

# A STUDY OF UROLITHIASIS IN NORTH WEST FRONTIER PROVINCE OF PAKISTAN

Pages with reference to book, From 241 To 243

Fazli Rab ( Department of Pharmacology, Postgraduate Medical Institute, Lady Reading Hospital, Peshawar. )

Fazli Mabood Qazi ( Department of Pathology, Khyber Medical College, Peshawar. )

Riaz Ahmad ( Department of Surgery, Khyber Medical College, Peshawar. )

Zahoorullah, Tasleem Akhtar ( PMRC Research Centre, Khyber Medical College, Peshawar. )

Isa Khan ( Department of Urology, Postgraduate Medical Institute, Lady Reading Hospital, Peshawar. )

## ABSTRACT

Of 188 (144 renal, 29 bladder, 15 ureteric) stones analysed, 109 (58%) were pure calcium oxalate stones and in 177 (94%) calcium oxalate was the main component. The remaining were of mixed composition containing calcium phosphate, uric acid and calcium hydrogen phosphate. Serum calcium levels in 50 patients with pure calcium oxalate stones were normal. Majority of the cases (76%) came from the hilly areas of N.W.F.P. (JPMA 40 241, 1990).

## INTRODUCTION

Urolithiasis is common in all regions of Pakistan<sup>1,2</sup> but the composition of stones may differ in various areas depending upon the diet, climate and other factors<sup>3</sup>. The knowledge of composition of stones is therefore essential for determining the aetiology<sup>4</sup> and the national therapy of urolithiasis<sup>5</sup>. This study reports the prevalence of various types of calculi in certain areas of North West Frontier Province of Pakistan.

## MATERIALS AND METHODS

A total of 188 (male 148 and female 40) surgically removed urinary calculi from the surgical ward of Hayat Shaheed Teaching Hospital, Peshawar between February 1984 and November 1988 were analysed. District of domicile, age, sex and site of stone were recorded. These patients were free from any parathyroid disease, disorders of calcium and phosphorous metabolism or apparent renal disease other than stones. The stones were thoroughly washed with plain water to remove blood and other tissue debris and dried in oven, finely powdered and analysed for chemical composition using E. Merck's Urinary Calculi Kit (Cat. No. 11003) based on Maurer and Gotz<sup>6</sup>. The approximate chemical combinations were depicted by using the manufacturer's calculation aid.

## RESULTS

The peak presentation in both sexes was in 20-40 years age group. The results of chemical analysis and sex distribution are given in the table.

**TABLE. Types of stones and sex distribution.**

Type	Total No. (%)	Male No. (%)	Female No. (%)
1. Pure calcium oxalate	109 (58.0)	92 (49.0)	17 (9.0)
2. Calcium oxalate + Apatite	31 (16.5)	23 (12.0)	8 (5.0)
3. Calcium oxalate + Uric Acid	21 (11.2)	14 (7.3)	7 (3.7)
4. Calcium oxalate + Brushite	13 (7.0)	8 (5.2)	5 (1.8)
5. Calcium oxalate + Struvite	2 (1.1)	1 (0.5)	1 (0.5)
6. Calcium oxalate + Cystine	1 (0.5)	1 (0.5)	–
7. Pure uric acid	4 (2.0)	3 (1.5)	1 (0.5)
8. Pure Struvite	2 (1.1)	2 (1.5)	–
9. Struvite + Apatite	2 (1.1)	2 (1.0)	–
10. Struvite + Uric acid	1 (0.5)	–	1 (0.5)
11. Pure Ammonium urate	1 (0.5)	1 (0.5)	–
12. Pure Cystine	1 (0.5)	1 (0.5)	–
Total	188 (100)	148 (79.0)	40 (21.0)

Apatite : Tri Calcium phosphate

Brushite : Calcium Hydrogen phosphate

Struvite : Magnesium Ammonium phosphate

For pure calcium oxalate, male to female ratio was 5.4:1 while overall it was 3.8:1, respectively. Majority of the cases (76%) came from the hilly areas of the province and adjoining Afghanistan which too is a hilly terrain. Ninety four percent of stones contained calcium oxalate in pure (58%) or mixed (36%) form.

