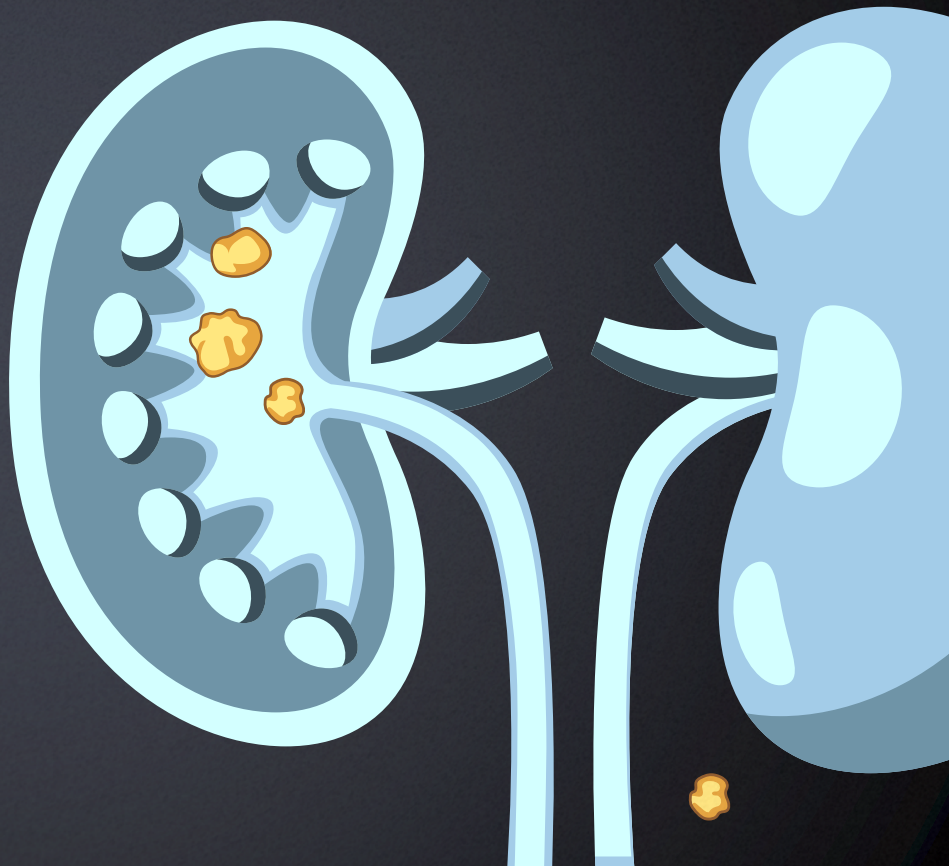
Kidney Stones Disease

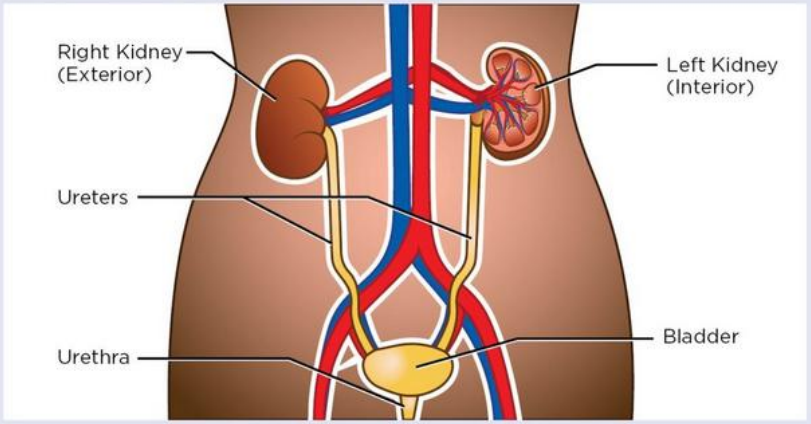
By Robson Hidalgo



Renal System

Kidneys: Central to homeostasis, sift through blood to separate waste substances and maintain electrolyte balance (Fontenelle & Sarti, 2019).
Ureters: Are thin, muscular tubes that transport urine from the kidneys to the bladder, accumulating before discharge through the urethra.
Bladder: Is a hollow, spherical-shaped organ in your lower abdomen that holds urine (pee).
Urethra: duct that transmits urine from the bladder to the exterior of the body during urination.

