PEDIATRIC ABDOMEN and PELVIS
IMAGING GUIDELINES
Version 17.0; Effective 02-16-2015

MedSolutions, Inc. Clinical Decision Support Tool for Advanced Diagnostic Imaging

Common symptoms and symptom complexes are addressed by this tool. Imaging requests for patients with atypical symptoms or clinical presentations that are not specifically addressed will require physician review. Consultation with the referring physician, specialist and/or patient’s Primary Care Physician (PCP) may provide additional insight.

This version incorporates MSI accepted revisions prior to 12/31/14

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# PEDIATRIC ABDOMEN and PELVIS IMAGING GUIDELINES

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PACAB-1.1 General Considerations

See: AB-1~General Guidelines

The Abdominal Imaging Guidelines are the same for both the pediatric population and the adult population, unless there are specific guidelines listed here in the Pediatric Abdominal Imaging Guidelines.

- To avoid radiation exposure, pediatric imaging should consider the use of ultrasound or MRI where it is a clinical option.
- **CT imaging:**
  - Abdominal CT for the evaluation of a pediatric abdominal mass can be performed without and with intravenous contrast (CPT®74170), to detect calcification in the mass.
- For infants with projectile vomiting/pyloric stenosis, and ultrasound of the abdomen is appropriate
- A complete retroperitoneal ultrasound (CPT®76770) can be approved as an initial for neurogenic bladder, myelomeningocele, hydronephrosis, and spina bifida.
- A complete retroperitoneal ultrasound can be approved for follow-up/surveillance for any of the above
See: **AB-2~Abdominal Pain, Generalized**

✓ Children with generalized abdominal pain and normal physical examination and laboratory studies, including stool for blood (and stool culture if diarrhea), should initially be evaluated by ultrasound (CPT® 76700 or CPT® 76705) and treated conservatively.
  o Gastroenterology (GI) specialist evaluation is helpful in determining the need for advanced imaging.

✓ Children with abdominal pain and signs of failure to thrive, anemia, bleeding, and/or abnormal laboratory studies should be initially evaluated with plain abdominal x-rays or ultrasound (CPT® 76700 or CPT® 76705) to determine the need for further imaging.*

  * *Pediatr Nurs* 2007; 33(3):247-259

✓ Children presenting with abdominal pain may have an intussusception.
  o Plain x-rays (supine and left lateral decubitus views) should be performed initially to exclude mass or bowel obstruction from other causes.
  o Ultrasound (CPT® 76700 or CPT® 76705) is appropriate as the initial study if there is a strong suspicion for intussusception, but if negative, plain x-rays of the abdomen should follow.
PACAB-3~Abdominal Sepsis (Suspected Abdominal Abscess)

See: AB-3~Abdominal Sepsis (Suspected Abdominal Abscess)

PACAB-4~Flank Pain, Rule Out Renal Stone

See: AB-4~Flank Pain, Rule out Renal Stone

In children, ultrasound (CPT®76770 or CPT®76775) or MR urography (MRI abdomen and pelvis, with or without contrast [CPT®74182/72196 or CPT®74181/72195]) is the best initial study to avoid radiation exposure.*

*ACR Appropriateness Criteria, Acute onset flank pain, 2011

PACAB-5~Acute Gastroenteritis (Pediatric)

Imaging is not indicated in pediatric acute gastroenteritis unless there is a concern for other causes of symptoms.

Pediatric imaging in suspected gastroenteritis should begin with plain x-rays of the abdomen, including supine and left lateral decubitus views. The left lateral decubitus view is useful for the detection of air-fluid levels and for detection of gas in the rectum -- to exclude obstruction.

✔ Ultrasound (CPT®76700 or CPT®76705) should be performed if there is suspicion for intussusception or organomegaly.

✔ Ultrasound (CPT®76700 or CPT®76705) may detect findings of gastroenteritis, but is not indicated for the diagnosis of gastroenteritis.

✔ Gastroenterology (GI) specialist evaluation is helpful, especially in evaluating patients with persistent symptoms or with gross bleeding.

References

2. CDC, Managing Acute Gastroenteritis Among Children, November 21, 2003, Vol.52, No. RR-16
PACAB-6~Left Lower Quadrant Pain

✓ Pelvic ultrasound (CPT®76856) is the initial imaging study of choice for children and for females who still have ovaries or uterus intact, for detecting gynecologic abnormalities that may cause left lower quadrant pain.

A 5 to 7 day trial of conservative therapy and close observation should be performed prior to considering advanced imaging in patients who present with mild localized abdominal pain, but without significant clinical or laboratory findings.

