Clinical Appropriateness Guidelines: Advanced Imaging

Imaging Program Guidelines: Pediatric Imaging

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Proprietary

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Administrative	07-26-2016	07-26-2016
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Abdomen and Pelvis	11-01-2016	11-01-2016
Spine	08-27-2015	07-26-2016
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Table of Contents

Description and Application of the Guidelines 4

Administrative Guidelines 5

Ordering of Multiple Studies 5

Pre-test Requirements 6

Head & Neck Imaging 7

CT of the Head – Pediatrics 7

MRI of the Head/Brain – Pediatrics 14

CTA/MRA Head: Cerebrovascular – Pediatrics 21

Functional MRI (fMRI) Brain – Pediatrics 24

PET Brain Imaging – Pediatrics 25

CT Orbit, Sella Turcica, Posterior Fossa, Temporal Bone, including Mastoids – Pediatrics 26

MRI Orbit, Face & Neck (Soft Tissues) – Pediatrics 29

CT Paranasal Sinus & Maxillofacial Area – Pediatrics 33

MRI Temporomandibular Joint (TMJ) – Pediatrics 36

CT Neck for Soft Tissue Evaluation – Pediatrics 37

CTA/MRA of the Neck – Pediatrics 40

Chest Imaging 42

CT Chest – Pediatrics 42

CTA of the Chest (Non-Coronary) – Pediatrics 47

MRI Chest – Pediatrics 49

MRA of the Chest – Pediatrics 52

Abdominal & Pelvic Imaging 54

CT Abdomen – Pediatrics 54

MRI Abdomen – Pediatrics 65

MR Cholangiopancreatography (MRCP) Abdomen – Pediatrics 74

CTA and MRA of the Abdomen - Pediatrics 76

CT Pelvis – Pediatrics 79

MRI Pelvis – Pediatrics 85

CTA and MRA of the Pelvis – Pediatrics 91

CT of the Abdomen and Pelvis Combination – Pediatrics 93

CTA of the Abdomen and Pelvis Combination – Pediatrics 101

Spine Imaging **103**
CT Cervical Spine – Pediatrics 103
MRI Cervical Spine – Pediatrics 106
CT Thoracic Spine – Pediatrics 110
MRI Thoracic Spine – Pediatrics 113
CT Lumbar Spine – Pediatrics 117
MRI Lumbar Spine – Pediatrics 120
MRA Spinal Canal – Pediatrics 124

Extremity Imaging **125**
CT Upper Extremity – Pediatrics 125
MRI Upper Extremity (Any Joint) – Pediatrics 128
MRI Upper Extremity (Non-Joint) – Pediatrics 132
CTA and MRA Upper Extremity – Pediatrics 135
CT Lower Extremity – Pediatrics 137
MRI Lower Extremity (Joint & Non-Joint) – Pediatrics 140
CTA and MRA Lower Extremity – Pediatrics 147

Description and Application of the Guidelines

AIM's Clinical Appropriateness Guidelines (hereinafter "AIM's Clinical Appropriateness Guidelines" or the "Guidelines") are designed to assist providers in making the most appropriate treatment decision for a specific clinical condition for an individual. As used by AIM, the Guidelines establish objective and evidence-based, where possible, criteria for medical necessity determinations. In the process, multiple functions are accomplished:

- To establish criteria for when services are medically necessary
- To assist the practitioner as an educational tool
- To encourage standardization of medical practice patterns
- To curtail the performance of inappropriate and/or duplicate services
- To advocate for patient safety concerns
- To enhance the quality of healthcare
- To promote the most efficient and cost-effective use of services

AIM's guideline development process complies with applicable accreditation standards, including the requirement that the Guidelines be developed with involvement from appropriate providers with current clinical expertise relevant to the Guidelines under review and be based on the most up to date clinical principles and best practices. Relevant citations are included in the "References" section attached to each Guideline. AIM reviews all of its Guidelines at least annually.

AIM makes its Guidelines publicly available on its website twenty-four hours a day, seven days a week. Copies of AIM's Clinical Appropriateness Guidelines are also available upon oral or written request. Although the Guidelines are publicly-available, AIM considers the Guidelines to be important, proprietary information of AIM, which cannot be sold, assigned, leased, licensed, reproduced or distributed without the written consent of AIM.

AIM applies objective and evidence-based criteria and takes individual circumstances and the local delivery system into account when determining the medical appropriateness of health care services. The AIM Guidelines are just guidelines for the provision of specialty health services. These criteria are designed to guide both providers and reviewers to the most appropriate services based on a patient's unique circumstances. In all cases, clinical judgment consistent with the standards of good medical practice should be used when applying the Guidelines. Guideline determinations are made based on the information provided at the time of the request. It is expected that medical necessity decisions may change as new information is provided or based on unique aspects of the patient's condition. The treating clinician has final authority and responsibility for treatment decisions regarding the care of the patient and for justifying and demonstrating the existence of medical necessity for the requested service. The Guidelines are not a substitute for the experience and judgment of a physician or other health care professionals. Any clinician seeking to apply or consult the Guidelines is expected to use independent medical judgment in the context of individual clinical circumstances to determine any patient's care or treatment.

The Guidelines do not address coverage, benefit or other plan specific issues. If requested by a health plan, AIM will review requests based on health plan medical policy/guidelines in lieu of AIM's Guidelines.

The Guidelines may also be used by the health plan or by AIM for purposes of provider education, or to review the medical necessity of services by any provider who has been notified of the need for medical necessity review, due to billing practices or claims that are not consistent with other providers in terms of frequency or some other manner.

Administrative Guideline: Ordering of Multiple Studies

Requests for multiple imaging studies to evaluate a suspected or identified condition and requests for repeated imaging of the same anatomic area are subject to additional review to avoid unnecessary or inappropriate imaging.

Simultaneous Ordering of Multiple Studies

In many situations, ordering multiple imaging studies at the same time is not clinically appropriate because:

- Current literature and/or standards of medical practice support that one of the requested imaging studies is more appropriate in the clinical situation presented; or
- One of the imaging studies requested is more likely to improve patient outcomes based on current literature and/or standards of medical practice; or
- Appropriateness of additional imaging is dependent on the results of the lead study.

When multiple imaging studies are ordered, the request will often require a peer-to-peer conversation to understand the individual circumstances that support the medically necessity of performing all imaging studies simultaneously.

Examples of multiple imaging studies that may require a peer-to-peer conversation include:

- CT brain and CT sinus for headache
- MRI brain and MRA brain for headache
- MRI cervical spine and MRI shoulder for pain indications
- MRI lumbar spine and MRI hip for pain indications
- MRI or CT of multiple spine levels for pain or radicular indications
- MRI foot and MRI ankle for pain indications
- Bilateral exams, particularly comparison studies

There are certain clinical scenarios where simultaneous ordering of multiple imaging studies is consistent with current literature and/or standards of medical practice. These include:

- Oncologic imaging – Considerations include the type of malignancy and the point along the care continuum at which imaging is requested
- Conditions which span multiple anatomic regions – Examples include certain gastrointestinal indications or congenital spinal anomalies

Repeated Imaging

In general, repeated imaging of the same anatomic area should be limited to evaluation following an intervention, or when there is a change in clinical status such that imaging is required to determine next steps in management. At times, repeated imaging done with different techniques or contrast regimens may be necessary to clarify a finding seen on the original study.

Repeated imaging of the same anatomic area (with same or similar technology) may be subject to additional review in the following scenarios:

- Repeated imaging at the same facility due to motion artifact or other technical issues
- Repeated imaging requested at a different facility due to provider preference or quality concerns
- Repeated imaging of the same anatomic area (MRI or CT) based on persistent symptoms with no clinical change, treatment, or intervention since the previous study
- Repeated imaging of the same anatomical area by different providers for the same member over a short period of time

Administrative Guideline: Pre-Test Requirements

Critical to any finding of clinical appropriateness under the guidelines for specific imaging exams is a determination that the following are true with respect to the imaging request:

- A clinical evaluation has been performed prior to the imaging request (which should include a complete history and physical exam and review of results from relevant laboratory studies, prior imaging and supplementary testing) to identify suspected or established diseases or conditions.
- **For suspected diseases or conditions:**
  - Based on the clinical evaluation, there is a reasonable likelihood of disease prior to imaging; and
  - Current literature and standards of medical practice support that the requested imaging study is the most appropriate method of narrowing the differential diagnosis generated through the clinical evaluation and can be reasonably expected to lead to a change in management of the patient; and
  - The imaging requested is reasonably expected to improve patient outcomes based on current literature and standards of medical practice.
- **For established diseases or conditions:**
  - Advanced imaging is needed to determine whether the extent or nature of the disease or condition has changed; and
  - Current literature and standards of medical practice support that the requested imaging study is the most appropriate method of determining this and can be reasonably expected to lead to a change in management of the patient; and
  - The imaging requested is reasonably expected to improve patient outcomes based on current literature and standards of medical practice.
- If these elements are not established with respect to a given request, the determination of appropriateness will most likely require a peer-to-peer conversation to understand the individual and unique facts that would supersede the pre-test requirements set forth above. During the peer-to-peer conversation, factors such as patient acuity and setting of service may also be taken into account.

Computed Tomography (CT) Head – Pediatrics

CPT Codes

70450..... CT of head, without contrast

70460..... CT of head, with contrast

70470..... CT of head, without contrast, followed by re-imaging with contrast

Standard Anatomic Coverage

- From the skull base to vertex, covering the entire calvarium and intracranial contents
- Scan coverage may vary, depending on the specific clinical indication

Technology Considerations

- MRI of the head is preferable to CT in most clinical scenarios, due to its superior contrast resolution and lack of beam-hardening artifact adjacent to the petrous bone (which may limit visualization in portions of the posterior fossa and brainstem on CT)
- Exceptions to the use of brain MRI as the neuroimaging study of choice and clinical situations where CT head is preferred:
  - initial evaluation of recent craniocerebral trauma
  - evaluation of acute intracranial hemorrhage (parenchymal, subarachnoid, subdural, epidural)
  - evaluation of calcified intracranial lesions
  - osseous assessment of the calvarium, skull base and maxillofacial bones, including detection of calvarial and facial bone fractures

Common Diagnostic Indications

This section begins with general pediatric indications for CT Head, followed by neurologic signs and symptoms and vascular indications.

General Head/Brain

Abnormal imaging findings

Follow up of abnormal or indeterminate findings on a prior imaging study when required to direct treatment

Ataxia, congenital or hereditary

Examples include ataxia-telangiectasia, fragile X syndrome, congenital anomalies of the posterior fossa.

Congenital or developmental anomaly

Diagnosis or management (including perioperative evaluation) of a suspected or known congenital anomaly or developmental condition

Examples include Chiari malformation, craniosynostosis, macrocephaly, and microcephaly.

- Ultrasound is required as the initial study to evaluate macrocephaly in patients under 5 months of age.

Common Diagnostic Indications

Developmental delay

Evaluation of either of the following conditions:

- Cerebral palsy
- Global developmental delay, defined as significant delay or loss of milestones in **at least two** of the following domains:
  - Activities of daily living
  - Cognition
  - Motor skills (gross/fine)
  - Social/personal
  - Speech/language

Hearing loss

Evaluation for a structural cause of conductive, sensorineural or mixed hearing loss

Note: *MRI is preferred for sensorineural hearing loss. CT is preferred for conductive or mixed hearing loss.*

Horner's syndrome**

*****Requires** contraindication to MRI*

Hydrocephalus/ventricular assessment

- Evaluation of signs or symptoms suggestive of increased intracranial pressure or hydrocephalus
  - Ultrasound is required as the initial study in patients under 5 months of age
- Management of established hydrocephalus and ventricular shunts

Infectious disease

Diagnosis or management (including perioperative evaluation) of parenchymal lesions associated with CNS infection

Inflammatory disease

Diagnosis or management of inflammatory disease with CNS involvement

Lumbar puncture risk assessment

Evaluation prior to lumbar puncture when at least one of the following is present

- Papilledema
- Absent venous pulsations on funduscopic exam
- Altered mental status
- Abnormal neurological exam
- Evidence for meningeal irritation

Multiple sclerosis and other white-matter diseases**

- Diagnosis of suspected demyelinating disease
- Management or surveillance of established disease

*****Requires** contraindication to MRI*

Neurocutaneous disorders

Diagnosis or management (including perioperative evaluation) of CNS lesions associated with a known neurocutaneous disorder

Examples include neurofibromatosis, Sturge-Weber syndrome, tuberous sclerosis, and von Hippel-Lindau disease.

Papilledema

Common Diagnostic Indications

Pseudotumor cerebri

Seizures and epilepsy

Neonatal/Infantile seizure (age 2 years or younger)

- Initial evaluation of seizure not associated with fever
- Periodic follow-up at 6-month intervals up to 30 months, if initial imaging study is non-diagnostic

Childhood/Adolescent seizure (over age 2)

- When **at least one** of the following is present:
  - Focal neurologic findings at the time of the seizure
  - Persistent neurologic deficit in the postictal period
  - Idiopathic epilepsy with atypical clinical course
  - Partial seizures
  - Seizures increasing in frequency and severity despite optimal medical management
  - Electroencephalogram (EEG) findings inconsistent with idiopathic epilepsy

Complex febrile seizure (age 6 months – 5 years)

- When **either** of the following is present:
  - More than one seizure during a febrile period
  - Seizure lasting longer than 15 minutes

Note: *Imaging is not generally indicated for simple febrile seizures.*

Trauma

Evaluation following head trauma when at least one of the following is present:

- Non-accidental injury (NAI)
- Trauma associated with any of the following features:
  - Altered mental status
  - Change in behavior
  - Vomiting
  - Loss of consciousness
  - History of high risk MVA or other mechanism of injury
  - Scalp hematoma if less than 2 years of age
  - Evidence of basilar skull fracture

Note: *This indication does not apply to patients with bleeding diathesis or intracranial shunts.*

Tumor (benign or malignant)

- Diagnosis of suspected tumor when supported by the clinical presentation
- Management (including perioperative evaluation) of established tumor when imaging is required to direct treatment
- Surveillance of established tumor

Common Diagnostic Indications

Neurologic Signs & Symptoms

This section contains indications for Bell's palsy, headache, mental status change, syncope, vertigo/dizziness, and visual disturbance.

Advanced imaging based on nonspecific signs or symptoms is subject to a high level of clinical review.

Appropriateness of imaging depends upon the context in which it is requested. At a minimum, this includes a differential diagnosis and temporal component, along with documented findings on physical exam.

Additional considerations which may be relevant include comorbidities, risk factors, and likelihood of disease based on age and gender.

In general, the utility of structural brain imaging is limited to the following categories, each with a unique set of clinical presentations:

- Identification of a space occupying lesion or other focal abnormality (tumor, CVA)
- Detection of parenchymal abnormalities (atrophy, demyelinating disease, infection, ischemic change)
- Identification of ventricular abnormalities (hydrocephalus)

There are a number of common symptoms or conditions for which the likelihood of an underlying central nervous system process is extremely low. The following indications include specific considerations and requirements which help to determine appropriateness of advanced imaging for these symptoms.

Bell's palsy (peripheral facial weakness)

- When associated with additional neurologic findings suggestive of intracranial pathology
- Symptoms persisting beyond six (6) weeks in the absence of additional neurologic findings

Headache

Onset within the past 30 days with no prior history of headache, when at least one of the following is present:

- Personal or family history of disorders that may predispose one to central nervous system (CNS) lesions and clinical findings suggesting CNS involvement (including, but not limited to, vascular malformations, aneurysms, brain neoplasms, infectious/inflammatory conditions such as sarcoidosis or personal history of meningitis and tuberculosis)
- Associated neurologic findings on physical exam
- Developmental delay
- Headache that awakens the patient repeatedly from sleep or develops upon awakening
- Sudden onset and severe headache (includes thunderclap headache or worst headache of life)

Persistent or recurrent headache, when at least one of the following is present:

- Change in quality (pattern or intensity) of a previously stable headache
- Headache persisting for a period of up to 6 months duration and not responsive to medical treatment, and no prior imaging has been done to evaluate the headache
- Headache associated with **at least one** of the following:
  - Abnormal reflexes
  - Altered mental status
  - Cranial nerve deficit
  - Gait/motor dysfunction
  - Nystagmus
  - Seizure
  - Sensory deficit
  - Sign of increased intracranial pressure (increased head circumference, vomiting, papilledema, symptoms that worsen with valsalva

Note: *Imaging is not generally indicated for typical presentations of migraine.*

Common Diagnostic Indications

Mental status change (including encephalopathy), with documented evidence on neurologic exam

Syncope

Evaluation for a structural brain lesion when associated with any of following:

- Seizure activity was witnessed or is highly suspected at the time of the episode.
- There is a documented abnormality on neurological examination.
- At least one persistent neurological symptom is present

Vertigo and dizziness

- Evaluation of signs or symptoms suggestive of a CNS lesion
- Symptoms associated with abnormal audiogram or auditory brainstem response

Note: *Vertigo or dizziness which is clearly related to positional change does not require advanced imaging.*

Visual disturbance

Evaluation for central nervous system pathology when suggested by the ophthalmologic exam

Vascular indications

This section contains indications for aneurysm, cerebrovascular accident/transient ischemic attack, hemorrhage/hematoma, and other vascular abnormalities.

Aneurysm

- **Screening** in asymptomatic, high-risk individuals
  - At least two (2) first degree relatives with intracranial aneurysm or subarachnoid hemorrhage
  - Presence of a heritable condition which predisposes to intracranial aneurysm (examples include autosomal dominant polycystic kidney disease and Ehlers-Danlos syndrome type IV)
- **Diagnosis** of suspected aneurysm based on neurologic signs or symptoms (for isolated headache, see **Headache** indication)
- **Management** (including perioperative evaluation) of known (treated or untreated) intracranial aneurysm when associated with new or worsening neurologic symptoms
- **Surveillance** of known aneurysm in the absence of new or worsening symptoms
  - Initial evaluation at 6–12 months following diagnosis, then every 1–2 years
  - Follow-up after treatment with clips, endovascular coil or stenting

Cerebrovascular accident (CVA or stroke) and transient ischemic attack (TIA)

Hemorrhage/hematoma

Other vascular abnormalities

- Arteriovenous malformation (AVM)
- Cavernous malformation
- Cerebral vein thrombosis
- Dural arteriovenous fistula (DAVF)
- Dural venous sinus thrombosis
- Venous angioma

Note: *CTA or MRA is generally preferred for these indications.*

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Magnetic Resonance Imaging (MRI) Head/Brain – Pediatrics

CPT Codes

70551..... MRI Head, without contrast

70552..... MRI Head, with contrast

70553..... MRI Head, without contrast, followed by re-imaging with contrast

Standard Anatomic Coverage

- From skull base to vertex, covering the entire calvarium and intracranial contents, including the internal auditory canals
- Scan coverage may vary, depending on the specific clinical indication

Technology Considerations

- MRI of the head is preferable to CT in most clinical scenarios, due to its superior contrast resolution and lack of beam-hardening artifact adjacent to the petrous bone (which may limit visualization in portions of the posterior fossa and brainstem on CT).
- Exceptions to the use of brain MRI as the neuroimaging study of choice and clinical situations where CT head is preferred:
  - initial evaluation of recent craniocerebral trauma
  - evaluation of acute intracranial hemorrhage (parenchymal, subarachnoid, subdural, epidural)
  - evaluation of calcified intracranial lesions
  - osseous assessment of the calvarium, skull base and maxillofacial bones, including detection of calvarial and facial bone fractures

Common Diagnostic Indications

This section begins with general pediatric indications for MRI Head/Brain, followed by neurologic signs and symptoms and vascular indications.

General Head/Brain

Abnormal imaging findings

Follow up of abnormal or indeterminate findings on a prior imaging study when required to direct treatment

Ataxia, congenital or hereditary

Examples include ataxia-telangiectasia, fragile X syndrome, congenital anomalies of the posterior fossa.

Congenital or developmental anomaly

Diagnosis or management (including perioperative evaluation) of a suspected or known congenital anomaly or developmental condition

Examples include Chiari malformation, craniosynostosis, macrocephaly, and microcephaly.

- Ultrasound is required as the initial study to evaluate macrocephaly in patients under 5 months of age.

Common Diagnostic Indications

Developmental delay

Evaluation of either of the following conditions:

- Cerebral palsy
- Global developmental delay, defined as significant delay or loss of milestones in **at least two** of the following domains:
  - Activities of daily living
  - Cognition
  - Motor skills (gross/fine)
  - Social/personal
  - Speech/language

Hearing loss

Evaluation for a structural cause of conductive, sensorineural or mixed hearing loss

Note: *MRI is preferred for sensorineural hearing loss. CT is preferred for conductive or mixed hearing loss.*

Horner's syndrome

Hydrocephalus/ventricular assessment

- Evaluation of signs or symptoms suggestive of increased intracranial pressure or hydrocephalus
  - Ultrasound is required as the initial study in patients under 5 months of age
- Management of established hydrocephalus and ventricular shunts

Infectious disease

Diagnosis or management (including perioperative evaluation) of parenchymal lesions associated with CNS infection

Inflammatory disease

Diagnosis or management of inflammatory disease with CNS involvement

Multiple sclerosis and other white-matter diseases

- Diagnosis of suspected demyelinating disease
- Management or surveillance of established disease

Neurocutaneous disorders

Diagnosis or management (including perioperative evaluation) of CNS lesions associated with a known neurocutaneous disorder

Examples include neurofibromatosis, Sturge-Weber syndrome, tuberous sclerosis, von Hippel-Lindau disease.

Papilledema

Pseudotumor cerebri

Common Diagnostic Indications

Seizures and epilepsy

Neonatal/Infantile seizure (age 2 years or younger)

- Initial evaluation of seizure not associated with fever
- Periodic follow-up at 6-month intervals up to 30 months, if initial imaging study is non-diagnostic

Childhood/Adolescent seizure (over age 2)

- When **at least one** of the following is present:
  - Focal neurologic findings at the time of the seizure
  - Persistent neurologic deficit in the postictal period
  - Idiopathic epilepsy with atypical clinical course
  - Partial seizures
  - Seizures increasing in frequency and severity despite optimal medical management
  - Electroencephalogram (EEG) findings inconsistent with idiopathic epilepsy

Complex febrile seizure (age 6 months – 5 years)

- When **either** of the following is present:
  - More than one seizure during a febrile period
  - Seizure lasting longer than 15 minutes

Note: *Imaging is not generally indicated for simple febrile seizures.*

Trauma

Evaluation following head trauma when at least one of the following is present:

- Non-accidental injury (NAI)
- Trauma associated with any of the following features:
  - Altered mental status
  - Change in behavior
  - Vomiting
  - Loss of consciousness
  - History of high risk MVA or other mechanism of injury
  - Scalp hematoma if less than 2 years of age
  - Evidence of basilar skull fracture

Note: *This indication does not apply to patients with bleeding diathesis or intracranial shunts.*

Tumor (benign or malignant)

- Diagnosis of suspected tumor when supported by the clinical presentation
- Management (including perioperative evaluation) of established tumor when imaging is required to direct treatment
- Surveillance of established tumor

Common Diagnostic Indications

Neurologic Signs & Symptoms

This section contains indications for Bell's palsy, headache, mental status change, syncope, vertigo/dizziness, and visual disturbance.

Advanced imaging based on nonspecific signs or symptoms is subject to a high level of clinical review.

Appropriateness of imaging depends upon the context in which it is requested. At a minimum, this includes a differential diagnosis and temporal component, along with documented findings on physical exam.

Additional considerations which may be relevant include comorbidities, risk factors, and likelihood of disease based on age and gender.

In general, the utility of structural brain imaging is limited to the following categories, each with a unique set of clinical presentations:

- Identification of a space occupying lesion or other focal abnormality (tumor, CVA)
- Detection of parenchymal abnormalities (atrophy, demyelinating disease, infection, ischemic change)
- Identification of ventricular abnormalities (hydrocephalus)

There are a number of common symptoms or conditions for which the likelihood of an underlying central nervous system process is extremely low. The following indications include specific considerations and requirements which help to determine appropriateness of advanced imaging for these symptoms.

Bell's palsy (peripheral facial weakness)

- When associated with additional neurologic findings suggestive of intracranial pathology
- Symptoms persisting beyond six (6) weeks in the absence of additional neurologic findings

Headache

Onset within the past 30 days with no prior history of headache, when at least one of the following is present:

- Personal or family history of disorders that may predispose one to central nervous system (CNS) lesions and clinical findings suggesting CNS involvement (including, but not limited to, vascular malformations, aneurysms, brain neoplasms, infectious/inflammatory conditions such as sarcoidosis or personal history of meningitis and tuberculosis)
- Associated neurologic findings on physical exam
- Developmental delay
- Headache that awakens the patient repeatedly from sleep or develops upon awakening
- Sudden onset and severe headache (includes thunderclap headache or worst headache of life)

Persistent or recurrent headache, when at least one of the following is present:

- Change in quality (pattern or intensity) of a previously stable headache
- Headache persisting for a period of up to 6 months duration and not responsive to medical treatment, and no prior imaging has been done to evaluate the headache
- Headache associated with **at least one** of the following:
  - Abnormal reflexes
  - Altered mental status
  - Cranial nerve deficit
  - Gait/motor dysfunction
  - Nystagmus
  - Seizure
  - Sensory deficit
  - Sign of increased intracranial pressure (increased head circumference, vomiting, papilledema, symptoms that worsen with valsalva)

Note: *Imaging is not generally indicated for typical presentations of migraine.*

Common Diagnostic Indications

Mental status change (including encephalopathy), with documented evidence on neurologic exam

Syncope

Evaluation for a structural brain lesion when associated with any of following:

- Seizure activity was witnessed or is highly suspected at the time of the episode.
- There is a documented abnormality on neurological examination.
- At least one persistent neurological symptom is present

Vertigo and dizziness

- Evaluation of signs or symptoms suggestive of a CNS lesion
- Symptoms associated with abnormal audiogram or auditory brainstem response

Note: *Vertigo or dizziness which is clearly related to positional change does not require advanced imaging.*

Visual disturbance

Evaluation for central nervous system pathology when suggested by the ophthalmologic exam

Vascular indications

This section contains indications for aneurysm, cerebrovascular accident/transient ischemic attack, hemorrhage/hematoma, and other vascular abnormalities.

Aneurysm

- **Screening** in asymptomatic high-risk individuals
  - At least two (2) first degree relatives with intracranial aneurysm or subarachnoid hemorrhage
  - Presence of a heritable condition which predisposes to intracranial aneurysm (examples include autosomal dominant polycystic kidney disease and Ehlers-Danlos syndrome type IV)
- **Diagnosis** of suspected aneurysm based on neurologic signs or symptoms (for isolated headache, see **Headache** indication)
- **Management** (including perioperative evaluation) of known (treated or untreated) intracranial aneurysm when associated with new or worsening neurologic symptoms
- **Surveillance** of known aneurysm in the absence of new or worsening symptoms
  - Initial evaluation at 6–12 months following diagnosis, then every 1–2 years
  - Follow-up after treatment with clips, endovascular coil or stenting

Cerebrovascular accident (CVA or stroke) and transient ischemic attack (TIA)

Hemorrhage/hematoma

Other vascular abnormalities

- Arteriovenous malformation (AVM)
- Cavernous malformation
- Cerebral vein thrombosis
- Dural arteriovenous fistula (DAVF)
- Dural venous sinus thrombosis
- Venous angioma

Note: *CTA or MRA is generally preferred for these indications.*

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CT Angiography (CTA) and MR Angiography (MRA) Head: Cerebrovascular – Pediatrics

CPT Codes

70496..... Computed tomographic angiography, head, with contrast material(s), including noncontrast images, if performed, and image postprocessing

70544..... Magnetic resonance angiography, head, without contrast

70545..... Magnetic resonance angiography, head, with contrast

70546..... Magnetic resonance angiography, head, without contrast, followed by re-imaging with contrast

Angiography includes imaging of all blood vessels, including arteries and veins. The codes above include CT/MR Venography.

Standard Anatomic Coverage

- CTA or MRA may be performed to assess the major intracranial arteries of the anterior and posterior circulations (including the Circle of Willis) as well as the venous structures (major cerebral veins and dural venous sinuses).
- For specific clinical indications, exams may be tailored to the region of interest.
- MRA of the head includes imaging of the entire arteriovenous system of the brain. Separate requests for concurrent imaging of the arteries and the veins in the head are inappropriate.

Choice of Imaging Study

Advantages of CTA

- Higher sensitivity for detection of mural calcification
- Absence of in-plane flow phenomenon which can exaggerate the degree of stenosis
- Improved detection of surgical clips and stents
- Shorter scan time, resulting in less motion artifact and better quality images

Advantages of MRA

- Provides information about the age of blood
- No need for iodinated contrast material
- No exposure to ionizing radiation

Combination with MRI

- In the majority of clinical situations, appropriateness of a second imaging study is dependent on the results of the lead study. This is particularly true with regard to MRI and MRA of the same anatomic region, as there is considerable overlap in visualizing vascular structures. Therefore, it is prudent to begin with the optimal study for the indication requested.
- When ordered in combination, peer to peer conversation will be required to understand the individual and unique facts that would support the medical necessity of all imaging studies requested.

