

2011 Imaging Criteria

Computed Tomography (CT), Abdomen and Pelvis^{(1)*RIN}

ICD-9-CM: 87.71, 88.01, 88.02, 88.38

CPT: 74176, 74177, 74178

I/O Setting: Outpatient

INDICATION(S)

- 100 Suspected AAA leak/rupture ◆
- 200 Follow-up post endovascular repair AAA
- 300 Abdominal mass by PE/KUB/US
- 400 Suspected intra-abdominal hemorrhage ◆
- 500 Acute abdominal pain, unknown etiology ◆
- 600 Suspected appendicitis ◆
- 700 Suspected diverticulitis
- 800 Follow-up diverticulitis
- 900 Suspected intra-abdominal/pelvic abscess ◆
- 1000 Follow-up of known abdominal/pelvic abscess after Rx
- 1100 New onset/change in nonspecific GI symptoms
- 1200 Fever of unknown origin (FUO)
- 1300 Abdominal/pelvic evaluation with known cancer
- 1400 Suspected bowel obstruction
- 1500 Abdominal/pelvic trauma
- 1600 Cryptorchidism
- 1700 Genitourinary tract tumor by imaging/testing
- 1800 Nephrolithiasis
- 1900 Unilateral flank/abdominal pain by Hx
- 2000 Cystitis/pyelonephritis by culture
- 2100 Complex cystic/indeterminate/solid renal parenchymal mass by US
- 2200 Hematuria (nontraumatic)

- 100 Suspected AAA leak/rupture **[One]** ◆⁽²⁾
 - 110 Known AAA **[Both]**
 - 111 By Hx/imaging
 - 112 New onset back/abdominal/flank pain⁽³⁾
 - 120 Suspected AAA **[Both]**
 - 121 New onset back/abdominal/flank pain⁽³⁾
 - 122 Findings **[One]**
 - 1 Abdominal mass by PE
 - 2 Calcification suggestive of AAA by x-ray

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- 3 Hemodynamic instability **[One]**^(4, 5)
 - A) Systolic BP < 100 mmHg
 - B) Decrease in systolic BP ≥ 30 mmHg from baseline
 - C) Shock by PE⁽⁶⁾

- 200 Follow-up post endovascular repair AAA **[One]**⁽⁷⁾
 - 210 4 wks post procedure
 - 220 Every 6 mos post procedure and type II endoleak at initial follow-up
 - 230 1 yr post procedure
 - 240 Every 1 yr post procedure and no type II endoleak⁽⁸⁾

- 300 Abdominal mass by PE/KUB/US⁽⁹⁾

- 400 Suspected intra-abdominal hemorrhage **[All]** ♦
 - 410 Abdominal pain/tenderness/distention
 - 420 Risk factor for bleeding **[One]**
 - 421 Recent intra-abdominal surgery/instrumentation⁽¹⁰⁾
 - 422 Coagulopathy
 - 423 Abdominal/pelvic trauma
 - 430 Findings **[One]**
 - 431 Hct decrease ≥ 6% w/in 4 hrs
 - 432 Hemodynamic instability **[One]**⁽⁴⁾
 - 1 Systolic BP < 100 mmHg
 - 2 Decrease in systolic BP ≥ 30 mmHg from baseline
 - 3 Shock by PE⁽⁶⁾
 - 4 Orthostatic changes **[One]**⁽¹¹⁾
 - A) Decrease in systolic BP ≥ 20 mmHg⁽¹²⁾
 - B) Decrease in diastolic BP ≥ 10 mmHg⁽¹²⁾
 - C) Increase in heart rate ≥ 20/min

- 500 Acute abdominal pain, unknown etiology **[All]** ♦
 - 510 Abdominal tenderness
 - 520 CBC normal
 - 530 Serum/urine HCG **[One]**^(13*RIN)
 - 531 Negative
 - 532 Not indicated⁽¹⁴⁾
 - 540 U/A or urine culture normal
 - 550 Cervical cultures **[One]**
 - 551 Gonorrhea test negative and no chlamydia by DNA/antibody testing
 - 552 Not indicated

