CASE REPORT

Post renal acute kidney injury without significant hydronephrosis.

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Background

Post renal acute kidney injury (AKI) is characterized by an obstructive process preventing the flow of urine at any point from the renal collecting system to the urethra. In order to have clinically evident renal dysfunction, a process causing bilateral ureteral obstruction must occur which is usually at the level of the bladder or urethra; or as in our case, a solitary kidney with obstruction of a single ureter.

Post renal AKI often presents with lower abdominal pain or a sensation of fullness and oliguria despite adequate hydration. A renal ultrasound (US) or non-contrast computerized tomography (CT) scan with renal protocol is useful to visualize a hydronephrosis and hydroureter. Hydronephrosis is an important finding for proximal post renal AKI. Renal US alone has a sensitivity of 80-85% in detecting hydronephrosis and when combined with CT scan detects hydronephrosis in > 90% of cases. This report highlights a case of postrenal AKI in which CT and US failed to identify a direct source of obstruction or significant hydronephrosis. Treatment is generally focused to relieve the obstruction.

Case

A 37-year-old female presented to the emergency department of a community hospital with right-sided abdominal pain. The patient’s significant past medical history included left donor nephrectomy five years ago, migraines, deep venous thrombosis (DVT), and uncomplicated abdominal hysterectomy twelve days prior. The patient had no prior history of renal dysfunction with a baseline serum creatinine of less than 1.0 mg/dl. She was diagnosed with a urinary tract infection one day prior to presentation, and was started on ciprofloxacin. On the day of admission to the outside hospital, the patient’s serum creatinine was mildly elevated at 1.3 mg/dl. A contrast CT of abdomen and pelvis showed mild hydronephrosis on the right, however no hydroureter and no significant stone or obstruction. The patient remained anuric and her serum creatinine continued to trend up progressively following two liters of normal saline. A renal ultrasound study was performed and the findings remained consistent with the CT study: mild hydronephrosis without significant obstruction.

On hospital day two, when the patient was transferred to our facility, the differential diagnoses included ureteral stricture, acute intrinsic renal failure, pyelonephritis, ureteral injury from recent surgery, a passed renal calculus due to topiramate use for migraines, acute renal vein thrombosis and less likely from ovarian vein thrombosis as she had a history of DVT and recent abdominal surgery. A renal US with doppler study was repeated at our facility and the findings remained consistent with prior CT and US studies at the outside facility. Emergent dialysis was strongly considered for noted rise in serum creatinine to 6.7 mg/dl and non significant hydronephrosis on multiple radiologic studies. However, based on the patient's clinical history being notable for recent pelvic surgery, a decision was made to rule out an obstructive process, and a retrograde pyelogram was performed.

During the procedure, an apparent obstruction was visualized two centimeters from the ureteral orifice; the ureteral obstruction was a result of a ureteral stricture sustained during her hysterectomy. Following placement of the ureteral stent, there was immediate return of urine. The patient's renal function drastically improved to near-baseline in three days time, and she was eventually discharged home.
Discussion

Although postrenal AKI occurs in only 2-5% of cases in the inpatient setting, it is an important diagnosis to rule out as the management differs greatly from AKI due to other etiologies. Renal US is commonly the first study performed in detecting hydronephrosis. However, the sensitivity of renal US is 80-85% indicating the potential increased likelihood of false negative results. Unenhanced CT scan has a similar sensitivity in detecting hydronephrosis as US.

The use of both CT and US increase the diagnostic yield, however, as demonstrated by our case, caution must be used in interpreting these studies. Therefore, if the clinical suspicion for ureteral obstruction remains high, this must be further evaluated despite a negative result on imaging studies.

Exclusion of ureteral injury following a gynecologic surgery appears imperative in the evaluation of postrenal AKI. Ureteral injury following gynecologic surgery is relatively common, with a reported frequency of 0.5-1.5%. Injury typically occurs more commonly in the setting of a surgery complicated by increased intraoperative bleeding; nevertheless it has been shown to occur following routine procedures as well. The presentation of ureteral injury following gynecologic surgery may occur immediately, or after some delay. We suspect that our patient's ureteral stricture was indeed a surgical complication with a delayed presentation.

Conclusion

Renal US and CT scan are the mainstay diagnostic approaches for hydronephrosis; however, if the clinical suspicion remains high a negative finding may not necessarily exclude ureteral obstruction. As the recovery following prompt relief of an acute obstruction is quick and complete, further evaluation should be done without delay to avoid irreversible renal injury, worsening of renal failure and subsequent potentially life threatening complications.

References