

COMPOSITION OF RENAL STONES: CALCIUM OXALATE STONES ARE MORE COMMON IN THE NORTH WEST OF PAKISTAN

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SUMMARY

In this study two hundred renal stones were chemically analyzed over the course of 10 years from November 1989 to October 1999. These stones were surgically removed in three different institutions. The stones were analyzed using stone analysis kit (Merck). Calcium oxalate stones were found to be more common in this part of the country i.e. 60%. The results are compared with other studies both national and international.

INTRODUCTION

The disease of urinary tract stones is as old as man¹. Stones may be produced in gall bladder, salivary gland, prostate and urinary system. The stone in the urinary system is not just a collection crystalline material. It has a definite structure². The formation of renal stone has been explained by different theories³ like Nucleation theory, Stone matrix theory, Theory of inhibition of crystalization and Intra-nephronic and fixed nucleation theory.

The stone analysis is done by chemical method⁴, Infra red spectroscopic study and X-diffraction.

In this study chemical stone analysis kit (Merck) was used to identify the chemical composition of 200 renal stones.

MATERIAL AND METHODS

A retrospective study was conducted to collect the data of stone analysis in 200 cases operated for renal stone disease over ten years i.e. from November 1989 to October 1999 from three different institutions i.e. Khyber Teaching Hospital Peshawar, Sheikh Zayed Hospital Lahore and Rehman Medical Complex D.I. Khan. This data was collected in randomize way from three different cities of Pakistan in a different time period.

No.	Chemical Composition of renal	No. of patients	Percentage in our study	Percentage in other studies ^{2,4,5,6,7}
1	Pure Calcium oxalate stones	120	60%	33%
2	Pure Calcium phosphate stones	10	5%	6%
3	Mixed calcium oxalate + calcium Phosphate stones	44	22%	34%
4	Magnesium ammonium phosphate (struvite)	18	9%	10-15%
5	Cystine acid stones	2	1%	1-3%
6	Uric acid stones	4	2%	5-10%
7	Uric acid + Calcium oxalate + calcium phosphate stoned and others	2	1%	1%

TABLE -I

The stone after removal was sent to laboratory for biochemical analysis. In the laboratory they are crushed and dissolved as homogenous solution. Using stone analysis kit⁴ (Merck) the various components of the calculus were determined by titrimetric and colorimetric method.

RESULTS

The results of the study show that calcium oxalate stones were present in 120 patients, calcium phosphate stones were present in 10 patients, mixed calcium oxalate+calcium phosphate stones were present in 44 patients, magnesium ammonium phosphate stones (struvite) were recorded in 18 patients, cystine stones were noted in 2 patients, uric acid stones in patients and uric acid, calcium oxalate, calcium phosphate in 2 patients. The results are compared with other studies in Table no. 1.

DISCUSSION

Renal stone disease is a common entity of surgical and urology department. Several studies have been conducted in different parts of the world by different surgeons to look into the structure and biochemistry of renal stones.^{1,3,4,5,6,7}

The result of these studies when compared with our study show that pure calcium oxalate stone is more common in this part of the world than in other regions i.e. 60% in our study and 33% in studies conducted by E.J. Westbury¹ (1974), A. Kambal⁵ (1979). This may be due to increase intake of vegetables and cereals in this part of the world.^{8,9,10,11,12}

The result of our study also shows that cystine stone and, Uric acid stone are less common i.e. cystine stone 1%, Uric acid stone 2% as compared to multinational studies which shows cystine stone in 1-3% and Uric acid stones 5-10%¹³. This may be due to low intake of proteins as compared to high intake in the western society.^{4,6,8,9}

While magnesium ammonium phosphate (triple phosphate, Struvite) and mixed calcium oxalate + calcium phosphate stone results are comparable with other studies i.e. triple phosphate 9%, mixed stone 22% in our study and triple phosphate 10-15%, mixed stone 34% in other studies conducted in different parts of the world (Table 1)

To conclude, Renal disease is a common pathology in the north west region of Pakistan. The prevalence of renal stone is higher in areas of hot climate and insufficient drinking water. Calcium oxalate stone is the

commonest renal stone in this part of the country. Renal stones should be properly analyzed before restricting the diet of the patient. More studies are required to find the cause of renal stones and its chemical composition to have a better understanding of this disease.

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