- 600 Suspected appendicitis **[All]** ♦⁽¹⁵⁾
 - 610 Periumbilical/suprapubic/RLQ pain⁽¹⁶⁾
 - 620 Findings **[One]**
 - 621 Involuntary guarding with localization of pain
 - 622 Persistent direct tenderness to palpation
 - 623 Abdominal rigidity
 - 624 WBC > 12,000/cu.mm(12×10^9 /L)
 - 625 Temperature > 100.4 F(38.0 C)
 - 630 Pelvic examination **[One]**⁽¹⁷⁾
 - 631 Nondiagnostic for the etiology of pain
 - 632 Not indicated⁽¹⁸⁾
 - 640 Pregnancy excluded **[One]**⁽¹⁹⁾
 - 641 HCG negative⁽²⁰⁾
 - 642 Sterilization by Hx⁽²¹⁾
 - 643 Patient not sexually active by Hx⁽²²⁾
 - 644 Not indicated⁽¹⁴⁾

- 700 Suspected diverticulitis **[Both]**⁽²³⁾
 - 710 Lower abdominal pain/mass
 - 720 Findings **[One]**
 - 721 Temperature > 100.4 F(38.0 C)
 - 722 WBC > 12,000/cu.mm(12×10^9 /L)
 - 723 Diverticulosis by prior imaging study

- 800 Follow-up diverticulitis **[Both]**⁽²⁴⁾
 - 810 Sx/findings **[One]**
 - 811 Abdominal pain/mass
 - 812 Temperature > 100.4 F(38.0 C)
 - 813 WBC > 12,000/cu.mm(12×10^9 /L)
 - 820 Continued Sx/findings **after** Rx **[Both]**
 - 821 Abx ≥ 2 days
 - 822 Clear liquids/NPO ≥ 2 days

- 900 Suspected intra-abdominal/pelvic abscess **[Both]** ♦⁽²⁵⁾
 - 910 Abdominal/pelvic pain > 24 hrs by Hx
 - 920 Findings **[Two]**⁽²⁶⁾
 - 921 Localized abdominal tenderness
 - 922 Temperature > 100.4 F(38.0 C)
 - 923 WBC > 12,000/cu.mm(12×10^9 /L)

- 1000 Follow-up of known abdominal/pelvic abscess after Rx **[One]**⁽²⁵⁾

- 1010 Sx/findings unimproved **after** Rx **[Both]** ⁽²⁷⁾
 - 1011 IV Abx ≥ 2 days
 - 1012 Drainage
- 1020 Sx/findings unimproved after IV Abx Rx ≥ 1 wk ⁽²⁷⁾
- 1030 New/worsening Sx/findings **[One]**
 - 1031 Abdominal pain
 - 1032 Abdominal mass
 - 1033 Temperature > 100.4 F(38.0 C)
 - 1034 WBC increasing
- 1040 Single follow-up study

- 1100 New onset/change in nonspecific GI symptoms **[Both]** ⁽²⁸⁾
 - 1110 Age ≥ 40
 - 1120 FOBT negative

- 1200 Fever of unknown origin (FUO) **[All]** ^(29, 30)
 - 1210 Temperature > 101 F(38.3 C) > 3 wks
 - 1220 No fever source by Hx & PE
 - 1230 CXR normal
 - 1240 Blood cultures negative/nondiagnostic for etiology of fever
 - 1250 Urine culture negative/nondiagnostic for etiology of fever

- 1300 Abdominal/pelvic evaluation with known cancer **[One]**
 - 1310 Initial staging ^(31*MDR, 32)
 - 1320 Follow-up after Rx **[One]**
 - 1321 After surgery and before adjuvant chemotherapy/radiation
 - 1322 After Rx for metastatic/unresectable disease ⁽³³⁾
 - 1330 New/worsening Sx/findings **[One]**
 - 1331 Anorexia
 - 1332 Weight loss by Hx/PE
 - 1333 Jaundice
 - 1334 Abdominal/pelvic pain
 - 1335 Abdominal/pelvic mass
 - 1336 Hepatomegaly
 - 1337 Ascites
 - 1338 Bowel obstruction by KUB
 - 1339 Lab values elevated/increasing **[One]**
 - 1 LFTs
 - 2 CEA ⁽³⁴⁾
 - 3 CA-125