Common Diagnostic Indications

Abnormal imaging findings

Follow up of abnormal or indeterminate findings on a prior imaging study when required to direct treatment

Common Diagnostic Indications

Aneurysm

- **Screening** in asymptomatic, high-risk individuals
  - At least two (2) first degree relatives with intracranial aneurysm or subarachnoid hemorrhage
  - Presence of a heritable condition which predisposes to intracranial aneurysm (examples include autosomal dominant polycystic kidney disease and Ehlers-Danlos syndrome type IV)
- **Diagnosis** of suspected aneurysm based on neurologic signs or symptoms (for isolated headache, see **Headache** indication)
- **Management** (including perioperative evaluation) of known (treated or untreated) intracranial aneurysm when associated with new or worsening neurologic symptoms
- **Surveillance** of known aneurysm in the absence of new or worsening symptoms
  - Initial evaluation at 6–12 months following diagnosis, then every 1–2 years
  - Follow-up after treatment with clips, endovascular coil or stenting

Cerebrovascular accident (CVA)

- Evaluation for stenosis or occlusion of the intracranial arteries following confirmation of recent non-hemorrhagic CVA on MRI, CT or ultrasound of the brain
- Evaluation for a vascular etiology following confirmation of a recent hemorrhagic CVA on MRI, CT or ultrasound of the brain

Congenital or developmental vascular anomaly

Diagnosis or management (including perioperative or periprocedural management) of a suspected or known cerebrovascular anomaly

Examples include arteriovenous malformation (AVM), cavernous malformation, dural arteriovenous fistula (DAVF).

Dissection

Diagnosis or management (including perioperative evaluation) of intracranial arterial dissection

Headache

Evaluation for a vascular etiology when at least one of the following is present:

- Exertional headache
- Positional headache
- Sudden onset of worst headache of life

Hemorrhage / hematoma

Pulsatile tinnitus

- Evaluation for vascular etiology

Stenosis or occlusion of intracranial arteries

- Diagnosis or management of known or suspected steno-occlusive disease

Examples include Moyamoya disease, sickle cell anemia, and idiopathic progressive arteriopathy of childhood.

Thromboembolic disease of major intracranial arterial or venous systems

Trauma

- When vascular involvement is known or suspected

Tumor (benign or malignant)

- **Evaluation of vascular supply to established tumor**

Common Diagnostic Indications

Vasculitis

Diagnosis or management of vasculitis with known or suspected CNS involvement

Venous thrombosis or compression

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1. Uchino A, Sawada A, Takase Y, Kudo S.MR angiography of anomalous branches of the internal carotid artery. *AJR Am J Roentgenol*. 2003 Nov;181(5):1409-1414.

Functional Magnetic Resonance Imaging (fMRI) Brain – Pediatrics

CPT Codes

70554..... Magnetic resonance imaging, brain, functional MRI; including test selection and administration of repetitive body part movement and/or visual stimulation, not requiring physician or psychologist administration

70555..... Magnetic resonance imaging, brain, functional MRI; including test selection and administration of repetitive body part movement and/or visual stimulation, requiring physician or psychologist administration of entire neurofunctional testing

Standard Anatomic Coverage

- From the skull base to vertex, covering the intracranial contents
- Scan coverage may vary, depending on the specific clinical indication

Technology Considerations

- Functional MRI of the brain may be used to localize eloquent areas in the brain, prior to resection of neoplasm or medically intractable epileptogenic foci.
- Studies have shown excellent agreement in language localization, when comparing functional brain MRI with the Wada test and direct electrical stimulation.
- Advantages of functional brain MRI over a Wada test include the non-invasive technique (not requiring catheter placement and contrast injection), lack of ionizing radiation, shorter time-requirement, lower cost and quicker post-procedural recovery. Additionally, the Wada test is considered limited in right hemisphere dominance.
- Advantages of functional brain MRI over intraoperative electrocortical stimulation include its non-invasive technique and more extensive anatomic brain mapping. Direct electrical stimulation is an invasive procedure, which usually evaluates only one hemisphere (limiting assessment for partial or bilateral language dominance) and usually identifies only eloquent brain regions on the surface of the brain.
- Functional MRI may successfully map primary brain activities related to motor, sensory and language functions. Examples of tasks which may be used include sentence completion (to map language) and bilateral hand squeeze task (for sensory motor mapping).

Common Diagnostic Indications

Brain tumor

- For preoperative neurosurgical planning, as a replacement for a Wada test or direct electrical stimulation mapping

Seizures/epilepsy refractory to medical treatment

- For preoperative neurosurgical planning, as a replacement for a Wada test or direct electrical stimulation mapping

Positron Emission Tomography (PET) Brain Imaging – Pediatrics

CPT Codes

78608..... PET brain, metabolic evaluation

78609..... PET brain, perfusion evaluation

Commonly Used Radiopharmaceuticals

- 2-(fluorine-18) fluoro-2-deoxy-d-glucose (FDG) Scan coverage may vary, depending on the specific clinical indication

Common Diagnostic Indications

Brain tumor

- Diagnosis or staging
- Differentiation of post treatment scarring from residual or recurrent disease

Refractory seizures/epilepsy

- Presurgical evaluation to identify a focus of seizure activity in patients who have failed conventional medical therapy

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Computed Tomography (CT) Orbit, Sella Turcica, Posterior Fossa, Temporal Bone, including Mastoids – Pediatrics

CPT Codes

70480..... CT of orbit, sella or posterior fossa and outer, middle or inner ear, without contrast

70481..... CT of orbit, sella or posterior fossa and outer, middle or inner ear, with contrast

70482..... CT of orbit, sella or posterior fossa and outer, middle or inner ear, without contrast, followed by re-imaging with contrast

Standard Anatomic Coverage

- The anatomic coverage and protocol specifications will vary, depending on the clinical indication. Anatomic evaluation includes the internal auditory canals (IACs), posterior fossa, sella turcica, orbits and temporal bone, with the mastoid air cells.
- Targeted evaluation, such as CT of the temporal bones, involves collimated views through the region of interest, often in two imaging planes: axial images (petrous bones through mastoid tips) and coronal views (temporomandibular joints through temporal bones).

Technology Considerations

- CT is often the preferred study for suspected fracture or follow-up of a known fracture, foreign body detection, assessment of calcified lesions and temporal bone evaluation.
- With capability for high-resolution osseous imaging, CT can provide detailed anatomic depiction of the temporal bone anatomy, including the middle and inner ear structures.
- MRI (unless contraindicated) is usually preferred over CT for evaluation of the sella turcica, internal auditory canal regions and visual pathways, as well as for most soft tissue tumor evaluation.
- Bony changes from a sellar, parasellar or orbital mass or infectious process are usually well demonstrated by CT.

Common Diagnostic Indications

This section begins with general pediatric indications, followed by orbital and otic indications.

General indications

Abnormal imaging findings

Follow up of abnormal or indeterminate findings on a prior imaging study when required to direct treatment

Congenital or developmental anomaly

Diagnosis or management (including perioperative evaluation) of a suspected or known congenital anomaly or developmental condition of the orbit, temporal bone, sella turcica or posterior fossa (see Standard Anatomic Coverage for detail)

Infectious disease

Diagnosis or management (including perioperative evaluation) of infection involving the orbit, temporal bone, sella turcica or posterior fossa

Inflammatory disease

Diagnosis or management of inflammatory disease known to involve the orbit, temporal bone, sella turcica or posterior fossa

Localized facial pain – when persistent and unexplained

Common Diagnostic Indications

Osseous lesions

Examples include fibrous dysplasia, Paget's disease, and otosclerosis.

Trauma to the orbit, temporal bone, or skull base

Tumor (benign or malignant)

Diagnosis or management (including perioperative evaluation) of benign or malignant tumor of the orbit, temporal bone, sella turcica or posterior fossa

Orbital indications

Evaluation of any of the following:

- Absence of red reflex
- Dysconjugate gaze
- Exophthalmos (or proptosis)
- Extraocular muscle weakness
- Nystagmus
- Optic neuritis
- Orbital pseudotumor
- Papilledema
- Strabismus
- Thyroid ophthalmopathy

Foreign body in the orbit

- Following non-diagnostic radiograph

Visual disturbance

Evaluation for orbital or optic nerve pathology when suggested by the ophthalmologic exam

Otic indications

Cholesteatoma

Cochlear implant

Preoperative and post-operative evaluation

Hearing loss

Evaluation for a structural cause of conductive, sensorineural or mixed hearing loss

Note: *CT is preferred for conductive or mixed hearing loss. MRI is preferred for sensorineural hearing loss.*

Pulsatile tinnitus

Vertigo and dizziness

- Evaluation of signs or symptoms suggestive of a CNS lesion
- Symptoms associated with abnormal audiogram or auditory brainstem response

Note: *Vertigo or dizziness which is clearly related to positional change does not require advanced imaging.*

References

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Magnetic Resonance Imaging (MRI) Orbit, Face & Neck (Soft Tissues) – Pediatrics

CPT Codes

70540..... MRI orbit, face and neck, without contrast

70542..... MRI orbit, face and neck, with contrast

70543..... MRI orbit, face and neck, without contrast, followed by re-imaging with contrast

Standard Anatomic Coverage

- Scan coverage is dependent on the specific anatomic area of clinical interest and may include the following:
  - Facial structures
  - Larynx and subglottic regions
  - Nasopharynx, oropharynx and hypopharynx
  - Neck soft tissues, surrounding the airway and glands
  - Optic nerve
  - Orbit
  - Salivary glands
  - Sinuses
  - Thyroid and parathyroid gland

Choice of Imaging Study

- CT is generally the modality of choice for traumatic injury, calcified lesions, localized infection (for example, orbital extension of an adjacent complicated sinusitis), and foreign body evaluation following initial radiographic evaluation for a radiopaque foreign body.
- CT is preferred for visualization of soft tissue structures in the neck.
- MRI of the orbit, face and neck is not indicated for imaging the internal auditory canals (see MRI brain, CPT codes 70551–70553).

Common Diagnostic Indications

This section begins with general pediatric indications, followed by nasal, neck, and orbital indications.

General indications

Abnormal imaging findings

Follow up of abnormal or indeterminate findings on a prior imaging study when required to direct treatment

Congenital anomalies

Diagnosis or management (including perioperative evaluation) of a suspected or known congenital anomaly of the orbit, maxillofacial area, or soft tissue structures of the neck (see Standard Anatomic Coverage for detail)

Horner's syndrome

Infectious disease (excluding sinusitis)

Diagnosis or management (including perioperative evaluation) of infection involving the orbit, maxillofacial area, or soft tissue of the neck

Note: *For sinus infection, see CT Paranasal Sinus and Maxillofacial Area*

Common Diagnostic Indications

Inflammatory disease

Diagnosis or management of inflammatory disease known to involve the orbit, maxillofacial area, or soft tissue structures of the neck

Example *includes Wegener's granulomatosis (granulomatosis with polyangiitis)*

Osteonecrosis of the jaw

- Evaluation following non-diagnostic Panorex/radiographs

Trauma to facial structures or soft tissues of the neck

Tumor (benign or malignant)

Diagnosis or management (including perioperative evaluation) of suspected or known malignancy when imaging is required to direct treatment

Nasal indications

Evaluation of any of the following:

- Anosmia
- Recurrent epistaxis
- Nasal airway obstruction or polyposis refractory to medical therapy

Neck indications

Hoarseness, dysphonia or vocal cord weakness/paralysis

- Following laryngoscopy, when findings suggest recurrent laryngeal nerve dysfunction or identify a suspicious lesion
- Symptoms persisting longer than one month which are unexplained by laryngoscopy

Lymphadenopathy

Evaluation of unexplained lymphadenopathy in any of the following clinical scenarios:

- Ultrasound findings suggestive of nodal malignancy
- Non-diagnostic ultrasound and failure to resolve following a six (6) week course of empiric therapy
- Non-diagnostic ultrasound and presence of **at least one*** of the following features:
  - Constitutional symptoms
  - Firm/immobile and larger than 3 cm in diameter
  - Persistent enlargement on exam for longer than 2 weeks
  - Presence of ulceration
  - Supraclavicular or posterior triangle location

***Note:** Biopsy may be more appropriate than imaging when any of these features are present.*

Neck mass

- Initial evaluation of a palpable neck mass when ultrasound demonstrates a solid mass other than a lymph node
- Management of known cystic neck mass or other benign tumor when ultrasound is not sufficient to guide treatment
- Evaluation of a retropharyngeal neck mass

Parathyroid adenoma

- Evaluation of suspected adenoma following abnormal parathyroid ultrasound or scintigraphy
- Preoperative planning in patients with aberrant anatomy
- Localization of residual parathyroid tissue following failed parathyroidectomy

Common Diagnostic Indications

Stridor

- Evaluation of acute stridor
- For subacute or chronic stridor, following non-diagnostic radiograph and ENT evaluation

Thyroid nodule or thyromegaly (goiter)

- Following non-diagnostic thyroid ultrasound or thyroid scintigraphy
- When associated with mass effect on the upper airway or esophagus
- For preoperative evaluation

Torticollis

- Evaluation of childhood (acquired) torticollis when clinical findings suggest a secondary cause (such as infection, neoplasm, trauma)
- Evaluation of congenital muscular torticollis when all of the following apply:
  - Age 8 months or younger
  - Following non-diagnostic ultrasound of the neck
  - Following non-diagnostic cervical spine radiograph
  - Failure to respond to at least four (4) weeks of conservative treatment

Tracheal stenosis

Upper airway obstruction

Orbital indications

Evaluation of any of the following:

- Absence of red reflex
- Dysconjugate gaze
- Exophthalmos (or proptosis)
- Extraocular muscle weakness
- Nystagmus
- Optic neuritis
- Orbital pseudotumor
- Papilledema
- Strabismus
- Thyroid ophthalmopathy

Visual disturbance

Evaluation for orbital or optic nerve pathology when suggested by the ophthalmologic exam

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Computed Tomography (CT) Paranasal Sinus & Maxillofacial Area – Pediatrics

CPT Codes

70486..... CT of maxillofacial area, without contrast

70487..... CT of maxillofacial area, with contrast

70488..... CT of maxillofacial area, without contrast, followed by re-imaging with contrast

Standard Anatomic Coverage

- Includes the sinuses, facial structures and maxillary regions. Individual scan coverage depends on the specific clinical request, but generally includes images through the entire frontal, ethmoid, maxillary and sphenoid sinuses. Coverage may be extended to include the mandible and temporomandibular joint (TMJ) in select cases and depending on the clinical indication. CT sections may be obtained in one or two (usually coronal and axial) planes.

Common Diagnostic Indications

Abnormal imaging findings

Follow up of abnormal or indeterminate findings on a prior imaging study when required to direct treatment

Congenital anomaly

Diagnosis or management (including perioperative evaluation) of a suspected or known congenital maxillofacial anomaly when imaging is required to direct treatment

Infectious disease

Diagnosis or management (including perioperative evaluation) of the following:

- Fungal or other complex sinus infections
- Osteomyelitis of the facial bones

Inflammatory disease

Diagnosis or management of inflammatory disease known to involve the maxillofacial region

Examples *include Wegener's granulomatosis (granulomatosis with polyangiitis)*

Osteonecrosis of the jaw

Evaluation following non-diagnostic Panorex/radiographs

Sinus and nasal indications

Diagnosis or management (including perioperative evaluation) of the following:

- Anosmia
- Foreign body in the maxillofacial region
- Mucocoele of paranasal sinuses
- Nasal airway obstruction refractory to medical therapy
- Polyposis
- Recurrent epistaxis

Common Diagnostic Indications

Sinusitis, acute and subacute

(any one of the following)

- Screening of immunocompromised patient or a patient who is likely to become immunocompromised by therapy (for example, prior to chemotherapy or transplant)
- Management of complications of acute sinusitis **(any one of the following)**
  - Abscess, intracranial or orbital
  - Encephalitis or cerebritis
  - Meningitis
  - Sinus thrombosis
  - Invasive fungal sinusitis in immunocompromised patients

Note: *Any episode of sinusitis with duration of less than 30 (acute) or 31-90 (subacute) days. Sinusitis is generally rare in patients under 3 years of age.*

Sinusitis, chronic or recurrent

(any one of the following)

- Corroborate diagnosis of chronic sinusitis prior to a prolonged course of antibiotics
- Diagnose underlying medical condition **(any one of the following)**
  - Chronic allergies or asthma
  - Ciliary motility disorder
  - Craniofacial abnormality
  - Cystic fibrosis
  - Immunodeficiency
- Diagnose unilateral sinusitis
- Post-operative management of complications
- Pre-operative evaluation to determine whether the patient is a surgical candidate
- Pre-operative image guidance study

Note: *Any episode of sinusitis that persists beyond ninety (90) days. Indication includes recurrent acute bacterial sinusitis (RABS), defined as episodes of sinusitis lasting less than 30 days with at least 10 symptom-free days in-between. At least three (3) such episodes within six (6) months or four (4) episodes within a year are required to qualify.*

Temporomandibular disease (TMD)

Diagnosis of a temporomandibular joint (TMJ) source of TMD when at least one of the following applies:

- Panorex is inconclusive or not available
- Panorex findings are unclear or require further characterization:
- Panorex is normal but high clinical suspicion for TMJ pathology remains and the results will change management (including perioperative evaluation)

Note: *Temporomandibular disease is a collective term, which includes disorders of both the masticatory muscles and the TMJ. CT is generally not indicated when a muscular etiology for TMD is suspected. Most TMJ pathology can be evaluated with a Panorex radiograph.*

Trauma to the facial bones

Tumor or mass lesion in the sinus or nasal region

Diagnosis or management (including perioperative evaluation) of benign or malignant tumor

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Magnetic Resonance Imaging (MRI) Temporomandibular Joint (TMJ) – Pediatrics

CPT Codes

70336..... MRI of Temporomandibular Joint(s)

Standard Anatomic Coverage

- Bilateral study, including open and closed mouth views, often performed with surface coils
- Images may be obtained in axial, (oblique) sagittal and (oblique) coronal planes

Common Diagnostic Indications

Abnormal imaging findings

Follow up of abnormal or indeterminate findings on a prior imaging study when required to direct treatment

Arthropathy of the temporomandibular joints

Following non-diagnostic radiograph, or Panorex view of the TMJ

Examples *include traumatic, inflammatory or infectious arthritis*

Frozen jaw

Juvenile idiopathic arthritis (JIA)

Management of JIA when radiographs are not sufficient to guide therapy

Temporomandibular joint dysfunction

Evaluation of persistent symptoms when all of the following requirements are met:

- X-ray or Panorex has not provided sufficient information to guide treatment.
- Intervention is being considered.
- Symptoms have not improved with conservative treatment, including NSAIDs or acetaminophen, a short-term trial of soft diet and proper chewing techniques, and an oral appliance (such as a bite block).

Trauma to the temporomandibular joints

- Evaluation of meniscal position and integrity

Note: *Conventional radiographs, Panorex views or CT of the TMJ are preferred for initial evaluation of trauma.*

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Computed Tomography (CT) Neck for Soft Tissue Evaluation – Pediatrics

CPT Codes

70490..... CT Soft Tissues of Neck, without contrast

70491..... CT Soft Tissues of Neck, with contrast

70492..... CT Soft Tissues of Neck without contrast, followed by re-imaging with contrast

Standard Anatomic Coverage

- Axial images from the skull base to the clavicles

Technology Considerations

- CT is generally the modality of choice for the following indications: detection of sialolithiasis (salivary gland calculi); following trauma to the soft tissues of the neck; and during foreign body evaluation, after initial radiographic assessment for a radiopaque foreign body

Common Diagnostic Indications

Abnormal imaging findings

Follow up of abnormal or indeterminate findings on a prior imaging study when required to direct treatment

Congenital anomaly

Diagnosis or management (including perioperative evaluation) of a suspected or known congenital or developmental anomaly of the soft tissue structures of the neck

Foreign body in the upper aerodigestive tract or surrounding neck tissue

- Following non-diagnostic neck radiograph

Hoarseness, dysphonia, or vocal cord weakness/paralysis

- Following laryngoscopy, when vocal cord paralysis is demonstrated, or study is non-diagnostic
- Evaluation of symptoms persisting longer than one month when laryngoscopy has not been performed

Horner's syndrome

Infectious disease

Diagnosis or management (including perioperative evaluation) of infection involving soft tissue structures in the neck

Inflammatory disease

Diagnosis or management of inflammatory disease involving soft tissue structures in the neck

Laryngeal edema

Common Diagnostic Indications

Lymphadenopathy

Evaluation of unexplained lymphadenopathy in any of the following clinical scenarios:

- Ultrasound findings suggestive of nodal malignancy
- Non-diagnostic ultrasound and failure to resolve following a six (6) week course of empiric therapy
- Non-diagnostic ultrasound and presence of at least one* of the following features:
  - Absence of pain or tenderness
  - Constitutional symptoms
  - Firm/immobile and size greater than 3 cm in diameter
  - Persistent enlargement on exam for longer than 2 weeks
  - Presence of ulceration
  - Supraclavicular or posterior triangle location

***Note:** Biopsy may be more appropriate than imaging when any of these features are present.*

Neck mass

- Initial evaluation of a palpable neck mass when ultrasound demonstrates a solid mass other than a lymph node
- Management of known cystic neck mass or other benign tumor when ultrasound is not sufficient to guide treatment
- Evaluation of a retropharyngeal neck mass

Osteonecrosis of the jaw

Evaluation following non-diagnostic X-ray or Panorex

Parathyroid adenoma

- Evaluation of suspected adenoma following abnormal parathyroid ultrasound or scintigraphy
- Preoperative planning in patients with aberrant anatomy
- Localization of residual parathyroid tissue following failed parathyroidectomy

Salivary/parotid gland ductal calculi

Stridor

- Evaluation of acute stridor
- For subacute or chronic stridor, following non-diagnostic radiograph and ENT evaluation

Thyroid nodule or thyromegaly (goiter)

- Following non-diagnostic thyroid ultrasound or thyroid scintigraphy
- When associated with mass effect on the upper airway or esophagus
- For preoperative evaluation

Torticollis

- Evaluation of childhood (acquired) torticollis when clinical findings that suggest a secondary cause (such as infection, neoplasm, or trauma)
- Evaluation of congenital muscular torticollis when all of the following apply:
  - Age 8 months or younger
  - Non-diagnostic ultrasound of the neck
  - Non-diagnostic cervical spine X-ray
  - Failure to respond to at least four (4) weeks of conservative treatment

Tracheal stenosis

Traumatic injury to soft tissues structures of the neck

Common Diagnostic Indications

Tumor (benign or malignant)

Diagnosis or management (including perioperative evaluation) of suspected or known malignancy

Upper airway obstruction

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CT/MR Angiography (CTA/MRA) Neck – Pediatrics

CPT Codes

70498..... CTA of neck, with contrast material(s), including noncontrast images, if performed, and image post-processing

70547..... MRA of Neck without contrast

70548..... MRA of Neck with contrast

70549..... MRA of Neck without contrast, followed by re-imaging with contrast

Angiography includes imaging of all blood vessels (arteries and veins). The above CPT codes include venography.

Standard Anatomic Coverage

- CTA and MRA of the neck involve image acquisitions from the aortic arch to the skull base, to visualize major vessels which include the extracranial carotid arteries and vertebral arteries. The major venous structures may also be interrogated with CT and MR angiographic techniques.

Choice of Imaging Study

- Duplex Doppler ultrasound is a first line imaging study for most carotid indications.

Advantages of CTA

- Higher sensitivity for detection of mural calcification
- Absence of in-plane flow phenomenon which can exaggerate the degree of stenosis
- Improved detection of surgical clips and stents
- Shorter scan time, resulting in less motion artifact and better quality images

Advantages of MRA

- Provides information about the age of blood
- No need for iodinated contrast material
- No exposure to ionizing radiation

Common Diagnostic Indications

Abnormal imaging findings

Follow up of abnormal or indeterminate findings on a prior imaging study when required to direct treatment

Aneurysm or dissection of carotid or vertebral arteries

Carotid stenosis or occlusion

Diagnosis or management of known or suspected steno-occlusive disease

- Following abnormal or equivocal duplex Doppler study, unless the diagnosis is supported by clinical exam findings.

Examples include Moyamoya disease, sickle cell anemia, and idiopathic progressive arteriopathy of childhood.

Congenital or developmental vascular anomaly

Diagnosis or management (including perioperative evaluation) of a vascular anomaly of the carotid or vertebral arteries including arteriovenous malformation (AVM)

Horner's syndrome

Intramural hematoma

Common Diagnostic Indications

Post-operative or post-procedure evaluation

Note: *This indication is for post-operative evaluation of conditions not specifically referenced elsewhere in this guideline.*

Preoperative or pre-procedure evaluation

Note: *This indication is for preoperative evaluation of conditions not specifically referenced elsewhere in this guideline.*

Exclusion:

- MRV (or CTV) in preparation for either a neurosurgical or percutaneous procedure to treat multiple sclerosis is not considered appropriate.

Thromboembolic disease of major extracranial arterial and/or venous systems

Traumatic vascular injury to the extracranial carotid and vertebral arteries

Vasculopathy (including fibromuscular dysplasia and vasculitis)

Venous thrombosis or compression

Vertebrobasilar stenosis or occlusion

Computed Tomography (CT) Chest – Pediatrics

CPT Codes

71250..... Chest CT without contrast

71260..... Chest CT with contrast

71270..... Chest CT without contrast, followed by re-imaging with contrast

Standard Anatomic Coverage

- Lung apices through costophrenic sulci
- Scan coverage may vary, depending on the specific clinical indication

Technology Considerations

- In the majority of clinical situations, chest radiographs should be performed prior to advanced imaging with CT, preferably within 30 days of the chest CT exam request.
- CT chest is not appropriate for cardiac and coronary artery imaging. Please review guidelines for cardiac CT and CCTA.
- When the purpose of the study is imaging of the heart, including the coronary arteries, requesting a chest CT in addition to a dedicated cardiac/coronary artery CT (CCTA) (CPT 75574) is inappropriate.

Common Diagnostic Indications

This section contains general chest, pulmonary, mediastinal and hilar, and pleural, chest wall and diaphragm indications.