Fig 1. **Anatomy of the urinary system**



Renal Calculi: A Complex Medical Concern

(or Kidney Stones)

01

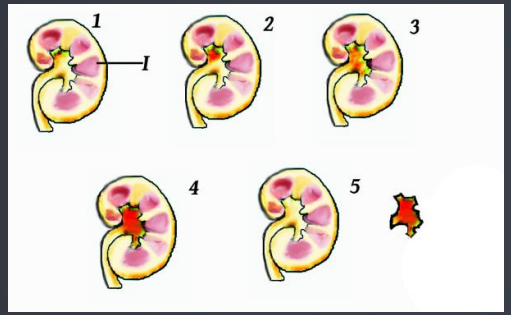
Genetics can predispose individuals to kidney stones by affecting the way minerals and fluids are processed in the body.

02

Dietary choices for example, low fluid intake and excessive consumption of certain minerals.

03

Medical conditions, such as hyperparathyroidism, can increase the likelihood of developing kidney stones.



04

Environmental influences like climate and water composition can affect stone formation variability(Alelign & Petros, 2018).

05

Lifestyle choices can exacerbate predispositions, highlighting the need for holistic healthcare approaches.

06

Comprehensive approach can guide patients in mitigating stone formation risks and managing existing kidney stone issues.

Types of kidney Stones

Calcium Kidney Stones

80 %

Risk Factors:

Calcium or vitamin D dietary supplement

Foods – very high in Oxalates

Avocados, Dates, Grapefruit, Kiwi, Orange, Raspberries, Spinach and Tomato Sauce.

Struvite Stone

10 %

Composed of magnesium, ammonium and phosphate

Risk Factors:

Urinary tract infections: Proteus mirabilis, Klebsiella pneumonia, Enterobacter, and Pseudomonas aeruginosa.

Uric Acid Stone

9 %

Risk Factors:

Diarrhea and Gout

Cystine stones

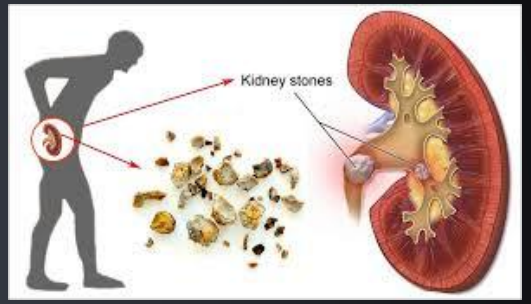
1 %

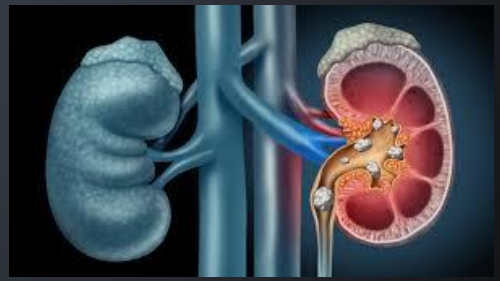
Risk Factors:

Rare disorder called "Cystinuria"

Impact of disease on organ

- The obstruction of urine flow caused by kidney stones can lead to pain and hematuria or blood in the urine.
- If left untreated, they can lead to the accumulation of urine within the kidney, which can cause a condition known as hydronephrosis.
- The accumulation of stagnant urine in the kidney can create a breeding ground for bacteria, which increases the risk of urinary tract infections and potential kidney infections. (Walter, 2022).
- Early diagnosis and management are crucial to alleviate acute symptoms and prevent the progression of complications.





Kidney Stones Treatment Approaches

Hydration: increasing fluid intake, which can help dilute urine and promote natural small stone flushing.

Pain management: Nonsteroidal anti-inflammatory drugs (NSAIDs) or opioids may be used to alleviate the discomfort associated with passing stones.

Alpha-blockers: can help relax the ureter muscles, making it easier for stones to pass.

Shock wave lithotripsy: is a non-invasive technique that uses sound waves to break the stones into smaller fragments.

Ureteroscopy: Involves the use of a camera to visualize the stones in the urinary tract. The stones can then be removed or broken apart using laser technology.