- 1400 Suspected bowel obstruction **[Both]**⁽³⁵⁾
- 1410 Sx/findings **[Two]**
 - 1411 Crampy abdominal pain
 - 1412 Nausea/vomiting
 - 1413 Constipation
 - 1414 Abdominal distention
 - 1415 High-pitched, tinkling bowel sounds
 - 1416 Diffuse abdominal tenderness
 - 1420 KUB abnormal but nonspecific⁽³⁶⁾
- 1500 Abdominal/pelvic trauma **[One]**
- 1510 Initial evaluation **♦**⁽³⁷⁾
 - 1520 Follow-up for known/suspected intra-abdominal injury **[One]**⁽³⁸⁾
 - 1521 Periodic assessment^(39, 40)
 - 1522 New/worsening Sx/findings **[One]** **♦**⁽³⁷⁾
 - 1 Abdominal/pelvic pain
 - 2 Abdominal/pelvic tenderness
 - 3 Hct decrease $\geq 6\%$ w/in 4 hrs
 - 4 Hemodynamic instability **[One]**⁽⁴⁾
 - A) Systolic BP < 100 mmHg
 - B) Decrease in systolic BP ≥ 30 mmHg from baseline
 - C) Shock by PE⁽⁶⁾
 - D) Orthostatic changes **[One]**⁽¹¹⁾
 - 1) Decrease in systolic BP ≥ 20 mmHg⁽¹²⁾
 - 2) Decrease in diastolic BP ≥ 10 mmHg⁽¹²⁾
 - 3) Increase in heart rate ≥ 20 /min
- 1600 Cryptorchidism **[Both]**^(41, 42)
- 1610 Testicle not palpable in scrotum/inguinal canal
 - 1620 Abdominal/pelvic US nondiagnostic for undescended testicle
- 1700 Genitourinary tract tumor by imaging/testing⁽⁴³⁾
- 1800 Nephrolithiasis **[One]**⁽⁴⁴⁾
- 1810 Suspected renal/ureteral stone **[One]**^(45, 46)
 - 1811 Unilateral flank pain⁽⁴⁷⁾
 - 1812 Sx/findings **[Both]**⁽⁴⁸⁾
 - 1 Symptoms **[One]**
 - A) Unilateral abdominal/pelvic pain
 - B) Unilateral groin/genitalia pain
 - 2 Findings **[One]**

- A) Hematuria
- B) Multiple stones by KUB⁽⁴⁹⁾
- 1820 Known renal/ureteral stone **[One]**⁽⁵⁰⁾
 - 1821 Pain/nausea/vomiting uncontrolled by medication
 - 1822 Continued flank/abdominal pain > 3 days
 - 1823 Continued microscopic hematuria > 4 wks
 - 1824 Continued hematuria > 2 wks after passing stone
 - 1825 Stone present by KUB > 8 wks
- 1900 Unilateral flank/abdominal pain by Hx **[One]**⁽⁵¹⁾
 - 1910 Solitary kidney by Hx
 - 1920 Known pelvic tumor
 - 1930 Prior kidney/ureteral/bladder procedure/instrumentation
 - 1940 Stone by KUB
- 2000 Cystitis/pyelonephritis by culture **[One]**⁽⁵²⁾
 - 2010 Male **[One]**⁽⁵³⁾
 - 2011 Cystitis ≥ 2 episodes⁽⁵⁴⁾
 - 2012 Pyelonephritis ≥ 1 episode⁽⁵⁵⁾
 - 2013 Persistent/worsening pyelonephritis **after** Abx ≥ 3 days **[One]**⁽⁵⁶⁾
 - 1 Flank/abdominal/groin pain
 - 2 Flank/abdominal tenderness
 - 3 Temperature > 100.4 F(38.0 C)
 - 2020 Female **[One]**
 - 2021 Cystitis despite Abx suppressant Rx^(54, 57)
 - 2022 Pyelonephritis ≥ 2 episodes⁽⁵⁵⁾
 - 2023 Persistent/worsening pyelonephritis **after** Abx ≥ 3 days **[One]**⁽⁵⁶⁾
 - 1 Flank/abdominal/groin pain
 - 2 Flank/abdominal tenderness
 - 3 Temperature > 100.4 F(38.0 C)
- 2100 Complex cystic/indeterminate/solid renal parenchymal mass by US⁽⁵⁸⁾
- 2200 Hematuria (nontraumatic) **[One]**^(59*RIN)
 - 2210 Gross hematuria **[Both]**⁽⁶⁰⁾
 - 2211 Blood by urine dipstick
 - 2212 Urine culture negative⁽⁶¹⁾
 - 2220 Microscopic hematuria **[All]**^(62, 63, 64)
 - 2221 RBCs ≥ 3/HPF
 - 2222 No RBC casts by U/A⁽⁶⁵⁾
 - 2223 UTI excluded **[One]**