General Chest

Abnormality detected on other imaging study which requires further clarification to direct treatment

Bronchiolitis obliterans

Note: *Includes Swyer-James syndrome*

Chest wall deformity

(any <u>one</u> of the following)

- Post-operative evaluation for complications or recurrence[1]
- Pre-operative evaluation[1] **(any <u>one</u>♦ of the following)**
  - Evaluation for cardiac displacement or pulmonary impingement following non-diagnostic radiograph
  - Evaluation of chest wall anatomy (includes asymmetry, sternal torsion, or elevation[2])
  - Measurement of the Haller/pectus index (HI)
  - Nuss bar length design

Note: *Chest wall deformities include pectus excavatum, pectus carinatum, and Poland syndrome*

Congenital pulmonary airway malformation

- Diagnosis and management **(any <u>one</u> of the following)**
  - Congenital cystic adenomatoid malformation
  - Congenital lobar emphysema
  - Pulmonary sequestration

Congenital thoracic anomaly

- Diagnosis and management **(any <u>one</u> of the following)**
  - Bronchial atresia
  - Bronchopulmonary foregut malformation (includes bronchogenic cyst, esophageal duplication cyst, or neurenteric cysts)
  - Pulmonary agenesis, aplasia, or hypoplasia
  - Scimitar syndrome (hypogenetic lung)

Common Diagnostic Indications

Cough, chronic[3]

- Persisting more than four (4) weeks **(any <u>one</u> of the following)**
  - Following non-diagnostic radiograph
  - Immunosuppressed patient

Note: *If there is clinical concern, see associated indications:* ***Bronchiectasis****,* ***Pneumonia****,* ***Tuberculosis****,* ***Interstitial lung disease****, or* ***Malignancy***

Fever of unknown origin

(any <u>one</u> of the following)

- Lasting more than three (3) weeks following standard work-up (such as chest x-ray, urine, and/or blood work) to localize the source
- Immunocompromised patient **(any <u>one</u>♦ of the following)**
  - Chronic steroid use
  - Dialysis patients
  - Immune defects
  - Neutropenia
  - Use of an immune-blocking biologic agent

Hemoptysis

- Following non-diagnostic chest radiograph

Note: *Bronchoscopy is a complementary modality to assess for hemoptysis*

Horner's syndrome

Infectious or inflammatory process not otherwise specified

- For initial evaluation or surveillance

Note: *Includes lung abscess, mediastinal abscess, and other infectious processes. This indication is used for evaluation of infectious/inflammatory processes not specifically referenced elsewhere in this guideline (e.g.,* ***Pneumonia complications****,* ***Mediastinitis****,* ***Sternal infection and dehiscence****, and* ***Abnormal pleural fluid collection****)*

Tumor, benign or malignant

(any <u>one</u> of the following)

- Diagnosis or management of benign neoplasms
- For staging and periodic follow-up of documented malignancy

Mediastinitis

Note: *Includes mediastinal infection/abscess and fibrosing mediastinitis*

Paraneoplastic syndrome with unknown primary

Note: *This includes opsoclonus-myoclonus ataxia, limbic encephalitis, and anti-NMDAR encephalitis*

Pneumonia, complications[4]

(any <u>one</u> of the following)

- Following non-diagnostic chest radiograph
- Immunosuppressed patient

Note: *Complications of the mediastinum, lung parenchyma, or pleura include abscess, bronchopleural fistula, complicated or loculated parapneumonic effusion, empyema, necrotic pneumonia, and purulent pericarditis*

Pneumonia, persistent or recurrent

- Following non-diagnostic radiograph when the patient is refractory to at least four (4) weeks of medical treatment

Note: *Defined as two or more episodes of pneumonia in one year or three (3) or more in a lifetime (recurrent)*[6]

Common Diagnostic Indications

Positive sputum cytology for malignancy

Post-operative or post-procedure evaluation

Note: *For post-operative evaluation of conditions not specifically referenced elsewhere in this guideline*

Pre-operative or pre-procedure evaluation

Note: *For pre-operative evaluation of conditions not specifically referenced elsewhere in this guideline*

Pulmonary embolism

Sarcoidosis

- Initial evaluation and periodic follow-up

Sternal infection and dehiscence

Note: *Rare complication of cardiothoracic surgery*

Trauma

- Injury involving the chest wall, cardiomediastinal structures and/or lungs

Mediastinal and Hilar

Evaluation of the thoracic aorta

(any <u>one</u> of the following)

- Evaluation when there is concern for complications (such as dissection)
- Further characterization of suspected aneurysm based on prior diagnostic or imaging study
- Patient with confirmed aortic dissection experiencing new or worsening symptoms
- Periodic surveillance **(any <u>one</u> of the following)**
  - High risk patient (patient with connective tissue disease or coarctation of the aorta)
  - Patient with known thoracic aneurysm
- Post-operative evaluation
- Preoperative evaluation

Note: *Echocardiogram is generally recommended as a first line modality for evaluation of the ascending aorta in pediatric patients*

Hilar and/or mediastinal lymphadenopathy/mass

- Periodic follow-up

Hilar enlargement on recent chest X-ray

Hoarseness, dysphonia, or vocal cord weakness - suspected to result from recurrent laryngeal nerve pathology[14-17]

- When hoarseness persists more than one month
- When laryngoscopy is non-diagnostic or shows vocal cord paralysis

Note: *Dysphonia is defined as a disorder characterized by altered vocal quality, pitch, loudness, or vocal effort that impairs communication or otherwise reduces quality of life*

Mediastinal widening on recent chest X-ray

Superior vena cava (SVC) syndrome

Common Diagnostic Indications

Thymoma

(any <u>one</u> of the following)

- Evaluation of thymoma
- Patient with history of myasthenia gravis

Note: *Approximately 15% of patients with myasthenia gravis will have a thymoma*

Tracheobronchial lesion evaluation

Traumatic aortic injury

Vasculitis of the thoracic aorta or branch vessel

Pleural, Chest Wall and Diaphragm

Abnormal pleural fluid collection, including effusion, hemothorax, empyema and chylothorax

Note: *Ultrasound should be considered as initial imaging modality and prior to a diagnostic or therapeutic pleural tap*[7-10]

Chest wall mass

- When further characterization is needed following non-diagnostic radiograph or ultrasound

Diaphragmatic hernia

Pleural mass

Pneumothorax, unexplained or recurrent

Thoracic outlet syndrome

Unexplained diaphragmatic elevation or immobility

Pulmonary

Arteriovenous malformation (AVM), pulmonary

Bronchiectasis

Note: *Consider high resolution chest CT (HRCT) technique*

Hyperlucent lung

Interstitial lung disease/pulmonary fibrosis

Note: *Consider high resolution chest CT (HRCT) technique*

Pulmonary mass or suspicious parenchymal abnormality on recent chest X-ray or other imaging exam

CT is generally not indicated in the following clinical situations

The indications listed in this section generally do not require advanced imaging using CT. If there are circumstances that require CT imaging, a peer-to-peer discussion may be required.

Foreign body aspiration (FBA), tracheobronchial

Note: *Advanced imaging is generally not indicated. Bronchoscopy is the standard of care for suspected FBA*[5,11-13]

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CT Angiography (CTA) Chest (Non-Coronary) – Pediatrics

CPT Codes

71275..... CTA of chest (non-coronary), with contrast material(s), including non-contrast images, if performed, and image post-processing

Angiography includes imaging of all blood vessels, including arteries and veins. The code above includes CT Venography.

Standard Anatomic Coverage

- Scan coverage varies depending on the clinical indication. This exam does not include cardiac and coronary artery indications
- Chest CTA may be used for anatomic depiction from the pulmonary apices through the costophrenic sulci

Technology Considerations

Advantages of CTA

- Rapidly acquired exam, with excellent anatomic detail afforded by most multidetector CT scanners

Disadvantages of CTA

- Potential complications from use of intravascular iodinated contrast administration

Biosafety Issues

- Ordering and imaging providers are responsible for considering safety issues prior to the CTA exam. One of the most significant considerations is the requirement for intravascular iodinated contrast material, which may have an adverse effect on patients with a history of documented allergic contrast reactions or atopy, as well as on individuals with renal impairment, who are at greater risk for contrast-induced nephropathy

Ordering Issues

- CTA chest is not appropriate for cardiac and coronary artery imaging. Please review guidelines for cardiac CT and CCTA
- Pulmonary embolus is rare in the absence of elevated blood D-dimer levels and certain specific risk factors

Common Diagnostic Indications

This section contains general chest, thoracic aorta and great vessel, and pulmonary artery and vein indications.

General Chest

Congenital pulmonary or thoracic vascular malformation

- Diagnosis and management of **(any one♦ of the following)**
  - Aortic coarctation
  - Double aortic arch
  - Hypoplastic or atretic pulmonary arteries
  - Inferior vena caval interruption
  - Partial anomalous pulmonary venous return (includes Scimitar)
  - Persistent left-sided superior vena cava
  - Pulmonary sequestration
  - Right-sided aortic arch
  - Total anomalous pulmonary venous return
  - Truncus arteriosus

Post-traumatic vascular injury

Subclavian steal syndrome

Common Diagnostic Indications

Systemic venous thrombosis or occlusion

Note: *Includes superior vena cava (SVC) syndrome*

Thoracic outlet syndrome

Vascular involvement from neoplasm in the chest

Pulmonary Artery and Vein

Arteriovenous malformation (AVM), pulmonary

Pulmonary arterial hypertension

Pulmonary embolism

(any <u>one</u> of the following)

- When there is a moderate or high clinical suspicion of pulmonary embolism
- When recurrent thromboembolism is a concern in patients on adequate medical therapy

Note: *Conditions where thromboembolism is a concern: sickle cell disease, coagulopathy, prolonged non-ambulatory state, patient taking oral contraceptive pills (OCP)*

Thoracic Aorta and Great Vessel

Evaluation of the thoracic aorta

(any <u>one</u> of the following)

- Evaluation when there is concern for complications (such as dissection)
- Further characterization of suspected aneurysm based on prior diagnostic or imaging study
- Patient with confirmed aortic dissection experiencing new or worsening symptoms
- Periodic surveillance **(any <u>one</u> of the following)**
  - High risk patient (patient with connective tissue disease or coarctation of the aorta)
  - Patient with known thoracic aneurysm
- Post-operative evaluation
- Preoperative evaluation

Note: *Echocardiogram is generally recommended as a first line modality for evaluation of the ascending aorta in pediatric patients*

Hematoma

Post-operative or post-procedure evaluation

Note: *For post-operative evaluation of conditions not specifically referenced elsewhere in this guideline*

Stent graft evaluation

(any <u>one</u> of the following)

- Post-procedure follow-up
- Pre-procedure assessment

Note: *Includes detection of an endoleak*

Vasculitis

Magnetic Resonance Imaging (MRI) Chest – Pediatrics

CPT Codes

71550..... MRI chest, without contrast

71551..... MRI chest, with contrast

71552..... MRI chest, without contrast, followed by re-imaging with contrast

Standard Anatomic Coverage

- Chest MRI studies are often performed as problem-solving exams, following chest CT. In these circumstances, anatomic coverage will depend on the specific indication for the study.
- This guideline excludes cardiac indications, which are covered under the cardiac MRI section and corresponding CPT codes (75557-75563, 75565).

Technology Considerations

Hemoptysis

- Rare in children most common causes are pneumonia and aspirated foreign body
- Chest radiograph will be normal in about 1/3 of patients
- Additional radiographic views including decubitus should be performed if there is concern for an aspirated foreign body

Advantages of chest MRI:

- Chest MRI may be helpful after a CT in the following scenarios:
  - Defining mediastinal and hilar lymphadenopathy (particularly after an unenhanced chest CT exam)
  - Determining direct lung tumor invasion into the mediastinum and hilar structures, without the need for iodinated contrast material in CT
  - Assessing spinal canal extension from a posteromedial thoracic mass
  - Evaluating a suspected Pancoast tumor (also referred to as apical pleuropulmonary groove or superior pulmonary sulcus tumors) for direct chest wall extension, given the multiplanar capability of MRI

Disadvantages of chest MRI:

- Lung lesions are usually better imaged with CT when compared with MRI, given the superior spatial resolution of CT.
- MRI should not be performed in patients with certain implanted devices that are not MRI compatible, such as pacemakers.

Ordering issues:

- For initial evaluation of most thoracic lesions, such as pulmonary nodules and masses, chest CT is considered the study of choice.
- Contrast utilization for chest MRI is at the discretion of the ordering and imaging providers.
- For cardiac and coronary artery imaging, see Cardiac MRI guidelines.

Common Diagnostic Indications

Chest wall deformity

(any <u>one</u> of the following)

- Post-operative evaluation for complications or recurrence[1]
- Pre-operative evaluation[1] **(any <u>one</u>♦ of the following)**
  - Evaluation for cardiac displacement or pulmonary impingement following non-diagnostic radiograph
  - Evaluation of chest wall anatomy (includes asymmetry, sternal torsion, or elevation[2])
  - Measurement of the Haller/pectus index (HI)
  - Nuss bar length design

Note: *Chest wall deformities include pectus excavatum, pectus carinatum, and Poland syndrome*

Chest wall mass

- When further characterization is needed following non-diagnostic radiograph or ultrasound

Developmental anomaly of the thoracic vasculature

(any <u>one</u>♦ of the following)

- Aortic coarctation
- Double aortic arch
- Hypoplastic or atretic pulmonary arteries
- Inferior vena caval interruption
- Partial anomalous pulmonary venous return
- Persistent left-sided superior vena cava
- Right-sided aortic arch
- Total anomalous pulmonary venous return
- Truncus arteriosus

Evaluation of the thoracic aorta

(any <u>one</u> of the following)

- Evaluation when there is concern for complications (such as dissection)
- Further characterization of suspected aneurysm based on prior diagnostic or imaging study
- Patient with confirmed aortic dissection experiencing new or worsening symptoms
- Periodic surveillance **(any <u>one</u> of the following)**
  - High risk patient (patient with connective tissue disease or coarctation of the aorta)
  - Patient with known thoracic aneurysm
- Post-operative evaluation
- Preoperative evaluation

Note: *Echocardiogram is generally recommended as a first line modality for evaluation of the ascending aorta in pediatric patients*

Hemoptysis

- Following non-diagnostic chest radiograph when there is a concern for a congenital vascular anomaly

Horner's syndrome

Mediastinal and hilar mass lesions

(any <u>one</u> of the following)

- Assess vascular invasion by tumor
- Detect spinal extension from a posteromedial chest mass
- Differentiate mediastinal and hilar lesions from vascular structures

Common Diagnostic Indications

Superior vena cava syndrome

Thoracic outlet syndrome

Thymoma

(any <u>one</u> of the following)

- Evaluation of thymoma
- Patient with history of myasthenia gravis

Note: *Approximately 15% of patients with myasthenia gravis will have a thymoma*

Tumor, benign or malignant

(any <u>one</u> of the following)

- Diagnosis or management of benign neoplasms
- For staging and periodic follow-up of documented malignancy

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MR Angiography (MRA) Chest – Pediatrics

CPT Codes

71555..... MRA of chest (excluding the myocardium) without contrast, followed by re-imaging with contrast

Angiography includes imaging of all blood vessels, including arteries and veins. The code above includes MR Venography.

Standard Anatomic Coverage

- Scan coverage varies depending on the clinical indication
- Chest MRA may be used for vascular anatomic depiction, from the pulmonary apices through the costophrenic sulci

Technology Considerations

Advantages of Chest MRA

- Use of MR imaging is advantageous over CT in avoiding ionizing radiation and allowing for direct multiplanar imaging

Disadvantages of Chest MRA

- With MRA, artifact due to patient motion may have a particularly significant impact on exam quality
- MRA cannot be performed in patients with certain implanted devices that are not MRI compatible, such as pacemakers

Common Diagnostic Indications

This section contains common chest MRA, thoracic aorta and great vessel, and pulmonary artery and vein indications.

General Chest

Developmental anomaly of the thoracic vasculature

(any one♦ of the following)

- Aortic coarctation
- Double aortic arch
- Hypoplastic or atretic pulmonary arteries
- Inferior vena caval interruption
- Partial anomalous pulmonary venous return
- Patent ductus arteriosus
- Persistent left-sided superior vena cava
- Right-sided aortic arch
- Total anomalous pulmonary venous return
- Transposition of the great vessels
- Truncus arteriosus

Post-traumatic vascular injury

Subclavian steal syndrome

Systemic venous thrombosis or occlusion

Note: *Includes superior vena cava (SVC) syndrome*

Thoracic outlet syndrome

Vascular involvement from neoplasm in the chest

Common Diagnostic Indications

Pulmonary Artery and Vein

Arteriovenous malformation (AVM), pulmonary

Pulmonary arterial hypertension

Pulmonary embolism

(any <u>one</u> of the following)

- Pulmonary embolism is clinically suspected
- Follow-up when recurrent thromboembolism is a concern in patients on adequate medical therapy

Note: *MRA/MRV is rarely requested to evaluate pulmonary embolism. It is used only in selected cases. For example, intravenous iodinated contrast material for a CTA is contraindicated due to significant iodinated contrast allergy, and a diagnostic ventilation/perfusion (V/Q) study cannot be obtained*

Pulmonary sequestration

Thoracic Aorta and Great Vessel

Evaluation of the thoracic aorta

(any <u>one</u> of the following)

- Evaluation when there is concern for complications (such as dissection)
- Further characterization of suspected aneurysm based on prior diagnostic or imaging study
- Patient with confirmed aortic dissection experiencing new or worsening symptoms
- Periodic surveillance **(any <u>one</u> of the following)**
  - High risk patient (patient with connective tissue disease or coarctation of the aorta)
  - Patient with known thoracic aneurysm
- Post-operative evaluation
- Preoperative evaluation

Note: *Echocardiogram is generally recommended as a first line modality for evaluation of the ascending aorta in pediatric patients*

Hematoma

Post-operative or post-procedure evaluation

Vasculitis

Computed Tomography (CT) Abdomen – Pediatrics

CPT Codes

74150..... CT abdomen; without contrast

74160..... CT abdomen; with contrast

74170..... CT abdomen; without contrast, followed by re-imaging with contrast

Standard Anatomic Coverage

- Diaphragmatic dome to iliac crests
- Scan coverage may vary, depending on the specific clinical indication, but generally extends from the diaphragm to the iliac crests

Technology Considerations

- Abdominal ultrasound should generally be obtained prior to advanced imaging when evaluating for disease in the hepatobiliary system, pancreas, spleen, kidneys, and in some circumstances bowel (for example, appendicitis and intussusception).
- Abdominal radiographs can evaluate for bowel obstruction, line and catheter placement, abnormal calcification, pneumoperitoneum, and suggest many other pediatric abdominal abnormalities.

Common Diagnostic Indications

This section contains general abdominal, hepatobiliary, pancreatic, gastrointestinal, genitourinary, splenic, and vascular indications.

General Abdominal – Whenever possible, guidelines in this section should be superseded by more specific guidelines in subsequent sections

Abdominal mass

(any <u>one</u> of the following)

- Following non-diagnostic ultrasound
- Palpable on exam

Note: *Ultrasound is suggested as the initial imaging modality when evaluating a palpable abdominal mass. Evaluation depends on location of the mass and age of the patient. See separate indications for* ***Focal liver lesion***, ***Pancreatic mass***, ***Genitourinary*** *(renal and adrenal), and* ***Pelvic mass****.*

Abdominal pain

- Following non-diagnostic ultrasound **(any <u>one</u> of the following)**
  - Evaluation of acute abdominal pain when pain is unexplained by clinical findings, physical examination, or other imaging studies
  - Evaluation of chronic or recurrent abdominal pain when a red flag sign is present (see **Table** below)

Note: *Acute pain is defined as new onset pain within the past 30 days. Chronic pain is defined as pain lasting more than 30 days; recurrent pain refers to three (3) or more episodes of pain over a period of three (3) or more months. For family history of clinical evidence for* ***Inflammatory bowel disease (IBD)****, see separate indication.*

Red flag signs for evaluation of abdominal pain	
• Chronic severe diarrhea (at least three (3) watery stools per day for more than two weeks) • Deceleration of linear growth • Fever of unknown origin • Gastrointestinal bleeding • History of a genetic or congenital syndrome	• Immunocompromised • Involuntary weight loss • Persistent focal abdominal pain, especially right upper or right lower quadrant • Persistent vomiting

Common Diagnostic Indications

Abnormality detected on other imaging study which requires additional clarification to direct treatment

Ascites

- For diagnosis and surveillance following non-diagnostic ultrasound

Congenital anomaly

Note: *For congenital anomalies not discussed elsewhere in this guideline*

Fever of unknown origin

(any <u>one</u> of the following)

- Lasting more than three (3) weeks following standard work-up (such as chest x-ray, urine, and/or blood work) to localize the source
- Immunocompromised patient **(any <u>one</u>♦ of the following)**
  - Chronic steroid use
  - Dialysis patients
  - Immune defects
  - Neutropenia
  - Use of an immune-blocking biologic agent

Gastrointestinal bleeding

- Following non-diagnostic endoscopy, colonoscopy, or upper/lower GI series

Hematoma/hemorrhage

Note: *Includes hemoperitoneum and retroperitoneal bleed. See separate indication for* ***gastrointestinal bleeding***.

Hernia

- Following non-diagnostic ultrasound **(any <u>one</u> of the following)**
  - Diagnosis of a hernia with suspected complications
  - Pre-surgical planning

Note: *Includes femoral, internal, inquinal, spigelian, ventral, and incisional hernias*

Infectious or inflammatory process

(any <u>one</u>♦ of the following)

- Abscess
- Diffuse inflammation/phlegmon
- Fistula

Lower extremity edema, diffuse and unexplained

Note: *For female patients, to exclude an occult lesion causing mass effect, vascular compression, or intraluminal thrombi, ultrasound should be considered as the initial imaging modality*

Post-operative or post-procedure evaluation

Note: *For post-operative evaluation of conditions not specifically referenced elsewhere in this guideline*

Preoperative or pre-procedure evaluation

Note: *For preoperative evaluation of conditions not specifically referenced elsewhere in this guideline*

Retroperitoneal abnormality

(any <u>one</u> of the following)

- Fibrosis
- Inflammation
- Neoplasm

Common Diagnostic Indications

Trauma

- Following significant blunt or penetrating injury to the abdomen

Tumor, benign or malignant

(any <u>one</u> of the following)

- Diagnosis or management of benign neoplasms
- Diagnosis, management, or surveillance of malignant or indeterminate neoplasms

Note: *This indication applies only to tumors not otherwise listed in this guideline.*

Hepatobiliary

Acute cholecystitis

- Following clinical examination and non-diagnostic ultrasound for the evaluation of right upper quadrant pain when concerned for complications of acute cholecystitis

Congenital anomaly of the hepatobiliary system

- Clinically suspected and following non-diagnostic ultrasound **(any <u>one</u>♦ of the following)**
  - Biliary hamartoma (von Meyenburg complex)
  - Caroli's disease
  - Congenital hepatic fibrosis
  - Polycystic liver disease
  - Primary sclerosing cholangitis

Note: *For biliary atresia, see separate indication for Neonatal jaundice: biliary atresia and neonatal hepatitis. MRCP is a better modality for visualizing abnormalities of the biliary tree.*

Elevated liver transaminases

- Following non-diagnostic ultrasound

Note: *Includes both alanine transaminase (ALT) and aspartate transaminase (AST). In patients taking medications known to cause elevated liver transaminases, these medications should be stopped when possible and liver panels repeated prior to performing advanced imaging (examples include statins for hyperlipidemia, acetaminophen, NSAIDs, Dilantin®, protease inhibitors, and sulfonamides). When appropriate, additional diagnostic labs such as hepatitis panel and serum alpha fetoprotein should be considered.*

Focal liver lesion characterization

(any <u>one</u> of the following)

- Diagnosis, management (including staging), and surveillance of malignant neoplasms **(any <u>one</u>♦ of the following)**
  - Hepatoblastoma
  - Hepatocellular carcinoma
  - Metastasis including neuroblastoma
  - Rhabdomyosarcoma
- Diagnosis or management of benign neoplasms following non-diagnostic ultrasound **(any <u>one</u>♦ of the following)**
  - Focal nodular hyperplasia
  - Hemangioma (generally diagnosis)
  - Hepatic adenoma
  - Infantile hemangioendothelioma
  - Mesenchymal hamartoma

Note: *A simple liver cyst with benign characteristics on ultrasound may not require advanced imaging or surveillance.*

Hepatomegaly

- Following non-diagnostic ultrasound when hepatic enlargement is clinically suspected or worsening

Common Diagnostic Indications

Jaundice

(All of the following)

- Abnormal liver function tests (elevated transaminases)
- Following non-diagnostic ultrasound
- Unexplained icterus (jaundice)

Note: *For jaundice in newborn babies, see **Neonatal jaundice** in the CT not indicated section below.*

Pancreatic

Acute pancreatitis

- With suspected complications **(any one♦ of the following)**
  - Abscess
  - Pancreatic necrosis
  - Peri-pancreatic fluid
  - Pseudocyst
  - Vascular: portal vein thrombosis or pseudoaneurysm

Note: *Patients with mild acute, uncomplicated pancreatitis usually do not require cross-sectional imaging, aside from ultrasound identification of gallstones and/or biliary ductal calculi.*

Congenital anomaly of the pancreas

- Clinically suspected or following non-diagnostic ultrasound

Note: *Examples include agenesis of the pancreas, annular pancreas, pancreas divisum, nesidioblastosis*

Pancreatic mass

Note: *CT pancreas with pancreatic protocol is indicated. MRI pancreas may be performed as an alternative study.*

Pancreatic pseudocyst

(All of the following)

- Following non-diagnostic ultrasound
- Patient with prior history of pancreatitis or pancreatic trauma

Note: *For a patient with known pancreatic pseudocyst requiring follow-up surveillance, ultrasound should be considered as the initial imaging modality.*

Gastrointestinal

Appendiceal or periappendiceal mass

- Unexplained on physical exam and other imaging study

Appendicitis

(any one of the following)

- Evaluation of suspected appendicitis following non-diagnostic ultrasound (unless ultrasound is not available or expected to be limited due to body habitus)
- Failure of non-surgical treatment
- Post-operative complications

Bowel obstruction

- Following non-diagnostic radiograph

Common Diagnostic Indications

Congenital anomaly of the gastrointestinal system

- When clinically suspected **(any <u>one</u>♦ of the following)**
  - Anorectal malformations
  - Gastrointestinal duplication cyst
  - Gastroschisis and omphalocele

Note: *CT imaging is not generally indicated in the following congenital anomalies: Meckel's diverticulum, Hirschsprung's disease, pyloric stenosis, small left colon, jejunal or ileal stenosis. For alternative imaging modalities for these clinical situations, please see the "**CT not indicated**" section below.*

Constipation

- Following non-diagnostic radiograph when there is difficulty with defecation persisting for two or more weeks **(any <u>one</u> of the following)**:
  - When symptoms persist after a course of medical management
  - When there are red flag signs (see **table** below)

Red flag signs for evaluation of constipation

(any <u>one</u> of the following)

- Failure to thrive
- Fever
- Following barium enema or anal manometry when there is suspicion for **(any <u>one</u> of the following)**
  - Anal stenosis
  - Impaction in patients less than 1 year of age
  - Tight empty rectum
- Vomiting

Enteritis and/or colitis

Note: *Includes neutropenic colitis and radiation enteritis*

Foreign body

- Following non-diagnostic radiograph when there is a high clinical suspicion

Henoch-Schonlein Purpura (HSP)

Inflammatory bowel disease (IBD)

Diagnosis

- Evaluation of suspected Crohn's disease following non-diagnostic upper and lower endoscopy

Management

- Evaluation of new or worsening symptoms to confirm exacerbation or evaluate for complications, including stricture, abscess or fistula

Intussusception

(any <u>one</u> of the following)

- Following intussusception reduction
- Following non-diagnostic ultrasound

Ischemic bowel

Note: *For necrotizing enterocolitis (NEC), radiographs are the diagnostic modality of choice.*

Common Diagnostic Indications

Genitourinary

Adrenal hemorrhage

(any one of the following)

- Following non-diagnostic ultrasound
- History of trauma

Adrenal mass/lesion

(any one of the following)

- For characterization of an indeterminate adrenal mass (identified on prior imaging), such as a benign adenoma versus a metastatic deposit
- In neonatal patients, following non-diagnostic ultrasound
- When there is biochemical evidence of an adrenal endocrine abnormality

Congenital anomaly of the genitourinary system

- Diagnosis or management following non-diagnostic ultrasound **(any one♦ of the following)**:
  - Beckwith-Wiedemann syndrome
  - Bladder and cloacal exstrophy
  - Characterization of a ureterocele
  - Confirmation of the location, structure, and position of the ureters
  - Congenital adrenal hyperplasia
  - Congenital uteteropelvic junction (UPJ) or ureterovesical junction (UVJ) obstruction
  - Duplex collecting system
  - Management of complications (including infection, urachal carcinoma)
  - Megaureter
  - Pre-operative planning
  - Prune-belly syndrome
  - Renal and adrenal agenesis
  - Renal ectopy (includes crossed fused renal ectopy, horseshoe and pancake kidney)
  - Renal hypoplasia
  - Urachal anomalies (includes patent urachus, urachal cyst, and urachal umbilical sinus)

Hematuria

- Following non-diagnostic ultrasound when hematuria is persistent

Hydronephrosis

- Following non-diagnostic ultrasound

Note: *This also includes pyonephrosis, although this is typically a medical emergency.*

Neoplasm, genitourinary

(any one of the following)

- Diagnosis, management, and surveillance of the following malignant tumors **(any one♦ of the following)**
  - Renal (lymphoma, multicystic dysplastic kidney, renal cell carcinoma, or Wilm's tumor)
  - Adrenal (adrenocortical carcinoma, neuroblastoma, or pheochromocytoma)
- Diagnosis and management of the following benign renal neoplasms (angiomyolipoma, multilocular cystic nephroma, or nephroblastomatosis) following non-diagnostic ultrasound

Note: *Consider ultrasound evaluation for follow up particularly with benign tumors.*

Nephrocalcinosis

- Following non-diagnostic ultrasound

Common Diagnostic Indications

Polycystic kidney disease (PKD)

- Following non-diagnostic ultrasound

Note: *Includes autosomal dominant (ADPKD) and autosomal recessive (ARPKD) polycystic kidney disease*

Pyelonephritis

(any one of the following)

- Diagnosis of acute complicated pyelonephritis when patient has failed to respond to 72 hours of antibiotic therapy
- Evaluate response to therapy when clinically uncertain

Note: *Includes complications of acute pyelonephritis, such as emphysematous pyelonephritis and renal abscess*

Renal mass/lesion requiring further characterization

- Following non-diagnostic ultrasound when lesion does not meet criteria for a simple cyst

Note: *A simple cyst is defined as having all of the following characteristics: anechoic, circumscribed, thin walled, and posterior acoustic enhancement.*

Undescended testicle (cryptorchidism)

- Following evaluation with ultrasound

Urinary tract calculus

(any one of the following)

- Following non-diagnostic ultrasound
- Following non-diagnostic kidney, ureter, and bladder (KUB) radiograph

Xanthogranulomatous pyelonephritis (XPN)

Splenic

Congenital splenic anomaly

(any one♦ of the following)

- Asplenia
- Polysplenia
- Splenosis and wandering spleen

Note: *Accessory spleen (splenule) is a common incidental congenital variant that does not require follow up*

Splenic hematoma

(any one of the following)

- Parenchymal
- Perisplenic
- Subcapsular

Splenic lesion

- Indeterminate on prior imaging (such as ultrasound)

Note: *Splenic hemangioma is the most common benign splenic tumor and may be followed with splenic ultrasound*

Splenomegaly

- Following non-diagnostic ultrasound for clinically suspected or worsening splenic enlargement

Common Diagnostic Indications

Vascular

Aneurysm of the abdominal aorta

- Following non-diagnostic ultrasound and **(any <u>one</u> of the following)**
  - Annual screening in patients with connective tissue disease
  - Follow-up imaging of patients with an established aneurysm/dilation
  - Suspected complication of an aneurysm/dilation
  - Pre/post-operative

Aortic dissection

Note: *May evaluate with either CT or CTA. Usually results from subdiaphragmatic extension of a thoracic aortic dissection*

Thrombosis in the systemic and portal venous circulations

- Following initial evaluation with inconclusive Doppler ultrasound

CT is generally not indicated in the following clinical situations

The indications listed in this section generally do not require advanced imaging using CT. If there are circumstances that require CT imaging, a peer-to-peer discussion may be required.

