National Imaging Associates, Inc.*	
Clinical guidelines **CHEST (THORAX) MRI**	**Original Date: September 1997**
CPT Codes: 71550, 71551, 71552, +0698T	**Last Revised Date: April 2021**
Guideline Number: NIA_CG_021	**Implementation Date: January 2022**

INDICATIONS FOR CHEST MRI

The combination of superior soft tissue contrast and lack of ionizing radiation may make Chest Magnetic Resonance Imaging (MRI) preferable for the pediatric population or evaluation of the ~~soft tissue~~non-lung parenchyma ~~or mediastinal cancer follow-up~~. This must be weighed against a longer acquisition time and greater likelihood of artifact from patient motion. Chest Computed Tomography (CT) is generally better for lung evaluation. Chest Magnetic Resonance Angiography (MRA) is ordered ~~strictly~~ for evaluation of the intrathoracic blood vessels~~Some indications are for magnetic resonance imaging (MRI), magnetic resonance angiography (MRA), computed tomography (CT), or computed tomography angiography (CTA)~~. ~~More than one~~Chest MRI and Chest MRA **should not be approved at the same time.**

Chest Mass (non-lung parenchymal)
(Azizad, 2016; Carter, 2015, 2016, 2017; Hochhegger, 2011; Mullan, 2011)

- Mass or lesion, including lymphadenopathy, after non-diagnostic x-ray or ultrasound (~~,~~ Chest CT indicated for pulmonary nodule)~~.~~
- Thymoma screening in Myasthenia Gravis patients (Kumar, 2015)
- Congenital thoracic malformation on other imaging (chest x-ray, echocardiogram, gastrointestinal study, or inconclusive CT) (Ferreira, 2015~~,~~; Hellinger, 2011~~,~~; Karaosmanoglu, 2015~~,~~; Poletto, 2017)
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Chest Wall Pain (after initial evaluation with chest x-ray and/or rib series radiographs)

- History of known or suspected cancer
- Signs and symptoms of infection (non-lung parenchymal), such as:
  - Accompanying fever
  - Elevated inflammatory markers
  - Known infection at other sites
- Suspected muscle or tendon tear where imaging would change treatment

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

Brachial Plexopathy
(Mansukhani, 2013; Vijayasarathi, 2016)

- **If mechanism of injury or Electromyography/Nerve Conduction Velocity (EMG/NCV) studies are suggestive**
- **Chest MRI is preferred study, but neck and/or shoulder (upper extremity) MRI can be ordered depending on the suspected location of injury**

Cystic Fibrosis
(Woods, 2020)

- **Can be an alternative to Chest CT to evaluate perfusion abnormalities, bronchiectasis, and mucus plugging if needed for treatment planning**

Vascular Diseases are better evaluated with Chest CTA or MRA
(ACR, 2019):*

- **Superior vena cava (SVC) syndrome (Friedman, 2017)**

~~(Kircher, 2012; Rajiah, 2013)~~

~~*Chest CTA or MRA is preferred for vascular pathology (ACR, 2019)~~

- ~~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)
- Takayasu's arteritis (Keser, 2014)
- ~~Clinical concern for acute~~**Acute or chronic** 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~~

~~Thoracic Aortic Disease~~

- ~~(Chest CTA or MRA is preferred for vascular pathology) (ACR, 2019)~~

~~Thoracic Outlet Syndrome~~

~~(ACR, 2014; Chavhan, 2017; Povlsen, 2018; Smith, 2015)~~

- **Pulmonary hypertension - To evaluate for cause after echocardiogram or right heart catheterization (Ascha 2017, Rose-Jones 2015)**

~~Chest CTA or MRA is preferred for vascular pathology (ACR, 2019)~~

~~**Brachial Plexopathy**~~
~~**(Vijayasarathi, 2016)**~~

~~If mechanism of injury or EMG/NCV studies are suggestive~~

- ~~Chest MRI is preferred study , but vs. neck and/or or shoulder (upper extremity) MRI can be ordered depending on the suspected location of injury~~

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 **(Tanzer, 2003)**~~(Al-Timmy 2016; Long, 2016)~~

~~**Cystic Fibrosis**~~

- ~~Can be used to evaluate perfusion abnormalities, bronchiectasis and mucus plugging~~

~~**Pulmonary hypertension based on other testing**~~
~~**(Ascha 2017, Rose-Jones 2015)**~~

- ~~Echocardiogram~~
- ~~Right heart catheterization~~

Atrial fibrillation with ablation planned
(Kolandaivelu 2012)

- ~~(Kolandaivelu 2012)~~

Preoperative/procedural e~~E~~valuation

- **Pre-operative evaluation for a planned surgery or procedure**

Post-operative/procedural evaluation

- Post-surgical follow--up when records document medical reason requiring additional imaging

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BACKGROUND

Magnetic Resonance Imaging (MRI) is a noninvasive imaging technique for detection and evaluation of various disease and conditions in the chest, e.g., congenital anomalies and aneurysms. MRI may be used instead of computed tomography (CT) in patients with allergies to radiographic contrast or with impaired renal function.

