

RENAL CALCULUS - A REVIEW ARTICLE

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ABSTRACT

Lactic acid bacteria, *Lactobacillus plantarum* and *Lactobacillus pentosus*, were isolated from the breast milk of six healthy breast feeding mothers using MRS agar media and API50CHL kit and the total Lactic Acid Bacteria (LAB) count determined. These bacteria were facultative anaerobic, gram positive, catalase negative and non-endospore forming. The LAB isolates *Lactobacillus plantarum* and *Lactobacillus pentosus* showed a great antimicrobial effect on all the indicator organisms, namely *Salmonella sp.*, *Escherichia coli*, *Shigella sp.* and *Shigella sp.* *Klebsiella sp.* had the highest susceptibility of 16 mm and 14 mm on *Lactobacillus plantarum* and *Lactobacillus pentosus* respectively, while *Escherichia coli* had the least zone of inhibition of 11 mm and 6 mm on *Lactobacillus plantarum* and *Lactobacillus pentosus* respectively. It was found that human milk is a source of potential probiotic organisms which addition to infant formulas could be an alternative to the functional effects of human milk.

KEYWORDS: Probiotics, Antimicrobial, Human, Breast, Milk.

ABSTRACT

Kidney stones are small hard stones which are mainly formed in the kidney. The kidney stones are formed when the salts in the urine becomes solid. The main function of kidney is to filter salts and minerals in the blood and produce by products. In both males and females kidney stones are seen. The most common type of stone which we mainly see is calcium oxalate stones. Small stones can be flushed out by drinking plenty of water and to relieve pain administration of NSAID's and in case of large stones, as they are difficult through pass through urine as they are too large in size they can be remove by using medications like thiazides. The symptoms which may include are mainly difficulty in passing urine and presence of trace amounts of blood in urine etc.

KEYWORDS: Kidney stones, small and large stones, salts and minerals.

INTRODUCTION

Kidney stones are one of the most common disorder of the urinary tract. Kidney stones effect about 12% of men 5% of women by the time they are 70 years old. Men are about twice as likely to form kidney stones as women. Kidney stones are small, hard deposits of minerals and acids on the inner lining of the kidney. Stones usually occur between the age of 30-60. Stones are mainly classified based on their location in the urinary system:

- 1) Nephrolithiasis (presence of stones in the kidney).
- 2) Ureterolithiasis (presence of stone in the ureter).
- 3) Cystolithiasis (presence of stones in the bladder).

Kidney stones can cause disabling pain, bleeding and infection in the kidneys. In extreme cases it can lead to decrease of kidney function, even kidney failure.^[1-2]

Causes^[3]

Renal calculi is caused because of

- High concentrated urine
 - Imbalance of pH in urine
 - UTI
 - Drinking less water
 - Less consumption of vitamin A and C
 - Inadequate fluid intake,
 - Regular constipation
 - Increased salt intake
 - Genetics
 - Autosomal genetic disorders
 - Metabolic disorders: (Gout, blood pressure, diabetes, Inflammatory bowel disease).
- Drugs that promote kidney stone formation
- 1) Increased drug concentration in urine
Acyclovir, allopurinol, ciprofloxacin
 - 2) Altered urine pH and composition
Anti-epileptics, calcium containing drugs, carbonic anhydrase inhibitors, vitamin D.

Types of Stones

Stones are mainly classified based on crystalline/mineral substances in the stone

- 1) **Calcium oxalate stones:** This is the most common type of stones which occurs in two forms calcium oxalate and calcium phosphate. These stones cannot be dissolved with medicine. The only treatment is letting the small ones pass and treating the large ones with surgery.
- 2) **Uric acid stones:** This type of stone is common seen in gout patients because of purine abnormalities. Uric acid stones sometimes be dissolved by bicarbonates, if stones are not dissolved then surgery may be necessary
- 3) **Struvite stones:** This type of stone is called as infection stone. They form large stones in the kidney which typically need multiple surgical treatments.
- 4) **Cysteine stones:** Cystinuria is a rare autosomal – recessive hereditary disorder of amino acids transport in the renal tubules which results in the urinary excretion of large amounts of cysteine.^[4]



Calcium Oxalate Stone



Uric Acid Stone



Struvite Stone



Cysteine Stone

Composition	Frequency	Risk factors
Calcium (oxalate or phosphate)	70-80%	Hypercalciuria Hyperuricosuria Low urine volume Hyperoxaluria
Uric acid	10-15%	Low urine pH Metabolic syndrome
Magnesium ammonium phosphate (struvite)	10-15%	Urine infection with urine splitting bacteria
Cysteine	<1%	Cystinuria
Others (medications)	<1%	Indinavir Allopurinol

Symptoms

Kidney stones can cause severe pain and blockage as they travel down the ureter. Some of the following symptoms are noticed^[5-8]

- Severe pain in the back or side between the pelvis and lower ribs
- Difficulty in passing urine
- Nausea
- Any blockage can cause loss of kidney function
- Trace amounts of blood in the urine
- Presence of stones in the kidney may likely to cause infection.

