

UROLITHIASIS [RENAL CALCULI, STONE]

⇒ Urolithiasis is the formation of calculi at Any level in the urinary collecting system. Most commonly calculi Arise in the kidney. Peak is between 20-30 years old.

TERMINOLOGY:

→ Nephrolithiasis (Renal stones): within the collecting system of the kidney.

→ Urolithiasis (urinary calculi/stones): occur Anywhere in the collecting system.

→ Primary stone: develops in sterile urine. And often originates in the kidney.

→ Secondary stone: occur in the presence of infection, outflow obstruction, impaired bladder emptying or foreign body.

ETIOLOGY:

→ Diet - def of vit A cause desquamation epithelium

→ Dehydration

→ Infection - Streptococci, staphylococci & A

→ Metabolic alterations.

→ Abnormally citrate -

→ Altered urinary solutes and colloids - Dehydration ↑ the concentration of urinary solutes.

TYPES:

1) calcium oxalate / calcium phosphate:

- Idiopathic hypercalcaemia without hypercalcaemia
- Hypercalcaemia of hypercalcaemia
- Hyperoxaluria
- Hyperuricaemia

2) Struvite (magnesium, Ammonium, phosphate) - UTP.

3) Uric Acid

Associated with hyperuricaemia

Associated with hyperuricaemia

4) Lysine

5) Others:

CALCIUM STONES : calcium oxalate / calcium phosphate.

⇒ 80% composed of calcium oxalate alone or mixed with calcium phosphate.

Hypercalcaemia
with hypercalcaemia

Hypercalcaemia And
hypercalcaemia.

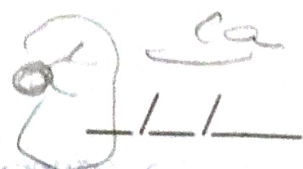
→ excessive amounts of Ca^{2+}

from the gut & secretion

the urine

due to hyperparathyroidism

bone destruction



STROVITE STONES: (Magnesium stones)

↳ Also known as struvite stone or triple phosphates stone

Infection of the urinary tract by urea-splitting bacteria
(proteus vulgaris, staphylococcus)

convert urea → ammonia → PH ↑

urea flow → precipitation of Mg, Al, PO_4

URIC ACID AND URATE STONE:

Found in patients with hyperuricemia & high uric acid level

more than 50% of patients have neither hyperuricemia

but excrete persistently acidic urine (with pH 5.5)

↓
Uric acid is insoluble in acidic urine → Stone formation

CYSTINE STONE:

Uncommon, Associated with cystinuria due to genetic defect

PATHOGENESIS:

two steps

Supersaturation

Precipitation of crystals

⇒ **SUPERSATURATION:**

- ↑ urinary concentration of stone constituents.



stone formation exceeds their solubility.

- ↓ urine volume

⇒ **PRECIPITATION OF CRYSTALS:**

Def: is inhibitors of crystal formation

eg: (pyrophosphate, glycerol monoglycerate, osteopontin, nephrastin (glycoprotein))

MORPHOLOGY

→ Unilateral in About 80% of patients

→ site - calyces And pelvis + bladder.

→ shape - have smooth contour or be irregular, jagged masses of spicules.

Ref text