MRI of the Thymus

March 2013
Thymus

Location and Function

• Located in the upper part of the chest, in front of the trachea, the thymus is one of the major endocrine glands.

• Important in children, the thymus produces thymosins that stimulate the development of antibodies.

• The thymus also produces T-lymphocytes that fight infection and destroy abnormal cells.
Thymus

Reasons for MRI

- Mediastinal mass/Thymic mass
- Lymphoma
- Carcinoid tumors
- Myasthenia gravis, lupus or rheumatoid arthritis.
Thymus

Characteristics of the study

• Eliminate respiratory, cardiac, and pulsatile motion.
• Anatomical dark blood imaging.
• In/opposed phase can distinguish between normal thymus and thymic hyperplasia from thymic neoplasms and lymphoma.
• Pre and post contrast GRE T1 imaging with fat suppression.
Thymus

Patient preparation/positioning

• Position patient either prone or supine. Only use the coil adjacent to the anterior chest wall.
• Place electrodes on patient for ECG gating. The patient’s skin must be cleaned, shaved, and prepped.
• Patient will receive 0.1ml/kg of Gadavist with a normal eGFR
• Coach patient on breathing instructions
Thymus

Coverage

• Cover the mediastinal area.
• Use a appropriate field of view.
• Check with Radiologist if coverage is adequate.
Thymus

Imaging Protocol

1. SCOUT
2. COR HASTE
3. AX HASTE
4. SAG HASTE
5. AX IN/OPPOSED PHASE
6. AX T1 TSE DB
7. AX T2 TSE DB
8. AX VIBE
   Inject Contrast
9. AX VIBE
10. COR VIBE
11. SAG VIBE

Imaging consists on single shot HASTE, fast breath held gradient echo T1, and cardiac gated dark blood imaging
Thymus

Cardiac gating needed to remove motion and flow artifacts

Cardiac gated dark blood T2 imaging

Non Cardiac gated T2 imaging
Thymus

Pre and post contrast enhanced vibe. The patient is instructed to hold their breath.
Thymus

Due to inhomogeneous fat suppression vibe with DIXON may need to be used.

If there were sternal wires or other metallic implants the fat suppression may be much worse.
Thymus

• These cardiac gated techniques may also work well for certain imaging exams of the chest wall.
• This a likely not a high volume study, so your understanding of the techniques and anatomy will determine your success in producing a high quality examination

Please reference the below link to the protocol

https://intrad.radiology.northwestern.edu/intrad-rails31/mri_body_systems/5/mri_protocols/255