OVERVIEW

MRI and Myasthenia Gravis – Myasthenia Gravis is a chronic autoimmune disease characterized by weakness of the skeletal muscles causing fatigue and exhaustion that is aggravated by activity and relieved by rest. It most often affects the ocular and other cranial muscles and is thought to be caused by the presence of circulating antibodies. Symptoms include ptosis, diplopia, chewing difficulties, and dysphagia. Thymoma has a known association with myasthenia. Contrast-enhanced MRI may be used to identify the presence of a mediastinal mass suggestive of myasthenia gravis in patients with renal failure or allergy to contrast material.

MRI and Thoracic Outlet Syndrome – Thoracic outlet syndrome is a group of disorders involving compression at the superior thoracic outlet that affects the brachial plexus, the subclavian artery, and veins. It refers to neurovascular complaints due to compression of the brachial plexus or the subclavian vessels. Magnetic resonance multi-plane imaging shows bilateral images of the thorax and brachial plexus and can demonstrate the compression of the brachial plexus and venous obstruction.

MRI and Brachial Plexus - MRI is the only diagnostic tool that accurately provides high resolution imaging of the brachial plexus. The brachial plexus is formed by the cervical ventral rami of the lower cervical and upper thoracic nerves which arise from the cervical spinal cord, exit the bony confines of the cervical spine, and traverse along the soft tissues of the neck, upper chest, and course into the arms.

POLICY HISTORY

Date	Summary
April 2021	~~Added Cystic Fibrosis imaging~~ • **Added details on brachial plexopathy imaging** • ~~NCV/EMG testing and additional imaging~~ **Expanded** ~~Added more detail to the~~ **introduction section** • ~~advantages of MRI~~ • • ~~**Reorganization**~~**Added Cystic Fibrosis imaging (alternative to CT)** **Clarified pre-operative evaluation for a planned surgery or procedure** • ~~Reorganization~~ ~~Added references~~
May 2020	• **Added Chest Wall Pain section:** ○ ***Chest Wall Pain (after initial evaluation with chest x-ray and/or rib series radiographs)*** • ***History of known or suspected cancer***

	• ***Signs and symptoms of infection (non-lung parenchymal), such as:***
	  ○ ***Accompanying fever***
	  ○ ***Elevated inflammatory markers***
	  ○ ***Known infection at other sites***
	• ***Suspected muscle or tendon tear where imaging would change treatment***
	• **Thoracic Aortic Disease: removed section and added note: *Chest CTA or MRA is preferred for vascular pathology***
	• **Thoracic Outlet Syndrome: removed section and added note: *Chest CTA or MRA is preferred for vascular pathology***
	• **Brachial Plexopathy: added note: *Chest MRI is preferred study vs. neck or shoulder MRI***

May 2019	• **Expanded indications including: vascular and congenital anomalies** • **Updated thoracic aortic section and reformatted to match other guidelines.**

~~May 2019~~

- ~~Expanded indications including: vascular and congenital anomalies~~
- ~~Updated thoracic aortic section and reformatted to match other guidelines.~~

~~May 2020~~

- ~~Added Chest Wall Pain section:~~
  - ~~*Chest Wall Pain (after initial evaluation with chest x-ray and/or rib series radiographs)*~~
    - ~~*History of known or suspected cancer*~~
    - ~~*Signs and symptoms of infection (non-lung parenchymal), such as:*~~
      - ~~*Accompanying fever*~~
      - ~~*Elevated inflammatory markers*~~
      - ~~*Known infection at other sites*~~
    - ~~*Suspected muscle or tendon tear where imaging would change treatment*~~
- ~~Thoracic Aortic Disease: removed section and added note: *Chest CTA or MRA is preferred for vascular pathology*~~
- ~~Thoracic Outlet Syndrome: removed section and added note: *Chest CTA or MRA is preferred for vascular pathology*~~
- ~~Brachial Plexopathy: added note: *Chest MRI is preferred study vs. neck or shoulder MRI*~~

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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. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.