## DISCUSSION

Calcium oxalates are the commonest urinary calculi world wide<sup>3,5</sup>. In our study calcium oxalate both in pure and mixed form comprised of 177(94%) of the cases while in pure form it exceeded more than half, 109 (58%) of the total number. Calcareous stones (calcium oxalate and/or calcium phosphate) together make up more than 80% of the renal calculi<sup>7</sup>, which best agrees with our figure of 82%.

Mixed entities of this form are commonly found in industrialised and urbanised areas elsewhere<sup>8</sup>, while in our study it was only 24% of the total. Stones containing uric acid are less frequent (14%) in our study. We had 4(2%) cases of pure uric acid stones. The scarcity of this entity in our area of study may be either real or a further study on large number of cases may clarify the position. Uric acid in combination with calcium oxalate, however, presented as the third major group with 21 (11.2%) of the total cases. An unusual finding was of cystine component mixed with calcium oxalate. Our results

show peak age presentation of 20—40 years and that too in males. These individuals, at the prime of their active work outdoor loose more water in sweating. People in our areas habitually consume less fluid, leading to low urine volume, particularly in hot dry climate. Consequently, supersaturation of urine with solutes results in high risk urolithiasis situation. A significant number of patients with no metabolic abnormality and type-II absorptive hypercalciuria had less than 1 liter of urinary output per day<sup>4</sup>. Due to the short average life span in the country (58 years) the frequency drops after the age of 60 years<sup>9</sup>. Patients with renal stones from the districts of Swat, Dir and Malakand Agency were 40% of the total cases. People of this zone consume more rice in their daily food besides milk and its products. High calcium content in these food products is one of the probable lithogenic factors in this region. High occurrence of calcium oxalate stones have been reported from Thailand where food rich in oxalate is consumed<sup>10</sup>. Similarly the lower socio-economic strata in the rural areas of Peshawar district eat spinach, turnip and other green leafy vegetables rich in calcium and oxalate contents. Urolithiasis is a heterogeneous disorder of multiple etiologies. This article is a preliminary report in this region. Forty percent of the patients in this study belonged to the districts of Swat, Dir and Malakand Agency. We intend to continue this study in other areas of N.W.F.P. to compare the frequency of different types of stones in various districts. We also intend to study the aetiological factors and food habits of patients in more detail.

## ACKNOWLEDGEMENT

Thanks are due to Professor Dr. Taj B. Uppal for reviewing the paper and Zahid Hussain and Zaigham Ali for typing.

## REFERENCES

1. Naqvi, S.A., Rizvi, S.A. and Shahjehan, S. Analysis of urinary calculi by chemical methods. JPMA., 1984; 34: 147.
2. Zaffar, I-I. Pzivalence and types of renal stones in Multan region. Proceeding of the PMRC Medical Research Congress, Islamabad, 1984, p. 268. (Unpublished data).
3. Smith, K. Urinary calculi. Medicine International, Pak. ed., 1986; 2:1358.
4. Pak, C.Y., Britten, F., Peterson, R., Ward, D., North Cutt, C., Breslau, N.A., McGuire, J., Sakhaee, K., Bush, S., Nicar, M., Norman, D.A. and Peters, P. Ambulatory evaluation of nephrolithiasis. Classification, clinical presentation and diagnostic criteria. Am. J. Med., 1980; 69: 19.
5. Sutor, D.J., Wooley, S.E. and Illingworth, J.J. A geographical and historical survey of the composition of urinary stones. Br. J. Urol., 1974; 46: 393.
6. Maurer, C. and Gotz, W. Comparison of different chemical and physical experimental methods for the analysis of the urinary stones in practice. Urology, 1976; 16: 226.
7. Glenn, M. and Priminger, M. D. Pharmacological treatment of calcium calculi. Urol. Clin. North Am., 1987; 14: 325.
8. Sutor, D. J. and Wooley, S.E. Composition of urinary calculi by x-rays diffraction. Collected data from various localities. Parts XIXIV. Northern Ireland, South Africa and Kuwait. Br. J. Urol., 1972; 44:287.
9. Grant, J.P. The state of the world's children. Edited and published for UNICEF and Oxford University Press and L. Adamson, Benson, Oxfordshire, 1989, p. 94.
10. Suvachittanont, O., Meksongce, L.A. and Dhanamitta, S. The oxalic acid content of some vegetables in Thailand, its possible relationships with bladder stone disease. J. Med. Assoc. Thai., 1973;56: 645.