

# Postrenal Acute Kidney Injury Pathophysiology and Presentation

Postrenal acute kidney injury occurs as a result of bilateral outflow tract obstruction which leads to increased backpressure on the glomerulus and subsequently decreased GFR. Common etiologies include benign prostatic hyperplasia, nephrolithiasis, neoplasm, and neurogenic bladder. On presentation, patients may have bladder distension, lower abdominal pain, edema, or oliguria.



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### **Pathophysiology**

#### **Bilateral Outflow Obstruction**

#### Bi-ladder Renal System Obstructed

Postrenal acute kidney injury can occur as a result of bilateral urinary obstruction in any part of the renal collection system, from the renal pelvis to the urethra. Unilateral kidney obstruction does not lead to acute kidney injury since the unobstructed kidney compensates. The unaffected kidney can maintain a physiologic GFR and normal serum creatinine. This is also the reason why kidney transplant donors can maintain a normal serum creatinine with only one functional kidney.<br/>
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### **Decreased GFR**

#### Down-arrow Gopher

Decreased GFR can be observed in postrenal acute kidney injury. The bilateral outflow tract obstruction causing this condition can lead to retrograde buildup of fluid in the renal collection system proximal to the obstruction. This can lead to hydronephrosis with subsequently decreased GFR. <br/>
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### **Etiologies**

# Benign Prostatic Hyperplasia (BPH)

# Bunny Plum Hiker-plates

# Nephrolithiasis

#### **Kidney Throwing Stones**

### Neoplasm

#### New-growths

A neoplasm may invade or compress the renal collecting system leading to bilateral outflow tract obstruction. Prostate cancer is the most common one; however, any cancer that can exert compression or invasion of these structures can be a cause of postrenal acute kidney injury e.g. cervical cancer. Other conditions that can lead to postrenal AKI include congenital malformations such as posterior urethral valves. <br/>
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# Neurogenic Bladder

#### Sleeping-nerves on Bladder

Flaccid Neurogenic Bladder is a condition in which the nerve innervation of the bladder is dysfunctional. This condition leads to buildup of urine in the bladder causing overflow incontinence. The urine buildup leads to retrograde urine buildup in the renal collecting system and can cause post-renal acute kidney injury. Flaccid neurogenic bladder can occur in patients with multiple sclerosis, peripheral neuropathy due to diabetes mellitus, and spinal cord lesions. <br/>
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#### **Presentation**

### **Bladder Distension**

Bladder Distended

### **Lower Abdominal Pain**

# Lower Abdominal Pain-bolt

#### Edema

Edamame

Edema can occur in postrenal AKI. The reduced GFR can lead to fluid buildup causing third-spacing and subsequent interstitial edema.

# Oliguria

Old-gopher

Oliguria is a common finding in cases of post-renal acute kidney injury since the obstruction will inhibit the passage of urine.<br/>