

## Original paper

# A Study to Determine the Commonest Type of Renal Stone in Iraqi Patients Admitted to Al- Hussein General Hospital in Kerbala

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## Abstract

**B** **Background:** Kidney stones (calculi) are known to be one of the most painful medical conditions. The causes of kidney stones vary according to the type of stone.

**Aim:** This study was employed to determine the incidence of kidney stones type in a group of patient in Kerbala from 2010 to 2012 in which 121 patients were enrolled.

**Patient and method:** eighty six males and thirty five females were evaluated to determine the type of kidney stone that they had. The age average was between 30 and 50 years .

**Results and discussion:** It was found that uric acid stones has the highest rate of incidence (52.9%) in both sexes (70.31 % in males and 29.69 % in females). The second rank (27.8%) was occupied by calcium oxalate stones (69.7 % in males and 30.3% in females), the magnesium phosphate stone constitute about 11.5% of all the stones that were collected (64.3 % in males and 35.7 % in females) and cysteine stone constitute 4% (60% in males and 40% in females) was followed. In this study it was observed that xanthine and mixed stones were found in males only in small ratio (2.5% and 1.65% respectively).

**Conclusion:** it is clear that the most common type of renal stone affecting people in Kerbala was uric acid stone which may be due to dietary habit.

**Key words:** stones, uric acid, calcium oxalate, struvite stones

## Introduction

The kidney stones regarded as an important disease that increasing all over the world. The National Institute of Diabetes and Kidney Disease reports that about 1 million people in the United States are treated for kidney stones each year and kidney stones now appear to have a prevalence of 5.2% of the total population and lifetime risk of stone formation in the USA exceeds 12% in men and 6% in women. <sup>(1)</sup>. It is found that kidney stones have the 3<sup>rd</sup> rank of renal disorders after urinary tract infections and diseases of prostate all over the world <sup>(2)</sup>.

It is important disease because it has a financial burden on the patient and it was reported that the cost of treating it in the United States was estimated to be more than 2 billion\$ in the year 2000 <sup>(3)</sup>. Urinary tract stones can result from increasing

urinary saturation of any substances that can induce the formation of stone <sup>(4)</sup>.

The recurrence rates of kidney stone without medical treatment of more than 50% over 10 years is likely to be occur <sup>(5,6)</sup>. Dietary recommendations in the presence of idiopathic calcium stones should be based on the urinary abnormalities including modification of the type of food or to prevent certain food stuff that may induce the formation of particular type of stone <sup>(7,8,9)</sup>. One of the causes that was proposed by American Urological Association (AUA) which increase the future incidence of kidney stone formation is the increase of global temperature of the climate <sup>(10)</sup>. Dehydration from low fluid intake is a major factor in stone formation <sup>(11,12)</sup>.

High dietary intake of animal protein <sup>(11)</sup>, sodium, refined sugars, fructose, and high fructose corn syrup <sup>(13)</sup>, oxalate <sup>(14)</sup>,

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grapefruit juice, and apple juice increase the risk of kidney stone formation<sup>(12)</sup>. Kidney stones can result from an underlying metabolic condition, such as distal renal tubular acidosis, Dent's disease, hyperparathyroidism, primary hyperoxaluria or medullary sponge kidney<sup>(15-18)</sup>. About 3–20% of people who form kidney stones have medullary sponge kidney<sup>(19)</sup>.

Kidney stones are more common in people with Crohn's disease. Crohn's disease is associated with hyperoxaluria and mal-absorption of magnesium<sup>(20)</sup>.

A person with recurrent kidney stones may be screened for such disorders. This is typically done with a 24-hour urine collection. The urine is analyzed for features that promote stone formation<sup>(21)</sup>.

## Patients and method

In this study which was done in Al-Hussein general hospital in Kerbala from December 2010 up to November 2012, 121 patients were selected randomly (86 males and 35 females), they were about 30-50 years old and they complained a recurrent renal colic. Their stones were obtained after spontaneous passage of the stones or by using the medication, surgical