- 1 Urine dipstick negative for nitrite/leukocyte esterase
- 2 Urine culture negative

Notes

(1)-RIN:

These criteria cover those indications for which both a CT of the abdomen and the pelvis are warranted.

(2)

These criteria address imaging of an AAA in a patient with symptoms worrisome for aneurysm rupture. US is the most appropriate study to identify and follow an AAA in an asymptomatic patient, and is also the most cost-effective method for serial size documentation (Chaikof et al., J Vasc Surg 2009; 50(4 Suppl): S2-49; Sparks et al., Am Fam Physician 2002; 65(8): 1565-1570). CT or MRI is indicated in patients with symptoms of AAA expansion or impending rupture (e.g., back, flank or abdominal pain) because US cannot document an aneurysmal leak. CT is the imaging method of choice in diagnosing acute aortic pathology and is the primary modality for preoperative planning (Chaikof et al., J Vasc Surg 2009; 50(4 Suppl): S2-49). If the patient is unstable and the clinical suspicion is high for a AAA, the patient should proceed to surgery without imaging evaluation (Rakita et al., Radiographics 2007; 27(2): 497-507; Barkin and Rosen, Emerg Med Clin North Am 2004; 22(3): 675-682).

(3)

These symptoms may signal impending rupture of the aneurysm and are thought to be caused by acute expansion of the vessel wall or bleeding (Assar and Zarins, Postgrad Med J 2009; 85(1003): 268-273).

(4)

These criteria apply to hemodynamic instability at initial presentation or any time during hospitalization. While this may be due simply to volume depletion, it is a matter of clinical judgment whether it represents severe disease with sepsis, volume loss, or retroperitoneal bleeding.

(5)

A bedside US may be appropriate in patients too unstable to be transferred to a CT scanner (Rakita et al., Radiographics 2007; 27(2): 497-507; Barkin and Rosen, Emerg Med Clin North Am 2004; 22(3): 675-682). The bedside study can only confirm the presence of the AAA but cannot be used to diagnose a leak.

(6)

PE findings in shock include clouded sensorium, hypotension, decreased urine output, tachycardia, and cool, mottled extremities with diminished or absent peripheral pulses.

(7)

The goals of surveillance following endovascular repair of AAA include confirmation and monitoring of the stent-graft placement, assessment of any changes in the size of the aneurysmal sac, and to assess for stent-graft failure and endoleaks (Thurnher and Cejna, Radiol Clin North Am 2002; 40(4): 799-833). The Society for Vascular Surgery recommends follow up surveillance following EVAR at one and 12 months post procedure, and then annually unless a type II endoleak is seen at one month post procedure. If a type II endoleak develops, surveillance should be done every 6 months (Chaikof et al., J Vasc Surg 2009; 50(4 Suppl): S2-49).

(8)

The risk of endoleak declines with increased negative follow-up evaluations; however, new endoleaks have been identified as long as 7 years after surgery (Corriere et al., Ann Surg 2004; 239(6): 800-807). Lifelong surveillance after EVAR is also necessary because of the lack of data relative to long-term durability of the endograft (Kranokpiraksa and Kaufman, J Vasc Interv Radiol 2008; 19(6 Suppl): S27-36).