If the kidney stones are small it can cause mild symptoms, when the stones are too large it might cause blockage and leads to swelling of the kidney.

Risk Factors

Diet can encourage the formation of stones by not drinking enough water. There are some factors for kidney stone formation

- Crohn's disease.
- Renal tubular acidosis.
- Dehydration of low fluid intake.
- Intake of calcium supplements may increase the risk of kidney stones.
- Diets that are high in proteins (especially meat) sodium and sugar may also increase the risk of kidney stones.
- Obesity is also a major risk factor for kidney stones.

- Not enough calcium in the diet –the best source are green leafy vegetables, cheese and milk.
- Other factors- body weight, genes and environmental factors.
- Family history.

Diagnosis

For the diagnosis of kidney stones the tests includes are^[9,11]

- 1) Urine test is done to identify any infecting organism present in the urinary tract.
- 2) Blood tests is done to monitor uric acid and calcium levels in the blood.
- 3) Renal function tests to know the abnormalities of high blood calcium levels.
- 4) 24 hour urine sample collection to measure uric acid levels, calcium, phosphate, urine volume.
- 5) Other tests –CT scan, Ultrasonography, Intravenous pyelogram, Ultra sound, abdominal x-ray and MRI, Intravenous urography.

Treatment

The main aim is to manage pain and relieve from symptoms, I.V fluids may be given if needed. Based on the size of stones the treatment is different for small stones and large stones.

1) Small stones

In this case, small stones (smaller than 5mm) usually pass by themselves within 72 hours, by drinking eight glasses of water daily which flushes the stones through urine, medications to relieve pain by I.V administration of NSAIDS or Opioids, medical therapy i.e alpha adrenergic blockers (tamsulosin) and calcium channel blockers (nifedipine) in which pass kidney stones with less pain.

2) Large stones

Large stones (up to 9mm in size) are very difficult through pass because these are too large, as they cause disabling pain, kidney failure. The stones can be removed by giving thiazide diuretics (chlorthalidone) as they inhibit the formation of calcium containing stones by reducing urine calcium levels; allopurinol is also recommended as they reduce kidney stone recurrence.^[12,15]

3) Surgery^[16-20]

- 1) ESWL (extra corpor eal shock wave lithotripsy) – It is a non-invasive treatment of kidney stones. In this type of surgery with the help of shock wave kidney stones are broken down in to small pieces, and those small pieces are flushed out in the urine.
- 2) Ureterscopy – This type of surgery is used when the stones are in the ureter, especially for stones closest to the bladder, in the lower half of the ureter It is the most common treatment of lower ureteral stones.
- 3) Percutaneous nephrolithotomy - This type of surgery is done to remove stones from the kidney by a small

puncture (up to about 1 cm) through the skin It is mostly suitable to remove stones of more than 2 cm in size and which are present near the pelvic region

- 4) Lithotripsy – A newer treatment for calculi is laser lithotripsy. Lasers are used together with a uretero - scope to remove or loosen impacted stones.
- 5) Open surgery – open surgery is rarely performed for stones any more. If there is severe kidney damage or anatomic abnormalities then open surgery is offered.

Precautions

- Drink plenty of water for every 1-2 hours.
- Avoid protein intake ; usually protein is restricted to 60g/day to decrease urinary excretion of calcium and uric acid.
- A sodium intake of 3-4g/day is recommended.
- Avoid intake of oxalate containing foods like spinach, tea, peanuts, strawberry.
- Drink two glasses of water at bed time and an additional glass at each night time awakening to prevent urine from becoming too concentrated during the night.
- Avoid activities leading to sudden increase in environmental temperature that may cause excessive sweating and dehydration.
- Contact your primary health care provider at the first sign of a urinary tract infection.

CONCLUSION

Kidney stones are small hard stones which are mainly formed in the kidney and occur in all genders. But due to lack of correct diagnosis the disease is not treated at primary stage.

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