Qualitative analysis of the renal calculi

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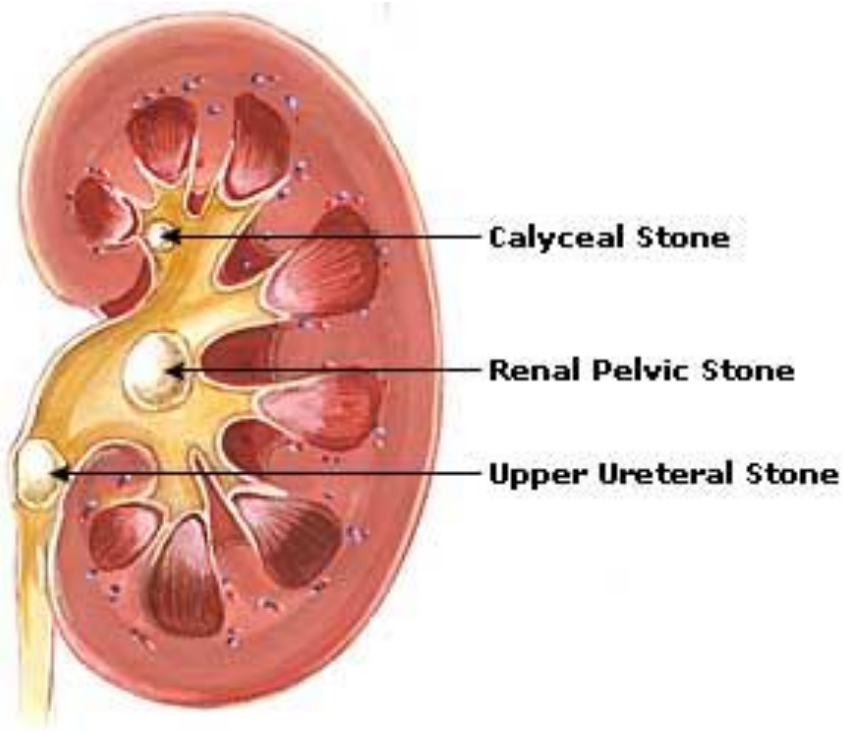
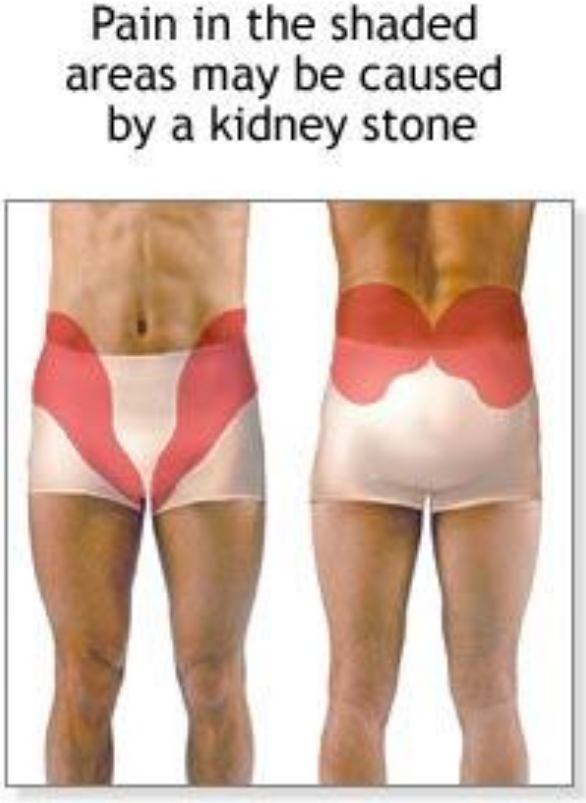


Renal calculi

Maine symptoms:

- A common cause of blood in the urine and pain in the abdomen, flank, or groin. Occurs in 1 in 20 people at some time in their life.
- Development of the stones is related to decreased urine volume or increased excretion of stone-forming components such as calcium, oxalate, urate, cystine, xanthine, and phosphate.

