AmeriHealth Caritas Louisiana

National Imaging Associates, Inc.*	
Clinical guidelines **CHEST MRA**	**Original Date: September 1997**
CPT Codes: 71555	**Last Revised Date: May 2020**
Guideline Number: NIA_CG_022-2	**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 MRA:

Magnetic resonance angiography (MRA) or computed tomography angiography (CTA) may be used for several indications but not both.

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; **Chavhan, 2017;** Povlsen, 2018~~; Chavhan, 2017~~)
- 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
- For MRPA (MR Pulmonary Angiography) in patients with intermediate pretest probability with a positive D-dimer or high pretest probability (but only at centers that routinely perform it well and only for patients for whom standard tests are contraindicated)

Thoracic Aortic Disease

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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
- ~~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 **after initial imaging for**~~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 - If an **abnormality** exists **on initial imaging,** ~~,~~annual imaging is recommended ~~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, gastrointestinal study, or inconclusive CT) (Ferreira, 2015; Hellinger, 2011; Karaosmanoglu, 2015; Poletto, 2017)
- Congenital heart disease with pulmonary hypertension (Pascall, 2018)
- Pulmonary Sequestration (**Al-Timmy, 2016;** Long, 2016~~; Al-Timmy, 2016~~)

Pulmonary Hypertension based on other testing (Ascha, 2017; Rose-Jones, 2015):
- Echocardiogram
- Right heart catheterization

Atrial fibrillation with ablation planned (Kolandaivelu, 2012)

Pre-operative Evaluation

Post-operative/~~ or post-~~procedural evaluation
- Post op complications (Bennet, 2017; Choudhury, 2017)
- Routine post-operative (**SVS, 2018;** Uthof, 2012~~; SVS, 2018~~)
    - Thoracic endovascular aneurysm repair
        - 1 month
        - 6 month if initial abnormal, or it for aortic dissection
        - Annual for 5 years
    - Open Surgical Repair
        - 5 year intervals

BACKGROUND:
Magnetic resonance angiography (MRA) is a noninvasive technique used to provide cross-sectional and projection images of the thoracic vasculature, including large and medium sized vessels, e.g., the thoracic aorta. It provides images of normal as well as diseased blood vessels and quantifies blood flow through these vessels. Successful vascular depiction relies on the proper imaging pulse sequences. MRA may use a contrast agent, gadolinium, which is non-iodine-based, for better visualization. It can be used in patients who have history of contrast allergy and who are at high risk of kidney failure.

OVERVIEW:

MRA and Coarctation of the Aorta – One of the most common congenital vascular anomalies is coarctation of the aorta which is characterized by obstruction of the juxtaductal aorta. Clinical symptoms, e.g., murmur, systemic hypertension, difference in blood pressure in upper and lower extremities, absent femoral or pedal pulses, may be present. Gadolinium enhanced 3D MRA may assist in preoperative planning as it provides angiographic viewing of the aorta, the arch vessels and collateral vessels. It may also assist in the identification of postoperative complications.

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

Studies show mixed results regarding the value of MRA v CTA in detecting pulmonary embolism. A systematic review and meta-analysis found MRA to be inferior to CTA in detecting PE. Therefore, MRA should be used only if CTA is not available or contraindicated in a specific patient (Li, 2009).

MRA and Thoracic Aortic Aneurysm – One of the most common indications for thoracic MRA is thoracic aortic aneurysm, most often caused by atherosclerosis. These aneurysms may also be due to aortic valvular disease. Aneurysms are defined by their enlargement and patients with rapidly expanding aortas, or with aortic diameters greater than five or six centimeters, are at high risk of rupture and may require surgery.

MRA and Thoracic Aortic Dissection - The most common clinical symptom of aortic dissection is tearing chest pain and the most common risk factor is hypertension. An intimal tear is the hallmark for aortic dissection and intramural hematoma may also be detected. Unfortunately, patients with aortic dissection may be unstable and not good candidates for routine MR evaluation; MRA may be indicated as a secondary study. 3D MRA is also useful in postoperative evaluation of patients with repaired aortic dissections.

MRA and Central Venous Thrombosis – 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.

Other MRA Indications – MRA is useful in the assessment for postoperative complications of pulmonary venous stenosis.

MRI and Patent Ductus Arteriosus – Patent ductus arteriosus (PDA) is a congenital heart problem in which the ductus arteriosus does not close after birth. It remains patent allowing oxygen-rich blood from the aorta to mix with oxygen-poor blood from the pulmonary artery. MRI can depict the precise anatomy of a PDA to aid in clinical decisions. It allows imaging in

multiple planes without a need for contrast administration. Patients are not exposed to ionizing radiation.

POLICY HISTORY:
Review Date: May 2019
Review Summary:

- Removed pulmonary embolism indication
- Added indications specifying criteria for follow-up of thoracic aneurysm
- Added statement: "For MRPA (MR Pulmonary Angiography) in patients with intermediate pretest probability with a positive D-dimer or high pretest probability (but only at centers that routinely perform it well and only for patients for whom standard tests are contraindicated)"
- Expanded criteria for congenital malformations
- Updated thoracic aortic disease section for consistency with cardiac guidelines
- Added greater specificity for post op complications

Review Date: May 2020
Review Summary:

- **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'***

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