

## Hydronephrosis

Hydronephrosis is a condition in which the renal pelvis and calyces dilate as a result of urinary tract obstruction, causing urine to accumulate. Congenital malformations, kidney stones, and even retroperitoneal fibrosis are among the causes of hydronephrosis. The dilation occurs proximal to the actual obstruction or pathology and can affect just one kidney or both. Bilateral hydronephrosis would suggest there is an obstruction further along the urinary tract, for example, the prostate or bladder. Notably, if this occurs in both kidneys, the serum creatinine will increase.



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### Pathophysiology

#### Dilated Renal Pelvis and Calyces

##### [Dyed Kidney with Pelvis](#)

The dilation of the renal pelvis and calyces occurs proximal to the obstruction.

### Mechanism

#### Nephrolithiasis

##### [Kidney Throwing Stones](#)

Nephrolithiasis, also known as renal stones, is the most common cause of acute unilateral hydronephrosis in adults. Kidney stones can cause hydronephrosis by obstructing urine flow to the bladder, leading to the accumulation of fluid proximal to the obstruction and resulting in unilateral hydronephrosis.

#### Benign Prostatic Hyperplasia (BPH)

##### [Bunny Plum Hiker-plates](#)

Benign prostatic hyperplasia (BPH) can cause bilateral hydronephrosis due to the enlarged prostate preventing urine from passing through the urethra. Hydronephrosis occurs when the prostate compresses the urethra, causing complete obstruction.

#### Cancer

##### [Tumor-guy](#)

Cancers that occur in the urinary tract or the surrounding tissues can lead to the development of hydronephrosis. Examples include renal cancer, bladder cancer, and uterine cancer.

#### Vesicoureteral Reflux

##### [Vest-guy Holding a U-wreath](#)

Vesicoureteral reflux occurs when urine flows backward from the bladder through the ureters to the kidneys. It is a congenital malformation, and therefore seen in young children. Patients with vesicoureteral reflux have an increased risk of urinary tract infections and recurrent pyelonephritis, which can lead renal cortical scarring and inflammation eventually resulting in chronic kidney failure.

#### Retroperitoneal Fibrosis

##### [Retro-man Holding a Pear](#)

Retroperitoneal fibrosis is the abnormal scarring and inflammation of the retroperitoneum, which is the area just behind the abdominal cavity. Scarring in the ureters can cause unilateral as well as bilateral blockages, resulting in chronic hydronephrosis. Retroperitoneal fibrosis can be primary (idiopathic) or secondary (eg, drug-induced). One important fact about primary retroperitoneal fibrosis is that it can be associated with IgG4-related diseases.

### Signs and symptoms

**Flank Pain****Flank Pain-bolt**

The main symptom of hydronephrosis is flank pain. Patient will also experience pain during the flank percussion, also known as costovertebral angle tenderness.<br>

**Nausea and Vomiting****Vomiting**

Nausea and vomiting can occur in individuals with hydronephrosis.

**Postrenal AKI****Post-renal-guy with Acute Angle**

Hydronephrosis can lead to a postrenal acute kidney injury (AKI). Serum creatinine levels can rise if both kidneys are obstructed or if one solitary kidney is obstructed. Over time, the ongoing pressure and damage can lead to scarring and inflammation of the renal cortex, resulting in irreversible loss of kidney function and chronic kidney failure