

Enormity of Urolithiasis in Sindh province

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Historical study on epidemiological aspects of Urolithiasis reveals Sindh to have the highest prevalence of stone disease in the sub continent.¹ Recent data from SIUT Karachi, a tertiary care hospital in the province shows that stone disease constitutes 50-60% of Urologic workload. In the last four decades, 83,067 adult stone patients were treated at the institute. The data of 2013 at SIUT Karachi, shows 4072 procedures done on stone patients and at SIUT Sukkur, (2622) procedures were done in the form of ESWL (64.2%) URS + PCNL (14.6%) and open surgery (8.8%). Similar reports for Gambat Institute of Medical science (GIMS) shows that 159 stone patients were treated in 2013. Out of those 56% were bladder calculi, all were subjected to open surgery. Another teaching hospital in Sukkur attached with Ghulam Mohd Mehar Medical College admitted 1971 stone patients in 2013 and HIRA private hospital admitted and treated about 87 stone patients. At these two centers all — of renal calculi were treated by open surgery however ureteric and bladder calculi were mostly-treated with endoscopic methods.

Chandka Medical College Larkana, another teaching hospital in the Sindh province, treated about 1934 stone patients in the year 2013. Of these there were ESWL (35.8%) PCNL (1.2%), URS (15.5%) cystolithoclast (19.5%) and 28% were subjected to open surgery. This data shows the disease to be enormous in the province, but there are inequalities in the practice pattern in the urban and rural areas.

SIUT data on paediatric urolithiasis published in 2007 showed that out of 2618 paediatric patients, 15% presented with renal failure and endemic bladder calculi constituted 14% of all urolithiasis cases in children.² However data from Nawabshah showed 46.6% of all stones to be bladder calculi,³ whereas G.I.M.S data showed 56% cases were bladder calculi. There is no doubt that endemic bladder calculi are decreasing in urban areas but are still prevalent in rural areas of Sindh and poor localities of urban cities. The possible predisposing factors for endemic bladder calculi in children in our country is the hot climate, chronic disorders with dehydration states, single cereal based diet, decreased

animal milk intake, increased oxalate Intake and deficiency of vitamin A, B and magnesium.⁴

Etiology of renal calculi is multi factorial ranging from epidemiological risk factors (age, sex, diet, water composition and decreased intake and occupation), genetic factors, obstruction and urinary tract infections. In our institution, the age of stone patients ranges from 3 months to 90 years with peak age at 3rd - 4th decade. The male to female ratio is 3:1.⁵ The prevalence is high in Northern parts of Sindh (Sukkur, Larkana, Khairpur, Shikarpur, Jacobabad). Extremes of hot climate in these areas is the main cause of stone disease. We get more patients with renal calculi, Calculus anuria, chronic renal failure and pyelonephritis in summer months both at SIUT Karachi and Sukkur centers.

Family history is positive in 20% of our patients. Questioning on the diet revealed that stone formers were taking less protein in 27% cases, Calcium intake was low in 60% stone formers with a high oxalate Intake in 38% and high sodium intake in 20% of patients.

Low water intake is an important known risk factor. It is also postulated that hardness and softness of water is the factor responsible for variations in geographical differences in stone disease but this has not been proven. Regarding the bacteriological analysis on drinking water of Sukkur city, the results showed that 100% of drinking water samples were contaminated with E Coli and chlorine was not present in any samples.⁶ Similarly water quality in Manchar lake was found to have higher content of lead and cadmium⁷ which are known nephrotoxic agents. On the contrary, another study from Iran showed an inverse relationship between magnesium and incidence of stone disease.

Modalities of imaging for urolithiasis are ultrasound, which detects 50-60% of the cases, while X- ray KUB has a diagnostic accuracy rate of 60-70%. Both modalities are available in all public sector hospitals. Detection rate for stone disease by Intravenous pyelogram is 70-90% and is also available in almost all hospitals, whereas non contrast CT scan detects stone disease in 90-100% cases but is available in only two or three public sector urologic centers. For a population of 42 million in the Sindh province, there are only 15 ESWL centers six in private and nine in the public sector. Of the nine lithotripsy centers in the public hospitals, only 1-2 centers are functioning.

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These are over loaded with patients coming from other provinces of Pakistan because of free services. Facilities for PCNL are available in four public sector hospitals however URS is available in seven centers.

Stone analysis done by (IRS) on rural area patients, showed 61% to be calcium Oxalate stones, of which 50% were mixed stones, and 27% were uric acid with 17% being mixed stones. Struvite stones were seen in 5-6% stones and ammonium hydrogen urate in 3.3% of all adult stone patients. Only 0.6% were other stones as 2.8 dihydroxy adenine and cystine. On the other hand majority of the stones from urban areas are smaller stones and pure calcium oxalate / calcium phosphate, and uric acid etc.⁸

How can Urolithiasis be prevented

Use of potable water after boiling is the main stay of prevention, one should take 10-12 glasses of water per day, urine output should be maintained around 2 liters in 24 hours, water should be encouraged during meal times and two hours after meals, night time diuresis should be encouraged by taking fluids before sleeping, bottled water containing calcium and magnesium reduces as many as nine factors which promote stone formation, similarly carbonated water offers increased protection.

Increased intake of soda drinks, increases risk of stones. Drinks acidified with Phosphoric acid increases the risk by 15%, caffeine, tea intake in excessive amounts increases the risk of stones.⁹ Hypocitraturia is the main urinary risk factor of urolithiasis in Pakistan. Use of Citrus fruits like oranges and lemon is beneficial in uric acid and calcium oxalate stones. 1.2 liters of orange juice is equivalent to 60meq of potassium citrate which increases the PH and citric acid level in urine. Similarly 4 ounces of lemon juice mixed with two liters of water has been shown to increase citrate levels in urine.¹⁰

Low protein intake in diet causes significant reduction in urine calcium, oxalate, uric acid, chloride and sodium. It is therefore suggested that stone formers should reduce meat and salt intake and increase the dietary calcium in form of milk and yogurt.

After hypocitaturia the hyperoxaluria is the main urinary abnormality found in the local population. High oxalate foods are peanuts, spinach, rhubarb, beetroots, dark chocolates, black tea, coffee, strawberries, okra and tomato sauces. All these foods should be restricted if hyperoxaluria is found in stone patients. There has been an interesting finding that stone does not occur among Greenland inhabitants because they have a high intake of

fish oil. So it is reasonable to take 1-1.5gm of fish oil pills which is beneficial in oxalate stone formers.

Alkaline Citrates constitutes three preparations i.e. potassium citrate (K-Citrate) Mg-K citrate and Na-K-citrate. These drugs are used in dissolving less than 5-6mm renal calculi, post ESWL fragments and prevention of future recurrence of renal calculi. The newer therapies are on horizon like high doses of vitamin 6, Pyridoxamine (derivative of Vit B6), orthophosphate, Oxalate degrading bacteria as probiotics, Bisphosphonates and sodium thio sulphate. With these newer drugs prevention will be more effective in the future.

With the back ground data and previous studies clearly indicate the high prevalence of stone disease in Sindh. Cumulatively, 10-15% of the stone patients present with life threatening complications of renal failure and other infections. In Sindh province there is a dire need to have comprehensive stone treatment centers equipped with Lithotripsy, PNL, flexible ureteroscopy and laparoscopy with facilities to have basic research on stone disease, metabolic laboratory and specialized group of urologists, nephrologists, biochemists experienced in special intervention in stone disease. There is also a need to conduct an epidemiologic study on stone disease in the community and to study the actual causes and risk factors in the local population.

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