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ABDOMINAL CT SCANS: WHEN IS CONTRAST IMPORTANT?

There is no doubt that CT scanning of the abdomen and pelvis is an invaluable tool in the workup of abdominal complaints, both in the acute setting and in those patients with chronic symptoms. But when is the use of IV contrast or oral contrast or both important during these scans? The following is meant to describe the benefits of contrast and provide guidelines for its usage.

CT scanning without IV or oral contrast is a rapid technique, aiding in the disposition of patients, especially in the ER or acute setting, but there are significant limitations. The “non-contrast” CT can be a very accurate, sensitive and cost-effective diagnostic test for acute inflammatory processes of the bowel, namely appendicitis, diverticulitis, small bowel obstruction, and bowel perforation/free air. However, interpretation of bowel pathology relies primarily upon inflammatory changes of the fat around the bowel or appendix. Therefore, the ideal patient has enough intraperitoneal fat to demonstrate this inflammation. Overall body habitus must be considered, but generally male patients over 30 years old and female patients over 35 years old are acceptable. For example, with the appropriate patient selection, 90-98% positive predictive value for appendicitis can be achieved.

Certain circumstances generally require CT WITH INTRAVENOUS CONTRAST. Patients with longer duration of symptoms (>3days) necessitate IV contrast. If the patient has appendicitis, it is more likely perforated or diverticulitis more likely complicated and thus there may be an abscess. IV contrast outlines abscesses very well. Additionally, longer duration of symptoms may indicate neoplasm or chronic inflammatory bowel disorder. Contrast is extremely helpful in these cases. IV contrast is generally required at a minimum. Oral contrast increases both sensitivity and specificity of findings.

Any trauma, suspected vascular injury or aortic dissection requires IV contrast for accurate delineation.

Advanced age (>70) significantly raises possibility of intestinal ischemia, infarction, neoplasm or other alternative diagnoses as cause of the

symptoms. CT with IV contrast is very helpful, both because of the increased prevalence of these processes in this age group and the intraperitoneal fat diminishes as we age, limiting the utility of a “non-contrast scan”.

A study without IV contrast is very useful for detection of nephro- or urolithiasis, especially in the acute setting. Virtually all renal stones are radio-opaque on CT. In addition, hydronephrosis and stranding around the kidneys are easily seen. However, suspected pyelonephritis requires CT with contrast for definitive diagnosis. Remember, however, the presence of IV contrast will not obscure the renal stones. So, when in doubt of the clinical cause (i.e. stones vs. pyelonephritis), order a CT scan with IV contrast.

Also remember that CT scanning is sometimes non-diagnostic, whether contrast is used or not. While all renal stones are opaque, most gallstones are not. Adnexal processes also are not well defined. Therefore, if there is suspected acute cholecystitis or cholelithiasis, ultrasound should be the best first line test. A young woman with pelvic pain and normal WBC count would be best served by a pelvic ultrasound first.

The take home message is that CT without contrast is a very valuable and accurate test in specific circumstances, but one must understand its limitations. For patients ages 30-70 with acute symptoms and suspected bowel perforation, diverticulitis, appendicitis or SBO or urolithiasis, CT without IV or oral contrast is likely an excellent choice. IV contrast is required for chronic symptoms, suspected solid visceral inflammation (i.e. pyelonephritis), or for the very thin or elderly patient. If there is significant suspicion for neoplasm or chronic inflammatory bowel disease, oral contrast is very helpful.

When in doubt, IV contrast is usually helpful. It rarely, if ever, limits the diagnostic capability of the CT scan. Lastly, ultrasound should be considered first line for gallbladder disease or adnexal processes.

The above discussion is meant as a guideline and certainly does not include specific parameters for every indication. Please feel free to contact the radiology department at OCMC or Dr Wasley directly at 714-378-7520 for any specific questions you may have.