(9)

CT is preferred to MRI to evaluate patients with an abdominal mass. CT is superior to MRI in evaluating solid organs, the bowel, and the presence of pathology in this region. Results of FOBT, urinalysis, or other simple tests may direct the provider to more organ-specific tests.

(10)

Bleeding postoperatively or after instrumentation is most likely to occur immediately or within the first 24 hours after the procedure. Delayed bleeding may also occur. When to obtain an imaging study is a matter of clinical judgment.

(11)-DEF:

Orthostatic changes are alterations in the patient's vital signs upon rising to a standing position, and are usually indicative of hypovolemia or autonomic dysfunction.

(12)-DEF:

Orthostatic hypotension is a reduction of systolic BP \geq 20 mmHg or diastolic BP \geq 10 mmHg after standing from the supine position.

(13)-RIN:

If the HCG is positive, see the "Laparoscopy, Diagnostic (Pelvic)" criteria subset in the *Obstetrics & Gynecology* category. A positive HCG with abdominal pain should raise the question of an ectopic pregnancy.

(14)

An HCG is ordered to exclude pregnancy (intrauterine or ectopic) and is not indicated in men or women who are postmenopausal or post hysterectomy.

(15)

The diagnosis of appendicitis usually rests upon history and PE. The teaching has traditionally been that imaging studies are helpful only with atypical presentations (e.g., in the very young or very old, in adolescent girls and women of reproductive age, when the patient has had symptoms for several days) and that imaging can delay diagnosis and treatment. Others, however, advocate routine use of imaging for any patient with suspected appendicitis (Hawkins and Thirlby, *Adv Surg* 2009; 43: 13-22). Imaging can confirm the diagnosis, exclude appendicitis, or suggest an alternative diagnosis.

CT has better test performance than compression US, with a sensitivity, specificity, and positive predictive value of nearly 94% (van Randen et al., *Radiology* 2008; 249(1): 97-106; Al-Khayal and Al-Omran, *Saudi Med J* 2007; 28(2): 173-180). CT without the use of contrast is adequate for making the diagnosis (Hlibczuk et al., *Ann Emerg Med* 2010, 55: 51-9 e1). CT has been shown to be cost-effective by eliminating unnecessary surgery (Doria et al., *Radiology* 2006; 241(1): 83-94; Terasawa et al., *Ann Intern Med* 2004; 141(7): 537-546).

(16)

The pain associated with appendicitis varies according to the anatomic location of the appendix; a pelvic appendix can cause tenderness in the suprapubic area or the RLQ, while a retrocecal appendix may manifest as periumbilical or flank discomfort.

(17)

Pelvic examination is performed to exclude diagnoses such as PID, ovarian cyst, or ectopic pregnancy.

(18)

Pelvic examination is not indicated in male patients.

(19)

Pregnancy and related complications (e.g., ectopic pregnancy, incomplete abortion, inevitable abortion) must be excluded before performing this procedure.

(20)

Pregnancy testing can be by measurement of either a serum or urine HCG and may be documented in either the PCP's, gynecologist's, or surgeon's records.

(21)

The healthcare provider should document a history of sterilization (i.e., tubal ligation) without a subsequent pregnancy. This criterion does not include sterilization of a partner, nor does it cover alternate birth control methods (e.g., OCP use, IUD insertion).

(22)

Patients have varying definitions of sexual activity (e.g., number of partners, timing of most recent episode, frequency of sexual activity). Unless the provider can confirm on exam that the patient has never had sexual intercourse, whether a patient is sexually active or not is a matter of clinical judgment.

(23)

These criteria address the use of CT to confirm a diagnosis of diverticulitis. CT can be used to establish the diagnosis in patients with clinical symptoms suggestive of diverticulitis but no prior history of diverticulosis. If a patient has known diverticulosis and findings suggestive of inflammation (e.g., lower abdominal pain, palpable mass, fever, elevated WBC), the provider may choose to treat empirically without CT confirmation of diverticulitis. However, because of the increased accuracy of helical CT and a high misdiagnosis rate on clinical grounds alone, there is increasing evidence that routine diagnostic CT imaging may improve patient care and lower costs (Rao et al., *Radiol Clin North Am* 1999; 37(5): 895-910). In a patient with asymptomatic diverticulosis, no imaging studies are indicated.