Cystic liver disease

Note: *Includes congenital and acquired cysts. Ultrasound is usually sufficient.*

Failure to thrive

Note: *Chronic condition which is not typically evaluated with advanced imaging.*

Gastroenteritis

Note: *Imaging is generally not indicated.*

Hirschsprung's disease (congenital aganglionosis)

Note: *Barium enema and radiography are the radiologic modalities of choice.*

Hypospadias

Note: *Voiding cystourethrogram is the modality of choice.*

Irritable bowel syndrome (IBS)

Note: *IBS is a clinical diagnosis. If indicated, plain films and fluoroscopy are the imaging modalities of choice. Advanced imaging is not indicated.*

Jejunal or ileal stenosis

Note: *Upper gastrointestinal fluoroscopy and radiography are the radiologic modalities of choice.*

Meckel's diverticulum or diverticulitis

Note: *Meckel's scan is the diagnostic modality of choice. For follow up of an established diagnosis when there are new or worsening symptoms, see indication for infectious or inflammatory process.*

Midgut volvulus

Note: *Emergent condition, not for outpatient workup. Upper gastrointestinal fluoroscopy and radiography are the diagnostic modalities of choice.*

Neonatal jaundice: biliary atresia and neonatal hepatitis

Note: *For cases of biliary atresia or neonatal hepatitis, ultrasound and nuclear scintigraphy are the diagnostic imaging modalities of choice.*

Posterior urethral valve

Note: *Voiding cystourethrogram is the modality of choice.*

Pyloric stenosis

Note: *Ultrasound and fluoroscopy are the radiologic modalities of choice.*

Common Diagnostic Indications

Small left colon syndrome

Note: *Barium enema and radiography are the radiologic modalities of choice.*

Urinary tract infection

Note: *In infants and children under 5 years, ultrasound, voiding cystourethrogram (VCUG), and renal scans (technetium-99-dimercaptosuccinic acid [DMSA]), as needed, are used to diagnose and manage urinary tract infections.*

Note: *In children age 5 years and older, advanced imaging is not indicated in the evaluation of a simple urinary tract infection, but could be considered when there is concern for complicated pyelonephritis.*

Note: *For **pyelonephritis**, see separate indication.*

Vesicoureteral reflux

Note: *Voiding cystourethrogram, followed by ultrasound, is generally sufficient.*

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Magnetic Resonance Imaging (MRI) Abdomen – Pediatrics

CPT Codes

74181..... MRI of abdomen, without contrast
74182..... MRI of abdomen, with contrast
74183..... MRI of abdomen, without contrast, followed by re-imaging with contrast

Standard Anatomic Coverage

- Scan coverage depends on the specific clinical indication for the abdominal MRI. General landmarks extend from the diaphragmatic dome to the iliac crests

Technology Considerations

- Abdominal MRI studies are usually targeted for further evaluation of indeterminate or questionable findings, identified on more standard imaging exams such as ultrasound and CT.
- For evaluation of vascular abnormalities such as renal artery stenosis and celiac/superior mesenteric artery stenosis (in chronic mesenteric ischemia), Doppler ultrasound, MRA or CTA should be considered as the preferred imaging modalities.
- The CPT code assignment for an MRI procedure is based on the anatomic area imaged. Requests for multiple MRI studies of the same anatomic area to address patient positional changes, additional sequences or equipment are not allowed. These variations or extra sequences are included within the original imaging request.
- For pediatric patients, MRI may be the preferred imaging modality in a number of clinical circumstances given its lack of ionizing radiation and excellent soft tissue contrast. However, MRI may require sedation and is more predisposed to artifacts.

Common Diagnostic Indications

General Abdominal – Whenever possible, guidelines in this section should be superseded by more specific guidelines in subsequent sections

Abdominal mass

(any <u>one</u> of the following)

- Following non-diagnostic ultrasound
- Palpable on exam

Note: *Ultrasound is suggested as the initial imaging modality when evaluating a palpable abdominal mass. Evaluation depends on location of the mass and age of the patient. See separate indications for **Focal liver lesion, Pancreatic mass, Genitourinary (renal and adrenal)**, and **Pelvic mass**.*

Abdominal pain

- Following non-diagnostic ultrasound **(any <u>one</u> of the following)**
  - Evaluation of acute abdominal pain when pain is unexplained by clinical findings, physical examination, or other imaging studies
  - Evaluation of chronic or recurrent abdominal pain when a red flag sign is present (see **Table** below)

Note: *Acute pain is defined as new onset pain within the past 30 days. Chronic pain is defined as pain lasting more than 30 days; recurrent pain refers to three (3) or more episodes of pain over a period of three (3) or more months. For family history of clinical evidence for **Inflammatory bowel disease (IBD)**, see separate indication*

Red flag signs for evaluation of abdominal pain	
• Chronic severe diarrhea (at least three (3) watery stools per day for more than two weeks) • Deceleration of linear growth • Fever of unknown origin • Gastrointestinal bleeding • History of a genetic or congenital syndrome	• Immunocompromised • Involuntary weight loss • Persistent focal abdominal pain, especially right upper or right lower quadrant • Persistent vomiting

Common Diagnostic Indications

Abnormality detected on other imaging study which requires additional clarification to direct treatment

Ascites

- For diagnosis and surveillance following non-diagnostic ultrasound

Congenital anomaly

Note: *For congenital anomalies not discussed elsewhere in this guideline*

Contraindication to CT

- Patient meets criteria for CT exam but CT is expected to be limited due to contraindications (such as a history of allergic reaction to iodinated radiographic contrast material)

Fever of unknown origin

(any one of the following)

- Lasting more than three (3) weeks following standard work-up (such as chest x-ray, urine, and/or blood work) to localize the source
- Immunocompromised patient **(any one♦ of the following)**
  - Chronic steroid use
  - Dialysis patients
  - Immune defects
  - Neutropenia
  - Use of an immune-blocking biologic agent

Hernia

- Following non-diagnostic ultrasound **(any one of the following)**
  - Diagnosis of a hernia with suspected complications
  - Pre-surgical planning

Note: *Includes femoral, internal, inquinal, spigelian, ventral, and incisional hernias*

Infectious or inflammatory process

(any one♦ of the following)

- Abscess
- Diffuse inflammation/phlegmon
- Fistula

Post-operative or post-procedure evaluation

Note: *For post-operative evaluation of conditions not specifically referenced elsewhere in this guideline*

Preoperative or pre-procedure evaluation

Note: *For preoperative evaluation of conditions not specifically referenced elsewhere in this guideline*

Retroperitoneal abnormality

(any one of the following)

- Fibrosis
- Inflammation
- Neoplasm

Tumor, benign or malignant

(any one of the following)

- Diagnosis or management of benign neoplasms
- Diagnosis, management, or surveillance of malignant or indeterminate neoplasms

Note: *This indication applies only to tumors not otherwise listed in this guideline.*

Common Diagnostic Indications

Hepatobiliary

Acute cholecystitis

- Following clinical examination and non-diagnostic ultrasound for the evaluation of right upper quadrant pain when concerned for complications of acute cholecystitis

Congenital anomaly of the hepatobiliary system

- Clinically suspected and following non-diagnostic ultrasound **(any one♦ of the following)**
  - Biliary hamartoma (von Meyenburg complex)
  - Caroli's disease
  - Congenital hepatic fibrosis
  - Polycystic liver disease
  - Primary sclerosing cholangitis

Note: *For biliary atresia, see **Neonatal jaundice** in the MRI not indicated section below. MRCP is a better modality for visualizing abnormalities of the biliary tree.*

Diffuse liver disease

- Following non-diagnostic ultrasound or CT

Note: *Includes the following hepatic disorders: Chronic hepatitis, cirrhosis, glycogen storage diseases, hemochromatosis, Wilson's disease.*

Elevated liver transaminases

- Following non-diagnostic ultrasound

Note: *Includes both alanine transaminase (ALT) and aspartate transaminase (AST). In patients taking medications known to cause elevated liver transaminases, these medications should be stopped when possible and liver panels repeated prior to performing advanced imaging (examples include statins for hyperlipidemia, acetaminophen, NSAIDs, Dilantin®, protease inhibitors, and sulfonamides). When appropriate, additional diagnostic labs such as hepatitis panel and serum alpha fetoprotein should be considered.*

Focal liver lesion characterization

(any one of the following)

- Diagnosis, management (including staging), and surveillance of malignant neoplasms **(any one♦ of the following)**
  - Hepatoblastoma
  - Hepatocellular carcinoma
  - Metastasis including neuroblastoma
  - Rhabdomyosarcoma
- Diagnosis or management of benign neoplasms following non-diagnostic ultrasound **(any one♦ of the following)**
  - Focal nodular hyperplasia
  - Hemangioma (generally diagnosis)
  - Hepatic adenoma
  - Infantile hemangioendothelioma
  - Mesenchymal hamartoma

Note: *A simple liver cyst with benign characteristics on ultrasound may not require advanced imaging or surveillance*

Hepatomegaly

- For clinically suspected or worsening hepatic enlargement following non-diagnostic ultrasound

Common Diagnostic Indications

Jaundice

(All of the following)

- Abnormal liver function tests (elevated transaminases)
- Following non-diagnostic ultrasound
- Unexplained icterus (jaundice)

Note: *For jaundice in newborn babies, see **Neonatal jaundice** in the MRI not indicated section below.*

Pancreatic

Acute pancreatitis

- With suspected complications **(any one♦ of the following)**
  - Abscess
  - Pancreatic necrosis
  - Peri-pancreatic fluid
  - Pseudocyst
  - Vascular: portal vein thrombosis or pseudoaneurysm

Note: *Patients with mild acute, uncomplicated pancreatitis usually do not require cross-sectional imaging, aside from ultrasound identification of gallstones and/or biliary ductal calculi.*

Congenital anomaly of the pancreas

- Clinically suspected or following non-diagnostic ultrasound

Note: *Examples include agenesis of the pancreas, annular pancreas, pancreas divisum, nesidioblastosis.*

Pancreatic mass

Note: *CT pancreas with pancreatic protocol is indicated. MRI pancreas may be performed as an alternative study*

Pancreatic pseudocyst

(All of the following)

- Following non-diagnostic ultrasound
- Patient with prior history of pancreatitis or pancreatic trauma

Note: *For a patient with a known pancreatic pseudocyst requiring follow-up surveillance, ultrasound should be considered as the initial imaging modality.*

Gastrointestinal

Appendiceal or periappendiceal mass

- Unexplained on physical exam and other imaging studies

Appendicitis

(any one of the following)

- Diagnosis following non-diagnostic ultrasound (unless ultrasound is not an available modality)
- Failure of non-surgical treatment
- Post-operative complications

Bowel obstruction

- Following non-diagnostic radiograph

Common Diagnostic Indications

Congenital anomaly of the gastrointestinal system

- When clinically suspected **(any one♦ of the following)**
  - Anorectal malformations
  - Gastrointestinal duplication cyst
  - Gastroschisis and omphalocele

Note: *MRI imaging is not indicated in the following congenital anomalies: Meckel's diverticulum, Hirschsprung's disease, pyloric stenosis, small left colon, jejunal stenosis, or ileal stenosis. For alternative imaging modalities for these clinical situations, please see the "**MRI not indicated**" section below.*

Constipation

- Following non-diagnostic radiograph when there is difficulty with defecation persisting for two or more weeks **(any one of the following)**
  - When symptoms persist after a course of medical management
  - When there are red flag signs (see table below)

Red flag signs for evaluation of constipation

(any one of the following)
• Failure to thrive
• Fever
• Following barium enema or anal manometry when there is suspicion for **(any one of the following)**
  ○ Anal stenosis
  ○ Impaction in patients less than 1 year of age
  ○ Tight empty rectum
• Vomiting

Henoch Schonlein Purpura (HSP)

Inflammatory bowel disease (IBD)

Diagnosis

- Evaluation of suspected Crohn's disease following non-diagnostic upper and lower endoscopy

Management

- Evaluation of new or worsening symptoms to confirm exacerbation or evaluate for complications, including stricture, abscess or fistula

Genitourinary

Adrenal hemorrhage

(any one of the following)

- Following non-diagnostic ultrasound
- History of trauma

Adrenal mass/lesion

(any one of the following)

- For characterization of an indeterminate adrenal mass identified on prior imaging (such as a benign adenoma versus a metastatic deposit)
  - Neonatal patients, following non-diagnostic ultrasound
- When there is biochemical evidence of an adrenal endocrine abnormality
  - Neonatal patients, following non-diagnostic ultrasound

Common Diagnostic Indications

Congenital anomaly of the genitourinary system

- Diagnosis or management following non-diagnostic ultrasound **(any one♦ of the following):**
  - Beckwith-Wiedemann syndrome
  - Bladder and cloacal exstrophy
  - Characterization of a ureterocele
  - Confirmation of the location, structure, and position of the ureters
  - Congenital adrenal hyperplasia
  - Congenital uteteropelvic junction (UPJ) or ureterovesical junction (UVJ) obstruction
  - Duplex collecting system
  - Management of complications (including infection, urachal carcinoma)
  - Megaureter
  - Pre-operative planning
  - Prune-belly syndrome
  - Renal and adrenal agenesis
  - Renal ectopy (includes crossed fused renal ectopy, horseshoe and pancake kidney)
  - Renal hypoplasia
  - Urachal anomalies (includes patent urachus, urachal cyst, and urachal umbilical sinus)

Hematuria

- Following non-diagnostic ultrasound when hematuria is persistent

Hydronephrosis

- Following non-diagnostic ultrasound

Note: *This also includes pyonephrosis, which is typically handled as a medical emergency*

Polycystic kidney disease (PKD)

- Following non-diagnostic ultrasound

Note: *Includes autosomal dominant (ADPKD) and autosomal recessive (ARPKD) disease*

Neoplasm, genitourinary

(any one of the following)

- Diagnosis, management, and surveillance of the following malignant tumors **(any one♦ of the following)**
  - Renal (lymphoma, multicystic dysplastic kidney, renal cell carcinoma, or Wilm's tumor)
  - Adrenal (adrenocortical carcinoma, neuroblastoma, or pheochromocytoma)
- Diagnosis and management of the following benign renal neoplasms (angiomyolipoma, multilocular cystic nephroma, or nephroblastomatosis) following non-diagnostic ultrasound

Note: *Consider ultrasound evaluation for follow up particularly with benign tumors*

Renal mass/lesion requiring further characterization

- Following non-diagnostic ultrasound when lesion does not meet criteria for a simple cyst

Note: *A simple cyst is defined as having all of the following characteristics: anechoic, circumscribed, thin walled, and posterior acoustic enhancement.*

Undescended testicle (cryptorchidism)

- Following non-diagnostic ultrasound

Common Diagnostic Indications

Splenic

Congenital splenic anomaly

(any one♦ of the following)

- Asplenia
- Polysplenia
- Splenosis and wandering spleen

Note: *Accessory spleen (splenule) is a common incidental congenital variant that does not require follow up.*

Splenic hematoma

(any one of the following)

- Parenchymal
- Perisplenic
- Subcapsular

Splenic lesion

- Non-diagnostic on prior imaging (such as ultrasound)

Note: *Splenic hemangioma is the most common benign splenic tumor and may be followed with splenic ultrasound.*

Splenomegaly

- Following non-diagnostic ultrasound for clinically suspected or worsening splenic enlargement

MRI is generally not indicated in the following clinical situations

The indications listed in this section generally do not require advanced imaging using MRI. If there are circumstances that require MRI imaging, a peer-to-peer discussion may be required.

Cystic liver disease

Note: *Includes congenital and acquired cysts. Ultrasound is usually sufficient.*

Failure to thrive

Note: *Chronic condition which is not typically evaluated with advanced imaging*

Gastroenteritis

Note: *Imaging is generally not indicated.*

Hirschsprung's disease (congenital aganglionosis)

Note: *Barium enema and radiography are the radiologic modalities of choice.*

Hypospadias

Note: *Voiding cystourethrogram is the modality of choice.*

Irritable bowel syndrome (IBS)

Note: *IBS is a clinical diagnosis. If indicated, plain films and fluoroscopy are the imaging modalities of choice. Advanced imaging is not indicated.*

Jejunal or ileal stenosis

Note: *Upper gastrointestinal fluoroscopy and radiography are the radiologic modalities of choice.*

Meckel's diverticulum or diverticulitis

Note: *Meckel's scan is the diagnostic modality of choice. For follow up of an established diagnosis when there are new or worsening symptoms, see indication for infectious or inflammatory process.*

Midgut volvulus

Note: *Emergent condition, not for outpatient workup. Upper gastrointestinal fluoroscopy and radiography are the diagnostic modalities of choice.*

Common Diagnostic Indications

Neonatal jaundice: biliary atresia and neonatal hepatitis

Note: *For cases of biliary atresia or neonatal hepatitis, ultrasound and nuclear scintigraphy are the diagnostic imaging modalities of choice.*

Posterior urethral valve

Note: *Voiding cystourethrogram is the modality of choice.*

Pyloric stenosis

Note: *Ultrasound and fluoroscopy are the radiologic modalities of choice.*

Small left colon syndrome

Note: *Barium enema and radiography are the radiologic modalities of choice.*

Urinary tract infection

Note: *In infants and children under 5 years, ultrasound, voiding cystourethrogram (VCUG), and renal scans (technetium-99-dimercaptosuccinic acid [DMSA]), as needed, are used to diagnose and manage urinary tract infections*

Note: *In children age 5 years and older, advanced imaging is not indicated in the evaluation of a simple urinary tract infection, but could be considered when there is concern for complicated pyelonephritis*

Note: *For **pyelonephritis**, see separate indication.*

Vesicoureteral reflux

Note: *Voiding cystourethrogram, followed by ultrasound, is generally sufficient.*

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Magnetic Resonance Cholangiopancreatography (MRCP) Abdomen – Pediatrics

CPT Codes

74181..... MRI of abdomen, without contrast

Standard Anatomic Coverage

- Magnetic resonance cholangiopancreatography (MRCP) is used to evaluate the biliary and pancreatic ductal systems non-invasively and is covered under CPT code 74181, abdominal MRI without contrast

Technology Considerations

- MRCP studies are usually targeted for further evaluation of indeterminate or questionable findings, identified on more standard imaging exams such as ultrasound and CT.
- When magnetic resonance cholangiopancreatography (MRCP) is requested in addition to a MRI of the abdomen, only one MRI abdomen code should be allowed. Additional sequences obtained for MRCP are considered part of the primary procedure.
- MRCP is performed using heavily T2-weighted images to display hyperintense signal from static or slowly-moving fluid-filled structures.
- Advantages of MRCP when compared with ERCP include non-invasive imaging technique, no ionizing radiation, no anesthesia required, often better anatomic visualization proximal to a ductal obstruction, may detect extra-ductal abnormalities not evident by ERCP.
- Disadvantages of MRCP when compared with ERCP include limited spatial resolution and therefore less sensitive exam for detection of more subtle abnormalities, only provides diagnostic information compared with ERCP which has both diagnostic and therapeutic capabilities, as a consequence, MRCP may result in a delay for needed therapeutic interventions performed with ERCP (such as sphincterotomy, stone extraction, stent placement), susceptibility artifact on MRI may occur (for example, from metallic foreign bodies/surgical clips in the right upper abdominal quadrant) and result in image degradation.
- MRCP is appropriate in cases of incomplete or failed ERCP or when ERCP cannot be safely performed (e.g., following pancreatic ductal trauma or a significant allergy to iodinated contrast material) or when ERCP is precluded by anatomic considerations such as a biliary-enteric surgical anastomosis.
- Significant upper abdominal ascites and large cystic/fluid-filled structures may impede visualization of the pancreatic and biliary ductal systems with MRCP.

Common Diagnostic Indications

Biliary tract dilatation

(any <u>one</u> of the following)

- Biochemical evidence of biliary obstruction
- Unexplained right upper quadrant pain

Note: *Includes the detection of benign stricture, choledocholithiasis, fistula, and mass lesion (benign or malignant)*

Cystic pancreatic mass

- When pseudocyst is suspected, to determine the relationship between the cyst and the pancreatic duct

Recurrent acute pancreatitis of unknown etiology

- To identify possible mechanical causes such as congenitally anomalies (e.g., choledochal cyst, pancreas divisum annular pancreas and duplication cysts)

Note: *Defined as more than two attacks of acute pancreatitis without evidence for chronic pancreatitis*

Common Diagnostic Indications

Suspected biliary or pancreatic ductal abnormality

(any one♦ of the following)

- Anomalous pancreaticobiliary ductal union (APBDU)
- Biliary hamartoma (von Meyenburg complex)
- Caroli's disease
- Choledochal cyst
- Pancreas divisum
- Primary sclerosing cholangitis

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CT Angiography (CTA) and MR Angiography (MRA) Abdomen – Pediatrics

CPT Codes

74175..... Computed tomographic angiography, abdomen, with contrast material(s), including non-contrast images, if performed, and image post-processing

74185..... Magnetic resonance angiography, abdomen; without or with contrast

Angiography includes imaging of all blood vessels, including arteries and veins. The codes above include CT and MR Venography respectively.

Standard Anatomic Coverage

- Anatomic coverage for CPT codes 74175 (CTA) and 74185 (MRA) includes the major arterial and/or venous structures in the abdomen, from the diaphragmatic dome through the iliac crests.

Technology Considerations

- For a combination CTA abdomen and pelvis study, use CPT code 74174.
- For CTA of the abdominal aorta and iliofemoral vasculature with lower extremity runoff, use CPT code 75635.
- For MRA of the abdominal aorta and iliofemoral vasculature, with lower extremity runoff, use the following CPT codes: CPT 74185 MRA Abdomen x 1 and CPT 73725 MRA Lower Extremities x 2.
- Doppler ultrasound examination is an excellent means to identify a wide range of vascular abnormalities, both arterial and venous in origin. This well-established modality should be considered in the initial evaluation of many vascular disorders listed below.
- CTA of the abdomen is an alternative exam in patients who cannot undergo MRA.

Common Diagnostic Indications

Aneurysm of the abdominal aorta

- Following non-diagnostic ultrasound **(any <u>one</u> of the following)**
  - Annual screening in patients with connective tissue disease
  - Follow-up imaging of patients with an established aneurysm/dilation
  - Pre/post-operative
  - Suspected complication of an aneurysm/dilation

Arteriovenous malformation (AVM) or arteriovenous fistula (AVF)

Note: *For renal or superficial AVM, ultrasound should be considered as the first imaging modality.*

Dissection

Of the abdominal aorta and/or branch vessel

Hematoma/hemorrhage

Of the abdominal aorta and/or branch vessel

Mesenteric ischemia

Note: *May have an acute or chronic and progressive (intestinal or abdominal angina) presentation*

Portal hypertension

Preoperative or pre-procedure evaluation

Note: *For preoperative evaluation of conditions not specifically referenced elsewhere in this guideline*

Common Diagnostic Indications

Prior to resection of pelvic neoplasm

Pseudoaneurysm

Of the abdominal aorta and/or branch vessel

Renal artery stenosis

- For suspected renovascular hypertension from renal artery stenosis, required clinical information includes at least 2-3 serial blood pressure measurements and a list of current anti-hypertensive medications. Renal artery CTA or MRA may be performed in the following clinical scenarios: **(any <u>one</u> of the following)**
  - Abdominal bruit, suspected to originate in the renal artery
  - Abrupt onset of hypertension
  - Accelerated or malignant hypertension
  - Deteriorating renal function on angiotensin converting enzyme inhibition
  - Following an abnormal renal Doppler ultrasound suggestive of renal artery stenosis
  - Generalized arteriosclerotic occlusive disease with hypertension
  - Hypertension developing in patients younger than 30 years of age
  - Hypertension with renal failure or progressive renal insufficiency
  - Recurrent, unexplained episodes of "flash" pulmonary edema
  - Refractory hypertension in patients on therapeutic doses of 3 or more anti-hypertensive medications (Note: imaging may not be required for hypertensive patients easily managed with less than 3 anti-hypertensive medications)
  - Unilateral small renal size (difference in renal size greater than 1.5 cm on ultrasound)

Note: *Doppler ultrasound examination of the renal arteries has been shown in the peer-reviewed literature to be efficacious and cost-efficient in detecting renal artery stenosis. However, it is less sensitive than CTA/MRA for detection of renovascular hypertension.*

Stenosis or occlusion of the abdominal aorta or branch vessels

(any <u>one</u>♦ of the following)

- Atherosclerosis
- Thromboembolism
- Other causes

Surgical planning for a kidney donor

Surgical planning for renal tumor resection

Traumatic vascular injury

Unexplained blood loss in the abdomen

Vascular anatomic delineation for other surgical and interventional procedures

(any <u>one</u>♦ of the following)

- For surgical porto-systemic shunt placement or TIPS (transjugular intrahepatic porto-systemic shunt)
- For hepatic chemo-embolization procedure
- For vascular delineation prior to operative resection of an abdominal neoplasm
- For pre- and post-procedure evaluation of bypass grafts, stents and vascular anastomoses

Vascular invasion or compression by an abdominal tumor

Vasculitis

Common Diagnostic Indications

Venous thrombosis or occlusion

Evaluation of suspected thrombosis or occlusion of major abdominal vessels, including portal and systemic venous systems

- Ultrasound is recommended as the initial study to evaluate the following:
  - Hepatic or portal vein thrombosis
  - Renal vein thrombosis
  - Splenic vein thrombosis

Computed Tomography (CT) Pelvis – Pediatrics

CPT Codes

72192..... CT of pelvis, without contrast

72193..... CT of pelvis, with contrast

72194..... CT of pelvis without contrast, followed by re-imaging with contrast

Standard Anatomic Coverage

- Iliac crests to ischial tuberosities
- Coverage may vary, depending on the specific clinical indication for the exam

Technology Considerations

- Consider using ultrasound for indications such as differentiation of cystic, complex and solid lesions and initial ascites evaluation.
- Verification of cystic lesions in the pelvis is usually well-established with ultrasound.
- Ultrasound studies may be limited in obese patients.

Common Diagnostic Indications

This section contains general pelvic, intestinal, genitourinary, vascular, and osseous indications.

