**INTRODUCTION:**

CT provides direct visualization of anatomic structures in the abdomen and pelvis and is a fast imaging tool used to detect and characterize disease involving the abdomen and pelvis. It has an ability to demonstrate abnormal calcifications or fluid/gas patterns in the viscera or peritoneal space.

**INDICATIONS FOR ABDOMEN/PELVIS CT:**

**Evaluation of known or suspected kidney or ureteral stones:**
- Delineation of known or suspected renal calculi or ureteral calculi with completion of initial work-up.

**Evaluation of hematuria:**
- Hematuria - painful or non-painful with completion of initial work-up (urinalysis) or documentation of gross blood on visual inspection.

**Evaluation of known tumor, cancer, mass or suspected metastasis. Identified specialists for known tumor, cancer, mass or suspected metastasis: Oncologist, Urologist, Nephrologist, Gynecologist, Gastroenterologist, or Surgeon.**
- Follow-up of known tumor or cancer of patient undergoing active treatment within the past 90 days.
- Initial staging of known tumor.
- Prostatic cancer with PSA greater than ten or rapidly increasing.
- Prostatic cancer with a Gleason score of seven or greater.
- Palpated or observed abdominal mass that extends into pelvis.
- Palpated or observed flank mass.
- Confirmed mass on previous imaging study.
- Confirmed abdomen and pelvis or retroperitoneal mass on previous CT if new signs or symptoms are present.
- Tumor or cancer presenting with new signs or new symptoms encompassing both abd and pelvis area.
- Abdominal/pelvic tumor or cancer (except prostate cancer in males) with no prior imaging for > 10 months.

**Evaluation of suspicious mass or tumor:**
- Rule out mass or tumor and other studies such as ultrasound, intravenous pyelogram, endoscopy (includes capsule endoscopy), colonoscopy, or sigmoidoscopy were previously done.
- Rule out mass or tumor on previous CT if new signs or symptoms are present.
- Rule out adrenal mass (pheochromocytoma).
- Confirm suspicious renal mass (complex cyst or solid tumor) based on physical exam, lab studies, intravenous pyelogram or ultrasound.

**Evaluation of an organ enlargement (i.e., hydronephrosis):**
- For the evaluation of an organ enlargement as evidenced on any previous imaging study (except enlargement of the liver).

**Evaluation of known or suspected infection: (i.e., appendicitis, peritonitis, pancreatitis, Crohn’s disease, ulcerative colitis, abscess, ascites, or inflammatory bowel disease).** *Identified specialists for known or suspected infection: Urologist, Nephrologist, Gynecologist, Gastroenterologist, Infectious Disease Specialist, or Surgeon.*
- Known or rule out infection ordered by identified specialist or primary care provider on behalf of identified specialist who has seen the patient.
- Physical findings or abnormal blood work consistent with peritonitis, abscess, pancreatitis, or appendicitis such as abdominal tenderness, abnormal elevated WBC’s, elevated lipase or amylase or left shift in the differential.
- Clinical or endoscopic findings of Crohn’s disease, ulcerative colitis, acute non-ulcerative colitis, or inflammatory bowel disease and demonstration of need for imaging.
- Radiographic or ultrasound findings consistent with abnormal fluid collection, ascites or non-localized or retroperitoneal abscess.

**Evaluation of known or suspected vascular disease (i.e., aneurysms, hematomas)**
- Pre-operative evaluation of abdominal aortic aneurysm (AAA).
- Evidence of vascular abnormality other than abdominal aortic aneurysm (AAA) seen on plain film, or ultrasound.
- Scheduled follow-up evaluation of aorto/iliac endograft.
- Suspected retroperitoneal hematoma or hemorrhage.

**Evaluation of trauma:** *Identified specialists for follow up trauma: Gastroenterologist, Urologist, Nephrologist, Gynecologist or Surgeon.*
- Follow up for trauma ordered by identified specialist or primary care provider on behalf of identified specialist who has seen the patient.
- Follow-up for trauma with physical findings or abnormal blood work consistent with peritonitis or abscess.
- Lab or physical findings of an intra-abdominal bleed.
- Suspected retroperitoneal hematoma or hemorrhage.

**Pre-operative evaluation:** *Identified specialists for pre-operative evaluation: Oncologist, Urologist, Nephrologist, Gynecologist, Gastroenterologist, or Surgeon.*
- For abdominal/pelvic surgery or procedure ordered by identified specialist or primary care provider on behalf of identified specialist who has seen the patient.
• For planned or possible ventral hernia repair (primary or recurring) ordered by surgeon.

Post-operative evaluation:
• Initial follow-up of suspected or known post-operative complication.

