# Practical management of stone disease in primary care

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# In Primary Care 3 main aspects

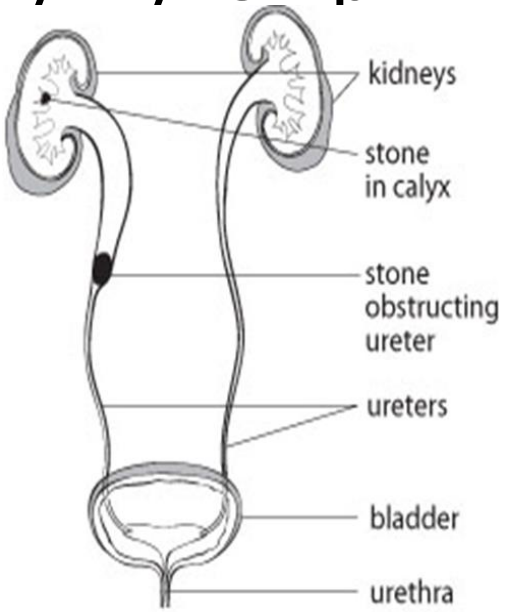
- 1. Management of the acutely ill patient
  - renal colic
  - stone related UTI
- 2. Medical management of stone disease
- 3. Prevention of stone disease

# Renal colic

- Typical history
  - Sudden onset
  - Radiation to groin
  - Severe and colicky pain. Unable to settle
- Beware the differentials
  - AAA – (elderly with no previous history of stones)
  - Acute cholecystitis
  - Biliary colic
  - Pancreatitis
  - Pyelonephritis

# Management of renal colic

- Careful history and exam and P/BP/Temp
- Analgesia
  - PR Diclofenac
  - Oral analgesics
  - Morphine
- Investigation –
  - FBC, U&E, urinalysis, MSU if infection suspected
  - Imaging: CT KUB is gold standard, USS, (IVU, KUB)



- >90% of stones <5mm will pass within 4 weeks
- Therefore observation alone is adequate in these cases if symptoms controlled

*J Urol1997;158:1915-21*

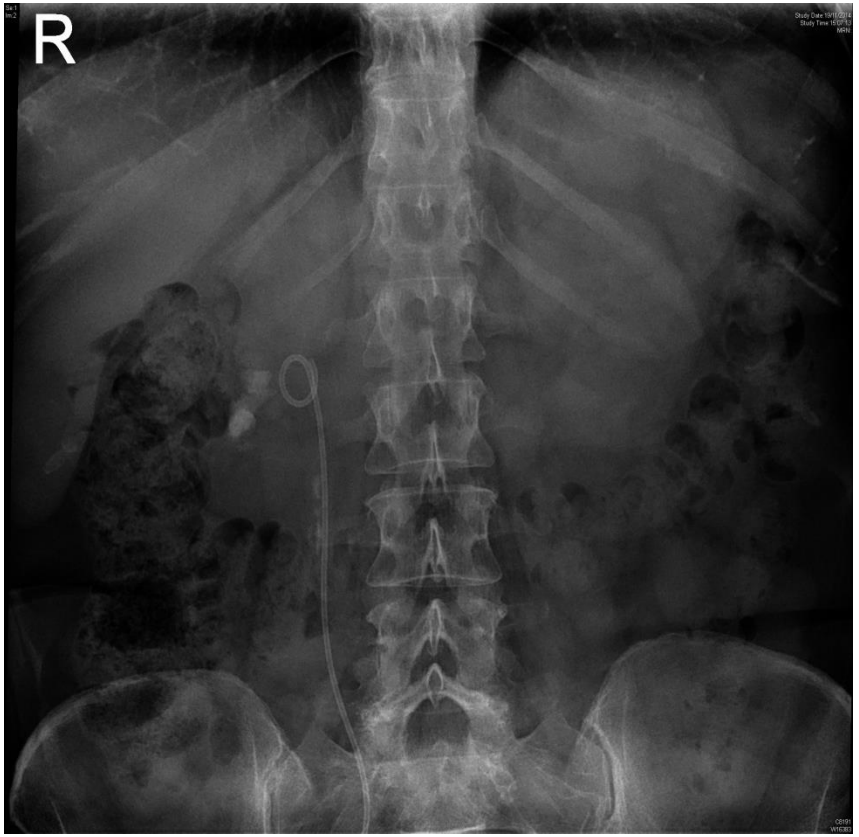
- Indications for urgent intervention
  - Infection/urosepsis
  - Intractable pain
  - Acute renal failure
  - Solitary kidney
  - Bilateral obstructing stones