General Pelvic – Whenever possible, guidelines in this section should be superseded by more specific guidelines in subsequent sections

Abnormality detected on other imaging study which requires additional clarification to direct treatment

Ascites

- For diagnosis and surveillance following non-diagnostic ultrasound

Congenital anomaly

(All of the following)

- Following non-diagnostic ultrasound
- MRI is contraindicated or not available
- Further characterization of genitourinary or anorectal malformations is required

Note: *For congenital anomalies not discussed elsewhere in this guideline.*

Fever of unknown origin

(any one of the following)

- Lasting more than three (3) weeks following standard work-up (such as chest x-ray, urine, and/or blood work) to localize the source
- Immunocompromised patient **(any one♦ of the following)**
  - Chronic steroid use
  - Dialysis patients
  - Immune defects
  - Neutropenia
  - Use of an immune-blocking biologic agent

Gastrointestinal bleeding

- Following non-diagnostic endoscopy, colonoscopy, or upper/lower GI series

Common Diagnostic Indications

Hematoma/hemorrhage

Hernia

- Following non-diagnostic ultrasound **(any <u>one</u> of the following)**
  - Diagnosis of a hernia with suspected complications
  - Pre-surgical planning

Note: *Includes femoral, internal, inquinal, spigelian, ventral, and incisional hernias*

Infectious or inflammatory process

(any <u>one</u>♦ of the following)

- Abscess
- Diffuse inflammation/phlegmon
- Fistula

Lower extremity edema, diffuse and unexplained

Note: *For female patients, to exclude an occult lesion causing mass effect, vascular compression, or intraluminal thrombi, ultrasound should be considered as the initial imaging modality.*

Palpable pelvic mass

- When palpable pelvic mass requires further evaluation following non-diagnostic pelvic ultrasound

Note: *MRI is preferred over CT.*

Pelvic pain

(any <u>one</u> of the following)

- For female patients, following non-diagnostic pelvic ultrasound
- Unexplained by clinical findings, physical examination, or other imaging studies

Note: *MRI is preferred over CT.*

Post-operative or post-procedure evaluation

Note: *For post-operative evaluation of conditions not specifically referenced elsewhere in this guideline*

Preoperative or pre-procedure evaluation

Note: *For preoperative evaluation of conditions not specifically referenced elsewhere in this guideline*

Retroperitoneal abnormality

(any <u>one</u> of the following)

- Fibrosis
- Inflammation
- Neoplasm

Trauma

- Following significant blunt or penetrating injury to the pelvis

Tumor, benign or malignant

(any <u>one</u> of the following)

- Diagnosis or management of benign neoplasms
- Diagnosis, management, or surveillance of malignant or indeterminate neoplasms

Note: *This indication applies only to tumors not otherwise listed in this guideline.*

Common Diagnostic Indications

Gastrointestinal

Appendiceal or periappendiceal mass

- Unexplained on physical exam and other imaging studies

Appendicitis

(any <u>one</u> of the following)

- Evaluation of suspected appendicitis following non-diagnostic ultrasound (unless ultrasound is not available or expected to be limited due to body habitus)
- Failure of non-surgical treatment
- Post-operative complications

Bowel obstruction

- Following non-diagnostic radiograph

Congenital anomaly of the gastrointestinal system

- When clinically suspected **(any <u>one</u>♦ of the following)**
  - Anorectal malformations
  - Gastrointestinal duplication cyst
  - Gastroschisis
  - omphalocele

Note: *CT imaging is not generally indicated in the following congenital anomalies:* ***Meckel's diverticulum, Hirschsprung's disease, pyloric stenosis, small left colon, jejunal*** *or* ***ileal stenosis****. For alternative imaging modalities for these clinical situations, please see the "CT not indicated" section below.*

Constipation

- Following non-diagnostic radiograph when there is difficulty with defecation persisting for two or more weeks[17]

  (any <u>one</u> of the following):
  - When symptoms persist after a course of medical management
  - When there are red flag signs (see table below)

Red flag signs for evaluation of constipation

(any <u>one</u> of the following)
• Failure to thrive
• Fever
• Following barium enema or anal manometry when there is suspicion for (any one of the following)
  ○ Anal stenosis
  ○ Impaction in patients less than 1 year of age
  ○ Tight empty rectum
• Vomiting

Enteritis and/or colitis

Note: *Includes neutropenic colitis and radiation enteritis*

Foreign body

- Following non-diagnostic radiograph when there is a high clinical suspicion

Henoch-Schonlein Purpura (HSP)

Common Diagnostic Indications

Inflammatory bowel disease (IBD)

Diagnosis

- Evaluation of suspected Crohn's disease following non-diagnostic upper and lower endoscopy

Management

- Evaluation of new or worsening symptoms to confirm exacerbation or evaluate for complications, including stricture, abscess or fistula

Ischemic bowel

Note: *For necrotizing enterocolitis (NEC), radiographs are the diagnostic modality of choice.*

Genitourinary

Hematuria

- Following non-diagnostic ultrasound when hematuria is persistent

Hydronephrosis

- Following non-diagnostic ultrasound

Note: *This also includes pyonephrosis, which is typically handled as a medical emergency.*

Undescended testicle (cryptorchidism)

- Following non-diagnostic ultrasound

Urinary tract calculus

(any <u>one</u> of the following)

- Following non-diagnostic ultrasound
- Following non-diagnostic kidney, ureter, and bladder (KUB) radiograph

Vascular

Aneurysm of the iliac or femoral vessels

- Following non-diagnostic ultrasound and **(any <u>one</u> of the following)**
  - Annual screening in patients with connective tissue disease
  - Follow-up imaging of patients with an established aneurysm/dilation
  - Suspected complication of an aneurysm/dilation
  - Pre/post-operative

Aortoiliac dissection

- May evaluate with either CT or CTA

Thrombosis in the systemic or portal venous circulations

- Following initial evaluation with a non-diagnostic Doppler ultrasound

Osseous

Acute pelvic trauma

- Following non-diagnostic pelvic radiograph for fracture evaluation

Developmental dysplasia of the hip (DDH)

- Pre-operative planning

Common Diagnostic Indications

Hip osteonecrosis

(any <u>one</u> of the following)

- For suspected hip osteonecrosis when **(<u>All</u> of the following)**
  - Patient is unable to undergo hip MRI or radionuclide bone scintigraphy, (Note: Both are more sensitive modalities than hip CT)
  - Patient with normal hip films or inconclusive radiographic evidence of hip osteonecrosis
- For known hip osteonecrosis and femoral head collapse for pre-operative planning to define the location and extent of disease in patients with painful hips

Osseous tumor evaluation in the pelvis

Note: *MRI or radionuclide bone scintigraphy may be more appropriate for detection of skeletal metastases and primary bone tumors unless otherwise contraindicated.*

Osteoid osteoma

- Following non-diagnostic hip radiograph

Sacroiliitis

- Following non-diagnostic sacroiliac joint radiograph

Stress/insufficiency/avulsion fracture in the pelvis

- Following non-diagnostic radiograph

Note: *Subsequent advanced imaging generally includes MRI or radionuclide bone scan as the next step.*

Suspicion of pelvic osteomyelitis or septic arthritis

- When the patient is unable to undergo hip MRI or radionuclide bone scintigraphy

CT is generally not indicated in the following clinical situations

The indications listed in this section generally do not require advanced imaging using CT. If there are circumstances that require CT imaging, a peer-to-peer discussion may be required.

Failure to thrive

Note: *Chronic condition which is not typically evaluated with advanced imaging*

Meckel's diverticulum or diverticulitis

Note: *Meckel's scan is the diagnostic modality of choice. For follow up of an established diagnosis when there are new or worsening symptoms, see indication for* ***infectious or inflammatory process****.*

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Magnetic Resonance Imaging (MRI) Pelvis – Pediatrics

CPT Codes

72195..... MRI of pelvis, without contrast

72196..... MRI of pelvis, with contrast

72197..... MRI of pelvis, without contrast, followed by re-imaging with contrast

Standard Anatomic Coverage

- Iliac crests to ischial tuberosities
- Coverage may vary, depending on the specific clinical indication for the exam

Technology Considerations

- Depending on the patient's presenting signs and symptoms, pelvic imaging should be directed to the most appropriate modality for clinical work-up.
- Diagnostic evaluation of the pelvis may be performed with:
  - Pelvic ultrasound (trans-abdominal and trans-vaginal), which is the initial imaging modality for most gynecologic abnormalities
  - Transabdominal pelvic sonography is also used for urinary bladder assessment, such as post-void residual urine volume
  - Endoscopy and barium examinations are well established procedures for intestinal evaluation
  - Cystoscopy is often used for lower urinary tract assessment
  - Pelvic CT or MRI
- Verification of cystic lesions in the pelvis is usually well-established with ultrasound.
- Ultrasound studies may be limited in obese patients.
  - The CPT code assignment for an MRI procedure is based on the anatomic area imaged. Authorization requests for multiple MRI imaging of the same anatomic area to address patient positional changes, additional sequences or equipment are not allowed.
- For pediatric patients, MRI may be the preferred imaging modality in a number of clinical circumstances given its lack of ionizing radiation and excellent soft tissue contrast. MRI however may require sedation and is more predisposed to artifacts.

Common Diagnostic Indications

Abnormality detected on other imaging study which requires additional clarification to direct treatment

Adenomyosis of the uterus

- Following non-diagnostic pelvic ultrasound

Adnexal mass

- Following non-diagnostic pelvic ultrasound

Note: *Usually performed to further evaluate problematic cases which are initially detected on pelvic ultrasound. Some uses of pelvic MRI in adnexal lesion evaluation include: differentiation of an ovarian mass from an exophytic or pedunculated fibroid; more confident identification of an ovarian dermoid/teratoma, following an ultrasound or other imaging exam; and demonstration of findings to suggest malignancy in some adnexal masses. Includes assessment of suspected hemorrhagic cystic lesions and tumors*

Common Diagnostic Indications

Appendicitis

(any <u>one</u> of the following)

- Diagnosis following non-diagnostic ultrasound [1-7] (unless ultrasound is not an available modality)
- Failure of non-surgical treatment
- Post-operative complications

Ascites

- For diagnosis and surveillance following non-diagnostic ultrasound[8]

Axial Spondyloarthropathy (SpA)

(any <u>one</u> of the following)

- For diagnosis of Spondyloarthopathy when: **(<u>All</u> of the following)**
  - Following non-diagnostic radiograph for sacroiliitis (Grade 0-2)
  - Back pain has persisted for at least three (3) months
  - Clinical evidence for inflammatory back pain defined as at least **<u>four</u> of the following** five features:
    - Age less than 40
    - Insidious (gradual) onset
    - Improvement with exercise
    - No improvement with rest
    - Pain at night which improves on getting up
- Evaluate response to therapy in patients with known ankylosing spondylitis (AS) **(<u>All</u> of the following)**
  - Established diagnosis of ankylosing spondylitis
  - No response to therapy
  - At least three (3) months of tumor necrosis factor (TNF) inhibitor therapy
- Baseline study prior to treatment when the diagnosis of AS is based on radiographic findings

Bilateral hip osteonecrosis (avascular necrosis; aseptic necrosis)

- Following non-diagnostic hip radiograph when there is clinical suspicion for osteonecrosis with hip pain

Bladder or urethral diverticula

Congenital anomaly of the genitourinary system

- Diagnosis or management following non-diagnostic ultrasound: **(any <u>one</u>♦ of the following)**
  - Beckwith-Wiedemann syndrome
  - Bladder and cloacal exstrophy
  - Characterization of a ureterocele
  - Confirmation of the location, structure, and position of the ureters
  - Congenital adrenal hyperplasia
  - Congenital ureteropelvic junction (UPJ) or ureterovesical junction (UVJ) obstruction
  - Duplex collecting system
  - Management of complications (including infection, urachal carcinoma)
  - Megaureter
  - Pre-surgical planning
  - Prune-belly syndrome
  - Renal and adrenal agenesis
  - Renal ectopy (includes crossed fused renal ectopy, horseshoe and pancake kidney)
  - Renal hypoplasia
  - Urachal anomaly (includes patent urachus, urachal cyst, and urachal umbilical sinus)

Common Diagnostic Indications

Congenital anomaly of the uterus

- Following non-diagnostic pelvic ultrasound

Note: *Includes diagnosis of Mullerian duct anomalies; bicornuate, didelphys, septate uterus, and Mayer-Rokitansky*

Contraindication to CT

- Patient meets criteria for CT exam but CT is expected to be limited due to contraindications (such as a history of allergic reaction to iodinated radiographic contrast material)

Endometriosis

- Following non-diagnostic pelvic ultrasound

Fever of unknown origin

(any <u>one</u> of the following)

- Lasting more than three (3) weeks following standard work-up (such as chest x-ray, urine, and/or blood work) to localize the source
- Immunocompromised patient **(any <u>one</u>♦ of the following)**
  - Chronic steroid use
  - Dialysis patients
  - Immune defects
  - Neutropenia
  - Use of an immune-blocking biologic agent

Hernia

- Following non-diagnostic ultrasound **(any <u>one</u> of the following)**
  - Diagnosis of a hernia with suspected complications
  - Pre-surgical planning

Note: *Includes femoral, internal, inquinal, spigelian, ventral, and incisional hernias*

Hydrometrocolpos and hematocolpos

- Following non-diagnostic pelvic ultrasound when concerned for genitourinary or anorectal malformation

Infectious or inflammatory process

(any <u>one</u>♦ of the following)

- Abscess
- Diffuse inflammation/phlegmon
- Fistula
- Recurrent cystitis (male with at least two episodes or female with failed antibiotic therapy)

Inflammatory bowel disease (IBD)

Diagnosis

- Evaluation of suspected Crohn's disease following non-diagnostic upper and lower endoscopy

Management

- Evaluation of new or worsening symptoms to confirm exacerbation or evaluate for complications, including stricture, abscess or fistula

Lower extremity edema, diffuse and unexplained

Note: *For female patients, to exclude an occult lesion causing mass effect, vascular compression, or intraluminal thrombi, ultrasound should be considered as the initial imaging modality.*

Obstetrical abnormalities, pelvimetry, or obstetrical complications

Common Diagnostic Indications

Osteomyelitis or septic arthritis

Palpable pelvic mass

- When palpable pelvic mass requires further evaluation
  - Following non-diagnostic pelvic ultrasound in female patients

Pelvic floor disorders associated with urinary or bowel incontinence

Pelvic injury

- Following non-diagnostic pelvic or sacral radiograph

Pelvic pain

(any <u>one</u> of the following)

- For female patients, following non-diagnostic pelvic ultrasound
- Unexplained by clinical findings, physical examination, or other imaging studies

Note: *MRI is preferred over CT.*

Pelvic venous thrombosis evaluation

Post-operative or post-procedure evaluation

Note: *For post-operative evaluation of conditions not specifically referenced elsewhere in this guideline*

Preoperative or pre-procedure evaluation

Note: *For preoperative evaluation of conditions not specifically referenced elsewhere in this guideline*

Retroperitoneal abnormality

(any <u>one</u> of the following)

- Fibrosis
- Inflammation
- Neoplasm

Sacral insufficiency fracture

Sacroiliitis

- Following non-diagnostic sacroiliac joint radiograph

Sports hernia (athletic pubalgia)

(<u>All</u> of the following)

- Pain persists at least 6 weeks
- Non diagnostic radiographs
- Following a trial of conservative therapy that lasts at least 6 weeks
- Patient is a surgical candidate
- Pain is insidious, progressive, worsens with valsalva or movement
- No detectable inguinal or ventral hernia on exam

Note: *Groin pain can sometimes be referred from the hip. If that is of concern, see separate guideline for femoral neck stress fracture.*

Common Diagnostic Indications

Tumor, benign or malignant

(any <u>one</u> of the following)

- Diagnosis or management of benign neoplasms
- Diagnosis, management, or surveillance of malignant or indeterminate neoplasms

Note: *This indication applies only to tumors not otherwise listed in this guideline.*

Undescended testicle (cryptorchidism)

- Following non-diagnostic ultrasound

MRI is generally not indicated in the following clinical situations

The indications listed in this section generally do not require advanced imaging using MRI. If there are circumstances that require MRI imaging, a peer-to-peer discussion may be required.

Failure to thrive

Note: *Chronic condition which is not typically evaluated with advanced imaging*

Piriformis syndrome

Note: *Advanced imaging is generally not indicated.*

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CT Angiography (CTA) and MR Angiography (MRA) Pelvis – Pediatrics

CPT Codes

72191..... Computed tomographic angiography, pelvis, with contrast material(s), including non-contrast images, if performed, and image post-processing

72198..... Magnetic resonance angiography, pelvis; without contrast, followed by re-imaging with contrast

Angiography includes imaging of all blood vessels, including arteries and veins. The codes above include CT and MR Venography respectively.

Standard Anatomic Coverage

- Iliac crests to ischial tuberosities
- Scan coverage may vary, depending on the specific clinical indication for the exam

Technology Considerations

- For a combination CTA abdomen and pelvis study, use CPT code 74174.
- Doppler ultrasound examination is an excellent means to identify a wide range of vascular abnormalities, both arterial and venous in origin. This well-established modality should be considered in the initial evaluation of many vascular disorders listed below.
- MRA should also be considered in patients with a history of either previous contrast reaction to intravascular administration of iodinated radiographic contrast material or atopy.
- CTA of the pelvis is an alternative exam in patients who cannot undergo MRA.
- Requests for pelvic CTA or MRA in addition to a request for a MRA or CTA abdominal aorta and bilateral iliofemoral lower extremity runoff study are not allowed.
- These guidelines also include indications for CT venography (CTV) and MR venography (MRV).

Common Diagnostic Indications

Aneurysm of the iliac vessels

- Following non-diagnostic ultrasound **(any <u>one</u> of the following)**
  - Annual screening in patients with connective tissue disease
  - Follow-up imaging of patients with an established aneurysm/dilation
  - Suspected complication of an aneurysm/dilation
  - Pre/post-operative

Arteriovenous malformation (AVM) or arteriovenous fistula (AVF)

Note: *For renal or superficial AVM, ultrasound should be considered as the first imaging modality*

Dissection

Of the iliac arteries or branches

Hematoma/hemorrhage

Of the Iliac arteries or branches

Pseudoaneurysm

Of the Iliac arteries or branches

Common Diagnostic Indications

Stenosis or occlusion of the lower abdominal aorta, iliac arteries or other branch vessels in the pelvis

Traumatic vascular injury

Unexplained blood loss in the pelvis

Vascular anatomic delineation for other surgical and interventional procedures

(any one♦ of the following)

- For vascular delineation prior to operative resection of a pelvic neoplasm
- For pre- and post-procedure evaluation of bypass grafts, stents and vascular anastomoses

Vascular invasion or compression by a pelvic tumor

Vasculitis

Venous thrombosis or occlusion

- Following initial evaluation with non-diagnostic Doppler ultrasound

Computed Tomography (CT) Abdomen and Pelvis Combination – Pediatrics

CPT Codes

74176..... CT of abdomen and pelvis, without contrast

74177..... CT of abdomen and pelvis, with contrast

74178..... CT of abdomen and pelvis, without contrast, followed by re-imaging with contrast

Standard Anatomic Coverage

- Diaphragmatic dome through pubic symphysis
- Scan coverage may vary, depending on the specific clinical indication

Technology Considerations

- Verification of cystic lesions in the abdominal and pelvis is usually well-established with ultrasound
- For abdominal symptoms in the pediatric population, abdominal ultrasound frequently provides diagnostic information without incurring radiation exposure from CT

Common Diagnostic Indications

This section contains general abdominal and pelvic, gastrointestinal, genitourinary, and vascular indications.

General Abdominal and Pelvic – Whenever possible, guidelines in this section should be superseded by more specific guidelines in subsequent sections

Abdominal mass

(any <u>one</u> of the following)

- Following non-diagnostic ultrasound
- Palpable on exam

Note: *Ultrasound is suggested as the initial imaging modality when evaluating a palpable abdominal mass. Evaluation depends on location of the mass and age of the patient. See separate indications for Focal liver lesion, Pancreatic mass, Genitourinary (renal and adrenal), and Pelvic mass.*

Abdominal pain

(any <u>one</u> of the following)

- Evaluation of acute abdominal pain when pain is unexplained by clinical findings, physical examination, or other imaging studies
- Evaluation of chronic or recurrent abdominal pain when a red flag sign is present (see table below)

Note: *Acute pain is defined as new onset pain within the past 30 days. Chronic pain is defined as pain lasting more than 30 days; recurrent pain refers to three (3) or more episodes of pain over a period of three (3) or more months. For family history or clinical evidence for inflammatory bowel disease (IBD), see separate indication.*

Red flag signs for evaluation of abdominal pain	
• Chronic severe diarrhea (at least three (3) watery stools per day for more than two weeks) • Deceleration of linear growth • Fever of unknown origin • Gastrointestinal bleeding • History of a genetic or congenital syndrome	• Immunocompromised • Involuntary weight loss • Persistent focal abdominal pain, especially right upper or right lower quadrant • Persistent vomiting

Abnormality detected on other imaging study which requires additional clarification to direct treatment

Common Diagnostic Indications

Ascites

- For diagnosis and surveillance, following non-diagnostic ultrasound

Congenital anomaly

Note: *For congenital anomalies not discussed elsewhere in this guideline*

Fever of unknown origin

(any <u>one</u> of the following)

- Lasting more than three (3) weeks following standard work-up (such as chest x-ray, urine, and/or blood work) to localize the source
- Immunocompromised patient **(any <u>one</u>♦ of the following)**
  - Chronic steroid use
  - Dialysis patients
  - Immune defects
  - Neutropenia
  - Use of an immune-blocking biologic agent

Gastrointestinal bleeding

- Following non-diagnostic endoscopy, colonoscopy, or upper/lower GI series

Hematoma/hemorrhage

Note: *Includes hemoperitoneum and retroperitoneal bleed. See separate indication for gastrointestinal bleeding.*

Hernia

- Following non-diagnostic ultrasound **(any <u>one</u> of the following)**
  - Diagnosis of a hernia with suspected complications
  - Pre-surgical planning

Note: *Includes femoral, internal, inquinal, spigelian, ventral, and incisional hernias*

Infectious or inflammatory process

(any <u>one</u>♦ of the following)

- Abscess
- Diffuse inflammation/phlegmon
- Fistula

Lower extremity edema, diffuse and unexplained

Note: *For female patients, to exclude an occult lesion causing mass effect, vascular compression, or intraluminal thrombi, ultrasound should be considered as the initial imaging modality.*

Post-operative or post-procedure evaluation

Note: *For post-operative evaluation of conditions not specifically referenced elsewhere in this guideline.*

Preoperative or pre-procedure evaluation

Note: *For preoperative evaluation of conditions not specifically referenced elsewhere in this guideline.*

Retroperitoneal abnormality

(any <u>one</u> of the following)

- Fibrosis
- Inflammation
- Neoplasm

Common Diagnostic Indications

Trauma

- Following significant blunt or penetrating injury to the abdomen

Tumor, benign or malignant

(any <u>one</u> of the following)

- Diagnosis or management of benign neoplasms
- Diagnosis, management, or surveillance of malignant or indeterminate neoplasms

Note: *This indication applies only to tumors not otherwise listed in this guideline.*

Gastrointestinal

Appendiceal or periappendiceal mass

- Unexplained on physical exam and other imaging studies

Appendicitis

(any <u>one</u> of the following)

- Evaluation of suspected appendicitis following non-diagnostic ultrasound (unless ultrasound is not available or expected to be limited due to body habitus)
- Failure of non-surgical treatment
- Post-operative complications

Bowel obstruction

- Following non-diagnostic radiograph

Congenital anomalies of the gastrointestinal system

- When clinically suspected **(any <u>one</u>♦ of the following)**
  - Gastrointestinal duplication cyst
  - Gastroschisis and omphalocele
  - Anorectal malformations

Note: *CT imaging is not indicated in the following congenital anomalies: Meckel's diverticulum. For alternative imaging modalities for these clinical situations, please see the* ***CT not indicated*** *section below.*

Constipation

- Following non-diagnostic radiograph when there is difficulty with defecation persisting for two or more weeks **(any <u>one</u> of the following)**:
  - When symptoms persist after a course of medical management
  - When there are red flag signs (see table below)

Red flag signs for evaluation of constipation

(any <u>one</u> of the following)

- Failure to thrive
- Fever
- Following barium enema or anal manometry when there is suspicion for **(any <u>one</u> of the following)**
  - Anal stenosis
  - Impaction in patients less than 1 year of age
  - Tight empty rectum
- Vomiting

Enteritis and/or colitis

Note: *This includes neutropenic colitis and radiation enteritis*

Common Diagnostic Indications

Foreign body

- Following non-diagnostic radiograph when there is a high clinical suspicion

Henoch-Schonlein Purpura (HSP)

Inflammatory bowel disease (IBD)

Diagnosis

- Evaluation of suspected Crohn's disease following non-diagnostic upper and lower endoscopy

Management

- Evaluation of new or worsening symptoms to confirm exacerbation or evaluate for complications, including stricture, abscess or fistula

Intussusception

(any <u>one</u> of the following)

- Following non-diagnostic ultrasound
- Following intussusception reduction

Ischemic bowel

Note: *For necrotizing enterocolitis (NEC), radiographs are the diagnostic modality of choice.*

Genitourinary

Congenital genitourinary anomalies

- Diagnosis or management following non-diagnostic ultrasound **(any <u>one</u>♦ of the following)**
  - Beckwith-Wiedemann syndrome
  - Bladder and cloacal exstrophy
  - Characterization of a ureterocele
  - Confirmation of the location, structure, and position of the ureters
  - Congenital adrenal hyperplasia
  - Congenital uteteropelvic junction (UPJ) or ureterovesical junction (UVJ) obstruction
  - Duplex collecting system
  - Management of complications (including infection, urachal carcinoma)
  - Megaureter
  - Pre-surgical planning
  - Prune-belly syndrome
  - Renal and adrenal agenesis
  - Renal ectopy (includes crossed fused renal ectopy, horseshoe and pancake kidney)
  - Renal hypoplasia
  - Urachal anomalies (includes patent urachus, urachal cyst, and urachal umbilical sinus)

Hematuria

- Following non-diagnostic ultrasound when hematuria is persistent

Hydronephrosis

- Following non-diagnostic ultrasound

Note: *This also includes pyonephrosis, which is typically handled as a medical emergency.*

Common Diagnostic Indications

Neoplasm, genitourinary

(any <u>one</u> of the following)

- Diagnosis, management, and surveillance of the following malignant tumors **(any <u>one</u>♦ of the following)**
  - Renal (lymphoma, multicystic dysplastic kidney, renal cell carcinoma, or Wilm's tumor)
  - Adrenal (adrenocortical carcinoma, neuroblastoma, or pheochromocytoma)
- Diagnosis and management of the following benign renal neoplasms (angiomyolipoma, multilocular cystic nephroma, or nephroblastomatosis) following non-diagnostic ultrasound

Note: *Consider ultrasound evaluation for follow up particularly with benign tumors*

Pyelonephritis

(any <u>one</u> of the following)

- Diagnosis of acute complicated pyelonephritis when patient has failed to respond to 72 hours of antibiotic therapy
- Evaluate response to therapy when clinically uncertain

Note: *Includes complications of acute pyelonephritis, such as emphysematous pyelonephritis and renal abscess*

Renal mass/lesion requiring further characterization

- Following non-diagnostic ultrasound when lesion does not meet criteria for a simple cyst

Note: *A simple cyst is defined as having all of the following characteristics: anechoic, circumscribed, thin walled, and posterior acoustic enhancement.*

Undescended testicle (cryptorchidism)

- Following non-diagnostic ultrasound

Urinary tract calculus

(any <u>one</u> of the following)

- Following non-diagnostic ultrasound
- Following non-diagnostic kidney, ureter, and bladder (KUB) radiograph

Xanthogranulomatous pyelonephritis (XPN)

Vascular

Aneurysm of the abdominal and iliac arteries

- Following non-diagnostic ultrasound **(any <u>one</u> of the following)**
  - Annual screening in patients with connective tissue disease
  - Follow-up imaging of patients with an established aneurysm/dilation
  - Suspected complication of an aneurysm/dilation
  - Pre/post-operative

Aortic dissection

Note: *May evaluate with either CT or CTA. Usually results from subdiaphragmatic extension of a thoracic aortic dissection.*

Thrombosis in the systemic and portal venous circulations

- Following initial evaluation with non-diagnostic Doppler ultrasound

Common Diagnostic Indications

CT is generally not indicated in the following clinical situations

The indications listed in this section generally do not require advanced imaging using CT. If there are circumstances that require CT imaging, a peer-to-peer discussion may be required.

Cystic liver disease
Note: *Includes congenital and acquired cysts. Ultrasound is usually sufficient.*

Failure to thrive
Note: *Chronic condition which is not typically evaluated with advanced imaging.*

Gastroenteritis
Note: *Imaging is generally not indicated.*

Hirschsprung's disease (congenital aganglionosis)
Note: *Barium enema and radiography are the radiologic modalities of choice.*

Hypospadias
Note: *Voiding cystourethrogram is the modality of choice.*

Irritable bowel syndrome (IBS)
Note: *IBS is a clinical diagnosis. If indicated, plain films and fluoroscopy are the imaging modalities of choice. Advanced imaging is not indicated.*

Jejunal or ileal stenosis
Note: *Upper gastrointestinal fluoroscopy and radiography are the radiologic modalities of choice.*

Meckel's diverticulum or diverticulitis
Note: *Meckel's scan is the diagnostic modality of choice. For follow up of an established diagnosis when there are new or worsening symptoms, see indication for infectious or inflammatory process.*

Midgut volvulus
Note: *Emergent condition, not for outpatient workup. Upper gastrointestinal fluoroscopy and radiography are the diagnostic modalities of choice.*

Neonatal jaundice: biliary atresia and neonatal hepatitis
Note: *For cases of biliary atresia or neonatal hepatitis, ultrasound and nuclear scintigraphy are the diagnostic imaging modalities of choice.*

Posterior urethral valve
Note: *Voiding cystourethrogram is the modality of choice.*

Pyloric stenosis
Note: *Ultrasound and fluoroscopy are the radiologic modalities of choice.*

Small left colon syndrome
Note: *Barium enema and radiography are the radiologic modalities of choice.*

Urinary tract infection
Note: *In infants and children under 5 years, ultrasound, voiding cystourethrogram (VCUG), and renal scans (technetium99 dimercaptosuccinic acid [DMSA]), as needed, are used to diagnose and manage urinary tract infections.*
Note: *In children age 5 years and older, advanced imaging is not indicated in the evaluation of a simple urinary tract infection, but could be considered when there is concern for complicated pyelonephritis.*
Note: *For **pyelonephritis**, see separate indication.*

Vesicoureteral reflux
Note: *Voiding cystourethrogram, followed by ultrasound, is generally sufficient.*

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CT Angiography (CTA) Abdomen and Pelvis Combination – Pediatrics

CPT Codes

74174..... Computed tomographic angiography, abdomen and pelvis, with contrast material(s), including noncontrast images, if performed, and image postprocessing

Angiography includes imaging of all blood vessels, including arteries and veins. The code above includes CT Venography.

