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Computerized Tomography (CT) Guidelines

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Definition

Computerized tomography (CT) scan combines a series of X-ray images taken from different angles around your body and uses computer processing to create cross-sectional images (slices) of the bones, blood vessels and soft tissues inside your body. CT scan images provide more-detailed information than plain X-rays do.

CT scan has many uses, but it's particularly well-suited to quickly examine people who may have internal injuries from car accidents or other types of traumas. A CT scan can be used to visualize nearly all parts of the body and is used to diagnose disease or injury as well as to plan medical, surgical or radiation treatment.

Indications

Indications for doing CT scan are very wide and below are most common indications:

A. CT of the Head or Brain

- Head trauma with below criteria:
- Minor or acute closed head injury with focal neurologic deficit.
- Moderate or severe acute closed head trauma.
- Penetrating injury, stable neurologically intact.
- Re-evaluation after stroke with one of the following:
- Anti-coagulation planned.
- Deteriorating clinical status with new or worsening neurologic findings.
- Repeat after recent hemorrhagic stroke.
- Headache with one of the following:
- Suspected subarachnoid hemorrhage.
- Stiff neck (nuchal rigidity).
- Age 5 years or less.
- Over age 50.
- Rapidly increasing frequency of headache.
- Known neurofibromatosis.

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- Suspected pituitary disease (microadenoma, macroadenoma) with one of the following:
 - Elevated pituitary hormones including precocious puberty.
 - Hypopituitarism includes hypogonadism.
 - Known pituitary tumor (adenoma, microadenoma, macroadenoma).
 - Suspected acoustic neuroma (schwannoma) or cerebellar pontine angle tumor.
 - Hydrocephalus with one of the following:
 - Suspected obstructive hydrocephalus with Clinical findings and supportive history.
 - Suspicion of VP (ventriculoperitoneal) shunt malfunction.
 - Hearing loss with one of the following:
 - Suspected cholesteatoma and audiogram demonstrating conductive hearing loss.
 - Conductive hearing loss.
 - Total deafness, congenital hearing loss.
 - Preoperative planning for cochlear implant.
 - Evaluation of psychiatric disorders.
 - Bell's palsy, with unusual presentation.
 - Dementia.
 - Sinus Imaging in Adults.

B. CT chest

- Lymphadenopathy
- Supraclavicular Region:

If ultrasound is indeterminate.

- Axillary Lymphadenopathy:

No advanced imaging indicated.

- Mediastinal Lymphadenopathy:

If mediastinal abnormalities are detected on a chest x-ray.

- Hemoptysis with one of the following:
- Abnormal chest x-ray.
- High risk for malignancy with >40 years of age.
- Massive hemoptysis (≥ 30 cc per episode or unable protect airway).

- Bronchiectasis
- To confirm suspected diagnosis of bronchiectasis after an initial x-ray.
 - For known bronchiectasis with worsening symptoms or worsening PFT's.

- COPD
- if emphysema is suspected.
- Interstitial Lung Disease.
- Multiple Pulmonary Nodules.
- Solitary Pulmonary Nodule (SPN)
- Pneumonia

if initial or repeat chest x-ray findings reveal:

- Complication of pneumonia
- Possible lung mass associated with the infiltration
 - Pleural Effusion

can be performed after both:

- Chest x-ray including lateral decubitus films.
- Thoracentesis determines if fluid is exudative or transudative and removes as much as possible (this fluid can obscure the underlying lung).
 - Pneumothorax/Hemothorax

Chest x-ray should be performed initially. Chest CT if:

- Diagnosis of a small pneumothorax is in doubt, and the presence of a pneumothorax will affect patient treatment decisions.
 - Pneumothorax is associated with hemothorax.
 - Suspected complications from hemothorax (e.g. empyema).
 - Suspected Alpha-1-Antitrypsin Deficiency (even without pneumothorax).
 - Cystic fibrosis with one of the following:
 - Hemoptysis.
 - Respiratory distress.
 - Spontaneous pneumothorax.
 - Acute onset chest pain.
 - Inspiratory rales or crackles.
 - Bronchiectasis.
 - Chronic or recurrent respiratory infections.
 - Cancer

may be obtained for one of the following:

- Suspected diagnosis.
- Initial staging.
- Monitoring response to chemotherapy.
- At the completion of planned chemotherapy and/or radiation therapy to establish a new post-treatment baseline.

C. CT Abdomen & Pelvis

- Pelvic Pain/Dyspareunia
- Chronic pelvic pain and pelvic ultrasound is equivocal.
 - Abdominal Aortic Aneurysm.

For obese patients, CT abdomen with contrast can be substituted for US.

- Suspected pelvic abscess, pelvic inflammatory disease (PID)
 - USG is indeterminate.
 - Extensive abscess formation as determined by ultrasound.
 - Complex ovarian, adnexal, or other pelvic mass found on imaging or physical examination.
 - Urethral diverticulum when ultrasound fails to demonstrate a diverticulum.

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- Prostate cancer
- Initial staging of newly diagnosed Prostate cancer only for one of the following:
 - o Gleason score ≥ 7 .
 - o PSA >20 .
 - o Gleason score of 6 with one of the following:
 - a. Tumor involving $>50\%$ of one lobe (T2b).
 - b. Tumor involving both lobes (T2c).
 - c. PSA >10 .
- Uterine cancer
- Initial staging of newly diagnosed uterine cancer and one of the following:
 - o Extrauterine disease suspected.
 - o Grade III tumor.
 - Suspected acute pancreatitis with abdominal pain with serum amylase or lipase are > 3 times normal level.
 - Suspected pancreatic pseudocyst.
 - Splenomegaly with LUQ pain.
 - Obstructive uropathy or hydronephrosis with negative ultrasound.
 - Diverticulitis with left lower quadrant pain and History of diverticulitis.
 - Ulcerative colitis with bloody mucoid stools.
 - Small bowel obstruction.
 - Complex or solid abdominal or liver mass on recent ultrasound.

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