# Surgical Interventions in acute colic

- Insertion of stent with later treatment by ESWL or Ureteroscopy
- Primary ureteroscopy and removal of stone

…and until recently

- (Medical expulsive therapies eg tamsulosin )



# Medical expulsive therapy in adults with ureteric colic: a multicentre, randomised, placebo-controlled trial

*Robert Pickard, Kathryn Starr, Graeme MacLennan, Thomas Lam, Ruth Thomas, Jennifer Burr, Gladys McPherson, Alison McDonald, Kenneth Anson, James N'Dow, Neil Burgess, Terry Clark, Mary Kilonzo, Katie Gillies, Kirsty Shearer, Charles Boachie, Sarah Cameron, John Norrie, Samuel McClinton*

## Summary

**Background** Meta-analyses of previous randomised controlled trials concluded that the smooth muscle relaxant drugs tamsulosin and nifedipine assisted stone passage for people managed expectantly for ureteric colic, but emphasised the need for high-quality trials with wide inclusion criteria. We aimed to fulfil this need by testing effectiveness of these drugs in a standard clinical care setting.

*Lancet* 2015; 386: 341–49

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# Stone Related Infections

- Present as:
  - Recurrent UTI
  - Persistent UTI
  - Unusual organisms
    - Klebsiella
    - Pseudomonas
- 2:1 Female to Male
- Investigation should include imaging (USS, CT) to exclude stones

# Medical management of renal stones

# Assessment

- Stone history:
  - Number of episodes/ interventions
    - If fewer than 1 episode every three years probably not cost effective to have detailed investigation

      *J Urol 2002; 168:937-40*
- Stone composition
  - Calcereous (oxalate or Phosphate)
  - Urate
  - Struvite
  - Cysteine
  - Others eg Indinavir

# Assessment

- Medical history
  - Gout
  - type 2 diabetes
  - Obesity
  - malabsorptive conditions (eg Crohns, previous  bariatric surgery)
  - sarcoidosis
  - Hyperparathyroidism,
  - genetic disorders eg cysteinuria
- Medications
  - Topiramate
  - Ephedrine
  - Calcium with Vit D
  - Indinavir
- Dietary History
  - Fluid intake, protein intake, salt intake, intake of fruit and vegetables
- Investigations
  - U&E, Bicarbonate, Urate, Calcium, PTH
  - Urine pH, Urinalysis and Urine culture
  - Stone analysis
  - Metabolic testing

# Metabolic testing

- Patients with frequent stone episodes
- Complex stones
- Children

- Usually 2x 24hour urine collections for
  - Volume, calcium, pH, oxalate, citrate, urate, creatinine,

# Pharmacological treatments for metabolic abnormalities

| Abnormality | Drug | Dosage |
|---|---|---|
| Calcium stones: | | |
| Hypercalciuria | Thiazide ± potassium citrate/potassium chloride | Chlorthalidone (hydrochlorothiazide) 12.5-50 mg BID, indapamide 1.25-5 mg/d, chlortalidone 12.5-50 mg/d |
| Hypocitraturia | Potassium citrate | 15-30 mEq BID |
| Hyperuricosuria | Allopurinol | 100-300 mg/d |
| Hyperoxaluria: | | |
| Primary | Pyridoxine (type I) | 5-20 mg/kg/d |
| Enteric | Potassium citrate/citric acid (liquid formulation) Calcium supplement | 10-30 mEq TID-QID titrate to reduce oxalate, take with 2 largest meals |
| RTA | Potassium citrate (±thiazide) | 15-30 mEq BID-TID |
| Uric acid stones | Potassium citrate | 15-30 mEq BID (titrate to pH 6-6.5) |
| Cystine stones | Potassium citrate, N-(2-mercaptopropionyl) glycine (tiopronin) | 15-30 mEq BID (titrate to pH 7-7.5) starting dose 200 mg BID-TID and titrate to reduce cystine concentration to <250 mg/L |
| Struvite stones | Acetohydroxamic acid | 250 mg BID-TID |