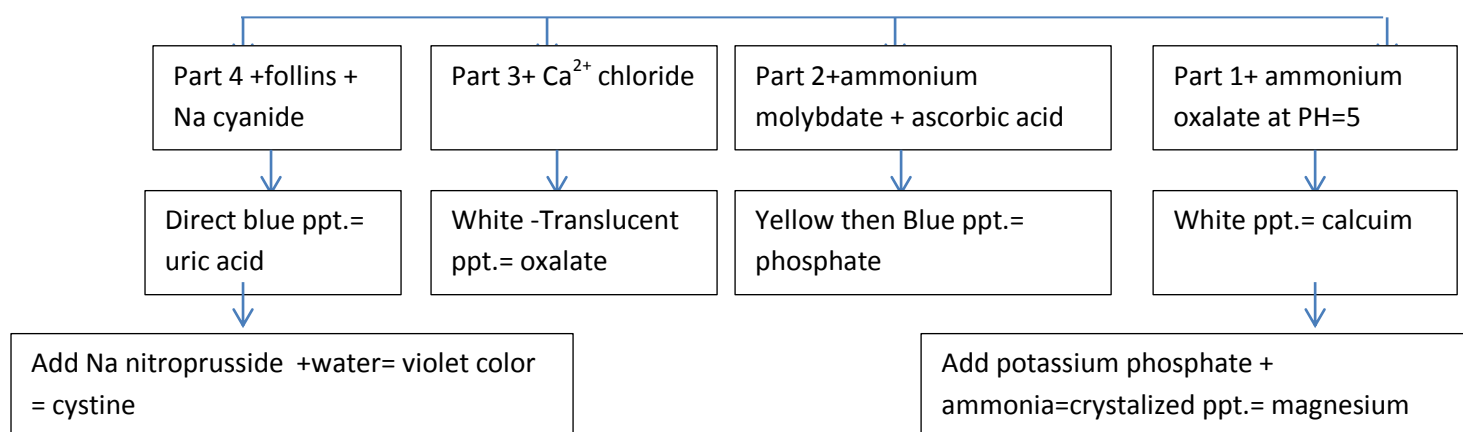
removal or by lithotripsy after which biochemical analysis was done for all of the stones to determine their type.

The stones were washed then dried well and applied in test tube. An adequate amount of HNO<sub>3</sub> was added for the tube, bubbles appeared which indicate the presence of carbonate moiety. Then the mixture boiled then cooled prior to get the precipitate (ppt.) which divided into four parts to proceed in the method as shown in figure 1.

## Discussion

It is obvious that uric acid stones are the most common type that was found in this study. Uric acid precipitates in acid urine in excess production of uric acid is the primary risk factor for the formation of uric acid stones<sup>(22)</sup>.

It was found that uric acid stone is the commonest type in both males and females. This is a particular because of the dietary habit in our society which consume a lot of amount of red meat and legumes which lead to increase purine load and subsequently hyperuricemia<sup>(23)</sup>. The male to female ratio was 3.2:1 which can be explained by the difference in the dietary habit between them.



**Figure 1.** the biochemical analysis of renal stones.

## Results

**Table 1.** shows the approximated percentage of occurrence of different types of renal stone

Type of stone	Total Number	Approximated Percentage
Uric acid	64	52.9%
Calcium oxalate	33	27.8%
Magnesium phosphate	14	11.5%
Cystine	5	4%
Xanthen	3	2.5
Mixed stones	2	1.65

**Table 2.** shows the percentage of occurrence of renal stones between males and females in regard to the total number for each type.

Type of stone	Males (Number and ratio)	Females (Number and ratio)	Total Number
Uric acid	45 (70.312%)	19 (29.69%)	64
Calcium oxalate	23 (69.7%)	10 (30.3%)	33
Magnesium phosphate	9 (64.3%)	5 (35.7%)	14
Cystine	3 (60%)	2 (40%)	5
Xanthen	3 (100%)	-	3
Mixed stones	2 (100%)	-	2

The second type of stones was calcium oxalate, although it is well known that this type is the commonest type all over the world<sup>(24)</sup>. The ratio between males to females is the same to that of uric acid stones. This also has the same explanation in addition to that the effect of testosterone in males which enhances the over excretion of oxalate and calcium in urine<sup>(25,26)</sup>.

Kidney stones that contains magnesium salt usually found in struvite stones and it is was found in a high percentage in this study, This suggest a high incidence of urinary tract infection by ammonia forming micro-organisms<sup>(27)</sup>.

Cystine stones result from an excess of urinary cystine, due to a genetic defect in renal reabsorption of dibasic amino acids including cystine<sup>(28)</sup>.

The dietary recommendation to prevent recurrent cystine stones include a high fluid intake and salt restriction<sup>(29)</sup>.

Only 3 cases of males were determined to get xanthine stone which is usually occur due to a deficiency of xanthine dehydrogenase, which is an enzyme necessary for converting xanthine to uric acid<sup>(30)</sup>.

## Conclusions

It is clear that the most common type of kidney stone in Kerbala governorate was uric acid stones with high incidence in males than female. The most important role in the occurrence of these stone was the food stuff which contains high amount of purines.

Another conclusion was a high incidence of struvite stone which predict the importance of urinary tract infection as a causative agent.

## Recommendations

An additional studies about the role of diet as a cause and as a preventive measurement is important in the epidemiology of renal stones.

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