✓ CT abdomen and pelvis with contrast (CPT®74177) can be performed if pain persists or if any one of the following significant clinical findings is present:
  o severe abdominal pain
  o palpable mass on examination
  o nausea/vomiting
  o fever
  o significant abdominal tenderness to palpation
  o elevated white blood cell count

Gastroenterology (GI) specialist evaluation is helpful in determining the appropriate diagnostic pathway in patients with mild pain and heme positive stools or rectal bleeding, since advanced imaging with CT is rarely helpful in the initial evaluation of these patients.

References
2. ACR Appropriateness Criteria, Left lower quadrant pain, 2008

PACAB-7~Left Upper Quadrant Pain

See: AB-2~Abdominal Pain
CT abdomen and pelvis with contrast (CPT®74177) can be performed in patients with suspected postoperative complications (e.g. bowel obstruction, abscess, anastomotic leak, etc.)

Children should be evaluated with ultrasound (CPT®76700 or CPT®76705) initially (especially in small children or in thin older children) or with MRI abdomen and pelvis without and with contrast (CPT®74183 and CPT®72197).

- Although MRI theoretically would be desirable to reduce radiation exposure, MRI is not practical for the timely evaluation of post-operative abscesses.
- MRI often requires sedation, is a lengthy study, and may take several days to be performed, thus causing a significant time delay in diagnosis.

Beyond 60 days postoperatively, see: PACAB-2~Abdominal Pain, Generalized.

References
1. *ACR Appropriateness Criteria, Suspect small bowel obstruction*, 2010
2. *ACR Appropriateness Criteria, Acute abdominal pain and fever or suspected abdominal abscess*, 2008
PACAB-9~Right Lower Quadrant Pain, Rule Out Appendicitis

✓ Children ≤14 years of age may have an initial ultrasound (CPT®76700 and CPT®76856)
  o If negative or equivocal, CT abdomen and pelvis with contrast (CPT®74177) or without contrast (CPT®74176) can be performed.

✓ Children > 14 years of age may have CT abdomen and pelvis with contrast (CPT®74177) or without contrast (CPT®74176)

See: AB-2~Abdominal Pain

If the appendix is absent, follow guidelines in: PACAB-2~Abdominal Pain

References
2. AJR 2004 Sept;183:671-675
3. Radiology 2006 March;238(3):891-899

PACAB-10~Right Upper Quadrant Pain, Rule Out Cholecystitis

See: AB-2~Abdominal Pain

PACAB-11~Abdominal Lymphadenopathy

See: AB-8~Abdominal Lymphadenopathy
PACAB-12~Blunt Abdominal Trauma

Significant trauma should be evaluated in the Emergency Department.

✓ Hemodynamically stable children who have experienced blunt abdominal trauma can be evaluated with CT abdomen and/or pelvis with contrast (CPT®74160, or CPT®72193, or CPT®74177).

References

PACAB-13~Gaucher’s Disease and Hemochromatosis

See: *AB-11~Gaucher’s Disease and Hemochromatosis*

See also: *PACPN-3 Gaucher’s Disease* in the Pediatric Peripheral Nerve Disorders Imaging Guidelines.
PACAB-14~Hernias

Children with suspected inguinal hernia benefit from evaluation by a surgeon to confirm the diagnosis and plan appropriate treatment.

✔ Ultrasound (CPT®76700 or CPT®76705 and/or CPT®76856) can be helpful when physical exam is inconclusive.

See: AB-12~Hernias

PACAB-15~Abdominal Wall Mass

See: AB-13~Abdominal Wall Mass

PACAB-16~Adrenal Cortical Lesions

See: AB-16~Adrenal Cortical Lesions

PACAB-17~Bowel Obstruction

See: AB-20~Bowel Obstruction
PACAB-18~Diarrhea/Constipation and Irritable Bowel

See: AB-21~Diarrhea/Constipation and Irritable Bowel

Constipation in Children that is not associated with abnormal physical examination including rectal exam, abnormal laboratory studies, GI bleeding, and/or failure to thrive does not require imaging.

- With any of the above mentioned findings, the child should be evaluated with plain x-rays, ultrasound (CPT®76700 and CPT®76856), or barium enema.

