⁷

- Six months follow-up after initial finding of a dilated thoracic aorta, for assessment of rate of change
 - Aortic Root or Ascending Aorta (in cm)
 - 3.5 to 4.4 Annual
 - 4.5 to 5.5 or growth rate ≥ 0.5 cm/year Every 6 months
 - Genetically mediated (Marfans syndrome, Aortic Root or Ascending Aorta) (in cm)
 - 3.5 to 4.4 Annual
 - 4.5 to 5.0 or growth rate ≥ 0.5 cm/year Every 6 months
 - Surgery generally recommended over 5.0 cm
 - Descending Aorta (in cm)¹⁸¹⁹
 - 4.0 to 5.0 Annual
 - 5.0 to 6.0 Every 6 months
- Follow-up post medical treatment of aortic dissection:
 - Acute dissection: 1 month, 6 months, then annually
 - Chronic dissection: annually
- Follow-up <u>TEVAR surveillance at 1 month, then I year post either root repair or AVR</u> plus ascending aortic root/arch repair: baseline post-op and if stable, then annually
- Follow up open repair if no residual aortopathy within first post op year, then every 5 years (if have residual aortopathy or abnormal findings on surveillance, annual follow up in then needed)
- Re-evaluation of known ascending aortic dilation or history of aortic dissection with a change in clinical status or cardiac exam or when findings may alter management.

Congenital Malformations (Chest Magnetic Resonance Angiography preferred if pediatrics or repeat imaging)

- Thoracic malformation on other imaging (chest x-ray, echocardiogram, gastrointestinal study, or inconclusive CT)¹⁹⁻²²²⁰⁻²³
- Congenital heart disease with pulmonary hypertension²³⁴ or vascular anomalies
- Pulmonary sequestration²⁴

• Pulmonary sequestration²⁵

Pulmonary Hypertension based on other testing^{25, 2626, 27}

• Echocardiogram

Page **3** of **16** Chest CTA

• Right heart catheterization

Atrial fibrillation with ablation planned²⁷



Preoperative/procedural evaluation

• Pre-operative evaluation for a planned surgery or procedure Atrial fibrillation with ablation planned²⁸

Preoperative/procedural evaluation

- Pre-operative evaluation for a planned surgery or procedure
- Pre-transplant CT or CTA/MRA chest approvable for surgical planning (to evaluate for vascular anatomy, mediastinal pathology, malignancy screening etc.)

Post-operative/procedural evaluation

- Post-operative complications^{28, 2929, 30}
- Routine post-operative^{30, 31}
 - Thoracic endovascular or open surgical aneurysm repair
 - 1 month
 - More frequent follow-up/possible intervention if complication detected
 - If stable, annual for 5 years

See above indications for TAA follow up

Chest CTA and Abdomen CTA-or, Abdomen/Pelvis CTA or Abdominal Arteries CTA

- Transcatheter Aortic Valve Replacement (TAVR) 13, 3214, 31
- Acute aortic dissection12
- Takayasu's arteritis¹¹
- Post-operative complications^{28, 29}
 - Acute aortic dissection
 - Takayasu's arteritis¹²
 - Post-operative complications^{29, 30}
 - To evaluate for an embolic source of lower extremity vascular disease (may also approved as a combination chest CTA and Abdominal Arteries CTA when LE runoff disease needs to be evaluated as well). Echocardiography is also often needed, since the heart is the most commonly reported source of lower extremity emboli, accounting for 55 to 87 percent of events.³²

Other Indications

Page **4** of **16** Chest CTA

Further evaluation of indeterminate findings on prior imaging (unless follow up is otherwise specified within the guideline):

• For initial evaluation of an inconclusive finding on a prior imaging report that requires further clarification

• One follow-up exam of a prior indeterminate MR/CT finding to ensure no suspicious interval change has occurred. (No further surveillance unless specified as highly suspicious or change was found on last follow-up exam.)

BACKGROUND

Computed tomography angiography is a non-invasive imaging modality that may be used in the evaluation of thoracic vascular problems. Chest CTA (non-coronary) may be used to evaluate vascular conditions, e.g., pulmonary embolism, thoracic aneurysm, thoracic aortic dissection, aortic coarctation, or pulmonary vascular stenosis. The vascular structures as well as the surrounding anatomical structures are depicted by CTA.

Pulmonary embolism (PE) Methods utilizing clinical assessment to determine probability for PE include:

Wells Score³³

 Clinical symptoms of DVT (leg swelling, pain with palpation) 	3.0		
Other diagnosis less likely than pulmonary embolism	3.0		
 Heart rate >100 	1.5		
 Immobilization (≥3 days) or surgery in the previous four weeks 	1.5		
Previous DVT/PE	1.5		
Hemoptysis	1.0		
 Malignancy 	1.0		
Probability	Score		
Traditional clinical probability assessment (Wells criteria)			
High	>6.0		
Moderate	2.0 to 6.0		
Low	<2.0		