Surgical removal: is necessary for larger stones or in cases where other methods have been ineffective.

While these treatments can be effective, they do come with some risks. Potential side effects include bruising, the risk of infection, and kidney injury. (Xu et al., 2023)

Surgical Therapies

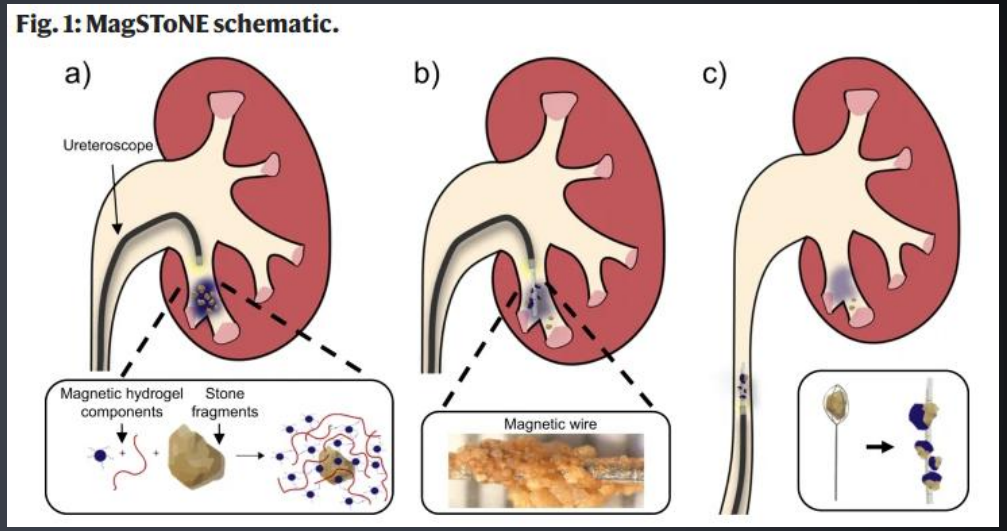


Table 2 – Surgical therapies for kidney stones

Primary therapeutic method	Indications
Extracorporeal shock-wave lithotripsy	Stone size < 2 cm; upper ureteral stone
Ureteroscopy	Stone size < 2 cm; lower ureteral stone
Percutaneous removal or lithotripsy	Stone size > 2 cm; complex calculus (staghorn); cystine stone

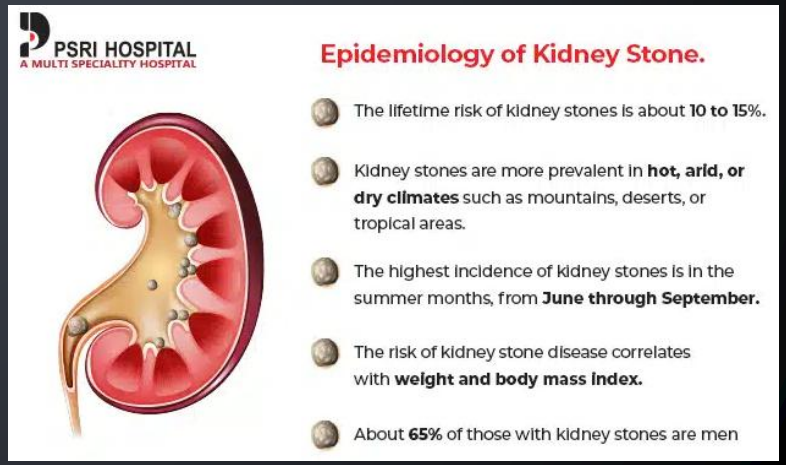
Epidemiology of Kidney Stones Disease

The incidence of kidney stones in men is higher when compared to women, with the highest incidence occurring between ages 30 and 60 (Xu et al., 2023).

The gender disparity observed in kidney stone prevalence may be attributed to a combination of factors such as hormonal differences, anatomical variations, and lifestyle choices.

Geographical and climatic factors, genetics, and diet also play a significant role in the prevalence of kidney stones (Alelign & Petros, 2018).

Importance of preventive measures, public health initiatives, and accessible healthcare interventions is underscored.



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