GI specialist consultation is helpful in determining the appropriate imaging pathway

References

PACAB-19~Inflammatory Bowel Disease, Rule Out Crohn’s Disease or Ulcerative Colitis

See: AB-23~Inflammatory Bowel Disease

✓ Children <age 14 should be evaluated with CT enterography (CPT®74177) or MR enterography (CPT®74183)

References

PACAB-20~Celiac Disease Sprue)

See: AB-24~Celiac Disease (Sprue)

PACAB-21~Liver Lesion Characterization

See: AB-29~Liver Lesion Characterization
PACAB-22~Elevated Liver Function Test (LFT) Levels

See: AB-30~Elevated Liver Function (LFT) Levels

PACAB-23~Spleen

See: AB-34~Spleen

PACAB-24~Indeterminate Renal Lesion

See: AB-35~Indeterminate Renal Lesion
**PACAB-25~Renovascular Hypertension**

- Doppler or Duplex (CPT®93975 or CPT®93976) or a complete retroperitoneal ultrasound (CPT®76770) can be approved as the initial imaging for pediatric imaging. All follow-up requests for pediatric hypertension will to Medical Directors for review.

**Other considerations for imaging evaluation:**
- Abdominal MRA (CPT®74185) or CTA (CPT®74175) may be indicated for pediatric patients with hypertension, controlled or uncontrolled, to exclude fibromuscular dysplasia of the renal arteries.

**References**


**PACAB-26~Polycystic Kidney Disease**

See: *AB-38~Polycystic Kidney Disease*
PACAB-27~Urinary Tract Infection (UTI)

See: **AB-40~Urinary Tract Infection (UTI)**

✓ Children should be evaluated initially by ultrasound (CPT®76770 or CPT®76775), and if further imaging is indicated, MRI abdomen and pelvis (contrast as requested) can be performed.

**PACAB-27.1 Upper Urinary Tract**

✓ Males with first time UTI (and females with first or second UTI) should undergo ultrasound evaluation (CPT®76770 or CPT®76775), as the initial imaging modality to diagnose hydronephrosis, pyonephrosis, or congenital renal anomaly.
  
  o If hydronephrosis is present, this should be further evaluated with voiding cystourethrography (VCUG), to evaluate for vesicoureteral reflux.
  
  o If the ultrasound findings are compatible with a multicystic dysplastic kidney, diuretic renography should be confirmed to evaluate function of the affected kidney or a ureteral-pelvic junction (UPJ) obstruction of the contralateral kidney.
  
  o If VCUG is negative, diuretic renography (using Tc-99m MAG 3) should be performed for diagnostic evaluation of upper tract dilatation. Diuretic renography is also appropriate for follow-up of some children with hydronephrosis.

✓ Diuretic renography is the study of choice for differentiating a dilated non-obstructed urinary system from a true stenosis (e.g., UPJ obstruction; ureteral-vesical junction [UVJ] obstruction), and for quantifying renal parenchymal function.

✓ Magnetic resonance urography (MRU) is appropriate (where available) for investigation of a dilated upper urinary tract.

**NOTE:** MRU requires sedation in young children

  o Where available, MRU can also quantitate renal function.
  
  o Children aged 5 years or younger with febrile UTI may undergo nuclear medicine DMSA imaging (Technetium-99m-dimercaptosuccinic acid [DMSA] scintigraphy) for the diagnosis of acute pyelonephritis. Sensitivity of DMSA scintigraphy is much higher than ultrasound and is equivalent to CT, but at a lower radiation dose.
  
  o Tc-99m DMSA scintigraphy is highly sensitive for detection of acute pyelonephritis and is the reference standard for detection of post-pyelonephritic renal scarring.
  
  o For detection of renal scarring, DMSA scintigraphy should be performed at least 6 months after the documented upper tract UTI.
  
  o Power Doppler ultrasound is significantly less accurate than Tc-99m DMSA or CT for the diagnosis of acute pyelonephritis.
  
  o MRI is very sensitive for the detection of acute pyelonephritis, and where
available, should be used in place of CT.

