



Kidney Stones in Children

1)What are kidney stones ?

Kidney stones develop when minerals crystallize within the kidneys, gradually enlarging into solid masses. These stones may migrate into the urinary tract, leading to complications such as discomfort and the presence of blood in urine(60-70%) and pus in urine (20%) . Certain stones have the potential to obstruct urine flow.

Fortunately, many kidney stones exit the body naturally without causing harm. Pain medication and ample hydration typically aid children in recovering from kidney stones.

2)What are the common causes of kidney stones in children?

In children, kidney stones can develop due to various factors, including dehydration, dietary habits (such as excessive consumption of salt or oxalate-rich foods like spinach and nuts), certain medical conditions (such as urinary tract infections or metabolic disorders), and a family history of kidney stones.

3) How common are kidney stones in children?

While kidney stones are more commonly associated with adults, they can also affect children, although less frequently. The incidence of kidney stones in children has been increasing in recent years, with certain risk factors contributing to this rise.

4) What investigations are required to diagnose kidney stones in children?

Diagnosing kidney stones in children typically involves a combination of medical history assessment, physical examination, and diagnostic tests. These may include urine analysis, blood tests, imaging studies (such as ultrasound or CT scan), and sometimes, a 24-hour urine collection to evaluate stone-forming substances.

Parameter	Pediatric Normal Value	Subject Value
Calcium	< 4mg/kg/day	
Oxalate	< 0.57mg/kg/day	
Citrate	> 6mg/kg/day	
Uric acid	< 10mg/kg/day	
Urine volume	>10ml/kg/hr	



5) How are kidney stones managed in children?

Management of kidney stones in children often focuses on relieving symptoms, promoting stone passage, and preventing recurrence. Treatment strategies may include pain management with medications, hydration therapy to increase urine flow and facilitate stone passage, dietary modifications to prevent stone formation, and in some cases, surgical interventions such as shock wave lithotripsy or endoscopic procedures to remove or break up larger stones. Additionally, children with recurrent kidney stones may benefit from long-term preventive measures and regular follow-up with pediatric urologists or nephrologists.

6) General recommendations

- Increased fluid intake (minimum 125% of normal maintenance volume) and avoidance of fizzy drinks
 - Decreased intake of animal protein
 - Restricted salt intake
 - Normal calcium intake (not in excess of or less than recommended amount)
 - Reduce intake of food rich in oxalate
 - Treatment of underlying disorder (e.g. cystic fibrosis)
 - Potassium citrate- might be helpful even in the absence of hypocitraturia
- Specific recommendations

7) Types of Stones in Children

Struvite stones (magnesium ammonium phosphate and calcium carbonate-apatite)	Calcium stones	Uric acid stones	Oxalate stones	Rare stones	Other
Associated with UTIs	Disorders of hypercalciuria & hypercalcemia (see guidelines) Dent's disease	Inborn errors of purine metabolism Tumour lysis Chronic diarrhoea	Hyperoxaluria (primary, enteric or idiopathic)	Xanthinuria Orotic aciduria	Cystine stones in cystinuria Stones in Hypocitraturia
<i>Radio-opaque</i>	<i>Radio-opaque</i>	<i>Radio-lucent</i>	<i>Radio-opaque</i>	<i>Radio-lucent</i>	<i>Radio-opaque</i>



8) Diagnostics for kidney stones in children

Blood: kidney function test , bicarbonate , vbg , LFT, Bone profile ,Magnesium , Uric acid , PTH , Plasma oxalate, Vitamin A and D levels , Vitamin B6 levels - optional

Urine - try for 24 hrs , otherwise 2nd morning spot sample

Urine for :

- 1)Dipstick , R/M , Culture
- 2)Protein creatinine ratio
- 3)Oxalate, citrate , cystine, calcium , urate

Imaging: USG,X ray -CT, DMSA -SOS