Renal Calculi Assessment

Renal calculi is commonly caused by hypercalcemia leading to kidney stone formation. Flank pain radiating toward the bladder is a characteristic symptom of renal calculi. As the renal stone passes down the ureter, the patient may experience a wavelike rhythmic pain classified as renal colic. Renal calculi may lead to urinary tract infection, hematuria, and urinary retention. Nearly 50% of patients with kidney stones will experience stone recurrence. Refer to the Picmonic on "Renal Calculi Interventions" for additional information.



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Cause/Mechanism

Hypercalcemia (Most Commonly)
Hiker-calcified-cow
Incidence and type of stone formation varies based on metabolic, dietary, genetic, climatic, and lifestyle factors. Calcium oxalate stones caused by hypercalcemia are the most common form of renal calculi. Hypercalcemia increases urine pH and forms precipitated crystals that develop into kidney stones. Renal calculi can be categorized as calcium oxalate, calcium phosphate, uric acid, cystine, and struvite (magnesium ammonium phosphate).

Signs and Symptoms

Flank Pain
Flank Pain-bolt
The obstructing kidney stone causes stretching, dilation, and spasm of the ureter. Sudden severe flank pain is a characteristic symptom of a kidney stone. The location of the kidney stone determines the patient's type of pain. The sharp pain may also be felt in the back or lower abdomen. The severe pain may also lead to symptoms of nausea and vomiting. Patients with non-obstructing stones may not experience pain.

Radiates Toward Bladder
Radiator Radiating Toward Bladder
Pain caused by renal colic radiates toward the bladder as the stone progresses downward. Pain in the groin may also occur. Men often experience testicular pain while women may complain of labial pain.

Renal Colic
Kidney Coal-lick
Renal stones passing through the ureter cause renal colic. This wavelike rhythmic pain makes staying still difficult in patients. To help ease their discomfort, they frequently alternate positions from walking to sitting to lying down. This often is referred to as the 'kidney stone dance.'

Urinary Tract Infection
Kidneys and Bladder in Flames
Individuals with renal calculi may demonstrate symptoms of urinary tract infection. Manifestations include mild shock with cool, moist skin, dysuria, fever, and chills.

Urinary Retention
Urine Retained in bladder
Kidney stones may obstruct the renal structures and block normal urine flow. Obstruction of the bladder outlet may lead to acute urinary retention.

Hematuria
Red-urinal
Kidney stones may cause trauma to the renal structures and lead to bleeding. The presence of hematuria, or blood in the urine, may suggest renal calculi.

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Considerations

Stone Recurrence

Stone Recurring-clock

Nearly 50% of patients with renal calculi will experience kidney stone recurrence. A 24-hour urinary analysis of calcium, phosphorus, magnesium, sodium, citrate, and uric acid will help determine the cause of renal calculi and determine interventions to prevent reoccurrence. Prescription medications and adequate hydration will help prevent stone recurrence.

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