

MEDICAL MANAGEMENT OF UROLITHIASIS - A SIMPLIFIED APPROACH

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Abstract : Although Extracorporeal Shock-Wave Lithotripsy (ESWL), Percutaneous Nephrolithotomy (PCNL) and Uretero-renaloscopy (URS) have considerably reduced the morbidity of stone disease, the incidence of stone recurrence is not altered by removal of stones. In contrast, a variety of medical treatments can prevent recurrence of stones. A detailed diagnostic work up is an essential prerequisite for medical management. Dietary modifications like high fluid intake and animal protein restriction are necessary for any type of stone disease. Specific modalities like potassium citrate, thiazide diuretics, allopurinol and treatment of infections might help in preventing recurrent stone disease in specific situations

INTRODUCTION

Urolithiasis denotes stones originating anywhere in the urinary tract, including the kidneys and bladder. Kidney stones form as a result of physicochemical or genetic derangements leading to supersaturation of the urine with stone-forming salts or, less commonly, from recurrent urinary tract infection with urease producing bacteria. In contrast, bladder stones form almost exclusively as a result of urinary stasis and/or recurrent infection due to bladder outlet obstruction or neurogenic bladder.

In the United States, the incidence of urinary stone disease is about 12% in men and 7% in women, and evidence suggests that these numbers are increasing. For patients who form stones, the likelihood of recurrence is nearly 50% within five years and up to 95% over a lifetime¹. After the first recurrence, the subsequent relapse risk is increased and the interval between recurrences gets shortened². While rarely fatal, urolithiasis causes substantial morbidity. In addition to the pain and suffering of an acute stone event, treatment incurs substantial costs, and additional costs result from the time lost from work, as many individuals are affected during their working years. Although Extracorporeal Shock-Wave Lithotripsy (ESWL), Percutaneous Nephrolithotomy (PCNL) and Uretero-renaloscopy (URS) have considerably reduced the morbidity of stone disease, the incidence of stone recurrence is not altered by removal of stones³. In contrast, a variety of medical treatments can prevent recurrence of stones⁴.

A meta-analysis of randomized medical therapy trials has shown that drug and dietary therapy can reduce the risk of urinary stone recurrence by 22.6%⁵. Hence, to reduce considerable morbidity and cost associated with treating recurrent urolithiasis, efforts should be directed at identifying the underlying pathophysiology and instituting appropriate general and specific preventive measures.

COMPOSITION OF STONES

Seventy percent of all renal stones primarily contain calcium, and approximately 26% of calcium stones are composed of pure calcium oxalate, 35% are composed of calcium oxalate and calcium phosphate, and approximately 5 to 10% are composed of calcium crystallized around a uric acid core⁶. Approximately 5 to 10% of renal stones are composed of pure uric acid. Magnesium ammonium phosphate or struvite stones account for approximately 10 to 15%

of stones and are more commonly found in women than in men. These stones are formed in urine infected with urease-producing organisms such as *Proteus* or *Morganella*. Cystine stones account for 1 to 2% of kidney stones and are found in patients who suffer from autosomal recessive cystinuria.

Prevalence of various types of urinary stones in India is as follows⁷:

- Calcium oxalate stones - 93.04%
- calcium oxalate monohydrate (COM)-80%
- calcium oxalate dihydrate (COD) - 20%
- Struvite -1.42% and
- Apatite -1.80%.
- Uric acid stones - 0.95%
- Mixed stones (COM + COD and calcium oxalate + uric acid, calcium oxalate + calcium phosphate, and calcium phosphate + magnesium ammonium phosphate) - 2.76%

A total of 89.98% of staghorn stones are made of oxalates (COM/+COD) and only 4.02% are struvite.

DIAGNOSTIC WORK UP OF UROLITHIASIS

There is paucity of reliable prospective data that can be used to formulate a definitive outcomes-based approach to managing the patient who has had one kidney stone. Several authors suggest that minimal investigations be performed in patients with their first stone provided no signs of infection or obstruction are present^{8,9}. A reasonable approach for a low risk patient would include a detailed history and physical examination (although specific clues are seldom noted on physical examination), selected laboratory tests, urinalysis and culture, review of any radiographs, and stone analysis (Table 1 and Fig. 1). For patients at high risk, an extensive evaluation should be done.

Table 1. Evaluation of a patient with a first kidney stone episode

Complete history, with emphasis on:

- Family history
- Occupation and hobbies that may predispose to dehydration
- Dietary history

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