Modified Geneva Score³⁴

Modified Geneva score			
	Variables	Points	
Risk factors	Age >65 years	1	
	Previous deep venous thrombosis or pulmonary embolism	3	
	Surgery under general anesthesia or fracture of the lower limbs within one month	2	
	Active malignancy (solid or hematologic; currently active or cured within the last year)	2	
Symptoms	Unilateral lower-limb pain	3	
	Hemoptysis	2	
Signs	Heart rate 75 to 94 beats per minute	3	
	≥95 beats per minute	5	
	Pain on lower limb deep venous palpation and unilateral edema	4	
		Total points	
Pre-test probability assessment	Low	0 to 3	
	Intermediate	4 to 10	
	High	≥11	

OVERVIEW

CTA and Coarctation of the Aorta – Coarctation of the aorta is a common vascular anomaly characterized by a constriction of the lumen of the aorta distal to the origin of the left subclavian artery near the insertion of the ligamentum arteriosum. The clinical sign of coarctation of the aorta is a disparity in the pulsations and blood pressures in the legs and arms. Chest CTA/MRA may be used to evaluate either suspected or known aortic coarctation and patients with significant coarctation should be treated surgically or interventionally. It may also assist in the identification of postoperative complications.

Central Venous Thrombosis – CTA/MRA is useful in the identification of venous thrombi. Venous thrombosis can be evaluated by gadolinium-enhanced 3D MRA as an alternative to CTA, which may not be clinically feasible due to allergy to iodine contrast media or renal insufficiency.

CTA and Pulmonary Embolism (PE) – Note: D Dimer blood test in patients at low risk for DVT is indicated prior to CTA imaging. Negative D-Dimer suggests alternative diagnosis in these patients.

CTA has high sensitivity and specificity and is the primary imaging modality to evaluate patients suspected of having acute pulmonary embolism. When high suspicion of pulmonary embolism on clinical assessment is combined with a positive CTA, there is a strong indication of



Page **6** of **16** Chest CTA pulmonary embolism. Likewise, a low clinical suspicion and a negative CTA can be used to rule out pulmonary embolism.

Low risk is not approved. Low risk is defined as **NO** to **ALL** of the following questions with intermediate and high risk defined based on the number of positive responses³³:

- Evidence of current or prior DVT;
- HR > 100;
- Cancer diagnosis;
- Recent surgery or prolonged immobilization;
- Hemoptysis;
- History of PE;
- Oral hormone use;
- Another diagnosis beside PE is less likely

CTA and Thoracic Aortic Aneurysms — Computed tomographic angiography (CTA) allows the examination of the precise 3-D anatomy of the aneurysm from all angles and shows its relationship to branch vessels. This information is very important in determining the treatment: endovascular stent grafting or open surgical repair.

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 aorta after stent-grafting and can be performed efficiently with fast scanning speed and high spatial and temporal resolution.

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POLICY HISTORY

Date	Summary
April 2023	• Simplified PE indications to high risk, no need for d dimer, all else
	requires d dimer (added Pretest probability tables and removed
	other details from background)
	Clarified and updated follow up after repair of TAA
	General Information moved to beginning of guideline with added
	statement on clinical indications not addressed in this guideline
	Added statement regarding further evaluation of indeterminate
	findings on prior imaging
March 2022	 For Suspected Pulmonary Embolism, clarified 'intermediate or high risk' as determined by parameters detailed in Overview section and included hyperlink to Overview section
April 2021	 Follow-up recommendations for bicuspid aortic valve.
	 Added suspected vascular cause of dysphagia or expiratory wheezing
	 Combined follow-up surveillance recommendations for
	endovascular and open ascending aorta repair as per literature
	review
	Clarified pre-operative evaluation for a planned surgery or
	procedure
May 2020	For Suspected Pulmonary Embolism, removed: 'Low Risk is not
	approved' section
	 Moved Vascular Disease content from Chest CT to Chest CTA, including:
	← Initial evaluation of aneurysm
	Echocardiogram shows aneurysm
	 Echocardiogram inconclusive of proximal aorta and
	first degree relative with thoracic aneurysm
	Chest x-ray shows possible aneurysm
	Follow-up after established Thoracic Aneurysm (above these sizes
	surgery is usually recommended)
	↔ Aortic Root or Ascending Aorta
	<u>■ 3.5 to 4.5 Annual</u>
	 4.5 to 5.4 Every 6 months
	 Genetically mediated (Marfans syndrome, Aortic Root or
	Ascending Aorta
	= 3.5 to 4.0 Annual
	■ 4.0 to 5.0 Every 6 months
	⊖ Descending Aorta
	= —4.0 to 5.0 Annual
	= 5.0 to 6.0 Every 6 months

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	Thoracic Aortic Disease
	 Organized into two sections:
	 Initial/Screening
	Follow-up of known aneurysm/vascular pathology
	 Removed: 'Annual follow up of enlarged
	thoracic aorta that is above top normal for
	age, gender, and body surface area'
May 2019	 Expanded vascular indications including:
	 Superior vena cava syndrome
	⊖ Takayasu's arteritis
	 Subclavian steal syndrome after positive or inconclusive
	ultrasound
	Expanded indications for congenital anomalies to include
	pulmonary sequestration
	Updated thoracic aortic section to match cardiac guidelines



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Reviewed / Approved by NIA Clinical Guideline Committee

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It is an expectation that all patients receive care/services from a licensed clinician. All
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data, and results of any special testing must be provided. If applicable: All prior relevant imaging
results and the reason that alternative imaging cannot be performed must be included in the
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Page **16** of **16** Chest CTA

