

Spine Magnetic Resonance Imaging (MRI) and Spine Computed Tomography (CT)

With/Without Contrast CT, MRI

- The study considered best for a specific clinical scenario should be ordered. The second study should be done **only** if the first study does not provide adequate information

Test Request Tip Sheet

- MRI is almost always preferred over a CT scan; if ordering CT, **clearly** document why MRI is not appropriate
- In cases of ongoing back pain, six weeks of conservative treatment within the most recent six months (without significant symptom improvement) or documentation that demonstrates the progression or worsening of symptoms during the course of the therapy should be provided in the submitted clinical information prior to an imaging study being ordered
- Clear documentation of all elements of conservative therapy is required, **including** details and dates of the physical therapy, home exercise program or chiropractic care
- **Reproducible** neurological deficits must be documented in the clinical notes by a thorough neurological physical examination
- We follow “Choosing Wisely” recommendations for low back pain as shown below:

Radiation Exposure

Spine MRI: 0 mSv

Spine CT: 6.5 mSv

Radiation exposure should be limited when possible.

With and without contrast doubles the radiation dose.



“Choosing Wisely” Recommendations¹

As part of Choosing Wisely, each participating specialty society has created lists of “Things Physicians and Patients Should Question” that provide specific, evidence-based recommendations physicians and patients should discuss to help make wise decisions about the most appropriate care based on their individual situation. The items below represent the recommendations associated with spine CT and MRI:

- **Don't do imaging for low back pain within the first six weeks, unless red flags are present** (American Academy of Family Physicians)
- **Don't obtain imaging studies in patients with non-specific low back pain** (American College of Physicians)
- **Avoid imaging studies (MRI, CT or x-rays) for acute low back pain without specific indications** (American Society of Anesthesiologists - Pain Medicine)
- **Don't recommend advanced imaging (e.g., MRI) of the spine within the first six weeks in patients with non-specific acute low back pain in the absence of red flags.** (*North American Spine Society*)

¹ “Choosing Wisely” is an initiative of the ABIM Foundation to help physicians and patients engage in conversations about the overuse of tests and procedures and support physician efforts to help patients make smart and effective care choices. Recognizing the importance of physicians and patients working together, leading specialty societies, along with Consumer Reports, have joined “Choosing Wisely” to help improve the quality and safety of healthcare in America.

Brain MRI and Brain CT Test Request Tip Sheet

- MRI is almost always preferred over CT scan; if ordering CT, **clearly** document why MRI is not appropriate
- Chronic headache (including chronic migraine) is an indication for advanced imaging **only** if the headaches are increasing in frequency or have changed in severity or new neurological deficits are present
- We follow “Choosing Wisely” recommendations for headache and syncope (loss of consciousness) as shown below:

Radiation Exposure

Brain MRI: 0 mSv

Brain CT: 4 mSv

Radiation exposure should be limited when possible.

With and without contrast doubles the radiation dose.



"Choosing Wisely" Recommendations¹

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- **Don't perform neuro-imaging studies in patients with stable headaches that meet criteria for migraine** (American Headache Society)
- **Don't perform CT imaging for headache when MRI is available, except in emergency settings** (American Headache Society)
- **In the evaluation of simple syncope and a normal neurological examination, don't obtain brain imaging studies (CT or MRI)** (American College of Physicians)
- **Don't do imaging for uncomplicated headache** (American College of Radiology)
- **Don't order CT scan of the head/brain for sudden hearing loss** (American Academy of Otolaryngology —Head and Neck Surgery Foundation)

Pediatric Considerations from “Choosing Wisely:”

- **Neuroimaging (CT, MRI) is not necessary in a child with simple febrile seizure** (American Academy of Pediatrics)

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Abdomen CT and Abdomen/Pelvis CT Test Request Tip Sheet

- Abdomen and abdomen/pelvis CTs deliver a high radiation dose and performing them with and without contrast delivers roughly double the dose
- Alternative studies, such as ultrasound, are frequently indicated prior to CTs and must be documented in the clinical information accompanying the imaging request
- Ultrasound should always be considered as the first imaging study in the evaluation of abdominal complaints in children
- Laboratory work that will assist in the diagnosis of inflammatory conditions such as appendicitis should be completed and documented in the clinical record before the CT request is made
- We follow “Choosing Wisely” recommendations for functional abdominal pain and pediatric abdominal pain/suspected appendicitis:

Radiation Exposure

Abdomen CT: 8

Abdomen/Pelvis CT:
14 mSv

Radiation exposure should be limited when possible.

With and without contrast doubles the radiation dose.