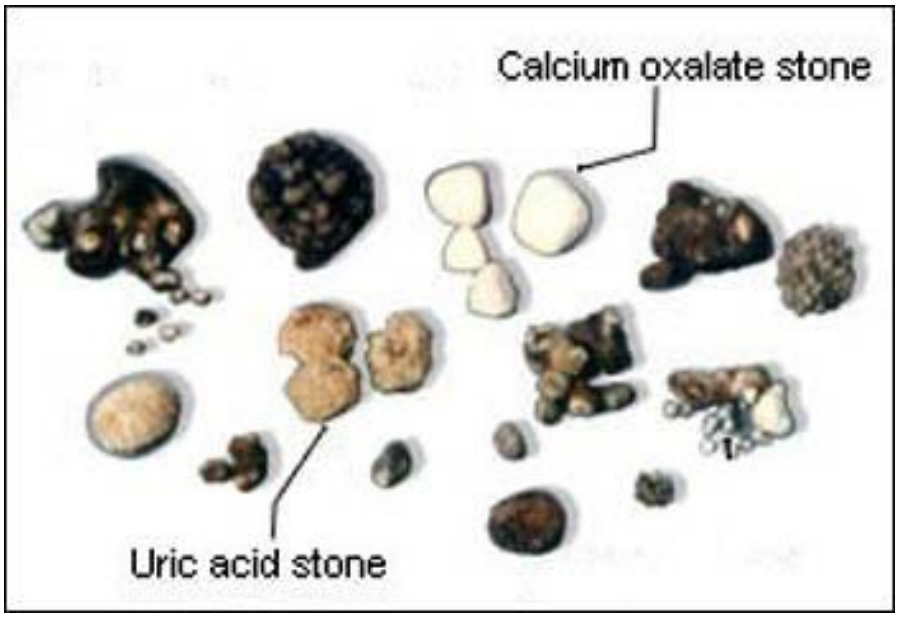


Formation of the stones

- **Location :**The stones form in the urine collecting area of the kidney and may range in size from tiny to staghorn stones the size of the renal pelvis itself .
- **The pain:** is usually of sudden onset, very severe and colicky ,not improved by changes in position, radiating from the back, down the flank, and into the groin. Nausea and vomiting are common.

The Maine components of stone or renal calculi:

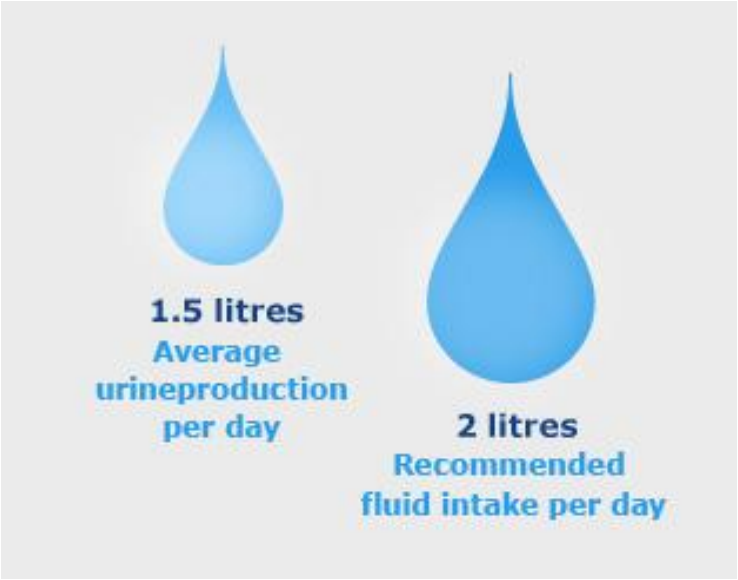
Calcium ,oxalate , urate , cystine , xanthine, and phosphate



Close-up of a calcium oxalate stone that was surgically removed from the urinary bladder.

Predisposing factors

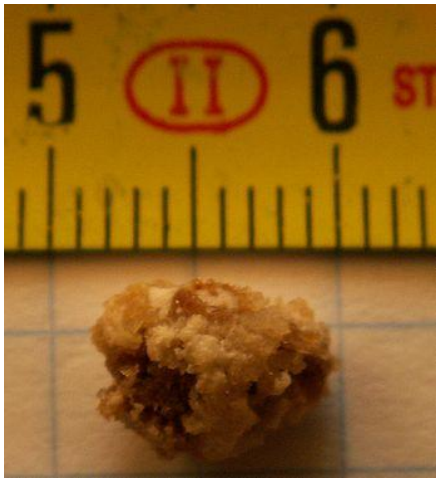
- recent reduction in fluid intake,
- increased exercise with dehydration,
- medications that cause hyperuricemia (high uric acid)
- a history of gout



- The majority of stones pass spontaneously within 48 hours, some stones may not.

