

<b>CLINICAL PRESENTATION AND RADIOLOGY QUIZ QUESTION</b>
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A 76 year old man presents with an increasing creatinine level.

Which of the following is the imaging study of choice for new onset of renal failure?

- (a) CT-KUB
- (b) renal ultrasound
- (c) renal MRI
- (d) renal scintigraphy (done with Tc-99m-DTPA)

<b>RADIOLOGY QUIZ QUESTION, ANSWER, AND EXPLANATION</b>
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A 76 year old man presents with an increasing creatinine level.

Which of the following is the imaging study of choice for new onset of renal failure?

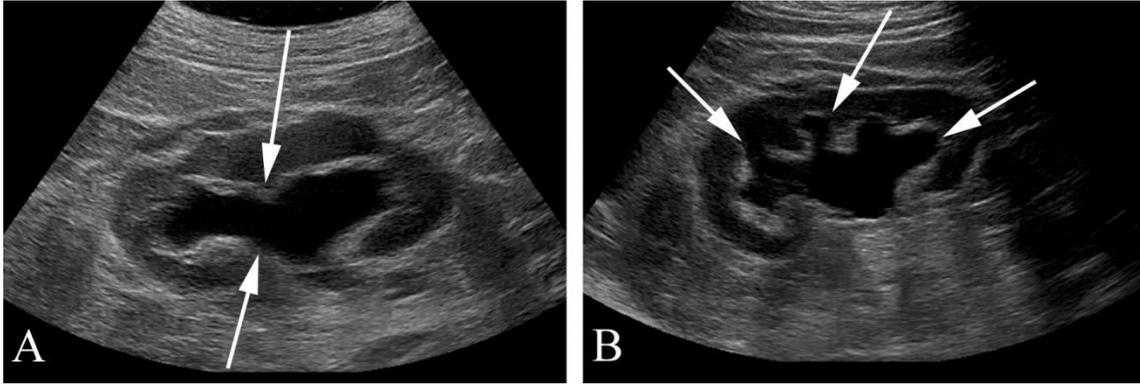
- (a) CT-KUB
- (b) renal ultrasound
- (c) renal MRI
- (d) renal scintigraphy (done with Tc-99m-DTPA)

Answer: b, renal ultrasound. Renal ultrasound is the study of choice for evaluation of new onset renal failure, since it allows the diagnosis of obstruction (typically readily treated and reversible) as a cause of failure.

CT-KUB, or CT of the abdomen and pelvis performed without contrast material, while the study of choice for renal colic, is NOT the study of choice for new onset renal failure. It involves radiation and greater expense than ultrasound. (a) is therefore incorrect. Renal MRI is also NOT the study of choice for new onset renal failure: it is more costly and typically involves a greater delay than ultrasound, and (c) is also incorrect. Renal scintigraphy is also NOT the study of choice for new onset renal failure, since it uses radiation, is more costly, and typically involves a greater delay than ultrasound. Therefore (d) is also incorrect.

## IMAGING STUDY AND QUESTIONS

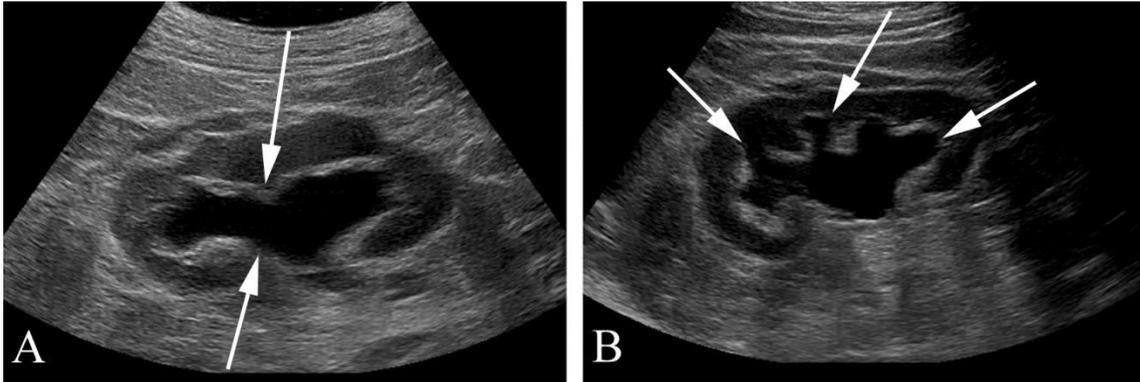
An imaging study was performed.



