What to Order, When: A Guide to Ordering Radiology Studies

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Goals:
Improve Initial Radiology Order Request Accuracy

- Improve efficiency
  - Reduce call backs/interruptions
- Improve patient satisfaction
  - Reduce cancellation of studies/delays
- Improve patient safety
  - Reduce redundancies
- Become familiar with ACR appropriateness criteria
- Ensure effective imaging
- Discuss risks associated with radiation exposure
OUTLINE

• General info about Radiology Department
• Protocoling CTs
• Emergent MRIs
• Indications for Ultrasounds
GENERAL INFO
Useful Rad Numbers

- **KCH ED rad**
  - Ext: 5121

- **UHB ED rad**
  - Ext: 6730
  - Pager: 917-760-1124 (5pm – 8am)

- **Ultrasound Tech**
  - KCH: 1405
  - UHB: 3901

- **IR**
  - KCH: 4442
  - UHB: 8292
Who to contact after-hours?

- **IR**
  - Contact ER radiology resident 5pm-8am @ KCH or UHB

- **Ultrasound:**
  - KCH: Ultrasound tech from 8am-5:30 pm M-Sat. On call resident 5:30pm – 8am M-Sat, Sunday 8am-8am.
  - UHB: Ultrasound tech from 8am-5:00 pm M-Fri. On call resident 5:30pm – 8am M-Fri, All weekend.

- **Fluoro study:**
  - Contact senior resident at UHB

- **MRI:**
  - Tech in house until midnight @ 2609. After midnight must get approval from ER radiology resident; on-call tech will be called in
  - **Emergent MRIs:** cord compression, pregnant woman r/o appy
General CT Tips

• Ordering a study with contrast means IV contrast, not PO
• Always order CT abdomen AND pelvis
• Never order CT with and without
  • Only exception is CT head
  • Patient is scanned twice (double the radiation dose)
• Must have at least 20g, antecubital IV for CTA
  • For high injection rates of 4cc/s
• PLEASE provide relevant clinical history!
• Oral contrast
  • Bowel transit time: 90-120 minutes to opacify most of bowel
When to use IV contrast?

- Infection
- Inflammation
- Malignancy
- Vascular injury
What are the cutoffs?

- We use GFR:
  - GFR > 30
  - Diabetics: GFR > 40
  - ESRD on HD: dialysis w/in 24-48hrs
CT HEAD

- w/o contrast (most cases)
  - Bleeds
  - CVA
  - AMS
  - HA
- w/ and w/o contrast
  - Malignancy
  - Infection
  - New onset seizure
CT Face/Sinus/Orbits/Temporal

- CT face, sinus, temporal ALWAYS w/o contrast

- CT orbits
  - w/ contrast: mass/infection
  - w/o contrast: trauma
CT NECK

- Always ordered w/ contrast, never w/o
- Indications:
  - Infection
  - malignancy
CT CHEST

- w/o contrast
  - Lung parenchyma (pulmonary nodules, mass)

- w/ contrast
  - To evaluate the pleura, mediastinum

- High resolution
  - Known ILD by PFTs
CT ABDOMEN/PELVIS

- w/ contrast
  - Focal pain, appendicitis, diverticulitis etc.
  - SBO
- w/o contrast
  - Kidney stones
  - Retroperitoneal hematoma
CT PELVIS

• w/ contrast, no oral
  • Perirectal abscess
  • CT cystogram
CT Extremity

- w/ contrast
  - Malignancy (soft tissue/bone)
  - Abscess/Infection
- w/o contrast
  - Trauma

**But, MRI with/without is test of choice for soft tissue and bony masses**
Pediatrics

- Appendicitis:
  - Pediatric protocol: limited CT of the lower abd/pelvis
- ALARA
  - As low as reasonably achievable
  - Consider MRI or US when possible in pediatric patients
CTA = CT Angiography

- Pulmonary embolism: Pulmonary CTA
- Dissection/Aneurysm: Thoracic aorta CTA
  - please state whether you want abdominal aorta included
- Brain aneurysm: Intracranial CTA
- Carotid disease: Extracranial CTA
Pulmonary CTA

- If low probability (Wells <4)
  - obtain D-Dimer,
    - If D-dimer negative -> no need for pulmonary CTA;
    - If D-dimer elevated → order pulmonary CTA

- If poor renal function
  - obtain doppler to r/o DVT
  - V/Q scan
    - Must have same day xray
    - Patient must be able to cooperate with exam
    - Only available 8am-5pm
Hematuria

- Microscopic hematuria
  - <50 years old → CT abd/pelvis without
  - >50 years old → CT abd/pelvis with

- Gross hematuria
  - CT urogram
Additional CT Trauma Examinations

- CT cystogram $\rightarrow$ suspected bladder injury
- CT Abd/Pelvis with rectal contrast $\rightarrow$ penetrating trauma
Important IV Contrast Points for MRI

• For all studies in which you think they will need IV contrast (*Always order* without and with)
MRI Safety Concerns

- Ask patients about
  - Pacemakers (always contraindicated)
  - Aneurysm clips (may be contraindicated)
  - Pain pumps (may be contraindicated)

- Shrapnel only contraindicated if near vessels/nerves/hollow viscous
ULTRASOUND
Ultrasound

• DVT study
  • Indication: unilateral swelling/pain
  • Most likely cause of bilateral, symmetric swelling is venous insufficiency, not DVT (Reference: BID study)

• Pelvic – should be TA and TV
  • Patient must have full bladder and gown
  • Chaperone if male ER rad resident
  • R/O Ectopic -> necessary to have BHcG to correlate with sono findings
USEFUL WEBSITES

• ACR Appropriateness criteria
  • Guidelines for types of studies to be ordered for different indications
  • http://www.acr.org/SecondaryMainMenuCategories/quality_safety/app_criteria.aspx
  • these criteria assign values on a number scale to indicate the degree of appropriateness of many different types of imaging studies, which may be used for answering a specific clinical question, helping to provide guidance as to choice of imaging

• Ordering guide
  • http://www.choosingwisely.org
Using ACR Appropriateness Criteria

1. Log on to the website acsearch.acr.org
ACR Website

2. Enter search terms

Select Category
- Select All
- Diagnostic Topics Only
- Radiation Oncology Topics Only
- Interventional Topics Only

any of these words*
- tachycardia

And

all of these words*

*Words and Phrases must be separated by a comma

Perform Search
ACR Website

3. Select from provided topics
ACR Website

4. Review the PDF (Tables, explanations and summary)
Thank You

Questions?