There are several factors which influence the ability to pass a stone.:

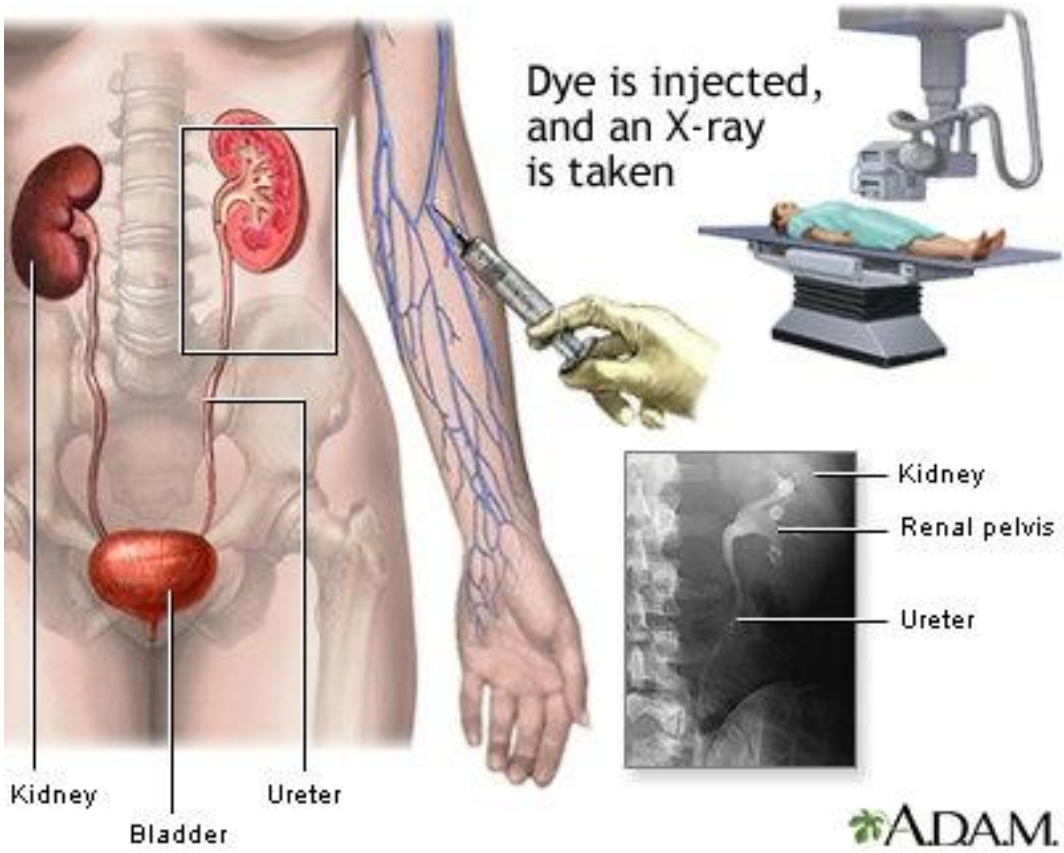
- the size of the person
- prior stone passage
- prostate enlargement
- pregnancy
- the size of the stone. A 4 mm stone has an 80% chance of passage while a 5 mm stone has a 20% chance.



A kidney stone, 8 mm in diameter

Treatment

- relief of pain
- hydration
- if there is concurrent urinary infection, antibiotics.



Objective:

- To test the constituents of a renal calculi qualitatively

MATERIALS

1- Dilute hydrochloric acid(2mol/l)
2- Dilute sulphuric acid (2mole/l)
3- Concentrated nitric acid
4- Acetic acid(30ml glacial acetic acid/100 ml water)
5- Pottasium hydroxide solution
6- Concentrated ammonia solution (s.g 0.88)
7- Dilute ammonia reagent(dilute reagent 6 fivefold with water)
8- Ammonium molybdate solution, 50g/l freshly prepared.
9- Ammonium oxalate solution, prepare a saturated solution.
10- Sodium cyanide solution, 100g/l
11- Potassium permanganate solution, 3g/l
12- Sodium nitroprusside solution, 50 g/l freshly prepared.
13- Titan yellow 1g/L of water

METHOD:

