

# MRA (Magnetic Resonance Angiogram) Thorax

**CPT: 71555**

# 1 Major Symptom or Complaint presented as primary indication

## 1.1 Cough

1.1.1 *See Pulmonary embolism suspected*

## 1.2 Dyspnea, acute onset

1.2.1 *See Pulmonary embolism suspected*

## 1.3 Hemoptysis

1.3.1 Hemoptysis alone is sufficient indication for CT of the chest with contrast.

1.3.1.1 Gonzales Ralph, Nadler Paul L, "Chapter 2. Common Symptoms" (Chapter). McPhee SJ, Papadakis MA, Tierney LM, Jr.: CURRENT Medical Diagnosis & Treatment 2009:

<http://www.accessmedicine.com/content.aspx?aID=79>

## 1.4 PAIN: Acute onset of severe chest, back or upper abdominal

1.4.1 *See Aortic dissection suspected*

## 1.5 PAIN: Pleuritic chest pain

### 1.5.1 Pulmonary embolism suspected [BOTH]

- Pend for Physician Review as a CTA Chest (71275) is the preferred study

#### References:

1. Massimo Pistolesi Pulmonary CT Angiography in Patients Suspected of Having Pulmonary Embolism: Case Finding or Screening Procedure? Radiology August 2010 256:334-337;
2. Mark D. Mamlouk, Eric vanSonnenberg, Rishi Gosalia, David Drachman, Daniel Gridley, Jesus G. Zamora, Giovanna Casola, and Sanford Ornstein Pulmonary Embolism at CT Angiography: Implications for Appropriateness, Cost, and Radiation Exposure in 2003 Patients Radiology August 2010 256:625-632
3. Patel S, Kazerooni EA. Helical CT for the evaluation of acute pulmonary embolism. AJR Am J Roentgenol 2005;185(1):135–149
4. Stein PD, Fowler SE, Goodman LR, et al. Multidetector computed tomography for acute pulmonary embolism. N Engl J Med 2006;354(22):2317–2327
5. Perrier A, Roy PM, Sanchez O, et al. Multidetector-row computed tomography in suspected pulmonary embolism. N Engl J Med 2005;352(17):1760–1768

## 1.6 Tachypnea

### 1.6.1 Pulmonary embolism suspected [BOTH]

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1. Massimo Pistolesi Pulmonary CT Angiography in Patients Suspected of Having Pulmonary Embolism: Case Finding or Screening Procedure? Radiology August 2010 256:334-337;
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## 2 Working Diagnosis or Rule Out presented as primary indication

### 2.1 Aneurysm Known or Suspected

#### 2.1.1 Aneurysm on prior examination

##### 2.1.1.1 Patient stable and greater than one year since prior examination

##### 2.1.1.2 Pain in chest or back

#### 2.1.2 Aortic Arch abnormal on CXR

##### 2.1.2.1 Arch or Descending Aorta > 3.5 cm diameter on CXR

##### 2.1.2.2 Ascending Aorta > 4.5cm cm diameter on CXR

#### 2.1.3 Marfan's, Turner's or Ehlers-Danlos Syndrome

### Notes and References

1. Thoracic aneurysms may involve one or more aortic segments (aortic root, ascending aorta, arch, or descending aorta) and are classified accordingly (Figure 1). Sixty percent of thoracic aortic aneurysms involve the aortic root and/or ascending aorta, 40% involve the descending aorta, 10% involve the arch, and 10% involve the thoracoabdominal aorta (with some involving >1 segment). The etiology, natural history, and treatment of thoracic aneurysms differ for each of these segments. Eric M. Isselbacher Thoracic and Abdominal Aortic Aneurysms Circulation 111: 816-828
2. Elefteriades John A, Olin Jeffrey W, Halperin Jonathan L, "Chapter 105. Diseases of the Aorta" (Chapter). Fuster V, O'Rourke RA, Walsh RA, Poole-Wilson P, Eds. King SB, Roberts R, Nash IS, Prystowsky EN, Assoc. Eds.: Hurst's The Heart, 12th Edition: <http://www.accessmedicine.com/content.aspx?aID=3075150>.
3. Eli Atar, Alexander Belenky, Menashe Hadad, Ehud Ranany, Shlomo Baytner, and Gil N. Bachar MR Angiography for Abdominal and Thoracic Aortic Aneurysms: Assessment Before Endovascular Repair in Patients with Impaired Renal Function Am. J. Roentgenol., Feb 2006; 186: 386 – 393
4. Olsson, Stefan Thelin, Elisabeth Ståhle, Anders Ekbom, and Fredrik Granath Thoracic Aortic Aneurysm and Dissection: Increasing Prevalence and Improved Outcomes Reported in a Nationwide Population-Based Study of More Than 14 000 Cases From 1987 to 2002 Circulation, Dec 2006; 114: 2611 – 2618
5. S. Illiceo, G. Ettore, et al Diagnosis of aneurysm of the thoracic aorta. Comparison between two non invasive techniques: two-dimensional echocardiography and computed tomography Eur. Heart J., Jul 1984; 5: 545 – 555