(24)

These criteria address performing CT in patients with suspected or confirmed diverticulitis whose symptoms worsen or fail to improve with treatment. Imaging is performed to exclude a diverticular abscess or another process which would require surgical or radiologic intervention.

(25)

Whether to perform CT or US in this situation is a matter of clinical judgment. US is excellent for imaging pelvic, liver, and appendiceal abscesses. US is not as useful deeper within the abdomen and is more technique dependent than CT. CT is better able to image the retroperitoneum and between bowel loops. If the patient is unstable and needs to undergo surgery, imaging may not be necessary.

(26)

These findings, when accompanied by abdominal pain, are suggestive of peritoneal irritation.

(27)

Evaluation is indicated for unimproved or worsening symptoms or findings (e.g., fever, elevated WBC, ileus, pain, tenderness, abdominal or pelvic mass).

(28)

These criteria address US or CT scanning in patients with nonspecific GI complaints such as bloating, migratory pain, and weight loss. The use of US or CT in these patients is restricted to patients \geq 40 years of age (where the incidence of malignancy is highest) and to patients with negative FOBT because GI evaluation (BE or endoscopy) would be more appropriate if the FOBT were positive.

(29)-DEF:

Fever of unknown origin (FUO) is a temperature $>$ 101 degrees Fahrenheit which persists for three weeks despite two outpatient visits or after three days of hospitalization.

(30)

FUO may be caused by infection, inflammation, or malignancy (e.g., lymphoma). CT is ordered to look for enlarged nodes or other findings consistent with a tumor.

(31)-MDR:

In most cases, staging studies include CT of both the abdomen and the pelvis. It is not necessary to perform abdominal CT to stage certain tumors (e.g., breast, head, or neck cancer) if the CEA and the LFTs are normal. A staging CT for patients with myeloma or leukemia is not indicated and these requests require secondary medical review.

(32)

Staging studies assess local disease extension, the presence of intra-abdominal tumor spread (most notably liver metastases), and tumor resectability.

(33)

Assessment during treatment with chemotherapy is generally not performed more frequently than every two cycles. With some cancers, tumor markers or PE findings are sufficient for screening; whether this is appropriate is a matter of clinical judgment. If the CT results will not affect therapy, these other parameters are more reasonable for patient follow-up. Post treatment assessments are generally performed about 6 weeks after the chemotherapy or radiation is completed.

(34)

Elevations of CEA levels, particularly if persistent, increasing, or $>$ 5 ng/mL, signal the need for diagnostic imaging for localizing recurrent disease; for these patients, PET accurately detects recurrence (Kyoto et al., Ann Nucl Med 2010).

(35)

CT is increasingly being used in the evaluation of bowel obstruction. Although in most instances the presence of obstruction is established by history, PE, and plain films, the speed and ability of CT to reveal the precise site, severity, and cause of obstruction makes it particularly valuable in aiding management decisions in the acute setting. CT has a high degree of accuracy in confirming the cause of bowel obstruction and can help in differentiating between adhesions, malignancy, or internal hernias as the cause of the obstruction (Scaglione et al., Eur J Radiol 2004; 50(1): 15-22; Zissin et al., Abdom Imaging 2004; 29: 320-325). CT has a reported sensitivity of 78% to 100% and an accuracy of 90% to 95% for detection of high-grade or complete small bowel obstruction (Mallo et al., J Gastrointest Surg 2005; 9(5): 690-694; Torreggiani et al., Can Assoc Radiol J 2003; 54(2): 93-99; Frager, Gastroenterol Clin North Am 2002; 31(3): 777-799; Boudiaf et al., Radiographics 2001; 21(3): 613-624). MRI may be as accurate as CT but is limited by poor anatomic definition and its inability to detect colonic obstructions (Beall et al., Clin Radiol 2002; 57(8): 719-724).

(36)

Plain abdominal radiography remains the starting point for imaging bowel obstruction, as it is widely available and inexpensive. X-ray has a sensitivity of 69% with a 57% specificity in detecting obstruction (Boudiaf et al., Radiographics 2001; 21(3): 613-624). Normal KUB findings are associated with a low incidence of bowel obstruction and none that are high-grade.

