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STONE ANALYSIS BY CHEMICAL QUALITATIVE METHOD

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ABSTRACT

Objectives: The purpose of this study was to determine the chemical qualitative of renal calculi at King Hussein medical center Laboratory.

Method: The stones from two hundred and sixty four subjects were studied (their age range between 6 and 55 years).Universal standard method used adapted for stone analysis utilizing chemical qualitative method kit.

Results: Our results Clearly indicate that calcium, cystine, uric acids are dominate.other stone types occur with the expected comparative frequency reported in the literature moreover, male predominance for the most prevailing stone types is seen with the exception of the (Ca oxalate + Ammonium magnesium phosphate) ,and cystine stone where the higher incidence was found in females.

Conclusion: High quality stone analysis is helpful in providing accurate information on which diagnosis and treatment may be used.

Application: of our existing knowledge is needed and should be implemented by a ''stone management team

Key words: Calculi, Calcium, AAU

Introduction

The presence of calculus in urine is due to the conglomeration and crystallization of matter in super saturation. There can be various reasons for this imbalance: nutritional, metabolically, Anatomical, neurogical, genetical or infection reasons. Several ones can occur, at the same time or successively, to the formation and growth of the calculus (1, 2)

The more frequently chemical component are (in descending frequency order): calcium oxalate, calcium phosphate and magnesium ammonium, phosphate uric acid, urates, various proteins, and cystine. (1, 2).
Ammonium acid urate (AAU) calculi are a rare urolithiasis in developed countries. In north America, incidence of AAU calculi have been reported to comprise (0.2% - 3.1%) of stone Forming population (3).
Regarding the chemical composition of stones, calcium oxalate either alone or in combination with other insoluble minerals, comprise more than 70% of all renal calculi (4).
Sierakowski et al (5) estimate that approximately 12 % of all men are expected to suffer at least one stone episode in their life time, and it is generally agreed that the incidence in women is approximately one- half to one- fifth that in men. The impact of such figures wither viewed in terms of patient morbidity or cost of treatment plus lost working, is enormous.
The prevalence of upper renal tract stone disease in the western word range between 5% and 12% .The prelevance is progressively rising and in addition recurrence rates are un acceptably high (10% after the first year of stone presentation, 35% at 5 year and 50% at 10 year (6).

Material and Method

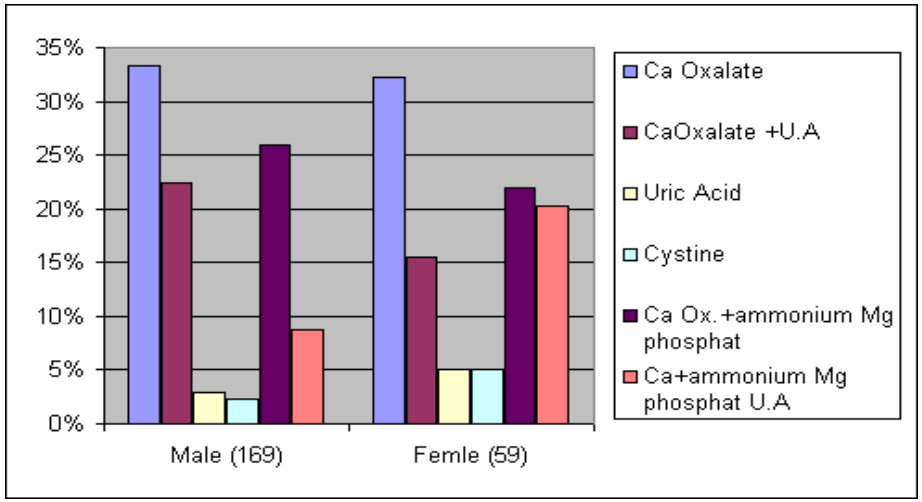
The study was conducted on 264 patients of whom 169 were males, 59 females, 36 children's (10 male, 26 females).
Individuals studied were between 6-55 years of age.
The calculi were either removed by surgery or extra corporeal shock wave lithotripsy (ESWL) or brought to the laboratory in a sterile container, along with a brief history of patient.
Each stone was weight and its size, shape, colour, surface appearance and consistency were noted.
Analysis of the stone was performed according to the procedure used routinely at K.H.M.C, using (Biolab Reagents). Chemical qualitative method.Reff-92315-02160.Maziy, France (7).