“Choosing Wisely” Recommendations¹

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- **For a patient with functional abdominal pain syndrome (as per ROME III criteria), CT scans should not be repeated unless there is a major change in clinical findings or symptoms** (American Gastroenterological Society)

Pediatric Considerations from “Choosing Wisely:”

- **CT scans are not necessary in the routine evaluation of abdominal pain** (American Academy of Pediatrics)
- **Don’t do computed tomography CT for the evaluation of suspected appendicitis in children until after ultrasound has been considered as an option** (American College of Radiology and American College of Surgeons)

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Extremity (Hand, Wrists, Knee Shoulder) MRI Test Request Tip Sheet

- An examination of the joint involved with documentation of findings consistent with the suspected diagnosis must be submitted as part of the clinical information when requesting an MRI
- In most cases of persistent pain or suspected fracture, a plain X-ray should be documented in submitted clinical information before MRI is ordered
- In cases of ongoing pain, four weeks of conservative therapy without significant pain relief or information regarding the progression or worsening symptoms during the course of the therapy should be provided in the submitted clinical information prior to an MRI being ordered
- We follow “Choosing Wisely” recommendations for MRI monitoring of rheumatoid disease:

Radiation Exposure

MRIs have no radiation exposure.

“Choosing Wisely” Recommendations¹

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Do not perform MRI of the peripheral joints to routinely monitor inflammatory arthritis. Data evaluating MRI for the diagnosis and prognosis of rheumatoid arthritis (RA) are currently inadequate to justify widespread use of this technology for these purposes in clinical practice (American College of Rheumatology)

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Chest CT Test Request Tip Sheet

- A chest computed tomography angiography (CTA), not a chest CT, is the most appropriate study to evaluate for pulmonary embolism
- A chest CTA is **not** usually indicated for evaluation of pulmonary embolism in a patient at low clinical risk for pulmonary embolism
 - Suggest application/use of the “Wells” or “Pulmonary Embolism Severity Index (PESI)” criteria
- We follow “Choosing Wisely” recommendations for radiographic evaluation of suspected pulmonary emboli:

Radiation Exposure

Chest CT: 7 mSv

Radiation exposure should be limited when possible.

With and without contrast doubles the radiation dose.



“Choosing Wisely” Recommendations¹

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- **Don’t perform CTA to evaluate for possible pulmonary embolism in patients with a low clinical probability and negative results of a highly sensitive D-dimer assay** (American College of Chest Physicians and American Thoracic Society)
- **Don’t perform CT surveillance for evaluation of indeterminate pulmonary nodules at more frequent intervals or for a longer period of time than recommended by established guidelines** (American College of Chest Physicians and American Thoracic Society)
- **Don’t perform CT screening for lung cancer among patients at low risk for lung cancer** (American College of Chest Physicians and American Thoracic Society)
- **Don’t image for suspected pulmonary embolism (PE) without moderate or high pre-test probability of PE. Imaging, particularly CT pulmonary angiography, is a rapid, accurate and widely available test, but has limited value in patients who are very unlikely, based on serum and clinical criteria, to have significant value** (American College of Radiology)
- **Avoid using a computed tomography angiogram to diagnose pulmonary embolism in young women with a normal chest radiograph; consider a radionuclide lung study (“V/Q study”) instead** (Society of Nuclear Medicine and Molecular Imaging)

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Sinus CT Test Request Tip Sheet

- The primary use of sinus CT scans is to aid in management of chronic sinusitis
 - Thus, sinus CT for sinusitis is appropriate **only** after completion of a trial of observation to rule out the most common cause, viral rhinosinusitis.
 - This must be followed by a trial of medical (antihistamines and antibiotic therapy without significant improvement in signs/symptoms)
- Brain/sinus CT combination studies are rarely indicated since brain CT almost always provides adequate views of the sinuses
- We follow “Choosing Wisely” recommendations for Radiographic monitoring of Rhinosinusitis including plain films:

Radiation Exposure

Sinus CT: 4 mSv

Radiation exposure should be limited when possible.

With and without contrast doubles the radiation dose.



“Choosing Wisely” Recommendations¹

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- **Don’t order sinus CT or indiscriminately prescribe antibiotics for uncomplicated acute rhinosinusitis** (American Academy of Allergy, Asthma & Immunology)
- **Don’t routinely obtain radiographic imaging for patients who meet diagnostic criteria for uncomplicated acute rhinosinusitis. Imaging of the paranasal sinuses, including plain film radiography, CT and MRI is unnecessary in patients who meet the clinical diagnostic criteria for uncomplicated acute rhinosinusitis** (American Academy of Otolaryngology — Head and Neck Surgery Foundation)

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