Other indications for Abdomen or Pelvic CT:
• Persistent pain not explained by multiple imaging studies ordered by Gastroenterologist, Surgeon or Oncologist (must have appropriate initial work-up and any two or more of the following completed: plain film, KUB, laparoscopy, ultrasound, endoscopy (includes capsule endoscopy), colonoscopy, sigmoidoscopy or intravenous pyelogram).
• Pancreatic pseudocyst seen on ultrasound.
• Unexplained weight loss of more than 10% of body weight in one month.
• Unexplained abdominal pain in patients 75 years or older.
• Suspected Spigelian hernia (ventral hernia) or incisional hernia (evidence by a surgical abdominal scar) when ordered as a pre-operative study by a surgeon or when surgery scheduled within 30 days.
• Hernia with suspected complications.
• Ischemic bowel.
• Diabetic patient with gastroparesis.
• Follow-up study for known diagnosis or evaluating progress of treatment only if Abdomen CT is being added on as an adjunct to a recently ordered Pelvis CT.

COMBINATION OF STUDIES WITH ABDOMINAL/PELVIS CT:
• Abdomen CT/Pelvis CT/ Chest CT/Neck MRI/Neck CT – known tumor or cancer for initial staging.
• Abdomen CT/Pelvis CT/Chest CT/Neck MRI/Neck CT with MUGA – known tumor or cancer for initial staging or evaluation before starting chemotherapy or radiation treatment.
• Abdomen CT/Pelvis CT/Chest CT – Any combination of exams for follow-up on cancer patient receiving or following treatment.
• Brain/Abdomen/Pelvis/Chest/Neck/Cervical Spine/Thoracic Spine/Lumbar Spine – Any MRI and/or CT combination up to five total exams for patient with cancer history, rule out metastasis, or suspect new tumor development.
• Abdomen CT/Pelvis CT - Known prostatic cancer with PSA greater than ten or rapidly increasing PSA.

INDICATIONS THAT REQUIRE FURTHER CLINICAL REVIEW:
• For same imaging test less than six weeks apart unless specific guideline criteria states otherwise.
• For different imaging tests, such as MRI and CT, of same anatomical structure less than six weeks apart without high level review to evaluate for medical necessity.
• For re-imaging of same, poor or contrast enhanced study.
• For imaging of pediatric patients twelve years old and younger under prospective authorization.

ADDITIONAL INFORMATION RELATED TO ABDOMEN/PELVIS CT:

Request for a follow-up study - A follow-up study may be needed to help evaluate a patient’s progress after treatment, procedure, intervention or surgery. Documentation requires a medical reason that clearly indicates why additional imaging is needed for the type and area(s) requested.

Intravascular administration of contrast material may be contraindicated in patients who have a documented allergy from prior contrast administration or a history of atopy. Intravascular contrast agents may be contraindicated in patients who have impaired renal function.

Ultrasound should precede any request for Abdomen or Pelvis CT for the following evaluations:
  o Possible gallstones or abnormal liver function tests with gall bladder present.
  o Evaluation of cholecystitis.
  o Repeat CT studies of renal or adrenal mass.
  o Repeat CT Hepatic mass follow-up.
  o Repeat CT for aortic aneurysm ordered by non-surgeon.

CT for organ enlargement - An abd/pelvis combo is most appropriate because it will demonstrate the kidneys and the ureters. Other organs may require an Abdomen CT or Pelvis CT only.

CT for suspected renal stones - An initial CT study is done to identify the size of the stone and rule out obstruction. (7 mm is the key size- less than that size the expectation is that it will pass) After the initial CT study for kidney stone is done, the stone can be followed by x-ray or US (not CT). If a second exacerbation occurs/a new stone is suspected another CT would be indicated to access the size of stone and rule out obstruction.

CT Imaging for Renal Colic and Hematuria – Multidetector computed tomography (CT) is the modality of choice for the evaluation of the urinary tract. It is fast and it has good spatial resolution. It is superior to plain-film for imaging the renal parenchyma. CT protocols include: “stone protocol” for detecting urinary tract calculi, “renal mass protocol” for characterizing known renal masses and CT urography for evaluating hematuria. Non-contrast CT can be used for detecting most ureteral and renal stones but sometimes an intravenous contrast agent is needed to determine the relationship of the calculus to the opacified ureter. CT is an effective imaging examination for diagnosing hematuria caused by urinary tract calculi, renal tumors and urothelia tumors.

CT Imaging for Abdominal Aortic Aneurysms – Abdominal aortic aneurysms are usually asymptomatic and most are discovered during imaging studies ordered for other
indications or on physical examination as a pulsatile abdominal mass. If a pulsatile abdominal mass is found, abdominal ultrasonography is an inexpensive and noninvasive technique for examination. For further examination, CT may be performed to better define the shape and extent of the aneurysm and the local anatomic relationships of the visceral and renal vessels. CT has high level of accuracy in sizing aneurysms.

**Combination request of Abdomen CT/Chest CT** - A Chest CT will produce images to the level of L3. Documentation for combo is required.