**NOTE:** MRI requires sedation in young children

**PACAB-27.2 Lower Urinary Tract**

- Ultrasound studies in neonates or young children revealing hydronephrosis should undergo voiding cystourethography (VCUG) for detection of possible vesico-ureteral reflux (VUR).
- The American Academy of Pediatrics clinical practice guidelines no longer recommend routine VCUG for infants and young children from 2 to 24 months of age after the first febrile UTI. The recommendation is to postpone the VCUG until the second febrile UTI UNLESS there are atypical or complex clinical circumstances or the renal bladder ultrasound reveals hydronephrosis, scarring, or obstructive uropathy. The recommendations in this AAP guideline do not indicate an exclusive course of treatment or serve as a standard of care; variations may be appropriate.
- Otherwise, Fluoroscopic VCUG is typically performed for diagnosis and grading of VUR, and should be the first modality used for diagnosis.
- Radionuclide cystography, because of its lower radiation burden and higher sensitivity for reflux > Grade I, is recommended for follow-up imaging of VU reflux, and investigation of VU reflux in siblings of refluxing children.
- First time male UTI’s should be evaluated with fluoroscopic VCUG studies rather than radionuclide cystography, to visualize the male urethra for possible posterior urethral valves.
  - Radionuclide cystography may replace fluoroscopic VCUG in girls as the first time study, since urethral anatomy is rarely abnormal except in complex malformations.
  - MR urography may be used for evaluation of ectopic distal ureteral insertion, or other complex lower urinary tract anatomy.

**NOTE:** MR urography requires sedation in young children

**References**

2. *J Urol* 2003;169:2308-2311
7. American College of Radiology, ACR appropriateness criteria, Urinary Tract Infection-Child, Review Date 2012
PACAB-28~Patent Urachus

See: AB-41~Patent Urachus

PACAB-29~Transplant

See: AB-42~Transplant
PACPV-1~General Guidelines

The Pelvis Imaging Guidelines are the same for both the pediatric population and the adult population, unless there are specific guidelines listed here in the Pediatric Pelvis Imaging Guidelines.

See: PV-1~General Guidelines

PELVIC SIGNS AND SYMPTOMS — FEMALE

PACPV-2~Abnormal Uterine Bleeding

See: PV-2~Abnormal Uterine Bleeding

PACPV-3~Amenorrhea

✓ Girls with amenorrhea and delayed puberty who are not sexually active should be evaluated initially with transabdominal ultrasound (CPT®76856 or CPT®76857).

  o Otherwise, initial imaging should be by pelvic ultrasound (CPT®76856 or CPT®76857 and/or CPT®76830 [transvaginal]) to look for genital and urinary tract abnormalities.

  o Congenital anomalies of the uterus and urinary system may require advanced imaging with MRI of the abdomen and pelvis (contrast as requested) in order to better define complex anatomy, especially for preoperative planning in girls with hydrocolpos (distension of the vagina by fluid due to congenital vaginal obstruction) or hematocolpos (distention of the vagina by blood due to congenital vaginal obstruction).

  o See: PV-3 Amenorrhea

PACPV-4~Adenomyosis

See: PV-4 Adenomyosis
PELVIC SIGNS AND SYMPTOMS — FEMALE

PACPV-5~Suspected Adnexal Mass

See: PV-5~Suspected Adnexal Mass

PACPV-6~Endometriosis

See: PV-6~Endometriosis

PACPV-7~Pelvic Inflammatory Disease (PID)

See: PV-7~Pelvic Inflammatory Disease (PID)

PACPV-8~Polycystic Ovary Syndrome

See: PV-8~Polycystic Ovary Syndrome

PACPV-9~Pelvic Pain/Dyspareunia, Female

See: PV-11~Pelvic Pain/Dyspareunia, Female

PACPV-10~Leiomyomata

See: PV-12~Leiomyomata
PELVIC SIGNS AND SYMPTOMS — FEMALE

PACPV-11~Periurethral Cysts and Urethral Diverticula

See: PV-13~Periurethral Cysts and Urethral Diverticula

PACPV-12~Fetal MRI

See PV-15~Fetal MRI
PELVIC SIGNS AND SYMPTOMS — MALE

PACPV-13~Penis-Soft Tissue Mass

See: PV-18~Penis–Soft Tissue Mass

PACPV-14~Scrotal Pathology

See: PV-20~Scrotal Pathology

PACPV-15~Undescended Testis

Boys with a history of cryptorchid (undescended) testes have a several fold risk increase of testicular cancer. It is important to diagnose and treat this condition either by bringing the undescended testis into the scrotum, or resecting the testis.

✓ MRI abdomen and pelvis without and with contrast (CPT®74183 and CPT®72197) can be performed.

✓ MRI pelvis without and with contrast (CPT®72197) can be used to evaluate abnormalities of the scrotum if ultrasound is inconclusive.

✓ The pediatric population should be evaluated initially with ultrasound and if inconclusive, MRI pelvis (CPT®72197) can be performed. CT and MRI have a high false negative rate and in general are not reliable as diagnostic tools.
  o Urology evaluation is helpful in determining the most appropriate imaging pathway.

References

PACPV-16~Incontinence

See: PV-22~Incontinence