(37)

CT is the imaging procedure of choice in trauma patients suspected of having abdominal injuries. With the advent of the helical CT, the trend has been toward even broader use in trauma (Okamoto et al., *Am J Emerg Med* 2002; 20(6): 528-534). US performed in the ED may be useful in identifying intraperitoneal fluid and hemorrhage in hemodynamically unstable patients (Holmes et al., *Ann Emerg Med* 2004; 43(3): 354-361). However, unstable patients may require urgent surgery without imaging examinations.

(38)

CT scan can identify specific traumatic injuries to almost any intra-abdominal structure, including that of solid organ (liver, spleen, pancreas, kidney), vascular, and hollow viscus (gallbladder, small bowel, colon, and bladder). It can also often define injury severity, from mild contusion to rupture, allowing conservative management based on defined radiologic and clinical criteria. In some instances, initial CT scan has identified findings consistent with a possible injury (hemoperitoneum, pneumoperitoneum, peritoneal fluid), without identifying a specific source. One option in these instances, depending on the patient's condition, may be conservative management with repeat CT scan in 12 to 24 hours to show more specific signs not present on the initial scan (Novelline et al., *Radiol Clin North Am* 1999; 37(3): 591-612, vi-vii).

(39)

Follow-up imaging of splenic injury, the most common injury in blunt abdominal trauma, is controversial. The majority of clinicians choose to perform imaging, most using CT. Follow-up CT at 48 to 72 hours and at 1 week in patients with a minimal isolated splenic injury to exclude delayed rupture is advocated by some. US may provide the information necessary for management in a more cost-effective way than CT. Full physical activity is generally not allowed until complete healing has been demonstrated by imaging. Severe injuries may require months to heal. Since the late complications of pseudocyst formation, delayed splenic rupture, and pseudoaneurysm formation are rare, the question remains whether periodic imaging assessment is necessary. Until further studies are conclusive, periodic assessment with imaging is reasonable. The interval between studies is a matter of clinical judgment.

(40)

Injuries to the kidney should be assessed by CT or retrograde studies (e.g., retrograde pyelogram) and graded according to their severity. Because operative repair of many renal injuries can result in nephrectomy, observation should be the first line of therapy when the patient is clinically stable.

(41)-DEF:

Cryptorchidism is failure of the testicle to descend into the scrotum. This diagnosis is usually established in childhood but may not become apparent until later in life.

(42)

CT or MRI is performed to locate the nondescended testicle if abdominal or pelvic US is nondiagnostic. Abdominal testicles have a much higher incidence of testicular carcinoma and are usually removed in the adult patient.

(43)

Several diagnostic methods are used in evaluating genitourinary tract tumors including MRI, US, cystoscopy, retrograde pyelogram, and nephroureteroscopy.

(44)

Helical CT scanning without contrast is the most accurate imaging test for detecting renal and ureteral calculi and has supplanted IVP in evaluating nephrolithiasis (Cullen et al., *J Endourol* 2008; 22(11): 2441-2445). US is used when CT is contraindicated, while KUB is more appropriately performed for follow-up after conservative treatment (Johnston et al., *BJU Int* 2009; 104(5): 670-673; Ulasan et al., *J Clin Ultrasound* 2007; 35(5): 256-261).

(45)

Approximately 70% of patients diagnosed with nephrolithiasis have ureteral calculi and 30% have renal calculi (Johnston et al., *BJU Int* 2009; 104(5): 670-673).

(46)

The pain from nephrolithiasis, often called renal colic, may be localized to the flank, abdomen, or pelvis, and may radiate to the groin and genitalia.

(47)

Although hematuria is a common finding, nephrolithiasis may be present without hematuria and cases with a high suspicion of stone disease warrant further diagnostic testing (American College of Radiology (ACR), ACR Appropriateness Criteria: acute onset flank pain, suspicious of stone disease. 2008).

(48)

Although unilateral flank pain is a classic presentation of nephrolithiasis, hematuria or stones seen on a KUB would only make one suspect kidney stones if there was accompanying pain. CT is appropriate for confirming the diagnosis of nephrolithiasis.

