

Best practice guidelines - acute abdominal pain

As has been a focus of Memorialcare for several years, best-practice standards are being developed in radiology as well. These evidence-based guidelines are being formulated by several large groups and national committees to assist clinicians in making the most appropriate imaging or treatment decision for specific clinical conditions. The American College of Radiology has generated the ACR Appropriateness Criteria (available at ACR.org) which rate radiologic tests on a scale of 1 to 10 based on their “appropriateness” of being the single best radiologic diagnostic test in various clinical scenarios. The hope is that these efforts will enhance quality of care and contribute to the most efficacious use of radiologic testing.

At OCMMC, we employ several of these Criteria. But additionally, we take into account the radiation exposure dose to our patients and the overall cost-effectiveness of the examinations. In this month’s Coastlines, we present our radiologic best-practice approach in the workup of acute abdominal pain.

Several imaging studies are available to us in the workup of acute abdominal pain. Abdominal x-ray series, ultrasound and CT scanning are used most frequently. MRI, angiography and nuclear medicine can also be useful in the acute setting, but are primarily used in more chronic or problem solving (i.e characterization of masses) scenarios and will not be included in this discussion here.

Abdominal X-ray is inexpensive, readily available and creates relatively low radiation dose. While it can demonstrate several diagnostic clues to particular diagnoses, it is relatively non-specific for most. However, it can be very appropriate in the initial workup of ingested foreign body, suspected perforation (free air evaluation) or small bowel obstruction. Beyond these indications, however, there are significant limitations.

Ultrasound is an excellent modality for examination of fluid filled structures, especially the biliary system and urinary system. Gallstones reflect the ultrasound waves and create a diagnostic appearance. Biliary or urinary obstruction, ascites and pleural effusion can be easily evaluated. Ultrasound is also great for superficial structures such as lymph nodes, thyroid and for vascular imaging of the arterial and venous system. It is also generally first line imaging of the female pelvis.

Ultrasound is limited, however, for characterization of abdominal or superficial masses, a task best left for CT or MRI. Ultrasound is also limited for detection of renal stones. CT, on the other hand, is quite adept at detecting renal or ureteral stones and the potential hydronephrosis or abscess caused by them. In fact, effectively ALL renal stones (even uric acid ones) are visible on CT imaging.

Ultrasound is generally not appropriate for imaging of gas-filled structures such as bowel or abscesses and is probably not the best modality for potentially gas-obscured structures

such as the pancreas. Ultrasound waves do not penetrate thru gas well at all and significant artifact is created in the image. Fat tissue is also relatively difficult to penetrate with ultrasound.

On the contrary, fatty tissue and gas filled structures are the friends of CT. Mesenteric fat is excellent in depicting inflammatory changes surrounding bowel in appendicitis or diverticulitis and CT can detect very minute perforations of bowel. Studies have shown CT to be the most cost-effective imaging modality for bowel ischemia, diverticulitis and appendicitis with >96% sensitivity. Abscess, neoplasm, and adenopathy are also well characterized.

While fat is a natural contrast agent in larger body habitus patients, thin patients generally require IV contrast for an accurate CT workup. Renal stones are detected with or without IV contrast, but when unsure of the diagnosis, IV contrast can help to find other diagnoses. Oral contrast is not usually needed in the acute setting, except if there is a concern for a post-operative bowel leak or abscess.

In summary, if a rapid, cheap test is required for ingested foreign body, suspected acute perforation or initial evaluation for SBO, abdominal Xray series is probably the best place to start. Otherwise think ultrasound or CT. Ultrasound is best for thin or young patients (little fat and higher relative risk of radiation), suspected biliary disease or pelvic disease in women. CT is better for larger body habitus patients or suspected bowel disease, and provides a cost-effective diagnostic test for most non-biliary diagnoses.

We hope this helps you to understand how to select the most appropriate test for patients in your practice. As always, radiologists are available at OCMMC to answer questions you may have regarding specific clinical situations.