**REDUCING RADIATION EXPOSURE:**

**CT urography** - Utilization of appropriate imaging techniques can reduce radiation exposure in performance of CT urography. Some protocols may result in 15-35 mSv of exposure. In the article by Chow, et al. a technique involving administration of IV contrast in two boluses separated by a suitable time delay, allows nephrographic and excretory phases to be acquired in a single imaging pass. This allows for full non-contrast and contrast imaging to be obtained with two imaging passes.

**Evaluation for appendicitis following clinical and laboratory evaluation** - Sonography of the right upper quadrant and pelvis followed by graded compression and color Doppler sonography of the right lower quadrant was used by Gaitini and colleagues as the initial imaging study in 420 consecutive patients referred for emergency evaluation of acute appendicitis. This method correctly diagnosed acute appendicitis in 66 of 75 patients (88%) and excluded it correctly in 312 of 326 patients (96%). It was inconclusive in 19 patient (<5%). Sensitivity, specificity, positive predictive value, negative predictive value and accuracy were 74.2%, 97%, 88%, 93%, and 92%, respectively and comparable to CT. Appropriate and timely diagnosis of acute appendicitis is needed. Negative laparotomy rates can range from 16% to 47% when based on clinical and laboratory data alone, while perforation rate can reach 35% when surgery is delayed. Appropriate initial imaging can lower the negative laparotomy rate to 6-10%. Ultrasound has a higher non-diagnostic rate (4%) vs. 0.8% for MDCT. In a prospective study operator experience and patient BMI did not affect diagnostic accuracy.

**Consider the role of barium contrast studies** - Effective doses for fluoroscopic SBFT (small bowel follow through) imaging ranged between 1.37-3.83 mSv for the right lower quadrant, central abdomen and pelvis, respectively. The findings by Jaffe, et al suggest a modified examination for Crohn’s disease indications would have lower effective doses than these. For MDCT the effective dose was 16.1 mSv. This indicates a 5 fold increase in the use of MDCT over SBFT. For patients with Crohn’s disease, efforts should be made to minimize the number of CT examinations, decrease the CT dose or consider MR Enterography. Limitations of SBFT include partial evaluation of extramucosal and extraluminal disease, impaired evaluation of small-bowel loops, especially those inaccessible in the deep pelvis.
Consider the role of capsule endoscopy - Retrospective comparison of capsule endoscopy (CE) to CT in patients with no evidence of a small-bowel stricture at barium examination was the focus of the article by Hara, et al. Studies were done for bleeding of unknown origin after colonoscopy and/or Gastroenterologist, inflammatory bowel disease or chronic abdominal pain. CE was found to be more sensitive than CT examination in the 19 patients that underwent both. CE provides a complimentary and sensitive approach to the evaluation of the small bowel without radiation exposure. A negative examination does not completely rule out pathology.

Work up for distant metastasis in the initial evaluation of melanoma - Multiple studies, including the two authored by Miranda and Yancovitz below indicate that imaging studies, including Chest x-ray, Chest CT, Abdomen/Pelvis CT, Brain CT or Brain MRI in the absence of symptoms or findings of metastatic disease have extremely low yields (< 1%) in the survey evaluation of newly diagnosed melanoma, even in the presence of a positive sentinel node biopsy. The further work-up of the more common benign incidental finding (5-7%) on these studies lead to many more diagnostic tests, including surgery, which are seldom warranted.

Initial evaluation of abdominal aortic aneurysm (AAA) - Initial evaluation of AAA is accurately made by ultrasound. Risk of rupture in 6 years for an AAA < 4 cm is 1%. For a 4-5 cm AAA the risk of rupture increases to 1-3% per year and becomes 6-11% per year for AAA 5-7 cm in cross sectional diameter. >7% the risk of rupture goes to 7% per year. Chronic contained ruptures should meet the following criteria- known abdominal aortic aneurysm, previous pain symptoms that may have resolved; stable hemodynamic status with a normal HCT, CT scans showing retroperitoneal hemorrhage, and pathologic confirmation of organized hematoma.

Initial evaluation of adnexal masses - MRI is a sensitive and specific modality for evaluation of adnexal masses in comparison to CT. While improved diagnostic accuracy of MRI was not shown to be statistically significant in the study- there was a trend to more accurate results with MRI over multi-detector (16-row) CT.

Evaluation for recurrence of ovarian cancer metastases - MRI was noted to be superior to PET/CT (with non-contrast CT) in the detection of recurrence of ovarian cancer in a small study (36 patients).

Pre-operative evaluation of primary rectal cancer - Abdomen CT may detect hepatic and extra-hepatic disease relevant to decision making and prognosis in rectal cancer- but complete imaging through the pelvis does not add useful information. The area of the pelvis in pre-operative evaluation of rectal cancer is better defined by Pelvis MRI.
REFERENCES:


