

Renal Failure (AB-36.1)

The main role of imaging is to detect treatable causes of renal failure such as ureteral obstruction or renovascular disease and to evaluate renal size and morphology. Ultrasound is the modality of choice for initial imaging, with duplex Doppler reserved for suspected renal artery stenosis or thrombosis. ACR appropriateness criteria states that ultrasound contrast media are not nephrotoxic, ultrasound has the greatest diagnostic value in the detection of hydronephrosis, and ultrasound is highly sensitive for hydronephrosis and bladder distention.¹ It also allows for evaluation of general information about the kidney such as size and shape.¹ CT may be appropriate, particularly for urinary tract obstruction. CT is useful in determining the cause of hydronephrosis by demonstrating if mass or obstruction is present and at what level in the urinary tract.¹ MRA is useful when Renovascular causes of failure are suspected. MRA has shown to be able to detect renal artery stenosis.¹ However, the use of iodinated and gadolinium-based contrast should be evaluated critically depending on specific patient factors and cost-benefit ratio.

Tc-99m dimercaptosuccinic acid (DMSA) scintigraphy is ideal for functional renal cortical imaging and is most useful for detection of focal renal parenchymal abnormalities and scars in the setting of acute or chronic pyelonephritis or for differential renal function.

Tc-99m mercaptoacetyltriglycine (MAG3) is the most frequently used renal tubular agent, specifically to quantify renal tubular extraction.

References:

1. Papnicolaou N, Francis IR, Casalino DD, Arellano RS, et al. Expert Panel on Urologic Imaging. ACR Appropriateness Criteria® renal failure. American College of Radiology (ACR); 2008.
2. National Kidney Foundation. KDOQI Clinical Practice Guidelines for Chronic Kidney Disease: Evaluation, Classification, and Stratification. 2012. *Am J Kidney Disease*. 2002;39(2 Supp 1):S1-S266.
3. Kim C, Becker M, Grant F, et al., ACR–SPR Practice Guideline for the Performance of Renal Scintigraphy. Revised 2017. The American College of Radiology.