Standard Anatomic Coverage

- Anatomic coverage for CPT code 74174 (CTA abdomen & pelvis combination) includes the major arterial and/or venous structures in the abdomen, from the diaphragmatic dome to the ischial tuberosities.
- Coverage for an abdominal CTA generally includes the abdominal aorta and these visceral arteries (aortic branches): renal arteries, celiac artery, splenic artery, hepatic artery, and superior mesenteric artery origin.
- Coverage for a pelvic CTA includes the aortic bifurcation and these arteries: common iliac artery, internal iliac artery (aka hypogastric) and its branches, and external iliac artery.
- Full evaluation of the superior and inferior mesenteric artery generally requires both CTA abdomen and pelvis.
- Complete evaluation of the femoral artery generally requires CT angiography with ileofemoral lower extremity runoff (CPT 75635).
- These guidelines also include indications for CT venography (CTV).

Technology Considerations

- For CTA of the abdominal aorta and iliofemoral vasculature with lower extremity runoff, use CPT code 75635
- Doppler ultrasound examination is an excellent means to identify a wide range of vascular abnormalities, both arterial and venous in origin. This well-established modality should be considered in the initial evaluation of many vascular disorders listed below.
- CTA is an alternative exam in patients who cannot undergo MRA.
- Requests for a combination CTA abdomen and pelvis study in addition to a request for a CTA abdominal aorta and bilateral iliofemoral lower extremity runoff study are not allowed.
- The primary reason to combine CTA of the abdomen and pelvis is to evaluate for a vascular disease thst affects both the abdominal aorta (covered by the CTA abdomen) and the iliac arteries (covered by CTA pelvis). Some examples include ischemia, occlusion, aneurysm, trauma, and vasculitis.
- Aortic stent grafts often cover the infrarenal abdominal aorta and proximal iliac arteries. CTA abdomen and pelvis should be used to evaluate complications such as endoleak in these cases.
- Aortic dissection will often be requested at a CTA chest (CPT 71275) and abdomen. Pelvis is not required.

Common Diagnostic Indications

Aneurysm of the abdominal and iliac arteries

- Following non-diagnostic ultrasound and **(any <u>one</u> of the following)**
  - Annual screening in patients with connective tissue disease
  - Follow-up imaging of patients with an established aneurysm/dilation
  - Suspected complication of an aneurysm/dilation
  - Pre/post-operative

Arteriovenous malformation (AVM) or arteriovenous fistula (AVF)

Note: *For renal or superficial AVM, ultrasound should be considered as the first imaging modality.*

Dissection

Of the abdominal aorta and/or branch vessel

Common Diagnostic Indications

Hematoma/hemorrhage

Of the abdominal aorta and/or branch vessel

Mesenteric ischemia

Note: *May have an acute or chronic and progressive (intestinal or abdominal angina) presentation*

Preoperative or pre-procedure evaluation

Note: *For preoperative evaluation of conditions not specifically referenced elsewhere in this guideline*

Prior to resection of pelvic neoplasm

Pseudoaneurysm

Of the abdominal aorta and/or branch vessel

Stenosis or occlusion of the abdominal aorta or branch vessels

(any one♦ of the following)

- Atherosclerosis
- Thromboembolism
- Other causes

Traumatic vascular injury

Unexplained blood loss in the abdomen

Vascular anatomic delineation for other surgical and interventional procedures

(any one♦ of the following)

- For vascular delineation prior to operative resection of an abdominal neoplasm
- For pre- and post-procedure evaluation of bypass grafts, stents and vascular anastomoses

Vascular invasion or compression by an abdominal tumor

Vasculitis

Venous thrombosis or occlusion

Evaluation of suspected thrombosis or occlusion of major abdominal vessels, including portal and systemic venous systems

- Ultrasound is recommended as the initial study to evaluate the following:
  - Hepatic or portal vein thrombosis
  - Renal vein thrombosis
  - Splenic vein thrombosis

Computed Tomography (CT) Cervical Spine – Pediatrics

CPT Codes

72125..... CT of cervical spine, without contrast

72126..... CT of cervical spine, with contrast

72127..... CT of cervical spine, without contrast, followed by re-imaging with contrast

Standard Anatomic Coverage

- Entire cervical spine (C1-C7), from the craniocervical junction through the first thoracic (T1) vertebra
- Axial images are routinely obtained, with capability for coronal and sagittal reconstructions

Technology Considerations

- MRI is the modality of choice for most cervical spine imaging indications, unless contraindicated or not tolerated by the patient (for example, secondary to claustrophobia)
- CT is the preferred technique for certain clinical scenarios such as suspected fracture, follow-up of known fracture, osseous tumor evaluation and congenital vertebral defects, as well as procedures such as cervical spine CT myelography
- Although cervical spine CT has high diagnostic utility for bony injuries, it is not ideal for ligamentous injuries that are more common in children than in adults.
- CT cervical spine is not appropriate for imaging of the soft tissues of the neck. See CPT codes 70490-70492 CT soft tissue neck for this service

Common Diagnostic Indications

Abnormality detected on other imaging study which requires additional clarification to direct treatment

Basilar invagination

- Superior displacement of the odontoid

Note: *This diagnosis is often associated with skeletal dysplasia or metabolic bone disease*

Congenital spine anomaly

(any one♦ of the following)

- Achondroplasia and other dwarfism
- Congenital kyphosis and scoliosis
- Klippel-Feil syndrome
- Mucopolysaccharidosis
- Neurofibromatosis
- Other vertebral segmentation and fusion defects (hemi, block and butterfly vertebrae)
- Sclerosing bone dysplasia
- Skeletal dysplasia
- Spondyloepiphyseal dysplasia
- Syndromes including Down, Turner, and Marfan
- VACTERL (Vertebral, Anorectal, Cardiac, Tracheo-Esophageal fistula, Renal and Limb anomaly) association

Common Diagnostic Indications

Contraindication to MRI

- Patient meets criteria for MRI exam **(any <u>one</u> of the following)**
  - Patient has a contraindication to MRI (examples include metallic foreign bodies, permanent pacemaker, implantable cardioverter-defibrillators, and intracranial aneurysm surgical clips that are not compatible with MR imaging)
  - Patient is claustrophobic and unable to tolerate MRI

Craniocervical instability

- Following non-diagnostic radiograph in a high risk patient **(any <u>one</u> of the following)**
  - Down syndrome
  - Grisel syndrome
  - Rheumatoid arthritis
  - Skeletal dysplasia
  - Trauma

Note: *Includes atlantoaxial and occipital instability, and basilar invagination. Refers to superior displacement of the odontoid, often associated with skeletal dysplasia or metabolic bone disease*

Fracture evaluation

- Following non-diagnostic radiograph

Infectious process

(any <u>one</u>♦ of the following)

- Abscess
- Discitis
- Osteomyelitis

Neck pain with signs of compression

- Neck or radicular pain with neurologic findings related to the cervical spine **(any <u>one</u> of the following)**
  - Objective muscle weakness
  - Objective sensory abnormality in the cervical dermatome distribution
  - Reflex abnormality
  - Spasticity

Note: *Imaging in patients with polyneuropathy without additional abnormalities on neurological exam is not indicated* [4-7]

Non-specific neck pain

- Following a non-diagnostic radiograph and a trial of conservative therapy

Note: *Conservative therapy may include physician supervised physical therapy, a completed home physical therapy program, anti-inflammatory, antispasmodics and/or other pain management medications*

Post-myelogram CT or CT following other interventional procedure to the cervical spine

Post-operative or post-procedure evaluation

Note: *For post-operative evaluation of conditions not specifically referenced elsewhere in this guideline*

Pre-operative or pre-procedure evaluation

Note: *For pre-operative evaluation of conditions not specifically referenced elsewhere in this guideline*

Common Diagnostic Indications

Scoliosis

- Diagnosis and management of scoliosis confirmed by radiography **(any <u>one</u> of the following)**
  - Patient is less than 10 years of age
  - Patient is age 10 years or older with an atypical finding[1-3] **(any <u>one</u> of the following)**
    - Neurological sign/symptom
    - Rapid curve progression (greater than 10 degrees per year)
    - Significant pain[1]
    - Unusual curvature (such as left thoracic kyphosis)
  - Surgical planning
  - Post-surgical evaluation

Note: *Scoliosis defined by age of clinical presentation: congenital (at birth), infantile (<3 years), juvenile (3-10 years), and adolescent (10+ years). For pediatric patients who may require imaging of a significant portion of the spine or the entire spine, MRI should be considered to minimize radiation exposure*

Spondyloarthropathy

(any <u>one</u> of the following)

- Following non-diagnostic radiograph
- Following non-diagnostic standard laboratory work-up for spondyloarthropathy

Note: *This includes ankylosing spondylitis, reactive arthritis, psoriatic arthritis, spondyloarthritis associated with inflammatory bowel disease, and juvenile-onset spondyloarthritis*

Trauma

(any <u>one</u> of the following)

- Acute trauma
- Following non-diagnostic radiograph when pain is persistent or progressively worsening
- Neurologic deficit with possible spinal cord injury

Tumor, benign or malignant

(any <u>one</u>♦ of the following)

- Primary or metastatic neoplasm involving the vertebrae
- Spinal cord neoplasm

Note: *Includes both primary and secondary intramedullary, intradural/leptomeningeal and extramedullary neoplasms*

References

1. Wright N. Imaging in Scoliosis. *Arch Dis Child.* Jan 2000; 82(1): 38-40.
2. Evans SC, Edgar MA, Hall-Craggs MA, Powell MP, Taylor BA, Noordeen HH. MRI of 'idiopathic' juvenile scoliosis. A prospective study. *J Bone Joint Surg Br.* 1996 Mar;78(2):314-7.
3. Blickman JG, Parker BR, Barnes PD, eds. *Pediatric Radiology: the Requisites*. Philadelphia: Mosby Elsevier; 2009.
4. American Association of Neuromuscular and Electrodiagnostic Medicine. *Choosing Wisely: Five Things Physicians and Patients Should Question*. ABIM Foundation; February 10, 2015. Available at www.choosingwisely.org.
5. England JD, Gronseth GS, Franklin G, et al. Practice Parameter: evaluation of distal symmetric polyneuropathy: role of laboratory and genetic testing (an evidence-based review). *Neurology*. 2009;72(2):185-192.
6. Tracy JA, Dyck PJB. Investigations and treatment of chronic inflammatory demyelinating polyradiculoneuropathy and other inflammatory demyelinating polyneuropathies. *Curr Opin Neurol.* 2010;23(3):242-248.
7. England JD, Gronseth GS, Franklin G, et al. Distal symmetric polyneuropathy: a definition for clinical research: report of the American Academy of Neurology, the American Association of Electrodiagnostic Medicine, and the American Academy of Physical Medicine and Rehabilitation. *Neurology*. 2005;64(2):199-207.

Magnetic Resonance Imaging (MRI) Cervical Spine – Pediatrics

CPT Codes

72141..... MRI of cervical spine, without contrast

72142..... MRI of cervical spine, with contrast

72156..... MRI of cervical spine, without contrast, followed by re-imaging with contrast

Standard Anatomic Coverage

- Entire cervical spine (C1-C7), from the craniocervical junction through the first thoracic (T1) vertebra
- Axial images are routinely obtained, with capability for coronal and sagittal reconstructions

Technology Considerations

- For most cervical spine abnormalities, MRI is the examination of choice
- CT of the cervical spine is often reserved for suspected fracture, follow-up of a known fracture, osseous tumor evaluation, congenital vertebral defects and procedures such as cervical spine CT myelography
- In most other clinical situations, MRI is the preferred modality for cervical spine imaging, unless contraindicated [due to pacemaker, implantable cardioverter-defibrillator (ICD), and other non-compatible devices unsafe for use in an MRI scanner] or not tolerated by the patient (usually secondary to claustrophobia)
- The CPT code assignment for an MRI procedure is based on the anatomic area imaged. Authorization requests for multiple MRI imaging of the same anatomic area to address patient positional changes, additional sequences or equipment are not allowed. These variations or extra sequences are included within the original imaging request

Common Diagnostic Indications

Abnormality detected on other imaging study which requires additional clarification to direct treatment

Chiari malformation (Arnold-Chiari malformation)

Congenital spine anomaly

(any <u>one</u>♦ of the following)

- Achondroplasia and other dwarfism
- Congenital kyphosis and scoliosis
- Klippel-Feil syndrome
- Mucopolysaccharidosis
- Neurofibromatosis
- Other vertebral segmentation and fusion defects (hemi, block and butterfly vertebrae)
- Sclerosing bone dysplasia
- Skeletal dysplasia
- Spondyloepiphyseal dysplasia
- Syndromes including Down, Turner, and Marfan
- VACTERL (Vertebral, Anorectal, Cardiac, Tracheo-Esophageal fistula, Renal and Limb anomaly) association

Common Diagnostic Indications

Craniocervical instability

- Following non-diagnostic radiograph in a high risk patient **(any <u>one</u> of the following)**
  - Down syndrome
  - Grisel syndrome
  - Rheumatoid arthritis
  - Skeletal dysplasia
  - Trauma

Note: *Includes atlantoaxial and occipital instability, and basilar invagination. Refers to superior displacement of the odontoid, often associated with skeletal dysplasia or metabolic bone disease*

Craniocervical junction abnormality

Note: *Includes basilar invagination, platybasia, and os odontoiduem*

Fracture evaluation

- Following non-diagnostic radiograph

Infectious process

(any <u>one</u>♦ of the following)

- Abscess
- Discitis
- Osteomyelitis

Juvenile Idiopathic Arthritis (JIA)[1]

- For management of established JIA following non-diagnostic radiograph, to determine appropriate course of therapy, particularly intra-articular therapy

Multiple sclerosis or other white-matter disease

(any <u>one</u> of the following)

- Diagnosis
- Evaluation of changes in neurologic signs and symptoms
- For multiple sclerosis **(any <u>one</u> of the following)**
  - Assess asymptomatic disease progression
  - Evaluate response to treatment
  - Track disease progression to establish a prognosis

Note: *Includes multiple sclerosis and acute disseminated encephalomyelitis (ADEM)*

Myelopathy

Neck pain with signs of compression

- Neck or radicular pain with neurologic findings related to the cervical spine **(any <u>one</u> of the following)**
  - Objective muscle weakness
  - Objective sensory abnormality in the cervical dermatome distribution
  - Reflex abnormality
  - Spasticity

Note: *Imaging in patients with polyneuropathy without additional abnormalities on neurological exam is not indicated*[5-8]

Non-specific neck pain

- Following non-diagnostic radiograph and a trial of conservative therapy

Note: *Conservative therapy may include physician supervised physical therapy, a completed home physical therapy program, anti-inflammatory, antispasmodics and/or other pain management medications*

Common Diagnostic Indications

Post-operative or post-procedure evaluation

Note: *For post-operative evaluation of conditions not specifically referenced elsewhere in this guideline*

Pre-operative or pre-procedure evaluation

Note: *For pre-operative evaluation of conditions not specifically referenced elsewhere in this guideline*

Scoliosis

- Diagnosis and management of scoliosis confirmed by radiography and **(any <u>one</u> of the following)**
  - Patient is less than 10 years of age
  - Patient is age 10 years or older with an atypical finding[2-4] **(any <u>one</u> of the following)**
    - Neurological sign/symptom
    - Rapid curve progression (greater than 10 degrees per year)
    - Significant pain[2]
    - Unusual curvature (such as left thoracic kyphosis)
  - Surgical planning
  - Post-surgical evaluation

Note: *Scoliosis defined by age of clinical presentation: congenital (at birth), infantile (<3 years), juvenile (3-10 years), and adolescent (10+ years). For pediatric patients who may require imaging of a significant portion of the spine or the entire spine, MRI should be considered to minimize radiation exposure*

Spinal cord infarct

Spondyloarthropathy

(any <u>one</u> of the following)

- Following non-diagnostic radiograph
- Following non-diagnostic standard laboratory work-up for spondyloarthropathy

Note: *This includes ankylosing spondylitis, reactive arthritis, psoriatic arthritis, spondyloarthritis associated with inflammatory bowel disease, and juvenile-onset spondyloarthritis*

Syringohydromyelia

(any <u>one</u> of the following)

- Diagnosis
- Periodic surveillance

Note: *Includes syrinx, hydromelia, and hydrosyringomelia*

Trauma

(any <u>one</u> of the following)

- Acute trauma
- Following non-diagnostic radiograph when pain is persistent or progressively worsening
- Neurologic deficit with possible spinal cord injury

Note: *Includes spinal cord injury without radiographic abnormality (SCIWORA)*

Tumor, benign or malignant

(any <u>one</u>♦ of the following)

- Primary or metastatic neoplasm involving the vertebrae
- Spinal cord neoplasm

Note: *Includes both primary and secondary intramedullary, intradural/leptomeningeal and extramedullary neoplasms*

References

1. Magni-Manzoni S, Malattia C, Lanni S, Ravelli A. Advances and challenges in imaging in juvenile idiopathic arthritis. Nat Rev Rheumatol. 2012 Mar 27;8(6):329-336.
2. Wright N. Imaging in Scoliosis. *Arch Dis Child*. Jan 2000; 82(1): 38-40.
3. Evans SC, Edgar MA, Hall-Craggs MA, Powell MP, Taylor BA, Noordeen HH. MRI of 'idiopathic' juvenile scoliosis. A prospective study. *J Bone Joint Surg Br.* 1996 Mar;78(2):314-317.
4. Blickman JG, Parker BR, Barnes PD, eds. *Pediatric Radiology: the Requisites*. Philadelphia: Mosby Elsevier; 2009.
5. American Association of Neuromuscular and Electrodiagnostic Medicine. *Choosing Wisely: Five Things Physicians and Patients Should Question*. ABIM Foundation; February 10, 2015. Available at www.choosingwisely.org.
6. England JD, Gronseth GS, Franklin G, et al. Practice Parameter: evaluation of distal symmetric polyneuropathy: role of laboratory and genetic testing (an evidence-based review). *Neurology*. 2009;72(2):185-192.
7. Tracy JA, Dyck PJB. Investigations and treatment of chronic inflammatory demyelinating polyradiculoneuropathy and other inflammatory demyelinating polyneuropathies. *Curr Opin Neurol.* 2010;23(3):242-248.
8. England JD, Gronseth GS, Franklin G, et al. Distal symmetric polyneuropathy: a definition for clinical research: report of the American Academy of Neurology, the American Association of Electrodiagnostic Medicine, and the American Academy of Physical Medicine and Rehabilitation. *Neurology*. 2005;64(2):199-207

Computed Tomography (CT) Thoracic Spine – Pediatrics

CPT Codes

72128..... CT of thoracic spine, without contrast

72129..... CT of thoracic spine, with contrast

72130..... CT of thoracic spine, without contrast, followed by re-imaging with contrast

Standard Anatomic Coverage

- Entire thoracic spine (T1-T12), from the cervicothoracic region through the thoracolumbar junction
- Axial images are routinely obtained, with capability for coronal and sagittal reconstructions

Technology Considerations

- Advanced diagnostic imaging of the thoracic spine is indicated in selected clinical scenarios and is performed significantly less often than in the lumbar and cervical regions
- MRI is the modality of choice for most thoracic spine imaging indications, unless contraindicated or not tolerated by the patient (for example, secondary to claustrophobia)
- CT is the preferred technique for certain clinical scenarios such as suspected fracture, osseous tumor evaluation, congenital vertebral defects and interventional procedures such as CT myelography
- Authorization request for re-imaging, due to technically limited exams, is the responsibility of the imaging provider

Common Diagnostic Indications

Abnormality detected on other imaging study which requires additional clarification to direct treatment

Congenital spine anomaly

(any one♦ of the following)

- Achondroplasia and other dwarfism
- Congenital kyphosis and scoliosis
- Klippel-Feil syndrome
- Mucopolysaccharidosis
- Neurofibromatosis
- Other vertebral segmentation and fusion defects (hemi, block and butterfly vertebrae)
- Sclerosing bone dysplasia
- Skeletal dysplasia
- Spondyloepiphyseal dysplasia
- Syndromes including Down, Turner, and Marfan
- VACTERL (Vertebral, Anorectal, Cardiac, Tracheo-Esophageal fistula, Renal and Limb anomaly) association

Contraindication to MRI

- Patient meets criteria for MRI exam **(any one of the following)**
  - Patient has a contraindication to MRI (examples include metallic foreign bodies, permanent pacemaker, implantable cardioverter-defibrillators, and intracranial aneurysm surgical clips that are not compatible with MR imaging)
  - Patient is claustrophobic and unable to tolerate MRI

Common Diagnostic Indications

Fracture evaluation

- Following non-diagnostic radiograph

Infectious process

(any one♦ of the following)

- Abscess
- Discitis
- Osteomyelitis

Mid-back pain with signs of compression

- Mid-back or radicular pain with neurologic findings related to the thoracic spine **(any one of the following)**
  - Objective muscle weakness
  - Objective sensory abnormality in the thoracic dermatome distribution
  - Reflex abnormality
  - Spasticity

Note: *Imaging in patients with polyneuropathy without additional abnormalities on neurological exam is not indicated* [4-7]

Non-specific mid-back pain

- Following non-diagnostic radiograph and a trial of conservative therapy

Note: *Conservative therapy may include physician supervised physical therapy, a completed home physical therapy program, anti-inflammatory, antispasmodics and/or other pain management medications*

Post-myelogram CT or CT following other interventional procedure to the thoracic spine

Post-operative or post-procedure evaluation

Note: *For post-operative evaluation of conditions not specifically referenced elsewhere in this guideline*

Pre-operative or pre-procedure evaluation

Note: *For pre-operative evaluation of conditions not specifically referenced elsewhere in this guideline*

Scoliosis

- Diagnosis and management of scoliosis confirmed by radiography and **(any one of the following)**
  - Patient is less than 10 years of age
  - Patient is age 10 years or older with an atypical finding[1-3] **(any one♦ of the following)**
    - Neurological sign/symptom
    - Rapid curve progression (greater than 10 degrees per year)
    - Significant pain[1]
    - Unusual curvature (such as left thoracic kyphosis)
  - Surgical planning
  - Post-surgical evaluation

Note: *Scoliosis defined by age of clinical presentation: congenital (at birth), infantile (<3 years), juvenile (3-10 years), and adolescent (10+ years). For pediatric patients who may require imaging of a significant portion of the spine or the entire spine, MRI should be considered to minimize radiation exposure*

Spondyloarthropathy

(any one of the following)

- Following non-diagnostic radiograph
- Following non-diagnostic standard laboratory work-up for spondyloarthropathy

Note: *This includes ankylosing spondylitis, reactive arthritis, psoriatic arthritis, spondyloarthritis associated with inflammatory bowel disease, and juvenile-onset spondyloarthritis*

Common Diagnostic Indications

Trauma

(any <u>one</u> of the following)

- Acute trauma
- Following non-diagnostic radiograph when pain is persistent or progressively worsening
- Neurologic deficit with possible spinal cord injury

Tumor, benign or malignant

(any <u>one</u>♦ of the following)

- Primary or metastatic neoplasm involving the vertebrae
- Spinal cord neoplasm

Note: *Includes both primary and secondary intramedullary, intradural/leptomeningeal, and extramedullary neoplasms*

References

1. Wright N. Imaging in scoliosis. *Arch Dis Child.* Jan 2000; 82(1): 38-40.
2. Evans SC, Edgar MA, Hall-Craggs MA, Powell MP, Taylor BA, Noordeen HH. MRI of 'idiopathic' juvenile scoliosis. A prospective study. *J Bone Joint Surg Br.* 1996 Mar;78(2):314-317.
3. Blickman JG, Parker BR, Barnes PD, eds. *Pediatric Radiology: the Requisites*. Philadelphia: Mosby Elsevier; 2009.
4. American Association of Neuromuscular and Electrodiagnostic Medicine. *Choosing Wisely: Five Things Physicians and Patients Should Question*. ABIM Foundation; February 10, 2015. Available at www.choosingwisely.org.
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Magnetic Resonance Imaging (MRI) Thoracic Spine – Pediatrics

CPT Codes

72146..... MRI of thoracic spine, without contrast

72147..... MRI of thoracic spine, with contrast

72157..... MRI of thoracic spine, without contrast, followed by re-imaging with contrast

Standard Anatomic Coverage

- Entire thoracic spine (T1-T12), from the cervicothoracic region through the thoracolumbar junction
- Imaging planes generally include sagittal and axial/oblique axial (parallel with the disc spaces) views

Technology Considerations

- Advanced imaging of the thoracic spine is indicated in selected clinical scenarios and is performed significantly less often than in the cervical and lumbar regions
- CT is the preferred technique for certain indications, including fracture detection, follow-up of a known fracture, osseous tumor assessment, congenital vertebral defects and for interventional procedures, such as CT myelography
- In most other clinical situations, MRI is the modality of choice for thoracic spine imaging, unless contraindicated or not tolerated by the patient (for example, secondary to claustrophobia)
- The CPT code assignment for an MRI procedure is based on the anatomic area imaged. Requests for multiple MRI imaging of the same anatomic area to address patient positional changes, additional sequences or equipment are not allowed. These variations or extra sequences are included within the original imaging request

Common Diagnostic Indications

Abnormality detected on other imaging study which requires additional clarification to direct treatment

Congenital spine anomaly

(any one♦ of the following)

- Achondroplasia and other dwarfism
- Congenital kyphosis and scoliosis
- Klippel-Feil syndrome
- Mucopolysaccharidosis
- Neurofibromatosis
- Other vertebral segmentation and fusion defects (hemi, block and butterfly vertebrae)
- Sclerosing bone dysplasia
- Skeletal dysplasia
- Spondyloepiphyseal dysplasia
- Syndromes including Down, Turner, and Marfan
- VACTERL (Vertebral, Anorectal, Cardiac, Tracheo-Esophageal fistula, Renal and Limb anomaly) association

Fracture evaluation

- Following non-diagnostic radiograph

Common Diagnostic Indications

Infectious process

(any <u>one</u>♦ of the following)

- Abscess
- Discitis
- Osteomyelitis

Juvenile Idiopathic Arthritis (JIA)[1]

- For management of established JIA following non-diagnostic radiograph, to determine appropriate course of therapy, particularly intra-articular therapy

Mid-back pain with signs of compression

- Mid-back or radicular pain with neurologic findings related to the thoracic spine **(any <u>one</u> of the following)**
  - Objective muscle weakness
  - Objective sensory abnormality in the thoracic dermatome distribution
  - Reflex abnormality
  - Spasticity

Note: *Imaging in patients with polyneuropathy without additional abnormalities on neurological exam is not indicated*[5-8]

Multiple sclerosis or other white-matter disease

(any <u>one</u> of the following)

- Diagnosis
- Evaluation of changes in neurologic signs and symptoms
- For multiple sclerosis **(any <u>one</u> of the following)**
  - Assess asymptomatic disease progression
  - Evaluate response to treatment
  - Track disease progression to establish a prognosis

Note: *Includes multiple sclerosis and acute disseminated encephalomyelitis (ADEM)*

Myelopathy

Non-specific mid-back pain

- Following non-diagnostic radiograph and a trial of conservative therapy

Note: *Conservative therapy may include physician supervised physical therapy, a completed home physical therapy program, anti-inflammatory, antispasmodics and/or other pain management medications*

Post-operative or post-procedure evaluation

Note: *For post-operative evaluation of conditions not specifically referenced elsewhere in this guideline*

Pre-operative or pre-procedure evaluation

Note: *For pre-operative evaluation of conditions not specifically referenced elsewhere in this guideline*

Common Diagnostic Indications

Scoliosis

- Diagnosis and management of scoliosis confirmed by radiography and **(any <u>one</u> of the following)**
  - Patient is less than 10 years of age
  - Patient is age 10 years or older with an atypical finding[2-4] **(any <u>one</u> of the following)**
    - Neurological sign/symptom
    - Rapid curve progression (greater than 10 degrees per year)
    - Significant pain[2]
    - Unusual curvature (such as left thoracic kyphosis)
  - Surgical planning
  - Post-surgical evaluation

Note: *Scoliosis defined by age of clinical presentation: congenital (at birth), infantile (<3 years), juvenile (3-10 years), and adolescent (10+ years). For pediatric patients who may require imaging of a significant portion of the spine or the entire spine, MRI should be considered to minimize radiation exposure*

Spinal cord infarct

Spondyloarthropathy

(any <u>one</u> of the following)

- Following non-diagnostic radiograph
- Following non-diagnostic standard laboratory work-up for spondyloarthropathy

Note: *This includes ankylosing spondylitis, reactive arthritis, psoriatic arthritis, spondyloarthritis associated with inflammatory bowel disease, and juvenile-onset spondyloarthritis*

Syringohydromyelia

(any <u>one</u> of the following)

- Diagnosis
- Periodic surveillance

Note: *Includes syrinx, hydromelia, and hydrosyringomelia*

Spinal dysraphism

(any <u>one</u> of the following)

- Patients five (5) months of age or younger, following non-diagnostic ultrasound
- Patients older than five (5) months of age

