AmeriHealth Caritas Louisiana

National Imaging Associates, Inc.*	
Clinical guidelines **CHEST CTA**	**Original Date: September 1997**
CPT Codes: 71275	**Last Revised Date: May 2020**
Guideline Number: NIA_CG_022-1	**Implementation Date: ~~January 2021~~TBD**

GENERAL INFORMATION:

It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. All prior relevant imaging results, and the reason that alternative imaging (gold standard, protocol, contrast, etc.) cannot be performed must be included in the documentation submitted.

INDICATIONS FOR CHEST CTA:
Some indications are for magnetic resonance imaging (MRI), magnetic resonance angiography (MRA), computed tomography (CT), or computed tomography angiography (CTA). More than one should not be approved at the same time.

Suspected Pulmonary Embolism (PE)
(ACCP, 2013; ACR, 2016; Corrigan, 2016; Kirsch, 2017; Konstantinides, 2014)

- High risk for PE based on shock or hypotension
- ~~Not high risk but p~~Positive D-dimer (Corrigan, 2016; Konstantinides, 2014)

~~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 responses (Singh, 2013Konstantinides, 2020):~~

- ~~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~~
- ~~.~~

* National Imaging Associates, Inc. (NIA) is a subsidiary of Magellan Healthcare, Inc.

Vascular Disease

- Superior vena cava (SVC) syndrome (Friedman, 2017)
- Subclavian Steal Syndrome after positive or inconclusive ultrasound (Osiro, 2012; Potter, 2014)
- Thoracic Outlet Syndrome (ACR, 2014; Povlsen, 2018)
- Takayasu's arteritis (Keser, 2014)
- Clinical concern for Acute Aortic dissection (ACR, 2017; Barman, 2014)
    - Sudden painful ripping sensation in the chest or back and may include
        - New diastolic murmur
        - Cardiac tamponade
        - Distant heart sounds
        - Hypotension or shock
- **Initial evaluation of aneurysm (Erbel, 2014; Hannuksela, 2015; Hiratzka, 2010)**
    - **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) (Erbel, 2014; Hannuksela 2015; Hiratzka, 2010)**
    - **Aortic Root or Ascending Aorta**
        - **3.5 to 4.5 Annual**
        - **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**

Thoracic Aortic Disease

- **If TTE was not performed, was technically inadequate, or if imaging is required beyond the proximal ascending aorta**

Initial/Screening:

- **Screening of first-degree relatives of individuals with a thoracic aortic aneurysm (defined as > 50% above normal) or dissection, or if an associated high-risk mutation is present**
    - **If one or more first degree relatives of a patient with a known thoracic aortic aneurysm or dissection, have thoracic aortic dilatation, aneurysm or dissection, then imaging of 2nd degree relatives is reasonable**

- Evaluation of the ascending aorta in suspected connective tissue disease or genetic conditions that predispose to aortic aneurysm or dissection (e.g., Marfan syndrome, Ehlers Danlos or Loeys-Dietz syndromes) at time of diagnosis
- Patients with Turner's syndrome should undergo imaging to assess for bicuspid aortic valve, coarctation of the aorta or dilation of the ascending or thoracic aorta. If the initial imaging is normal and there are no additional risk factors for dissection, imaging can be done every 5-10 years.
- Screening of first-degree relatives of patients with a bicuspid aortic valve

Follow-up known aneurysm/vascular pathology:

- Six months follow up after initial finding of a dilated thoracic aorta, for assessment of rate of change
- Biannual (twice/year) follow up of enlarged aortic root > 4.5 cm or showing growth rate > 0.5 cm/year
- Evaluation of the ascending aorta in known connective tissue disease or genetic conditions that predispose to aortic aneurysm or dissection (e.g., Marfan syndrome, Ehlers Danlos or Loeys-Dietz syndromes) 6 months after initial imaging for growth rate assessment, followed by annual imaging, or biannual (twice yearly) if diameter ≥ 4.5 or expanding ≥ 0.5 cm/yr
- Turner's syndrome - If an abnormality exists on initial imaging, annual imaging is recommended
- 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
- Re-evaluation (<1 y, generally twice a year) of the size and morphology of the aortic sinuses and ascending aorta in patients with a bicuspid AV with 1 of the following:
  - Aortic diameter ≥ 4.5 cm
  - Rapid rate of change in aortic diameter when an annual growth rate of ≥ 0.5 cm is suspected.
  - Family history (first-degree relative) of aortic dissection
- Follow up post medical treatment of aortic disease:
  - Acute dissection: 1 month, 6 months, then annually
  - Chronic dissection: annually
- Follow up post either root repair or AVR plus ascending aortic root/arch repair: baseline post-op, then annually

