Urolithiasis - Clinical aspects
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Outcomes
- Clinical picture and diagnosis of kidney stones
- Complications of stones
- Epidemiology and aetiology of stones
- Composition of stones
- Differential diagnosis
- Management

Case study
- History
  - 42 years old female
  - C/O pain Left Flank
  - Hematuria
  - Past history of stone Rx
  - Diabetic
- Examination
  - General
    - Fehrile, pallor, (I) renal angle tenderness

Investigations
- Laboratory
- Urine dipstix & MC & S
- FBC
- U+E
- Glucose
- Radiological
- Sonar
- CT scan (Non contrast spiral CT)

Management
- Intravenous Fluids
- Antibiotics
- Glucose control
- DMSA
- PCNL

Ct scan
### Where?
- Upper tract
- Renal
- Ureter
- Lower tract
- Bladder
- Urethra

### Aetiology
- Factors for stone formation
  - Primary
  - Supersaturation of urine
  - Ionic strength
  - Solute concentration
  - Secondary factors
  - Urine stasis, infection e.g. PUJ obstruction

### Ureterocele

![Ureterocele Image](image1)

### Bladder stones

![Bladder Stones Image](image2)

### Radiology

![Radiology Image](image3)
Risk factors

- Intrinsic
  - Peak incidence: 20 – 40
  - Males:Females ≈ 3:1
    - Race
    - Genetic
      - 25% have family history
      - Hereditary - cystinuria, oxalosis
- Extrinsic
  - Geography
  - Seasonal
  - Occupation
  - Diet and water intake

uro lithiasis

pathogenesis

- Stone Formation
  - Nucleation
  - Supersaturation
  - Crystal growth in papilla
  - Crystal aggregation
    - Aggregation inhibitors in urine

Clinical picture

- Sudden pain
- Colic type pain
- Loin to groin
- Nausea – usually no vomiting
- Fever

history

- Age
- Hydration status past 6 months
- Previous stone disease
- Family history of stone disease
- Hyperparathyroidism
- Malignancy
- Sarcoidosis – Granuloma produces Vit D
- Glucocorticoid therapy
- Immobilization
- Short bowel syndrome

Diabetic mellitus
- Iatrogenic hypercalcemia
  - Thiazide diuretics
  - Lithium
  - Absorbable alkali
  - Excessive Vit D and Vit A
- Renal tubular acidosis
  - Distal: type 1
  - First morning urine pH > 5.5

Prevalence 1-15%
- Risk of recurrence
  - 7% within one year
  - 50% rest of life

Complications
- Individual: infection, renal function, squamous cell ca
- Economic implications
Special investigations

- Who to investigate?
- Serum Phosphate, Ca++, Urate
- Stone analysis
- Urine - PH, 24 hr collection – volume, citrate levels calcium oxalate excretion

Composition of stones

- Calcium stones
  - Majority of stones
  - Radio opaque due to Ca++
    - Calcium oxalate
    - Calcium phosphate
    - Calcium carbonate
- Noncalcium stones
  - Uric acid stones
  - Oxalate
  - Struvite
  - Cysteine
  - Rate-Matrix, xanthine, indinavir

Calcium stones

- Hypercalciuria – 30-60% normocalcaemic
- Types ---
  - Absorbive
  - Resorbive
  - Renal
  - Idiopathic

Calcium stones cont

- Hyperuricosuria
  - Endogenous or exogenous
- Hyperoxaluria
  - Primary
  - Secondary - enteric
- Hypocitraturia
  - Renal tubular acidosis
  - Thiazide Rx
  - Chronic diarrhoea
Differential diagnosis
- Acute appendicitis
- Ectopic pregnancy, PID, Ovarian diseases
- Abdominal aortic aneurysm
- bowel obstruction, diverticular disease,
- Peptic ulcer ds, cholecystitis
- Pancreatitis
- Lower lobe pneumonia

Investigations
- Laboratory
  - Urine dipstick & MC+S
  - Urea and electrolytes
  - FBC
- Radiological
  - Sonar
  - Ct scan
  - ?IVP
  - ?Renogram

Non-contrast Ct scan

Treatment
- Objectives
  - Pain control
  - Treat the infection
  - Relief of obstruction
  - Clearance of stones
  - Prevention of recurrence

Medical
- Uric acid stones
- Ureteric stones

Surgical treatment
- Endoscopic
- ESWL
- Percutaneous
- laparoscopic
- Open surgery
Early intervention
- Intractable pain
- Renal failure
- Infection
- Complete obstruction
- Bilateral stones or in a solitary kidney

Special clinical scenario
- Pregnancy
- Obesity
- Paediatrics

Prevention
- Fluid intake
- Citrate intake
  - 2 liters of water + 120ml of lemon juice
- Decrease salt intake, protein intake, Oxalate intake & Calcium intake
- Treatment of the primary cause

Thank you

AXR