## 2.2 Aortic dissection, suspected May be time sensitive, treat as expedited case

### 2.2.1 Absent distal pulses

### 2.2.2 Acute onset of severe chest, upper back, or abdominal pain

### 2.2.3 Pain with abnormal appearance of aorta on prior imaging

### 2.2.4 Prior Aneurysm Repair

### 2.2.5 Unequal blood pressure in arms

## References

1. ACR Appropriateness Criteria® Acute Chest Pain-Suspected Aortic Dissection 2008
2. A. Khan and Chandra K. Nair Clinical, Diagnostic, and Management Perspectives of Aortic Dissection Chest July 2002 122:311-328
3. Kersting-Sommerhoff, BA, Sechtem, UP, Fisher, MR, Higgins, CB MR imaging of congenital anomalies of the aortic arch Am. J. Roentgenol. 1987 149 9-13
4. Paul J. Arpasi, Kostaki G. Bis, Anil N. Shetty, Richard D. White, and Orlando P. Simonetti MR Angiography of the Thoracic Aorta with an Electrocardiographically Triggered Breath-Hold Contrast-enhanced Sequence RadioGraphics 2000 20: 107-120
5. Prince MR. Gadolinium-enhanced MR aortography. Radiology 1994; 191:155-164
6. Roche, Kevin J., Rivera, Rafael, Argilla, Michael, Fefferman, Nancy R., Pinkney, Lynne P., Rusinek, Henry, Genieser, Nancy B. Assessment of Vasculature Using Combined MRI and MR Angiography Am. J. Roentgenol. 2004 182: 861-866
7. Patel, Pawan D., Arora, Rohit R. Pathophysiology, diagnosis, and management of aortic dissection Therapeutic Advances in Cardiovascular Disease 2008 2: 439-468
8. G. Sutsch et al, Predictability of aortic dissection as a function of aortic diameter Eur. Heart J., Jan 1991; 12: 1247 – 1256

## 2.3 Coarctation of the Aorta

### 2.3.1 Follow up of known coarctation

### 2.3.2 Hypertension in the upper extremities AND ONE

#### NOTE

Coarctation of the aorta is typically a discrete narrowing of the thoracic aorta just distal to the left subclavian artery. However, the constriction may be proximal to the left subclavian artery or rarely in the abdominal aorta. In some cases, coarctation presents as a long segment or a tubular hypoplasia

#### 2.3.2.1 diminished or delayed femoral pulses (brachial-femoral delay), and

#### 2.3.2.2 low or unobtainable arterial blood pressure in the lower extremities

#### References

1. UpToDate 17.2 Clinical manifestations and diagnosis of coarctation of the aorta June 14, 2009
2. Hager, Alfred, et al Follow-up of Adults With Coarctation of the Aorta: Comparison of Helical CT and MRI, and Impact on Assessing Diameter Changes Chest 2004 126: 1169-1176

## 2.4 Congenital Anomalies of the Thoracic Vasculature

#### References

1. Sabiston Textbook of Surgery, 17th Edition (2004) Townsend et al, eds; pp1905-1907

## 2.5 Pulmonary embolism suspected [BOTH]

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1. Massimo Pistolesi Pulmonary CT Angiography in Patients Suspected of Having Pulmonary Embolism: Case Finding or Screening Procedure? Radiology August 2010 256:334-337;
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### 3 Abnormal Physical Exam Finding presented as primary indication

#### 3.1 Elevated Blood pressure and acute chest pain

3.1.1 *See Aortic Dissection suspected*

#### 3.2 Unequal blood pressure in the arms

3.2.1 *See Aortic Dissection suspected*

### 4 Abnormal Lab or Imaging presented as primary indication

#### 4.1 Known DVT by sonography

4.1.1 *See Pulmonary embolism suspected*

## 5 Significant Prior Medical History presented as primary indication

### 5.1 Aneurysm Known or Suspected

#### 5.1.1 Aneurysm on prior examination

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3. Eli Atar, Alexander Belenky, Menashe Hadad, Ehud Ranany, Shlomo Baytner, and Gil N. Bachar MR Angiography for Abdominal and Thoracic Aortic Aneurysms: Assessment Before Endovascular Repair in Patients with Impaired Renal Function Am. J. Roentgenol., Feb 2006; 186: 386 – 393.
4. Olsson, Stefan Thelin, Elisabeth Ståhle, Anders Ekbom, and Fredrik Granath Thoracic Aortic Aneurysm and Dissection: Increasing Prevalence and Improved Outcomes Reported in a Nationwide Population-Based Study of More Than 14 000 Cases From 1987 to 2002 Circulation, Dec 2006; 114: 2611 – 2618
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#### Notes and References

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3. Hager, Alfred, et al Follow-up of Adults With Coarctation of the Aorta: Comparison of Helical CT and MRI, and Impact on Assessing Diameter Changes Chest 2004 126: 1169-1176

## 5.3 Known Malignancy

### 5.3.1 Pulmonary embolism suspected

- Pend for Physician Review as a CTA Chest (71275) is the preferred study

## 5.4 Superior Vena Cava Syndrome

#### References

1. Yuh-Min Chen , Shuling Yang , Reury-Perng Perng , and Chun-Ming Tsai Superior Vena Cava Syndrome Revisited Jpn. J. Clin. Oncol. 25: 32-36
2. Sheth, Sheila, Ebert, Mark D., Fishman, Elliot K. Superior Vena Cava Obstruction Evaluation With MDCT Am. J. Roentgenol. 2010 194: W336-346

## 6 Mapping for venous access prior to an interventional procedure