~~Thoracic Aortic Disease~~

~~If TTE was not performed was technically inadequate, or if imaging is required beyond the proximal ascending aorta~~

- ~~Screening of first-degree relatives of individuals with a thoracic aortic aneurysm (defined as > 50% above normal) or dissection, or if an associated high-risk mutation is present~~
  - ~~If one or more first degree relatives of a patient with a known thoracic aortic aneurysm or dissection, have thoracic aortic dilatation, aneurysm or dissection, then imaging of 2nd degree relatives is reasonable~~

- ~~Six months follow up after initial finding of a dilated thoracic aorta, for assessment of rate of change~~
- ~~Annual follow up of enlarged thoracic aorta that is above top normal for age, gender, and body surface area~~
- ~~Biannual (twice/year) follow up of enlarged aortic root > 4.5 cm or showing growth rate > 0.5 cm/year~~

- ~~Evaluation of the ascending aorta in known or suspected connective tissue disease or genetic conditions that predispose to aortic aneurysm or dissection (e.g., Marfan syndrome, Ehlers Danlos or Loeys-Dietz syndromes) at time of diagnosis and 6 months thereafter for growth rate assessment, followed by annual imaging, or biannual (twice yearly) if diameter ≥ 4.5 or expanding ≥ 0.5 cm/yr~~
- ~~Patients with Turner's syndrome should undergo imaging to assess for bicuspid aortic valve, coarctation of the aorta or dilation of the ascending or thoracic aorta. If the initial imaging is normal and there are no additional risk factors for dissection, imaging can be done every 5-10 years. If an abnormality exists, annual imaging is recommended~~
- ~~Screening of first-degree relatives of patients with a bicuspid aortic valve~~
- ~~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~~
- ~~Re-evaluation (<1 y, generally twice a year) of the size and morphology of the aortic sinuses and ascending aorta in patients with a bicuspid AV with 1 of the following:~~
    - ~~Aortic diameter ≥ 4.5 cm~~
    - ~~Rapid rate of change in aortic diameter when an annual growth rate of ≥ 0.5 cm is suspected.~~
    - ~~Family history (first-degree relative) of aortic dissection~~
- ~~Follow up post medical treatment of aortic disease:~~
    - ~~Acute dissection: 1 month, 6 months, then annually~~
    - ~~Chronic dissection: annually~~
- ~~Follow up post either root repair or AVR plus ascending aortic root/arch repair:~~
    - ~~Baseline post-op, then annually~~

Congenital Malformations

- Thoracic malformation on other imaging (chest x-ray, echocardiogram, GI study, or inconclusive CT) (Ferreira, 2015; Hellinger, 2011; Karaosmanoglu, 2015; Poletto, 2017)
- Congenital heart disease with pulmonary hypertension (Pascall, 2018)
- Pulmonary sequestration (~~Long, 2016;~~ Al-Timmy, 2016**; Long, 2016**~~)~~)

Pulmonary Hypertension based on other testing (Ascha, 2017; Rose-Jones, 2015)

- Echocardiogram
- Right heart catheterization

Atrial fibrillation with ablation planned (Kolandaivelu, 2012)

Preoperative evaluation

Post-operative/~~ or post-~~procedural evaluation

- Post-operative~~s~~ complications (Bennet, 2017; Choudhury, 2017)
- Routine post-operative evaluation of:~~s~~ (Lawrence; 2018; Uthof; 2012; Zierler, 2018~~; SVS; 2018~~)
    - Thoracic endovascular aneurysm repair
        - 1 month, then at
        - 6 month~~s~~ if initial abnormal or if for aortic dissection, then
        - Annual~~l~~y for 5 years
    - Open surgical repair
        - Once every 5 year~~s~~ ~~intervals~~

Chest CTA and Abdomen CTA or Abdomen/Pelvis CTA

- Transcatheter Aortic Valve Replacement (TAVR) (Achenbach, 2012; ACR, 2017~~; Achenbach, 2012~~)
- Acute aortic dissection (Barman, 2014)
- Takayasu's arteritis (Keser, 2014)
- Post-operative~~s~~ complications (Bennet, 2017; Choudhury, 2017)

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.

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 may be used to evaluate either suspected or known aortic coarctation and patients with significant coarctation should be treated surgically or interventionally.

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

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 responses (Konstantinides, 2020):

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

POLICY HISTORY:
Review Date: May 2019
Review Summary:

- 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

Review Date: May 2020
Review Summary:

- **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*
        - *3.5 to 4.5 Annual*
        - *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*
- **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'***

REFERENCES:

Achenbach S, Delgado V, Hausleiter J, et al. SCCT expert consensus document on computed tomography imaging before transcatheter aortic valve implantation (TAVI)/transcatheter aortic valve replacement (TAVR). *J Cardiovasc Comput Tomogr*. 2012; 6(6):366-80.

