

What's Key and Evolving in GI Medical Imaging

FLUOROSCOPY:

- Useful for guiding minor procedures and vascular/interventional work
- Of very limited utility in evaluation of esophagus and stomach (negative/serious symptoms, scope; if positive then scope)
- Primarily for dynamic assessment of swallowing – post-op complications; functional anatomy

CT INDICATIONS:

- Trauma
- Acute abdominal pathology
- Acute vascular pathology
- Oncology staging and follow-up
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CT ADVANTAGES:

- Rapid large volume image acquisition and access for acutely ill monitored patients
- Spatial resolution; temporal resolution without motion artefact; contrast through air
- Ease of identification of acute blood (evolution of blood product signal on different MRI sequences is complex)

MRI INDICATIONS:

- Liver lesions/biliary tree
- Pancreas (often in conjunction with CT)
- Rectal CA staging
- Perianal fistulas

MRI ADVANTAGES/DISADVANTAGES:

- Superb soft tissue contrast and no ionizing radiation BUT...
- Long image acquisition time (5-8min. per sequence; 4-10 sequences per exam)
- Numerous artefacts – vascular pulsation, motion (breathing, cardiac, bowel)
- Ferromagnetic/electrical contraindications

- Gadovist – gadobutrol; extracellular intravenous gadolinium contrast agent; 100% renal excretion
- Primovist – gadoxetate disodium; vascular and extravascular with progressive distribution into hepatocytes and bile ducts; 50% hepatic and 50% renal excretion
- LI-RADS risk system for HCC in cirrhosis was developed with Gadovist
- Primovist primarily aids in differentiating benign focal nodular hyperplasia (contains hepatocytes) from metastases (from outside the liver, no hepatocytes); common benign hemangiomas can be more difficult to evaluate

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US INDICATIONS:

- Initial biliary work-up (acute or gallstones... not for suspected malignancy)
- Guiding biopsies and other interventions
- Emergency bedside triage - limited

- Can answer a VERY SPECIFIC clinical question
- Not useful for investigation of vague, chronic abdominal pain – there is a significant amount of anatomy that is not visualized
- Operator dependent – i.e. depends on the skill and dedication of the sonographer

- Generally not useful for bowel issues (except thin/young ER patient – appendicitis, pediatric intussusception)
- For these indications direct consultation with the radiologist is required as routine US does not assess bowel

- Patient body habitus is a very serious consideration – US sensitivity is significantly reduced in the obese
- How sure are you of your working diagnosis?
If there is significant uncertainty, CT is generally best
- Specific pathology – gallstones best seen by US (cholesterol), renal calculi best seen by CT (calcium oxalate, uric acid)... the ureters are almost never visualized with US (you may see the secondary hydronephrosis but only CT or MRI will demonstrate the ureteric stone)

- US can be useful in excluding gallstones as a cause of pancreatitis BUT is of no utility in diagnosing or assessing severity pancreatitis (i.e. pancreatic necrosis, venous thrombosis, arterial pseudoaneurysm or hepatic abscess formation)
- US rarely demonstrates a choledocholith (MRCP is the best non-invasive imaging for this; CT pancreas protocol is usually better than US where bowel gas obscures the distal CBD)
- Pancreas – US is not sensitive (particularly in larger patients or those with prominent bowel gas; the 2nd/3rd portions of the duodenum and the stomach wrap around the pancreas)
- Follow-up of solid organ mets – use CT
(the size, number, and extent are much more difficult to evaluate and compare on US)

- Contrast enhanced US – intravenous contrast containing microbubbles of nitrogen or perfluorocarbon gas
- CEUS shows promise for characterizing incidentally detected liver lesions – benign lesions have progressive/persistent microbubble uptake, malignant lesions typically display washout because of predominant arterial vascularity
- Fibroscan – transient elastography; 50MHz wave from an ultrasound probe
- Fibroscan converts velocity of a sound wave passing through the liver into a liver stiffness measurement in kilopascals; stage liver fibrosis without biopsy (limited by ascites, obesity)