Note: *Includes midline back mass when there is clinical concern for spinal dysraphism. This also includes closed spinal dysraphism (such as; lipomyelocele, lipomyelomeningocele, or dermal sinus) as well as open spinal dysraphism (such as meningocele, myelocele, or myelomeningocele)*

Tethered cord

(any <u>one</u> of the following)

- Diagnosis in patients five (5) months of age or younger, following a non-diagnostic ultrasound
- Diagnosis in patients older than five (5) months of age
- Pre-operative planning
- Post-operative evaluation when retethering is suspected

Note: *Defined as stretching of the low lying (below L2) cord due to attachment of the filum terminale*

Common Diagnostic Indications

Trauma

(any <u>one</u> of the following)

- Acute trauma
- Following non-diagnostic radiograph when pain is persistent or progressively worsening
- Neurologic deficit with possible spinal cord injury

Note: *Includes spinal cord injury without radiographic abnormality (SCIWORA)*

Tumor, benign or malignant

(any <u>one</u>♦ of the following)

- Primary or metastatic neoplasm involving the vertebrae
- Spinal cord neoplasm

Note: *Includes both primary and secondary intramedullary, intradural/leptomeningeal and extramedullary neoplasms*

References

1. Magni-Manzoni S, Malattia C, Lanni S, Ravelli A. Advances and challenges in imaging in juvenile idiopathic arthritis. *Nat Rev Rheumatol.* 2012 Mar 27;8(6):329-336.
2. Wright N. Imaging in Scoliosis. *Arch Dis Child.* 2000;82(1):38-40.
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4. Blickman JG, Parker BR, Barnes PD, eds. *Pediatric Radiology: the Requisites*. Philadelphia: Mosby Elsevier; 2009.
5. American Association of Neuromuscular and Electrodiagnostic Medicine. *Choosing Wisely: Five Things Physicians and Patients Should Question*. ABIM Foundation; February 10, 2015. Available at www.choosingwisely.org.
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Computed Tomography (CT) Lumbar Spine – Pediatrics

CPT Codes

72131..... CT of lumbar spine, without contrast

72132..... CT of lumbar spine, with contrast

72133..... CT of lumbar spine, without contrast, followed by re-imaging with contrast

Standard Anatomic Coverage

- Entire lumbar spine (L1-L5), from the thoracolumbar region through the lumbosacral junction
- Axial images are routinely obtained, with capability for coronal and sagittal reconstructions

Technology Considerations

- CT of the lumbar spine is often reserved for suspected fracture, follow-up of a known fracture, skeletal abnormalities such as spondylolysis and spondylolisthesis in operative candidates, congenital vertebral defects, osseous tumor evaluation, and procedures such as lumbar CT myelography
- For most other lumbar spine abnormalities, MRI is the modality of choice, unless contraindicated or not tolerated by the patient (for example, secondary to claustrophobia)

Common Diagnostic Indications

Abnormality detected on other imaging study which requires additional clarification to direct treatment

Cauda equina syndrome

Contraindication to MRI

- Patient meets criteria for MRI exam **(any <u>one</u> of the following)**
  - Patient has a contraindication to MRI (examples include metallic foreign bodies, permanent pacemaker, implantable cardioverter-defibrillators, and intracranial aneurysm surgical clips that are not compatible with MR imaging)
  - Patient is claustrophobic and unable to tolerate MRI

Congenital spine anomaly

(any <u>one</u>♦ of the following)

- Achondroplasia and other dwarfism
- Congenital kyphosis and scoliosis
- Klippel-Feil syndrome
- Mucopolysaccharidosis
- Neurofibromatosis
- Other vertebral segmentation and fusion defects (hemi, block and butterfly vertebrae)
- Sclerosing bone dysplasia
- Skeletal dysplasia
- Spondyloepiphyseal dysplasia
- Syndromes including Down, Turner, and Marfan
- VACTERL (Vertebral, Anorectal, Cardiac, Tracheo-Esophageal fistula, Renal and Limb anomaly) association

Fracture evaluation

- Following non-diagnostic radiograph

Common Diagnostic Indications

Infectious process

(any one♦ of the following)

- Abscess
- Arachnoiditis
- Discitis
- Osteomyelitis

Low back pain

(any one of the following)

- Pain is persistent **(all of the following)**
  - Following a four (4) week trial of conservative therapy
  - Following non-diagnostic radiograph
- Patient age is less than 5 years
- Red flag signs or symptoms are present[1-3] (see table below)
- Trauma – see separate Trauma indication

Note: *Conservative therapy may include physician supervised physical therapy, a completed home physical therapy program, anti-inflammatory, antispasmodics and/or other pain management medications*

Table: Low back pain red flag features

Back pain characteristics	Constitutional signs	Neurologic signs and symptoms
• Constant pain • Disrupts sleep • Recurrent pain • Worsening after initiation of conservative management early morning stiffness	• Bruising • Lymphadenopathy • Night sweats • Unexplained fever • Weight loss	• Altered gait • Bowel or bladder dysfunction • Radicular pain • Sensory symptoms in a lumbar dermatome distribution • Spasticity/abnormal reflexes • Weakness

Myelopathy involving the lower spinal cord

Post-myelogram CT or CT following other interventional procedure to the lumbar spine

Post-operative or post-procedure evaluation

Note: *For post-operative evaluation of conditions not specifically referenced elsewhere in this guideline*

Pre-operative or pre-procedure evaluation

Note: *For pre-operative evaluation of conditions not specifically referenced elsewhere in this guideline*

Scoliosis

- Diagnosis and management of scoliosis confirmed by radiography and (any one of the following)
  - Patient is less than 10 years of age
  - Patient is age 10 years or older with an atypical finding[1-3] (any one of the following)
    - Neurological sign/symptom
    - Rapid curve progression (greater than 10 degrees per year)
    - Significant pain[1]
    - Unusual curvature (such as left thoracic kyphosis)
  - Surgical planning
  - Post-surgical evaluation

Note: *Scoliosis defined by age of clinical presentation: congenital (at birth), infantile (<3 years), juvenile (3-10 years), and adolescent (10+ years). For pediatric patients who may require imaging of a significant portion of the spine or the entire spine, MRI should be considered to minimize radiation exposure*

Common Diagnostic Indications

Spondyloarthropathy

(any <u>one</u> of the following)

- Following non-diagnostic radiograph
- Following non-diagnostic standard laboratory work-up for spondyloarthropathy

Note: *This includes ankylosing spondylitis, reactive arthritis, psoriatic arthritis, spondyloarthritis associated with inflammatory bowel disease, and juvenile-onset spondyloarthritis*

Spondylolysis

(any <u>one</u> of the following)

- Following a non-diagnostic radiograph when there is strong clinical concern
- Following a radiograph that shows spondylolisthesis

Note: *Follow-up can be performed for four (4) months to assess healing[2] CT is preferred to evaluate bony detail*

Trauma

(any <u>one</u> of the following)

- Acute trauma
- Following non-diagnostic radiograph when pain is persistent or progressively worsening
- Neurologic deficit with possible spinal cord injury

Tumor, benign or malignant

(any <u>one</u>♦ of the following)

- Primary or metastatic neoplasm involving the vertebrae
- Spinal cord neoplasm

Note: *Includes both primary and secondary intramedullary, intradural/leptomeningeal and extramedullary neoplasms*

References

1. Feldman DS, Straight JJ, Badra MI, Mohaideen A, Madan SS. Evaluation of an algorithmic approach to pediatric back pain. *J Pediatr Orthop.* 2006;26(3):353-357.
2. Rodriguez DP, Poussaint TY. Imaging of back pain in children. *AJNR Am J Neuroradiol.* 2010 May;31(5):787-802.
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Magnetic Resonance Imaging (MRI) Lumbar Spine – Pediatrics

CPT Codes

72148..... MRI of lumbar spine, without contrast

72149..... MRI of lumbar spine, with contrast

72158..... MRI of lumbar spine, without contrast, followed by re-imaging with contrast

Standard Anatomic Coverage

- Entire lumbar spine (L1-L5), from the thoracolumbar region through the lumbosacral junction
- Imaging planes generally include sagittal and axial/oblique axial (parallel with disc spaces) views

Technology Considerations

- For most lumbar spine abnormalities, MRI is the modality of choice, unless contraindicated or not tolerated by the patient (for example, secondary to claustrophobia)
- Lumbar spine CT is often reserved for suspected fracture, follow-up of a known fracture, skeletal abnormalities such as spondylolysis and spondylolisthesis in operative candidates, congenital vertebral defects, osseous tumor evaluation, and procedures such as lumbar CT myelography
- For the majority of patients with acute low back pain, symptoms and/or physical exam findings will improve or resolve during a trial of conservative treatment, and diagnostic imaging is not necessary
- The spinal cord normally ends at L1-L2, which is seen on thoracic MRI. If the conus medullaris is not seen on thoracic spine imaging, the spinal cord is presumed to be tethered, and lumbar MRI is appropriate
- Definitive diagnosis is not achieved in as many as 85% of patients with low back pain
- The CPT code assignment for an MRI procedure is based on the anatomic area imaged. Requests for multiple MRI imaging of the same anatomic area to address patient positional changes, additional sequences or equipment are not allowed. These variations or extra sequences are included within the original imaging request

Common Diagnostic Indications

Abnormality detected on other imaging study which requires additional clarification to direct treatment

Back mass

- For patients up to age five (5) months following an abnormal or non-diagnostic ultrasound

Cauda equina syndrome

Common Diagnostic Indications

Congenital spine anomaly

(any one♦ of the following)

- Achondroplasia and other dwarfism
- Congenital kyphosis and scoliosis
- Klippel-Feil syndrome
- Mucopolysaccharidosis
- Neurofibromatosis
- Other vertebral segmentation and fusion defects (hemi, block and butterfly vertebrae)
- Sclerosing bone dysplasia
- Skeletal dysplasia
- Spondyloepiphyseal dysplasia
- Syndromes: Down's, Turner's, Marfan's
- VACTERL (Vertebral, Anorectal, Cardiac, Tracheo-Esophageal fistula, Renal and Limb anomaly) association

Fracture evaluation

- Following non-diagnostic radiograph

Infectious process

(any one♦ of the following)

- Abscess
- Arachnoiditis
- Discitis
- Osteomyelitis

Juvenile Idiopathic Arthritis (JIA)[1]

- For management of established JIA following non-diagnostic radiograph, to determine appropriate course of therapy, particularly intra-articular therapy

Low back pain

(any one of the following)

- Pain is persistent **(all of the following)**
  - Following a four (4) week trial of conservative therapy
  - Following non-diagnostic radiograph
- Patient age is less than 5 years
- Red flag signs or symptoms are present[2-4] (see table below)
- Trauma – see separate Trauma indication

Note: *Conservative therapy may include physician supervised physical therapy, a completed home physical therapy program, anti-inflammatory, antispasmodics and/or other pain management medications*

Table: Low back pain red flag features

Back pain characteristics	Constitutional signs	Neurologic signs and symptoms
• Constant pain • Disrupts sleep • Recurrent pain • Worsening after initiation of conservative management early morning stiffness	• Bruising • Lymphadenopathy • Night sweats • Unexplained fever • Weight loss	• Altered gait • Bowel or bladder dysfunction • Radicular pain • Sensory symptoms in a lumbar dermatome distribution • Spasticity/abnormal reflexes • Weakness

Myelopathy involving the lower spinal cord

Common Diagnostic Indications

Post-operative or post-procedure evaluation

Note: *For post-operative evaluation of conditions not specifically referenced elsewhere in this guideline*

Pre-operative or pre-procedure evaluation

Note: *For pre-operative evaluation of conditions not specifically referenced elsewhere in this guideline*

Scoliosis

- Diagnosis and management of scoliosis confirmed by radiography and **(any <u>one</u> of the following)**
  - Patient is less than 10 years of age
  - Patient is age 10 years or older with an atypical finding[2-4] **(any <u>one</u> of the following)**
    - Neurological sign/symptom
    - Rapid curve progression (greater than 10 degrees per year)
    - Significant pain[2]
    - Unusual curvature (such as left thoracic kyphosis)
  - Surgical planning
  - Post-surgical evaluation

Note: *Scoliosis defined by age of clinical presentation: congenital (at birth), infantile (<3 years), juvenile (3-10 years), and adolescent (10+ years). For pediatric patients who may require imaging of a significant portion of the spine or the entire spine, MRI should be considered to minimize radiation exposure*

Spinal cord infarct

Spinal dysraphism

- Patients five (5) months of age or younger, following non-diagnostic ultrasound
- Patients older than five (5) months of age

Note: *Includes midline back mass when there is clinical concern for spinal dysraphism. This also includes closed spinal dysraphism (such as; lipomyelocele, lipomyelomeningocele, or dermal sinus) as well as open spinal dysraphism (such as meningocele, myelocele, or myelomeningocele)*

Spina bifida occulta

- Symptomatic patients – see **Tethered cord**

Note: *Common incidental finding on radiography*

Spondyloarthropathy

(any <u>one</u> of the following)

- Following non-diagnostic radiograph
- Following non-diagnostic standard laboratory work-up for spondyloarthropathy

Note: *This includes ankylosing spondylitis, reactive arthritis, psoriatic arthritis, spondyloarthritis associated with inflammatory bowel disease, and juvenile-onset spondyloarthritis*

Spondylolysis

(any <u>one</u> of the following)

- Following a non-diagnostic radiograph when there is strong clinical concern
- Following a radiograph that shows spondylolisthesis

Note: *Follow-up can be performed for four (4) months to assess healing[4]. CT is preferred to evaluate bony detail*

Common Diagnostic Indications

Tethered cord

(any one of the following)

- Diagnosis in patients five (5) months of age or younger, following a non-diagnostic ultrasound
- Diagnosis in patients older than five (5) months of age
- Pre-operative planning
- Post-operative evaluation when retethering is suspected

Note: *Defined as stretching of the low lying (below L2) cord due to attachment of the filum terminale*

Trauma

(any one of the following)

- Acute trauma
- Following non-diagnostic radiograph when pain is persistent or progressively worsening
- Neurologic deficit with possible spinal cord injury

Note: *Includes spinal cord injury without radiographic abnormality (SCIWORA)*

Tumor, benign or malignant

(any one♦ of the following)

- Primary or metastatic neoplasm involving the vertebrae
- Spinal cord neoplasm

Note: *Includes both primary and secondary intramedullary, intradural/leptomeningeal and extramedullary neoplasms*

References

1. Magni-Manzoni S, Malattia C, Lanni S, Ravelli A. Advances and challenges in imaging in juvenile idiopathic arthritis. *Nat Rev Rheumatol*. 2012 Mar 27;8(6):329-336.
2. Feldman DS, Straight JJ, Badra MI, Mohaideen A, Madan SS. Evaluation of an algorithmic approach to pediatric back pain. *J Pediatr Orthop*. 2006;26(3):353-357.
3. Rodriguez DP, Poussaint TY. Imaging of back pain in children. *AJNR Am J Neuroradiol*. 2010;31(5):787-802.
4. Feldman DS, Hedden DM, Wright JG. The use of bone scan to investigate back pain in children and adolescents. *J Pediatr Orthop*. 2000;20:790-795.

MR Angiography (MRA) Spinal Canal – Pediatrics

CPT Codes

72159..... Magnetic resonance angiography of spinal canal

Angiography includes imaging of all blood vessels, including arteries and veins. The code above includes MR Venography.

Standard Anatomic Coverage

- Scan coverage depends on the specific clinical indication for the spinal canal MRA
- General landmarks extend from the craniocervical junction through the lumbosacral region

Technology Considerations

- MRA of the spinal canal is an infrequently requested exam. Potential applications which have been described include evaluation of spinal arteriovenous fistula (AVF) and arteriovenous malformation (AVM). These vascular lesions are usually detected by MRI or myelography. Intra-arterial digital subtraction angiography (DSA) of the spinal vasculature may be necessary to define the precise location and type of vascular abnormality
- MRI of the spinal canal CPT 72159 includes imaging of the entire spinal canal. Requests for multiple exams to address each anatomic area of the spinal canal are inappropriate

MR Angiography of the Spinal Canal

- MR Angiography (MRA) of the spinal canal is an evolving technology under clinical development. This clinical application of MRA and its impact on health outcomes will continue to undergo review, as new evidence-based studies are published. At this point, medically necessary applications are limited (see below). Interval routine coverage for MR angiography of the spinal canal is not generally available and is not considered medically appropriate at this time

Diagnostic Indications

Abnormality detected on other imaging study which requires additional clarification to direct treatment

Post-operative or post-procedure evaluation

Pre-operative or pre-procedure evaluation

Computed Tomography (CT) Upper Extremity – Pediatrics

CPT Codes

73200..... CT upper extremity, without contrast

73201..... CT upper extremity, with contrast

73202..... CT upper extremity, without contrast, followed by re-imaging with contrast

Standard Anatomic Coverage

- Scan coverage depends on the specific clinical indication for the exam and varies considerably, based on anatomic considerations (from shoulder through fingers) and clinical manifestations
- Depending on the protocol used, the CT data acquisition(s) may allow for diagnostic multi-planar reconstructions through the region of interest

Technology Considerations

- Non-diagnostic radiographs should be obtained before advanced imaging
- CT is generally the preferred modality for evaluation of displaced fractures and subluxations, whereas stress fractures and some incomplete and non-displaced fractures may be better imaged with MRI or radionuclide bone scintigraphy
- If radiographic findings are typical of osteomyelitis, advanced imaging may not be necessary
- In osteomyelitis, CT may be helpful in defining bone sequestra
- For evaluation of musculoskeletal tumors, MRI is generally preferred over CT, unless there is a contraindication to performance of an MRI exam
- Use of contrast (intravenous or intra-articular for CT arthrogram) is at the discretion of both the ordering and imaging physicians
- Brachial plexus imaging: MRI, when not contraindicated, is the preferred imaging modality for brachial plexus. The brachial plexus is a network of nerves in the neck, passing under the clavicle and into the axilla. Assign either a CT or MRI of the upper extremity for imaging the brachial plexus

Common Diagnostic Indications

Abnormality detected on other imaging study which requires additional clarification to direct treatment

Congenital anomaly

- Following non-diagnostic radiograph when further characterization is necessary

Contraindication to MRI

- Patient meets criteria for MRI exam (any one of the following)
  - Patient has a contraindication to MRI (examples include metallic foreign bodies, permanent pacemaker, implantable cardioverter-defibrillators, and intracranial aneurysm surgical clips that are not compatible with MR imaging)
  - Patient is claustrophobic and unable to tolerate MRI

CT accompanying an arthrogram (CT arthrography)

Common Diagnostic Indications

Fracture evaluation

- Following non-diagnostic radiograph **(any <u>one</u> of the following)**
  - Assessment of fracture healing for delayed union or non-union
  - Occult/stress fracture
  - Pre-operative evaluation **(any <u>one</u> of the following)**
    - Define the extent of an acute fracture
    - Intra-articular fracture
    - Physeal bar
    - Salter-Harris fracture

Hemarthrosis (bloody joint effusion)

- Documented by arthrocentesis except in cases when arthrocentesis is contraindicated (e.g. non-traumatic causes of hemarthrosis such as sickle cell, anticoagulant, or hemophilia)

Infectious process

(any <u>one</u> of the following)

- Abscess, to determine location and extent for surgical treatment
- Fasciitis
- Osteomyelitis, following non-diagnostic radiographs and when MRI is contraindicated
- Underlying soft tissue infection is clinically suspected and patient is unresponsive to treatment (such as antibiotics or incision/drainage

Instability. anterior glenohumeral

- For preoperative evaluation when radiograph is insufficient for planning **(any <u>one</u> of the following)**
  - First time dislocation for a young patient at high risk for recurrence[1,2]
  - Recurrent anterior shoulder dislocation

Intraarticular loose body

Note: *Includes synovial osteochondromatosis*

Juvenile Idiopathic Arthritis (JIA)[3]

- For management of established JIA when radiograph is insufficient to determine appropriate course of therapy, particularly intra-articular therapy

Osteochondroma (exostosis)

(any <u>one</u> of the following)

- Patient is symptomatic
- Periodic surveillance for malignant degeneration (especially when hereditary)

Note: *Includes hereditary multiple exostosis*

Osteonecrosis (avascular necrosis [AVN], aseptic necrosis)

- Following non-diagnostic radiograph

Note: *MRI is generally the preferred imaging modality, particularly for evaluation in the early stages of osteonecrosis. Common anatomic locations for osteonecrosis in the upper extremity are: Humeral head, radial head, carpal navicular bone, lunate bone (lunate osteonecrosis also referred to as Kienbock's disease)*

Post-operative or post-procedure evaluation

Note: *For post-operative evaluation of conditions not specifically referenced elsewhere in this guideline*

Pre-operative or pre-procedure evaluation

Note: *For pre-operative evaluation of conditions not specifically referenced elsewhere in this guideline*

Common Diagnostic Indications

Septic arthritis

- When MRI is contraindicated **(any <u>one</u> of the following)**
  - Diagnosis
  - Evaluate for associated osteomyelitis or cartilage involvement
  - Pre-operative evaluation

Note: *Septic arthritis is considered a medical emergency and typically not managed with elective outpatient imaging*

Shoulder pain, acute or chronic

- Following non-diagnostic radiograph **(any <u>one</u> of the following)**
  - When there is suspected bursitis or long head of biceps tenosynovitis and the patient is a candidate for corticosteroid or anesthetic injection
  - When the patient fails to show substantial improvement following a six (6) week trial of conservative therapy

Note: *Conservative therapy may include physician supervised physical therapy, a completed home physical therapy program, anti-inflammatory, antispasmodics, and/or other pain management medications*

Soft tissue mass

Trauma

- Following non-diagnostic radiograph

Note: *Includes non-accidental injury (NAI)*

Tumor, malignant

- Evaluation of biopsy-proven malignancy

Note: *Examples of biopsy-proven malignancies include osteosarcoma, Ewing's sarcoma, chondrosarcoma, lymphoma, fibromasarcoma, liposarcoma, synovial sarcoma, and metastatic disease*

References

1. Bencardino JT, Gyftopoulos S, Palmer WE. Imaging in anterior glenohumeral instability. *Radiology*. 2013;269(2):323-337.
2. Piasecki DP, Verma NN, Romeo AA, Levine WN, Bach BR Jr, Provencher MT. Glenoid bone deficiency in recurrent anterior shoulder instability: diagnosis and management. *J Am Acad Orthop Surg*. 2009;17(8):482-493.
3. Magni-Manzoni S, Malattia C, Lanni S. Ravelli A. Advances and challenges in miaging in juvenile idiopathic arthritis. *Nat Rev Rheumatol*. 2012. 27;8(6):329-336.

Magnetic Resonance Imaging (MRI) Upper Extremity (Any Joint) – Pediatrics

CPT Codes

73221..... MRI upper extremity, any joint, without contrast

73222..... MRI upper extremity, any joint, with contrast

73223..... MRI upper extremity, any joint, without contrast, followed by re-imaging with contrast

Standard Anatomic Coverage

- Scan coverage depends on the specific clinical indication for the exam and varies considerably, based on anatomic (from shoulder joint through hand/digits) and clinical considerations
- MRI routinely provides multi-planar imaging through the region of interest

Technology Considerations

- Non-diagnostic radiographs should be obtained before advanced imaging
- Use of contrast (intravenous or intra-articular) is at the discretion of both the ordering and imaging physicians
- CT is generally the preferred modality for evaluation of displaced fractures and subluxations, whereas stress fractures and some incomplete and non-displaced fractures may be better imaged with MRI or radionuclide bone scintigraphy
- MRI is generally recommended to evaluate internal derangements of the joints and related tendinous, ligamentous and cartilaginous structures
- MRI is also useful for evaluation of possible osteomyelitis, despite negative or non-diagnostic plain films and/or triple-phase bone scintigraphy. One exception for osteomyelitis is detection of bone sequestra, which may be better depicted with CT
- If radiographic findings are typical of osteomyelitis, advanced imaging may not be necessary
- For evaluation of musculoskeletal tumors, MRI is generally preferred over CT, unless there is a contraindication to performance of an MRI exam
- For suspected osteonecrosis, MRI is generally more sensitive than CT and bone scintigraphy
- Implanted surgical hardware, including joint prostheses, may produce sufficient local artifact to preclude adequate imaging through the region containing hardware

Common Diagnostic Indications

This section contains general upper extremity, shoulder, elbow, and wrist and hand joint indications.

General Upper Extremity

Abnormality detected on other imaging study which requires additional clarification to direct treatment

Congenital anomaly

- Following non-diagnostic radiograph

Fracture evaluation

- Following non-diagnostic radiograph **(any <u>one</u> of the following)**
  - Assessment of fracture healing for delayed union or non-union
  - Occult/stress fracture
  - Pre-operative evaulation **(any <u>one</u> of the following)**
    - Define the extent of an acute fracture
    - Intra-articular fracture
    - Physeal bar
    - Salter-Harris fracture

Common Diagnostic Indications

Hemarthrosis (bloody joint effusion)

- Documented by arthrocentesis except in cases when arthrocentesis is contraindicated (e.g. non-traumatic causes of hemarthrosis such as sickle cell, anticoagulant, or hemophilia)

Infectious process

(any <u>one</u> of the following)

- Abscess, to determine location and extent for surgical treatment
- Fasciitis
- Osteomyelitis, following non-diagnostic radiographs
- Underlying soft tissue infection is clinically suspected and patient is unresponsive to treatment (such as antibiotics or incision/drainage)

Intraarticular loose body

- Following non-diagnostic radiographs

Note: *Includes synovial osteochondromatosis*

Juvenile Idiopathic Arthritis (JIA)[1]

- For management of established JIA when radiograph is insufficient to determine appropriate course of therapy, particularly intra-articular therapy

Ligament or tendon injury

- Following a focused history and physical exam, the patient fails to show substantial improvement following a trial of conservative therapy

Note: *Conservative therapy may include physician supervised physical therapy, a completed home physical therapy program, anti-inflammatory, antispasmodics, and/or other pain management medications*

MRI accompanying an arthrogram (MR arthrography)

Osteochondral lesion

Osteochondroma (exostosis)

(any <u>one</u> of the following)

- Patient is symptomatic
- Periodic surveillance for malignant degeneration (especially when hereditary)

Note: *Includes hereditary multiple exostosis*

Osteonecrosis (avascular necrosis [AVN], aseptic necrosis)

- Following non-diagnostic radiograph

Note: *MRI is generally the preferred imaging modality, particularly for evaluation in the early stages of osteonecrosis. Common anatomic locations for osteonecrosis in the upper extremity are: Humeral head, radial head, carpal navicular bone, lunate bone (lunate osteonecrosis also referred to as Kienbock's disease)*

Pigmented villonodular synovitis (PVNS)

Post-operative or post-procedure evaluation

Note: *For post-operative evaluation of conditions not specifically referenced elsewhere in this guideline*

Pre-operative or pre-procedure evaluation

Note: *For pre-operative evaluation of conditions not specifically referenced elsewhere in this guideline*

Septic arthritis

(any <u>one</u> of the following)

- Diagnosis
- Evaluate for associated osteomyelitis or cartilage involvement
- Pre-surgical planning

Note: *Septic arthritis is considered a medical emergency and typically not managed with elective outpatient imaging*

Soft tissue mass

Trauma

- Following non-diagnostic radiograph

Note: *Includes non-accidental injury (NAI)*

Tumor, malignant

- Evaluation of biopsy-proven malignancy

Note: *Examples of biopsy-proven malignancies include osteosarcoma, Ewing's sarcoma, chondrosarcoma, lymphoma, fibromasarcoma, liposarcoma, synovial sarcoma, and metastatic disease*

Shoulder Joint

Instability/labral tear, anterior glenohumeral

- Diagnosis of anterior glenohumeral instability/anterior labral tear when **(any <u>one</u> of the following)**
  - Recurrent anterior shoulder dislocation[2]
  - First time dislocation for a young patient that has a high risk for recurrent dislocation[3]

Shoulder pain, acute or chronic

- Following non-diagnostic radiograph **(any <u>one</u> of the following)**
  - When there is suspected bursitis or long head of biceps tenosynovitis and the patient is a candidate for corticosteroid or anesthetic injection
  - When the patient fails to show substantial improvement following a six (6) week trial of conservative therapy

Note: *Conservative therapy may include physician supervised physical therapy, a completed home physical therapy program, anti-inflammatory, antispasmodics, and/or other pain management medications*

Superior Labrum Anterior Posterior (SLAP) tear (including labral tears)

(any <u>one</u> of the following)

- Diagnosis when there are clinical findings of a SLAP tear (as shown in **Table 1**) **(any <u>one</u> of the following)**
  - High-risk patient (as defined in **Table 2**)
  - Symptoms do not improve or worsen after 4 weeks of conservative therapy
- Pre-operative evaluation and **(any <u>one</u> of the following)**
  - Labral tear established by a modality other than MRI
  - More than 1 year between MRI and surgical evaluation
- Post-operative at least three (3) months post-surgery when there is no clinical improvement

Note: *Conservative therapy may include physician supervised physical therapy, a completed home physical therapy program, anti-inflammatory, antispasmodics, and/or other pain management medications*

Table 1. Clinical findings of a SLAP tear[4-6]

(any <u>one</u>♦ of the following)

- Pain exacerbated by overhead activity or heavy lifting
- Popping or locking of the shoulder
- Signs of shoulder instability
  - Compression-Rotation test
  - O'Brien's test
  - Speed's biceps tendon test
  - Yergason's test)

Table 2. Patients at High Risk for a SLAP tear

- Acute trauma and evidence of suprascapular nerve entrapment **(any <u>one</u>♦ of the following)**
  - Posterolateral shoulder pain
  - Supraspinatus and/or infraspinatus atrophy
  - Supraspinatus and/or infraspinatus weakness

Common Diagnostic Indications

Suspected occult shoulder fracture

- Following non-diagnostic radiograph when there is a high clinical suspicion

Elbow

Biceps tendon rupture

- At insertion onto radial tuberosity

Capitellar osteochondritis

Epicondylitis

- Following a focused history, physical exam, and non-diagnostic radiograph when patient fails to show substantial improvement following a trial of conservative therapy

Note: *Epicondylitis is generally considered a clinical diagnosis and imaging usually does not change management. Specialist evaluation should be strongly considered prior to advanced imaging. Conservative therapy may include physician supervised physical therapy, a completed home physical therapy program, anti-inflammatory, antispasmodics, and/or other pain management medications*

Suspected occult elbow fracture

- Following non-diagnostic radiograph when there is a high clinical suspicion

Triceps tendon rupture

- From olecranon insertion site

Ulnar collateral ligament tear

Wrist and Hand

Scaphoid fracture

Scapholunate instability

Triangular fibrocartilage complex (TFCC) tear

Ulnar collateral ligament tear (gamekeeper's thumb)

References

1. Magni-Manzoni S, Malattia C, Lanni S. Ravelli A. Advances and challenges in imaging in juvenile idiopathic arthritis. *Nat Rev Rheumatol*. 2012. 27;8(6):329-336.
2. Bencardino JT, Gyftopoulos S, Palmer WE.Imaging in anterior glenohumeral instability.*Radiology*. 2013;269(2):323-337.
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5. Keener JD, Brophy RH. Superior labral tears of the shoulder: pathogenesis, evaluation, and treatment. *J Am Acad Orthop Surg*. 2009;17(10):627-637.
6. Nam EK, Snyder SJ. The diagnosis and treatment of superior labrum, anterior and posterior (SLAP) lesions. *Am J Sports Med*. 2003;31(5):798-810.