Al-Timmy QAH, Al_Shamseei Intralobar pulmonary sequestration in elderly woman: a rare case report with emphasis on imaging findings. *Radiol Case Rep*. 2016; 11(3): 144–147.

American College of Chest Physicians (ACCP). Choosing Wisely®: Five things physicians and patients should question. ~~ACCP.~~ 2013. Retrieved from http://www.choosingwisely.org/clinician-lists/american-college-chest-physicians-american-thoracic-society-chest-ct-angiography-to-evaluate-possibly-pulmonary-embolism/.

American College of Radiology (ACR). ACR Appropriateness Criteria®. Retrieved from https://acsearch.acr.org/list. **2020.**

American College of Radiology (ACR). ACR Appropriateness Criteria®: Imaging for transcatheter aortic valve replacement. ACR, 2017. Retrieved from https://acsearch.acr.org/docs/3082594/Narrative/.

Ascha M, Renapurkar RD, Tonelli AR. A review of imaging modalities in pulmonary hypertension. *Ann Thorac Med*. 2017; 12(2):61–73.

Barman M. Acute aortic dissection. *Euro Soc Cardiol*. 2014; 12(25):02.

Bennet KM, Kent KC, Schumaker J, et el. Targeting the most important complications in vascular surgery. *J Vasc Surg.* 2017; 65(3):793-803.

Choudhury M. Postoperative Management of Vascular Surgery Patients: A Brief Review. *Clin Surg*. 2017; 2:-1584.

Corrigan D, Prucnal C, Kabrhel C. Pulmonary embolism: the diagnosis, risk-stratification, treatment and disposition of emergency department patients. *Clin Exp Emerg Med.* 2016; 3(3): 117–125.

Erbel R, Aboyans V, Boileau C, et al. 2014 ESC Guidelines on the diagnosis and treatment of aortic diseases: Document covering acute and chronic aortic diseases of the thoracic and abdominal aorta of the adult. The Task Force for the Diagnosis and Treatment of Aortic Diseases of the European Society of Cardiology (ESC). *Eur Heart J.* 2014; 35(41):2873.

Ferreira TDA, Chagas ISS, Ramos RTT, et al. Congenital thoracic malformations in pediatric patients: two decades of experience. *J Bras Pneumol.* 2015; 41(2):196-199.

Friedman T, Quencer KB, Kishore SA, et al. Malignant Venous Obstruction: Superior Vena Cava Syndrome and Beyond. *Semin Intervent Radiol.* 2017; 34(4):398.

Hannuksela M, Eva-Lena Stattin E, Johansson B, et al. Screening for familial thoracic aortic aneurysms with aortic imaging does not detect all potential carriers of the disease. *Aorta (Stamford).* 2015 Feb; 3(1): 1–8.

Hellinger JC, Daubert M, Lee EY, et al. Congenital thoracic vascular anomalies: Evaluation with state-of-the-art MR imaging and MDCT. *Radiol Clin N Am*. 2011; 49:969-996.

Hiratzka LF, Bakris GL, Beckman JA , et al. 2010 ACCF/AHA/AATS/ACR/ASA/SCA/SCAI/SIR/STS/SVM guidelines for the diagnosis and management of patients with Thoracic Aortic Disease: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines, American Association for Thoracic Surgery, American College of Radiology, American Stroke Association, Society of Cardiovascular Anesthesiologists, Society for Cardiovascular Angiography and Interventions, Society of Interventional Radiology, Society of Thoracic Surgeons, and Society for Vascular Medicine. *Circulation.* 2010; 121(13):e266.

Karaosmanoglu AD, Khawaja RD, Onur MR, et al. CT and MRI of aortic coarctation: Pre- and postsurgical findings. *AJR Am J Roentgenol*. March 2015; 204(3):W224-33. Retrieved from https://www.ajronline.org/doi/10.2214/AJR.14.12529.

Keser G, Direskeneli H, Aksu K. Management of Takayasu arteritis: a systematic review. *Rheumatology*. 2014; 53(5):793–801.

Kirsch J, Brown RKJ, Henry TS, et al. ACR Appropriateness Criteria® Acute Chest Pain-Suspected Pulmonary Embolism. *JACR*. 2017; 14(Suppl 5):S2-S12.

Kolandaivelu A. Role of Cardiac Imaging (CT/MR) Before and After RF Catheter Ablation in Patients with Atrial Fibrillation. J Atr Fibrillation. 2012 Aug-Sep; 5(2):523.

