

Original Article

Chemical Composition of Non-Infected Upper Urinary Tract Calculi

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ABSTRACT

Objectives: To document the chemical composition of urinary calculi at our institution.

Methods: This descriptive study was conducted at Urology Department, Rawalpindi General Hospital, and IIMC-T Railway General Hospital, Rawalpindi. It included 428 patients under going surgery or receiving Extracorporeal Shock Wave Lithotripsy (ESWL) for urinary calculi over a period of 3.5 years. All patients were screened for urinary tract infection by urine routine examination, urine culture and ultrasonography. Stones/fragment or gravel retrieved were sent for chemical analysis.

Results: Calcium was present in 92% calculi. Out of these, 34% were pure calcium oxalate calculi. Struvite stones were 5%, pure uric acid calculi 3% whereas mixed calculi containing urates were 37%. There were no cysteine stones found in this study.

Conclusion: Calcium containing mixed stones remain the commonest variety of renal calculi encountered in this study. (Rawal Med J 2008;33:54-55).

Key Words: Urolithiasis, Pakistan, stone chemical composition.

INTRODUCTION

Despite its well established worldwide prevalence, the true incidence of stone disease remains unidentified.^{1,2} It is the third most common urological disease in the west.³ Due to lack of resources and infrastructure, epidemiology of urolithiasis is poorly understood in Pakistan.^{1,4} However, many observers have found it to be the most common urological ailment here.⁴⁻⁶ Knowing chemical composition is an essential part of stone management.⁷ Chemical composition of stones can be performed on stones passed spontaneously, stone/fragment/gravel passed after ESWL or stone/fragments retrieved after open surgery or endourological procedure. Studies reporting stone compositions have been published from different parts of the country but no such reports are available from our region. Purpose of present study was to report our experience about stone composition in our area.

MATERIAL AND METHODS

This descriptive study was conducted at Urology department, Rawalpindi General Hospital, and IIMC-T Railway General Hospital, Rawalpindi. It included 428 patients under going surgery or receiving ESWL for upper tract urinary calculi from July 2003 to December 2006. All were screened for urinary tract infection by urine routine examination, urine culture and ultrasonography. Febrile patients, those with positive urine cultures, and sonological evidence of pyonephrosis were excluded from the study. Stones/fragment or gravel retrieved were sent for chemical analysis which was performed using Merckognost reagent kit (Merck, Germany). Results were reviewed and analyzed with the help of SPSS 11.

RESULTS

Out of 428 patients, 291 were males and 137 females. The age ranged from 12 to 85 (mean=38.5). Calcium containing calculi were the commonest variety encountered (92%). Pure calcium oxalate calculi were 34%. Pure uric acid calculi were 3%. Whereas mixed calculi containing calcium and urates were 58% and 37% respectively. Struvite stones formed 5% of total. There was no cystine stone found in this study.

DISCUSSION

Different methods of chemical analysis have been described. Layered analysis of stones has been advocated by some considering nucleus of stone to represent the basic aberration in the metabolism.⁸ However, majority of stones being managed with ESWL, Percutaneous Nephrolithotomy, Retrograde Intrarenal Surgery, and litholapexy are fragmented before retrieval and therefore complete stone is not always available for such formal analysis. Calcium containing calculi were the commonest variety encountered in our study (more than 90%). Out of which pure calcium oxalate (CaOX) calculi were 34% where as mixed calcium calculi were 58%.

Three studies from SIUT showed CaOX calculi to be the commonest component.^{4,9,10} and uric acid and urates formed 20% combinely.¹⁰ Various studies from all over the country have showed mixed stones to be most common variety.^{6,8,11-13}

A study form Multan reported uric acid calculi to be at the top with 28%, followed by CaOX calculi 26% , CaOX+calcium phosphate 10% and CaOX+calcium phosphate+uric acid 7%.⁷ This not only differs many studies from different parts of the country but also from a study from Multan also.¹⁴ Percentages of uric acid stones encountered varies from 1-26% and calcium oxalate from 65-88% in various parts of world.¹⁵ In conclusion, our

study showed that calcium containing mixed stones were the commonest variety of renal calculi encountered in our area.

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