(49)

Imaging is performed in this instance to identify the culprit stone causing symptoms and to determine the presence of any obstruction.

(50)

Imaging is not always needed in patients with a prior history of renal or ureteral stones but is indicated if treatment is planned (e.g., lithotripsy) or symptoms suggest obstruction. KUB may be sufficient to visualize the stone and follow its course in nonacute cases.

(51)

Severe or intermittent flank pain is a common, although nonspecific symptom with many different causes. Although considered a classic symptom of nephrolithiasis, up to 20% of patients experiencing flank pain have additional or alternative intra-abdominal pathology detected by CT and can be quickly directed to optimal therapy (Cullen et al., J Endourol 2008; 22(11): 2441-2445).

(52)

Whether to perform US or CT to exclude an underlying anatomic abnormality (e.g., stone, obstruction) or a complication (e.g., abscess) is a matter of clinical judgment.

(53)

Cystitis and pyelonephritis are more common in female patients. These conditions should prompt earlier evaluation in male patients.

(54)-DEF:

Cystitis is an inflammation of the bladder caused by a bacterial infection.

(55)-DEF:

Pyelonephritis is a kidney infection, confirmed by positive urine culture and is usually accompanied by fever, flank pain, and pyuria.

(56)

Imaging should be performed for cases of persistent pyelonephritis after 3 days of treatment to exclude an abscess, obstruction, stones, or congenital abnormality as the source of infection (American College of Radiology (ACR), ACR Appropriateness Criteria: acute pyelonephritis. 2008).

(57)

Patients who have had recurrent infections may require antibiotic suppressant therapy in an attempt to control the infections. If an infection occurs while the patient is receiving antibiotic suppressant therapy, further imaging is indicated.

(58)

A complex cyst, indeterminate renal mass, or solid renal mass by US will need CT or MRI for characterization (Zhang et al., Radiol Clin North Am 2007; 45(1): 119-147). Simple cysts found on US do not need follow-up since these are benign; however complex masses not fulfilling the criteria for cyst are considered indeterminate and require further evaluation by contrast-enhanced CT or MRI (American College of Radiology (ACR), ACR Appropriateness Criteria: indeterminate renal masses. 2008). Whether to perform CT or MRI is a matter of clinical judgment.

(59)-RIN:

These criteria address CT of the abdomen and pelvis for nontraumatic hematuria only. For work-up of a traumatic hematuria, see indication 1500 in this criteria subset.

(60)

The most common causes of gross (visible) hematuria in adults are urologic cancer, benign neoplasia, calculous disease, and infection (Grossfeld et al., Am Fam Physician 2001; 63(6): 1145-1154). The magnitude of hematuria does not help differentiate between these etiologies.

(61)

UTIs are common causes of gross hematuria and must be excluded or adequately treated. A urine culture is required, rather than a urinalysis, since the negative predictive value of the latter is diminished in the setting of gross hematuria. Further diagnostic evaluation should be pursued if gross hematuria persists after treatment of an infection, as documented by a negative culture.

(62)-DEF:

Definitions of microscopic hematuria vary from 1 to more than 10 RBCs per HPF; commonly for males it is ≥ 3 RBCs per HPF and for females it is ≥ 5 RBCs per HPF.

(63)

Microscopic hematuria can be caused by infection, nephrolithiasis (i.e., stone), inflammatory kidney disease, and tumor. Pain suggests a stone or infection as the cause for the hematuria. The workup in this setting should be focused on stone evaluation or further treatment and evaluation of infection. If the urinalysis suggests primary kidney disease, further workup is indicated and may include immunologic studies, renal biopsy, and renal US.

(64)

Imaging evaluation of microscopic hematuria will almost always be accompanied by cystoscopy or cystourethroscopy to evaluate urinary tract anatomy and to perform biopsy, if appropriate (American College of Radiology (ACR), ACR Appropriateness Criteria: hematuria. 2008).

(65)-DEF:

Red cell casts are red cells that have collected in the renal tubules and are bound together in a protein matrix which are then excreted as cylindrical casts. The finding of RBC casts is diagnostic for renal parenchymal disease.