Konstantinides SV, Meyer G, Becattini C, et al. 2019 ESC Guidelines for the diagnosis and management of acute pulmonary embolism developed in collaboration with the European Respiratory Society (ERS): The Task Force for the diagnosis and management of acute pulmonary embolism of the European Society of Cardiology (ESC). *Euro Heart J*. 2020; 41(4):543-603.

Konstantinides SV, Torbicki A, Agnelli G, et al. 2014 ESC Guidelines on the diagnosis and management of acute pulmonary embolism: The Task Force for the Diagnosis and Management of Acute Pulmonary Embolism of the European Society of Cardiology (ESC). *Euro Heart J*. 2014; 35(43):3033–3080.

~~Konstantinides SV, Meyer G, Becattini C, et al. 2019 ESC Guidelines for the diagnosis and management of acute pulmonary embolism developed in collaboration with the European Respiratory Society (ERS): The Task Force for the diagnosis and management of acute pulmonary embolism of the European Society of Cardiology (ESC). *Euro Heart J.* 2020; 41(4):543-603.~~

Lawrence PF. Society for Vascular Surgery: Recommendations for follow-up after vascular surgery procedures. *SVS Practice Guidelines.* 2018; 68(1):1. Retrieved from https://www.jvascsurg.org/article/S0741-5214(18)31069-3/fulltext.

Long Q, Zha Y, Yang Z. Evaluation of pulmonary sequestration with multidetector computed tomography angiography in a select cohort of patients: A retrospective study. *Clinics (Sao Paul).* 2016; 71(7):392–398.

Osiro S, Zurada A, Gielecki J, et, al. A review of subclavian steal syndrome with clinical correlation. *Med Sci Monit.* 2012;18(5): RA57-RA63**.**

Pascall E, Tulloh RMR. Pulmonary hypertension in congenital heart disease. *Future Cardiol.* 2018; 14(4): 343–353.

Poletto E, Mallon MG, Stevens RM, et al. Imaging review of aortic vascular rings and pulmonary sling. *J Am Osteopath Coll Radiol.* 2017; 6(2):5-14.

Potter BJ, Pinto DS. Subclavian Steal Syndrome. *Circulation*. 2014; 129:2320–2323.

Povlsen S, Povlsen B. Diagnosing thoracic outlet syndrome: Current approaches and future directions. *Diagnostics (Basel)*. 2018; 8(1):21.

Rose-Jones, LJ, Mclaughlin VV. Pulmonary hypertension: Types and treatments. *Curr Cardiol Rev*. 2015; 11(1):73-79.

~~Singh B, Mommer SK, Erwin PJ, et al. Pulmonary embolism rule-out criteria (PERC) in pulmonary embolism--revisited: a systematic review and meta-analysis. *Emerg Med J.* 2013; 30(9):701-6.~~

~~Lawrence PF. Society for Vascular Surgery: Recommendations for follow-up after vascular surgery procedures. *SVS Practice Guidelines.* 2018; 68(1):1. Retrieved from https://www.jvascsurg.org/article/S0741-5214(18)31069-3/fulltext.~~

Uthof H, Pena C, Katzen BT, et, el. Current clinical practice in postoperative endovascular aneurysm repair imaging surveillance. *J Vasc Intervent Radiol.* 2012; 23(9):1152–1159.

Zierler RE, Jordan WD, Lal BK, et al. The Society for Vascular Surgery practice guidelines on follow-up after vascular surgery arterial procedures. 2018 Jul 1; 68(1):256-84.

Reviewed / Approved by  M. Atif Khalid, M.D., Medical Director, Radiology

~~Reviewed / Approved by~~  ~~Patrick Browning, VP, Medical Director~~

Disclaimer: Magellan Healthcare service authorization policies do not constitute medical advice and are not intended to govern or otherwise influence the practice of medicine. These policies are not meant to supplant your normal procedures, evaluation, diagnosis, treatment and/or care plans for your patients. Your professional judgement must be exercised and followed in all respects with regard to the treatment and care of your patients. These policies apply to all Magellan Healthcare subsidiaries including, but not limited to, National Imaging Associates ("Magellan"). The policies constitute only the reimbursement and coverage guidelines of Magellan. Coverage for services varies for individual members in accordance with the terms and conditions of applicable Certificates of Coverage, Summary Plan Descriptions, or contracts with governing regulatory agencies. Magellan reserves the right to review and update the guidelines at its sole discretion. Notice of such changes, if necessary, shall be provided in accordance with the terms and conditions of provider agreements and any applicable laws or regulations.