# Dietary advice

- Fluids
  - Water
  - Citrus fruit juices
  - Aim for >2.5 litres of urine per day
- Calcium
  - Calcium supplements taken with meals protective
    - Works by interaction with oxalate causing decrease in urinary saturation of Ca oxalate
- Sodium
  - Low sodium diet associated with lower recurrence rates
- Protein
  - Restriction of animal protein in the diet associated with decrease in risk of stones
- Oxalate
  - Decrease intake of oxalate rich foods

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# DIETARY ADVICE FOR STONE FORMERS
## FREQUENTLY-ASKED QUESTIONS

### How much do I need to drink?

Drinking enough fluid is the most important way of preventing stone formation and reduces your risk of stone formation by almost one third (30-40%). Not drinking enough fluid causes your urine to become concentrated and makes stones more likely to form.

Try to drink two to three litres (four to six pints) of fluid each day (water, squash, or fizzy drinks). You should aim to keep your urine colourless throughout the day. This equates to a urine output of at least two litres (four pints) per day. In

Patients

# I think I might have...

# Kidney Stones

## Quick Links

- What should I do if I think I have kidney stones?
- What are the facts about kidney stones?
- What should I expect when I visit my GP?
- What could have caused my kidney stones?
- What treatments are available for this problem?
- What is the "bottom line"?

thebmj

STATE OF THE ART REVIEW

# Medical management of renal stones

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**ABSTRACT**

The prevalence of kidney stones is increasing in industrialized nations, resulting in a corresponding rise in economic burden. Nephrolithiasis is now recognized as both a chronic and systemic condition, which further underscores the impact of the disease. Diet and environment play an important role in stone disease, presumably by modulating urine composition. Dietary modification as a preventive treatment to decrease lithogenic risk factors and prevent stone recurrence has gained interest because of its potential to be safer and more economical than drug treatment. However, not all abnormalities are likely to be amenable to dietary therapy, and in some cases drugs are necessary to reduce the risk of stone formation. Unfortunately, no new drugs have been developed for stone prevention since the 1980s when potassium citrate was introduced, perhaps because the long observation period needed to demonstrate efficacy discourages investigators from embarking on clinical trials. Nonetheless, effective established treatment regimens are currently available for stone prevention.

# Clinical review

## Kidney stones

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*BMJ* 2004;328:1420–4

Kidney stones affect up to 5% of the population, with a lifetime risk of passing a kidney stone of about 8-10%.[1] Increased incidence of kidney stones in the industrialised world is associated with improved standards of living and is strongly associated with race or ethnicity and region of residence.[2] A seasonal variation is also seen, with high urinary calcium oxalate saturation in men during summer and in women during early winter.[3] Stones form twice as often in men as women. The peak age in men is 30 years; women have a bimodal age distribution, with peaks at 35 and 55 years. Once a kidney stone forms, the probability that a second stone will form within five to seven years is approximately 50%.[1]

### Summary points

- Calcium oxalate (alone or in combination) is the most common type of urinary stone
- Low urine volume is the most common abnormality and the single most important factor to correct so as to avoid recurrences
- Risk of a recurrent stone is about 50% within five to seven years
- Diets low in salt (<50 mmol/day) and animal proteins (<52 g/day) are helpful in decreasing the frequency of recurrent calcium oxalate stones

### Sources and search criteria

# Thank you