1-Test for uric acid

2- Test for cystine

3- Test for carbonate

4- Test for oxalate

5- Test for phosphates

6- Test for calcium

7-Test for magnesium

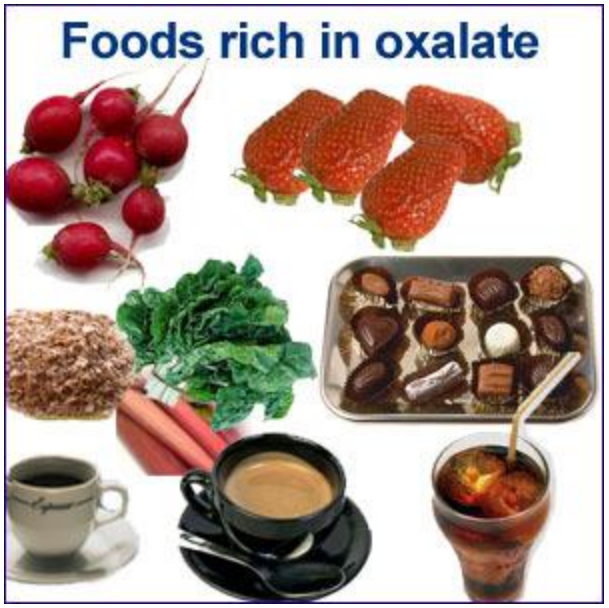
1-Test for uric acid

Add 2-3 drops of concentrated nitric acid to a small amount of the sample in a test tube by heating on a water bath.

The test is positive if a **red or yellow** residue is obtained which after being allowed to cool changes to purplish-red on addition of a drop of dilute ammonium hydroxide

3- Test for carbonate

Add a little dilute hydrochloric acid to a small portion of the sample, **gas bubbles will indicate the presence of carbonate**

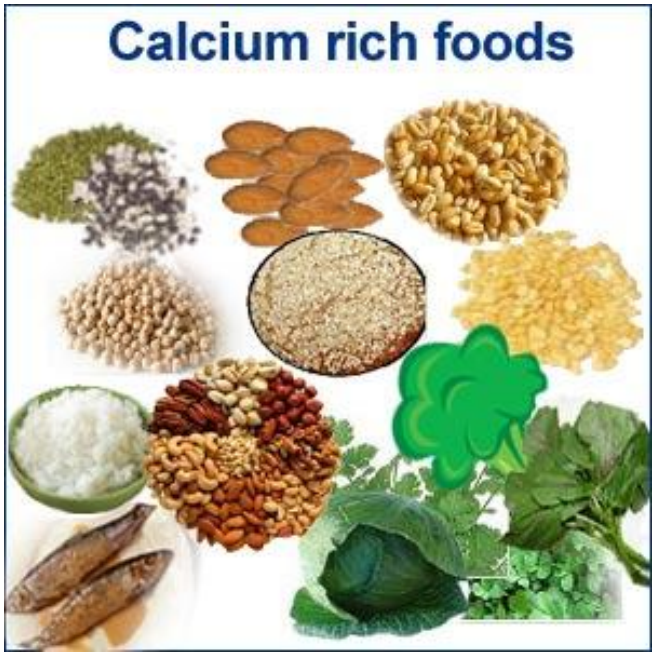


4- Test for oxalate

heat a part of the sample with 2 ml dilute sulphuric acid for 1 min, allow to cool to 60 -70 C, then add drop wise, **potassium permanganate solution, declorization** will confirm the presence of oxalate.

5- Test for phosphates

Test for phosphates Dissolve a little of the powdered stone in a few ml of concentrated nitric acid and then add an equal volume of ammonium molybdate solution. Heat to boiling, if phosphates are present, a yellow precipitate of ammonium phosphomolybdate is obtained.



6- Test for calcium

Dissolve a few of the sample by heating with 2 ml dilute hydrochloric acid, add 1 ml ammonium oxalate and. A white precipitate of calcium oxalate shows the presence of calcium

2- Test for cystine

A black precipitate or brown precipitate of lead sulphide indicates presence of cystine and cysteine.

7-Test for magnesium

Add a few drops of titan followed by potassium hydroxide until strongly alkaline. A red color indicates the presence of magnesium

RESULTS:

- Record your result

Components	Result
Uric acid	
carbonate	
oxalate	
phosphates	
calcium	

DISCUSSIONS:

Comment in each results you obtained and mention whether the sample contains these component or not? And what the disease that cause each type of stone.

Questions

What is the cause cystine stone?

What is the cause xanthine stone

What is type of stone would be in urine in Hyperparathyroidism patients ?