Magnetic Resonance Imaging (MRI) Upper Extremity (Non-Joint) – Pediatrics

CPT Codes

73218..... MRI upper extremity, non-joint, without contrast

73219..... MRI upper extremity, non-joint, with contrast

73220..... MRI upper extremity, non-joint, without contrast, followed by re-imaging with contrast

Standard Anatomic Coverage

- Scan coverage depends on the specific clinical indication for the exam and varies considerably, based on anatomic (from shoulder joint through hand/digits) and clinical considerations
- MRI routinely provides multi-planar imaging through the region of interest

Technology Considerations

- Non-diagnostic radiographs should be obtained before advanced imaging
- CT is generally the preferred modality for evaluation of displaced fractures and subluxations, whereas stress fractures and some incomplete or non-displaced fractures may be better imaged with MRI or radionuclide bone scintigraphy
- MRI is generally the preferred modality for evaluation of soft tissue abnormalities and for interrogation of possible osteomyelitis, despite negative or non-diagnostic plain films and/or triple-phase bone scintigraphy. One exception for osteomyelitis is detection of bone sequestra, which may be better depicted with CT
- If radiographic findings are typical of osteomyelitis, advanced diagnostic imaging may not be necessary
- Use of contrast is at the discretion of both the ordering and imaging physicians
- Brachial Plexus Imaging: MRI, when not contraindicated is the preferred imaging modality for brachial plexus. The brachial plexus is a network of nerves in the neck, passing under the clavicle and into the axilla. Assign either a CT or MRI of the upper extremity (non-joint) for imaging the brachial plexus

Common Diagnostic Indications

Abnormality detected on other imaging study which requires additional clarification to direct treatment

Brachial plexopathy

Brachial plexus mass

Congenital anomaly

- Following non-diagnostic radiograph

Entrapment neuropathy

(All of the following)

- Diagnosis confirmed by electromyogram (EMG)
- Following a trial of conservative therapy
- Results will be used to direct treatment

Note: *Suspected entrapment neuropathy, cubital tunnel detail, and/or carpal tunnel are not considered medically necessary. Conservative therapy may include physician supervised physical therapy, a completed home physical therapy program, anti-inflammatory, antispasmodics, and/or other pain management medications*

Common Diagnostic Indications

Fracture evaluation

- Following non-diagnostic radiograph **(any <u>one</u> of the following)**
  - Assessment of fracture healing for delayed union or non-union
  - Occult/stress fracture
  - Pre-operative evaulation **(any <u>one</u> of the following)**
    - Define the extent of an acute fracture
    - Intra-articular fracture
    - Physeal bar
    - Salter-Harris fracture

Infectious process

(any <u>one</u> of the following)

- Abscess, to determine location and extent for surgical treatment
- Fasciitis
- Osteomyelitis, following non-diagnostic radiographs
- Underlying soft tissue infection is clinically suspected and patient is unresponsive to treatment (such as antibiotics or incision/drainage)

Myositis

(any <u>one</u> of the following)

- Determine optimal location for biopsy
- Monitor treatment response

Osteochondroma (exostosis)

(any <u>one</u> of the following)

- Patient is symptomatic
- Periodic surveillance for malignant degeneration (especially when hereditary)

Note: *Includes hereditary multiple exostosis*

Persistent upper extremity pain

(<u>All</u> of the following)

- Focused history and physical exam suggest non-specific upper extremity pain
- Following non-diagnostic radiographs
- Patient fails to show substantial improvement following a six (6) week trial of conservative therapy

Note: *For suspicion of specific etiology, please refer to corresponding indication. Conservative therapy may include physician supervised physical therapy, a completed home physical therapy program, anti-inflammatory, antispasmodics, and/or other pain management medications*

Post-operative or post-procedure evaluation

Note: *For post-operative evaluation of conditions not specifically referenced elsewhere in this guideline*

Pre-operative or pre-procedure evaluation

Note: *For pre-operative evaluation of conditions not specifically referenced elsewhere in this guideline*

Septic arthritis

(any <u>one</u> of the following)

- Diagnosis
- Evaluate for associated osteomyelitis or cartilage involvement
- Pre-surgical planning

Note: *Septic arthritis is considered a medical emergency and typically not managed with elective outpatient imaging*

Common Diagnostic Indications

Soft tissue mass

Trauma

- Following non-diagnostic radiograph

Note: *Includes non-accidental injury (NAI)*

Tumor, malignant

- Evaluation of biopsy-proven malignancy

Note: *Examples of biopsy-proven malignancies include osteosarcoma, Ewing's sarcoma, chondrosarcoma, lymphoma, fibromasarcoma, liposarcoma, synovial sarcoma, and metastatic disease*

Ulnar collateral ligament tear (gamekeeper's thumb)

CT Angiography and MR Angiography (CTA/MRA) Upper Extremity – Pediatrics

CPT Codes

73206..... Computed tomographic angiography, upper extremity, with contrast material(s), including non-contrast images, if performed, and image post-processing

73225..... Magnetic resonance angiography, upper extremity, without and with contrast (Note: upper extremity MRA is not currently a covered benefit by the Centers for Medicare and Medicaid Services, through a National Coverage Determination)

Angiography includes imaging of all blood vessels, including arteries and veins. The codes above include CT and MR Venography respectively.

Standard Anatomic Coverage

- Depends on the specific anatomic area of interest, from the axillary region through the hand and digits

Technology Considerations

- CT and MR angiographic techniques include arterial and/or venous assessment, depending on the clinical indication
- Other generally available non-invasive arterial studies of the upper extremity circulation should be considered prior to advanced diagnostic imaging with CTA or MRA. These include segmental systolic pressure measurements, plethysmographic analysis, continuous wave Doppler and/or duplex ultrasonography
- CT angiography utilizes the data obtained from standard CT imaging. A request for a CT exam in addition to a CT Angiography of the same anatomic area during the same imaging session is inappropriate
- For MR arthrography of the upper extremity, see CPT codes 73221-73223
- For imaging the brachial plexus, see CT upper extremity or MRI upper extremity, non-joint

Common Diagnostic Indications

Aneurysm/dilation

Arterial entrapment syndrome

Arteriovenous malformation (AVM) or fistula (AVF)

Dialysis graft evaluation

- Following duplex Doppler assessment

Dissection

Intramural hematoma

Post-operative or post-procedure evaluation

Note: *For post-operative evaluation of conditions not specifically referenced elsewhere in this guideline*

Pre-operative or pre-procedure evaluation

Note: *For pre-operative evaluation of conditions not specifically referenced elsewhere in this guideline*

Thromboembolic disease, arterial or venous

Common Diagnostic Indications

Vascular invasion or compression by a musculoskeletal neoplasm

Vasculitis

Computed Tomography (CT) Lower Extremity – Pediatrics

CPT Codes

73700..... CT lower extremity without contrast

73701..... CT lower extremity with contrast

73702..... CT lower extremity without contrast, followed by re-imaging with contrast

Standard Anatomic Coverage

- Scan coverage depends on the anatomic area of concern and varies considerably, based on anatomic (from hip through toes) and clinical considerations
- Depending on the protocol used, the CT data acquisition(s) may allow for diagnostic multi-planar reconstructions through the region of interest

Technology Considerations

- Non-diagnostic radiographs should be obtained before advanced imaging
- CT is generally the preferred modality for evaluation of displaced fractures and subluxations, whereas stress fractures and some incomplete and non-displaced fractures may be better imaged with MRI or radionuclide bone scintigraphy
- If radiographic findings are typical of osteomyelitis, advanced imaging may not be necessary
- In osteomyelitis, CT may be helpful in defining bony sequestra
- Use of contrast (intravenous and intra-articular) is at the discretion of both the ordering and imaging physicians

Common Diagnostic Indications

Abnormality detected on other imaging study which requires additional clarification to direct treatment

Congenital anomaly of the lower extremity

- Diagnosis and management (primarily pre-operative evaluation) following non-diagnostic radiographs for **(any <u>one</u> of the following)**
  - Acetabular dysplasia
  - Congenital short femur **(any <u>one</u> of the following)**
    - Achondroplasia
    - Mucopolysaccharidosis
    - Neurofibromatosis
    - Skeletal dysplasias
    - Spondyloepiphyseal dysplasia
  - Proximal focal femoral deficiency (PFFD)

Note: *For evaluation of congenital anomalies not specifically referenced elsewhere in this guideline*

Contraindication to MRI

- Patient meets criteria for MRI exam **(any <u>one</u> of the following)**
  - Patient has a contraindication to MRI (examples include metallic foreign bodies, permanent pacemaker, implantable cardioverter-defibrillators, and intracranial aneurysm surgical clips that are not compatible with MR imaging)
  - Patient is claustrophobic and unable to tolerate MRI

CT accompanying an arthrogram (CT arthrography)

Common Diagnostic Indications

Fracture evaluation

- Following non-diagnostic radiograph **(any <u>one</u> of the following)**
  - Assessment of fracture healing for delayed union or non-union
  - Occult/stress fracture
  - Pre-operative evaulation **(any <u>one</u> of the following)**
    - Define the extent of an acute fracture
    - Intra-articular fracture
    - Physeal bar
    - Salter-Harris fracture

Hemarthrosis (bloody joint effusion)

- Documented by arthrocentesis except in cases when arthrocentesis is contraindicated (e.g. non-traumatic causes of hemarthrosis such as sickle cell, anticoagulant, or hemophilia)

Infectious process

(any <u>one</u> of the following)

- Abscess, to determine location and extent for surgical treatment
- Fasciitis
- Osteomyelitis, following non-diagnostic radiographs and when MRI is contraindicated
- Underlying soft tissue infection is clinically suspected and patient is unresponsive to treatment (such as antibiotics or incision/drainage)

Juvenile Idiopathic Arthritis (JIA)

- For management of established JIA when radiograph is insufficient to determine appropriate course of therapy, particularly intra-articular therapy

Osteochondroma (exostosis)

(any <u>one</u> of the following)

- Patient is symptomatic
- Periodic surveillance for malignant degeneration (especially when hereditary)

Note: *Includes hereditary multiple exostosis*

Osteoid osteoma

(any <u>one</u> of the following)

- Following suggestive radiographs for further characterization of the nidus
- Following non-diagnostic radiographs with high clinical suspicion

Osteonecrosis (avascular necrosis [AVN], aseptic necrosis)

- Following non-diagnostic radiograph

Note: *MRI is generally the preferred imaging modality, particularly for evaluation in the early stages of osteonecrosis.*

Persistent lower extremity pain (excluding knee joint)

(<u>All</u> of the following)

- Focused history and physical exam suggest non-specific lower extremity pain
- Following non-diagnostic radiographs
- Patient fails to show substantial improvement following a trial of conservative therapy

Note: *For suspicion of specific etiology, please refer to corresponding indication. Conservative therapy may include physician supervised physical therapy, a completed home physical therapy program, anti-inflammatory, antispasmodics, and/or other pain management medications*

Common Diagnostic Indications

Post-traumatic complications

(any <u>one</u> of the following)

- Chondrolysis
- Intra-articular bodies
- Premature growth plate closure

Post-operative or post-procedure evaluation

Note: *For post-operative evaluation of conditions not specifically referenced elsewhere in this guideline*

Pre-operative or pre-procedure evaluation

Note: *For pre-operative evaluation of conditions not specifically referenced elsewhere in this guideline*

Septic arthritis

- When MRI is contraindicated **(any <u>one</u> of the following)**
  - Diagnosis
  - Evaluate for associated osteomyelitis or cartilage involvement[4,5]
  - Pre-operative evaluation

Note: *Septic arthritis is considered a medical emergency and typically not managed with elective outpatient imaging*

Soft tissue mass

Trauma

- Following non-diagnostic radiograph

Note: *Includes non-accidental injury (NAI)*

Tarsal coalition

- Following non-diagnostic radiograph

Transient dislocation of the patella

Tumor, malignant

- Evaluation of biopsy-proven malignancy

Note: *Examples of biopsy-proven malignancies include osteosarcoma, Ewing's sarcoma, chondrosarcoma, lymphoma, fibromasarcoma, liposarcoma, synovial sarcoma, and metastatic disease*

CT is generally not indicated in the following clinical situations

The indications listed in this section generally do not require advanced imaging using CT. If there are circumstances that require CT imaging, a peer-to-peer discussion may be required.

Limb malalignment, preoperative

Note: *Radiographs or CT scanogram are usually sufficient. CT scanogram (without cross-sectional imaging) is not part of AIM review*

Magnetic Resonance Imaging (MRI) Lower Extremity (Joint & Non-Joint) - Pediatrics

CPT Codes

73718..... MRI lower extremity, other than joint, without contrast
73719..... MRI lower extremity, other than joint, with contrast
73720..... MRI lower extremity, other than joint, without contrast followed by re-imaging with contrast
73721..... MRI lower extremity, any joint, without contrast
73722..... MRI lower extremity, any joint, with contrast
73723..... MRI lower extremity, any joint, without contrast followed by re-imaging with contrast

Standard Anatomic Coverage

- Scan coverage depends on the specific clinical indication and varies considerably, based on anatomic and clinical considerations. If medically appropriate, an MRI exam may be requested for each major area of the right and left lower extremities: hip, thigh, knee, lower leg (calf), ankle, or foot (includes toes)
- Routine MRI examinations provide multi-planar imaging of the joint or non-joint region(s) of interest

Technology Considerations

- Non-diagnostic radiographs should be obtained before advanced imaging
- Use of contrast (intravenous and intra-articular) is at the discretion of both the ordering and imaging physicians
- CT is generally the preferred modality for evaluation of displaced fractures and subluxations, whereas stress fractures and some incomplete and non-displaced fractures may be better imaged with MRI or radionuclide bone scintigraphy
- MRI is often used to evaluate soft tissue abnormalities and to interrogate for possible osteomyelitis, despite negative or non-diagnostic plain films and/or triple-phase bone scintigraphy. One exception for osteomyelitis is detection of bone sequestra, which may be better depicted with CT
- If radiographic findings are typical of osteomyelitis, advanced imaging may not be necessary
- For suspected osteonecrosis, MRI is generally more sensitive than CT or bone scintigraphy
- Implanted surgical hardware, including joint prostheses, may produce sufficient local artifact to preclude adequate imaging through the region containing hardware
- For suspected Baker's cysts, ultrasound should be performed before advanced imaging exams

Common Diagnostic Indications

This section contains general lower extremity, hip, knee, and ankle and foot indications.

General Lower Extremity

Abnormality detected on other imaging study which requires additional clarification to direct treatment

Congenital anomaly of the lower extremity[1]

- Diagnosis and management (primarily pre-operative evaluation) following non-diagnostic radiographs for **(any <u>one</u> of the following)**
  - Acetabular dysplasia
  - Congenital short femur **(any <u>one</u> of the following)**
    - Achondroplasia
    - Mucopolysaccharidosis
    - Neurofibromatosis
    - Skeletal dysplasias
    - Spondyloepiphyseal dysplasia
  - Proximal focal femoral deficiency (PFFD)

Note: *For evaluation of congenital anomalies not specifically referenced elsewhere in this guideline*

Common Diagnostic Indications

Fracture evaluation

- Following non-diagnostic radiograph **(any <u>one</u> of the following)**
  - Assessment of fracture healing for delayed union or non-union
  - Occult/stress fracture
  - Pre-operative evaulation **(any <u>one</u> of the following)**
    - Define the extent of an acute fracture
    - Intra-articular fracture
    - Physeal bar
    - Salter-Harris fracture

Hemarthrosis (bloody joint effusion)

- Documented by arthrocentesis except in cases when arthrocentesis is contraindicated (e.g. non-traumatic causes of hemarthrosis such as sickle cell, anticoagulant, or hemophilia)

Infectious process

(any <u>one</u> of the following)

- Abscess, to determine location and extent for surgical treatment
- Fasciitis
- Osteomyelitis, following non-diagnostic radiographs
- Underlying soft tissue infection is clinically suspected and patient is unresponsive to treatment (such as antibiotics or incision/drainage)

Intraarticular loose body

- Following non-diagnostic radiographs

Note: *Includes synovial osteochondromatosis*

Juvenile Idiopathic Arthritis (JIA)[2]

- For management of established JIA when radiograph is insufficient to determine appropriate course of therapy, particularly intra-articular therapy

MRI accompanying an arthrogram (MR arthrography)

Myositis

(any <u>one</u> of the following)

- Determine optimal location for biopsy
- Monitor treatment response

Note: *Includes dermatomyositis[3]*

Osteochondral lesion[4]

Osteochondroma (exostosis)

(any <u>one</u> of the following)

- Patient is symptomatic
- Periodic surveillance for malignant degeneration (especially when hereditary)

Note: *Includes hereditary multiple exostosis*

Osteoid osteoma

(any <u>one</u> of the following)

- Following suggestive radiographs for further characterization of the nidus
- Following non-diagnostic radiographs with high clinical suspicion

Common Diagnostic Indications

Osteonecrosis (avascular necrosis [AVN], aseptic necrosis)

- Following non-diagnostic radiograph

Note: *MRI is generally the preferred imaging modality, particularly for evaluation in the early stages of osteonecrosis.*

Persistent lower extremity pain (excluding knee and hip joint)

(All of the following)

- Focused history and physical exam suggest non-specific lower extremity pain
- Following non-diagnostic radiographs
- Patient fails to show substantial improvement following a trial of conservative therapy

Note: *For suspicion of specific etiology, please refer to corresponding indication. Conservative therapy may include physician supervised physical therapy, a completed home physical therapy program, anti-inflammatory, antispasmodics, and/or other pain management medications*

Pigmented villonodular synovitis (PVNS)

Post-traumatic complications[3]

(any one of the following)

- Chondrolysis
- Intra-articular bodies
- Premature growth plate closure

Post-operative or post-procedure evaluation

Note: *For post-operative evaluation of conditions not specifically referenced elsewhere in this guideline*

Pre-operative or pre-procedure evaluation

Note: *For pre-operative evaluation of conditions not specifically referenced elsewhere in this guideline*

Septic arthritis

(any one of the following)

- Diagnosis
- Evaluate for associated osteomyelitis or cartilage involvement[5,6]
- Pre-surgical planning

Note: *Septic arthritis is considered a medical emergency and typically not managed with elective outpatient imaging*

Soft tissue mass

Trauma

- Following non-diagnostic radiograph

Note: *Includes non-accidental injury (NAI)*

Tumor, malignant

- Evaluation of biopsy-proven malignancy

Note: *Examples of biopsy-proven malignancies include osteosarcoma, Ewing's sarcoma, chondrosarcoma, lymphoma, fibromasarcoma, liposarcoma, synovial sarcoma, and metastatic disease*

Hip Joint

Coxa vara[1]

(any one of the following)

- Diagnosis following non-diagnostic radiograph
- Hip pain
- Pre-operative evaluation

Common Diagnostic Indications

Developmental hip dysplasia[1]

(any <u>one</u> of the following)

- Diagnosis following non-diagnostic radiograph
- Pre-operative evaluation **(any <u>one</u> of the following)**
  - Complex dislocations (i.e., teratologic)
  - Failure to respond to bracing
  - Late diagnosis
- Post-operative evaluation **(any <u>one</u> of the following)**
  - Adequacy of surgical reduction
  - Complications including growth disturbance or avascular necrosis

Labral tear of the hip

Legg-Calvé-Perthes disease

- Requires initial radiographic evaluation

Note: *Eponym for osteonecrosis (avascular necrosis) of bony epiphysis in femoral heads, usually in 4-10 year old age range*

Non-specific hip pain

- Following non-diagnostic radiograph **(any <u>one</u> of the following)**
  - Patient younger than age 5 years and has a limp[6] following non-diagnostic ultrasound
  - Patient age 5 years or older[7] and has failed to show substantial improvement following a trial of conservative therapy

Note: *When a specific etiology is suspected, please refer to corresponding indication such as Infectious process, Legg-Calvé-Perthes, Slipped capital femoral epiphysis (SCFE), and Trauma. Conservative therapy may include physician supervised physical therapy, a completed home physical therapy program, anti-inflammatory, antispasmodics, and/or other pain management medications*

Occult hip fracture

- Following non-diagnostic radiograph when there is a high clinical suspicion

Slipped capital femoral epiphysis[7]

- Following non-diagnostic radiograph

Note: *Defined as an atraumatic fracture through the physeal plate. The affected population is typically overweight teenagers*

Knee Joint

Blount's disease

- Pre-operative evaluation when there is clinical concern for physeal bony bars and radiograph is insufficient for planning

Note: *Radiographs are usually sufficient*

Discoid meniscus[8-11]

Note: *See indication for meniscal tear/injury*

Hemarthrosis/Lipohemarthrosis

Common Diagnostic Indications

Ligament tear of the knee

(any <u>one</u> of the following)

- Focused history and physical exam suggests a ligament tear when
  - Patient fails to show substantial improvement following a four (4) week trial of conservative therapy
- Post-operative evaluation following a ligament or tendon repair when there are new symptoms
- Pre-operative evaluation, based on physical exam findings **(any <u>one</u> of the following)**
  - Positive anterior or posterior drawer test
  - Positive Lachman test
  - Positive medial or lateral stress test
  - Positive pivot shift test

Note: *Conservative therapy may include physician supervised physical therapy, a completed home physical therapy program, anti-inflammatory, antispasmodics, and/or other pain management medications*

Meniscal tear/injury

(any <u>one</u> of the following)

- Focused history and physical exam suggests a meniscal tear when
  - Patient fails to show substantial improvement following a four (4) week trial of conservative therapy
- Pre-operative evaluation, based on physical exam findings **(any <u>one</u> of the following)**
  - Anterior cruciate ligament tear is present
  - Inability to bear weight
  - Inability to fully extend knee
  - Locking
  - Positive McMurray test with minimal knee flexion
  - Severe twisting injury after which activity could not be resumed
  - Swelling and symptoms develop immediately after an acute injury

Note: *Conservative therapy may include physician supervised physical therapy, a completed home physical therapy program, anti-inflammatory, antispasmodics, and/or other pain management medications*

Osteochondritis dissecans[4]

Patellar sleeve avulsion[12]

Transient dislocation of the patella[13,14]

Ankle and Foot

Tendon injury of the ankle or foot, acute or chronic

- Patient fails to show substantial improvement following a trial of conservative therapy

Note: *Conservative therapy may include physician supervised physical therapy, a completed home physical therapy program, anti-inflammatory, antispasmodics, and/or other pain management medications*

Tendon rupture, acute

- For pre-operative evaluation **(any <u>one</u> of the following)**
  - Following non-diagnostic radiograph for bone avulsion
  - Following non-diagnostic ultrasound
  - Severe muscle weakness from the involved tendon

Morton's neuroma

- When the diagnosis is not clear on physical examination or ultrasound

Common Diagnostic Indications

Neuropathic osteodystrophy (Charcot joint)

- Following non-diagnostic radiograph when additional diagnostic information needed to direct treatment

Plantar fasciitis

- Pre-operative evaluation of a patient who fails to show substantial improvement following six (6) months of physician supervised conservative therapy

Note: *Conservative therapy may include physician supervised physical therapy, a completed home physical therapy program, anti-inflammatory, antispasmodics, and/or other pain management medications*

Tarsal coalition

- Following non-diagnostic radiograph

Note: *CT may be preferred for bony coalition*

Tarsal tunnel

(any <u>one</u> of the following)

- Following EMG nerve conduction study when patient fails to show substantial improvement following four (4) weeks of physician supervised conservative therapy
- Neuropathy secondary to entrapment or compression of the posterior tibial nerve or its branches in the fibro-osseous tunnel, deep to the flexor retinaculum

Note: *Conservative therapy may include physician supervised physical therapy, a completed home physical therapy program, anti-inflammatory, antispasmodics, and/or other pain management medications*

MRI is generally not indicated in the following clinical situations

The indications listed in this section generally do not require advanced imaging using MRI. If there are circumstances that require MRI imaging, a peer-to-peer discussion may be required.

Transient (toxic) synovitis[6]

Note: *Patient is 2 to 9 years of age. Transient synovitis is* self-limiting. Ultrasound may help to confirm the presence of a joint effusion

Osgood-Schlatter[12]

Note: *Advanced imaging is not generally indicated. Clinical diagnosis sometimes suggested by radiography*

Patellar tendinitis

Note: *Advanced imaging is not generally indicated. This is a clinical diagnosis*

Sinding-Larsen-Johnassen[12]

Note: *Advanced imaging is not generally indicated. Clinical diagnosis sometimes suggested by radiography*

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CT Angiography and MR Angiography (CTA/MRA) Lower Extremity – Pediatrics

CPT Codes

73706..... Computed tomographic angiography, lower extremity, with contrast material(s), including noncontrast images, if performed, and image postprocessing

73725..... Magnetic resonance angiography, lower extremity, without and with contrast

Angiography includes imaging of all blood vessels, including arteries and veins. The codes above include CT and MR Venography respectively.

Standard Anatomic Coverage

- Depends on the area of interest and may extend from the iliofemoral regions through the feet

Technology Considerations

- Other generally available non-invasive arterial studies of the lower extremity circulation should be considered prior to advanced diagnostic imaging with CTA or MRA. These may include segmental systolic pressure measurements, plethysmographic analysis, continuous wave Doppler and/or duplex ultrasonography of the lower extremity arterial or venous circulations
- MRA should also be considered in patients with a history of either previous contrast reaction to intravascular administration of iodinated radiographic contrast material or atopy
- CT angiography utilizes the data obtained from standard CT imaging. An authorization request for a CT exam in addition to a CT angiography of the same anatomic area during the same imaging session is inappropriate
- A request for a CT lower extremity venogram is a request for a CTA of the lower extremity. A quick look at the vasculature of the lower extremity at the time of a CT or CTA of the chest for pulmonary embolism evaluation should not be separately entered or reported

Common Diagnostic Indications

Aneurysm/dilation

Arterial entrapment syndrome

Arteriovenous malformation (AVM) or fistula (AVF)

Critical limb ischemia

Note: *Examples include ischemic ulcers and gangrene in patients with diabetic vascular disease*

Dissection

Intramural hematoma

Post-operative or post-procedure evaluation

Note: *For post-operative evaluation of conditions not specifically referenced elsewhere in this guideline*

Pre-operative or pre-procedure evaluation

Note: *For pre-operative evaluation of conditions not specifically referenced elsewhere in this guideline*

Thromboembolic disease, arterial or venous

Vascular invasion or compression by a musculoskeletal neoplasm

Common Diagnostic Indications

Vasculitis

Venous compression, due to surrounding mass effect

Venous thrombosis