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Abstract

Pediatric Musculoskeletal Imaging Guidelines, Pediatric Musculoskeletal Imaging Age Considerations

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Abstract

Many conditions affecting the musculoskeletal system in the pediatric population are different diagnoses than those occurring in the adult population. For those diseases which occur in both pediatric and adult populations, minor differences may exist in management due to patient age, comorbidities, and differences in disease natural history between children and adults. Patients age < 18 years old should be imaged according to the pediatric musculoskeletal imaging guidelines, and patients age ≥ 18 years should be imaged according to the Musculoskeletal Imaging Guidelines, except where directed otherwise by a specific guideline section. Pediatric musculoskeletal imaging appropriate clinical evaluation and conservative treatment, A recent (within 60 days) face-to-face evaluation including a detailed history, physical examination, appropriate laboratory studies, and basic imaging such as plain radiography or ultrasound should be performed prior to considering advanced imaging, unless the patient is undergoing guideline-supported scheduled follow-up imaging evaluation. Plain X-ray should be done prior to advanced imaging for musculoskeletal conditions to rule out those situations that do not require advanced imaging, such as osteoarthritis, acute/healing fracture, osteomyelitis, and tumors of bone amenable to biopsy or radiation therapy (in known metastatic disease), etc. Even in soft tissue masses, plain X-rays are helpful in evaluating for calcium/bony deposits, e.g. myositis ossificans and invasion of bone. Provider-directed conservative care may include any or all of the following: R.I.C.E (rest, ice, compression, and elevation), NSAIDs (non-steroidal anti-inflammatory drugs), narcotic and non-narcotic analgesic medications, oral or injectable corticosteroids, viscosupplementation injections, a provider-directed home exercise program, cross-training, physical medicine, or immobilization by splinting/casting/bracing. These guidelines are based upon using advanced imaging to answer specific clinical questions that will affect patient management. Imaging is not indicated if the results will not affect patient management decisions. Standard medical practice would dictate continuing conservative therapy prior to advanced imaging in patients who are improving on current treatment programs. Repeat imaging studies of the same body area are not necessary solely for return-to-play decisions. Unless otherwise stated in a specific guideline section, repeat imaging studies of the same body area are not necessary unless there is evidence for progression of disease, new onset of disease, and/or documentation of how repeat imaging will affect patient management or treatment decisions. Pediatric musculoskeletal imaging modality general considerations, MRI: MRI without contrast is the preferred modality for pediatric musculoskeletal imaging unless otherwise stated in a specific guideline section, as it is superior in imaging the soft tissues and can also define physiological processes in some instances, e.g. edema, loss of circulation (AVN), and increased vascularity (tumors). MRI without and with contrast is frequently recommended for evaluation of tumors, infection, post-operative evaluation, arthrography, and juvenile idiopathic arthritis, as described in the disease-specific guideline sections. Due to the length of time for image acquisition and the need for stillness, anesthesia is required for almost all infants and young children (age < 7 years), as well as older children with delays in development or maturity. In this patient population, MRI imaging sessions should be planned with a goal of avoiding a short-interval repeat anesthesia exposure due to insufficient information using the following considerations: MRI should always be performed without and with contrast unless there is a specific contraindication to gadolinium use, since the patient already has intravenous access for anesthesia. If multiple body areas are supported by eviCore guidelines for the clinical condition being evaluated, MRI of all necessary body areas should be obtained concurrently in the same anesthesia session. The presence of surgical hardware or implanted devices may preclude MRI, as magnetic field distortion may limit detail in adjacent structures. The selection of best examination may require coordination between the provider and the imaging service. CT: CT without contrast is generally superior to MRI for imaging bone and joint anatomy; thus it is useful for studying complex fractures (particularly of the joints, dislocations, and assessing delayed union or non-union of fractures, integration of bone graft material, if plain X-rays are equivocal. CT should not be used to replace MRI in an attempt to avoid sedation unless listed as a recommended study in a specific guideline section. CT beam attenuation can result in “spray” artifact which can obscure adjacent details. This can

occur with radiopaque material such as metal objects or dense bones. The selection of best examination may require coordination between the provider and the imaging service. Ultrasound: Ultrasound is frequently used to evaluate infants for hip dysplasia, to detect and/or aspirate joint effusion, and as an initial evaluation of extremity soft tissue masses. CPT codes vary by body area and presence or absence of Doppler imaging and are included in the table at the beginning of this guideline. Nuclear Medicine: Nuclear medicine studies are commonly used in evaluation of the peripheral musculoskeletal system, and other rare indications exist as well: bone scan is indicated for evaluation of suspected loosening of orthopedic prostheses when recent plain X-ray is nondiagnostic. Nuclear medicine bone marrow imaging is indicated for detection of ischemic or infarcted regions in sickle cell disease. Triple phase bone scan is indicated for evaluation of complex regional pain syndrome or reflex sympathetic dystrophy. Bone scan is indicated for evaluation of suspected frostbite. Bone scan is indicated for evaluation of Paget's disease. 3D Rendering: 3D Rendering indications in pediatric musculoskeletal imaging are identical to those for adult patients. See MS-3 ~ 3D Rendering for imaging guidelines. The guidelines listed in this section for certain specific indications are not intended to be all-inclusive; clinical judgment remains paramount and variance from these guidelines may be appropriate and warranted for specific clinical situations.

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