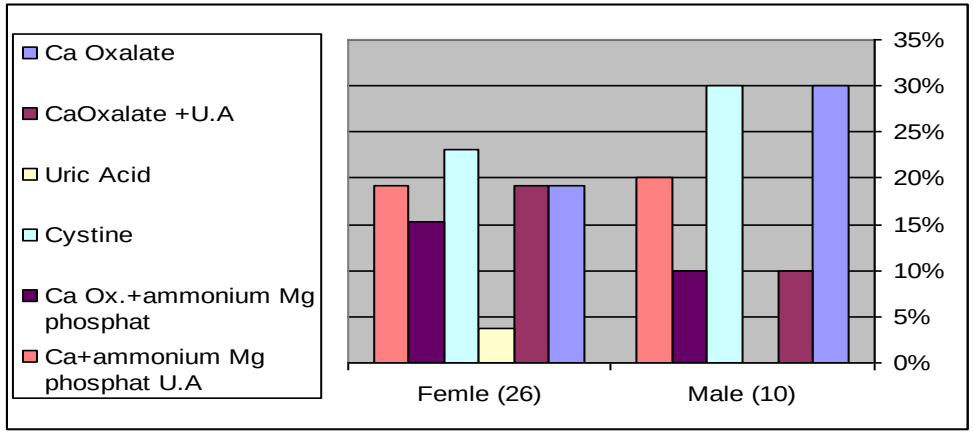
Table (1): Distribution of the percentage stone former adult patient's according to biolab- Method

Age(20-55)	Ca Oxalate	Ca Oxalate +U.A	Uric Acid	Cystine	Ca Ox.+ ammonium Mg phosphate	*Ca+ammonium Mg phosphate U.A*
Male (169)	33%	22%	3%	2%	26%	*9%*
Female (59)	*32%*	*15%*	*5%*	*5%*	*22%*	*20%*

Table (2): Distribution of the percentage stone former pediatric according to biolab- Method in K.H.M.C.

Age (2-13)	Ca Oxalate	Ca Oxalate +U.A	Uric Acid	Cystine	Ca Ox. + ammonium Mg phosphate	Ca+ ammon. Mg phosph.+U.A
Male (10)	30%	10%	0%	30%	10%	20%
Female (26)	19%	19%	4%	23%	15%	19%


35%
30%
25%
20%
15%
10%
5%
0%
Male (169)
Femle (59)
Ca Oxalate
CaOxalate +U.A
Uric Acid
Cystine
Ca Ox.+ammonium Mg phosphat
Ca+ammonium Mg phosphat U.A


Ca Oxalate
CaOxalate +U.A
Uric Acid
Cystine
Ca Ox.+ammonium Mg phosphat
Ca+ammonium Mg phosphat U.A
35%
30%
25%
20%
15%
10%
5%
0%
Femle (26)
Male (10)

Discussion

We observed that calcium oxalate stone are the most common stone in our patient. This finding is in agreement with the reported data that calcium oxalate stone are encountered in the world wide belt that is mainly confined to the tropical and subtropical regions of the globe. Also our data indicates that, this type of stone is not composed of pure calcium oxalate , ammonium acid urate, however, calcium oxalate, and ammonium urate predominates with different small quantities of calcium phosphate, Ammonium magnesium phosphate + U.A as well as uric acid, both of which are also present. All these finding are in agreement with data reported in literature (10, 6). Ammonium acid urate urolithiasis is still observed in developing countries as endemic bladder stones in children. Soble et al (8) reported that the pathophysiology and metabolic risk factor in north America are a history of inflammatory bowel disease or ileostomy diverion, laxative abuse, morbid obesity, recurrent uric acid calculi and recurrent urinary tract infection.(8, 6) In our study ,also in Japan found several trends in patients. Features to further classify ammonium acid urate calculi namely the pure and mixed types. No study has never tried to classify ammonium acid urate stone in the way of Japan s group (6).≥95 % a crystals with stone composition, < 95 % Auu were defied as mixed type .(6)
In our study the Ammonium Acid urate is not found purly but mixed with other type which consist of 20.3% and 19.2 % in children .(40% mixed type) .

Renal calculi were classified according to their composition and structure. Stone former were divided according to age, sex, and the percentage of each kind of calculi in the different considered age periods for men and women were determined. It was found that calcium oxalate calculi decrease with age, but only in men .These calculi were also clearly predominant in men. Uric acid calculi increase with age in both men and women, but were predominant in men (9).

In our study, we classified the stone according to their composition, and structure, also the percentage of each kind of stone in the differed considered age period for men, and women were determined .The percentage of calcium oxalate decreased with age in males and female, but its predominate in men .Also uric acid decrease with age in women while it is increase in men.

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About 5% to 10% of kidney stones are made of uric acid, 1% of cystine, and nearly 80% of calcium compound, especially calcium oxalate. (10)

In our study: 3% to 5% of kidney stones are made of uric acid, 2.5%to 30% of cystine and 19% to 33% of calcium oxalate.

The percentage of uric acid and cystine in female is greater than that in male in both adult and children.

The objective of our study is to provide clinician with information that might help in identifying causes of the disease and therapy .Also it provide a rationale for treatment or to obtain an index which will enable the prediction of recurrence so that preventive measures may be instituted .

Conclusion and recommendation

High quality stone analysis is helpful in providing accurate information on which diagnosis and treatment may be based.

Application of our existing knowledge is needed and should be implementing by a stone management to identify the concentration of each type of kidney stones.

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