Imaging questions:

- 1) What type of study is this?
- 2) What is depicted by the arrows in A?
- 3) What is depicted by the arrows in B?
- 4) What is the cause of the patient's new onset of renal failure?
- 5) What is the diagnosis?
- 6) What is the next step in patient management?

## IMAGING STUDY QUESTIONS AND ANSWERS



Imaging questions:

- 1) What type of study is this? Renal ultrasound.
- 2) What is depicted by the arrows in A? The (dilated) renal pelvis.
- 3) What is depicted by the arrows in B? (Dilated) renal calyces, part of the renal collecting system.
- 4) What is the cause of the patient's new onset of renal failure? Renal obstruction.
- 5) What is the diagnosis? The cause of renal failure is not clear in this case. Bilateral renal collecting system distension is most likely from an enlarged prostate gland (either benign or malignant) in a patient of this age, although a bladder tumor or a stone or blood clot within the bladder blocking the urethra could also cause bilateral renal collecting system distension.
- 6) What is the next step in patient management? Urology referral. The patient needs to undergo urologic evaluation and treatment to eliminate the obstruction, with anticipated improvement in renal function.

<b>PATIENT DISPOSITION, DIAGNOSIS, AND FOLLOW-UP</b>
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This patient had undergone a radical prostatectomy for prostate cancer approximately 6 years before his creatinine became elevated. A urologist found a bladder neck stricture causing the hydronephrosis and the patient's creatinine improved following treatment of this stricture.

## SUMMARY

**Presenting symptom:** Many (if not most) patients with renal insufficiency are diagnosed because of increasing creatinine on laboratory evaluation, and many of these patients have no clinically apparent symptoms. Renal failure may, in some patients, manifest as decreased renal output, flank pain, edema, hypertension, weakness and fatigue, anorexia, vomiting, mental status changes, or fever.

**Imaging work-up:** Imaging of new onset renal failure relies on ultrasound, which is relatively cheap, portable, involves no ionizing radiation, is usually readily available, and which demonstrates distension of the collecting system in cases where the renal failure is from obstruction.

**Establishing the diagnosis:** Renal insufficiency is a diagnosis based on laboratory data although the cause may be secondary to a specific disease process. For example, prostate cancer or urethral stricture may cause obstructive uropathy, while glomerulonephrosis may cause nonobstructive uropathy.

**Treatment:** Treatment for obstructive disease generally involves relieving the cause of the obstruction (e.g., a transurethral resection of the prostate [TURP] in patients with prostatic tumors or hypertrophy) or bypassing the cause of obstruction (e.g., foley catheters across urethral strictures and ureteral stents past areas of ureteral stricture versus percutaneous nephrostomy placement when ureteral stents cannot be placed). Prostate carcinoma may also be treated with hormone therapy or radiation. Urologists usually treat obstructive disease, whereas nephrologists diagnose and treat medical renal disease (i.e., nonobstructive renal insufficiency).

**Take-home message:** Ultrasound is the study of choice for evaluation of new onset renal insufficiency.

## FURTHER READING

Post TW, Rose BD. Diagnostic approach to the patient with acute or chronic renal disease. UpToDate.com, accessed 11/28/08.

Renfrew, DL. Renal Symptoms. Chapter 1 of *Symptom Based Radiology*, Symptom Based Radiology Publishing, Sturgeon Bay, WI, 2010, available for no charge at [www.symptombasedradiology.com](http://www.symptombasedradiology.com).