

Study the correlation among some kidney stone parameters in Babylon province

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Abstract

Kidney stone malady symbolizes a multifactorial sickness concerning metabolic, active, and demographic parts. The prevailing training studied demographic facts and organic parameters mid patients spotted with nephrolithiasis. Fallouts directed that males stayed more artificial than females, and a widespread series of oldness clusters were embodied, tell-tale the wide impact of this ailment. These discoveries advocate that food stone pathophysiology is not limited to lonely irregularities but arises from compound exchanges among many chemical systems. A broad considerate of these interactions could lift both proactive and useful methods in curative trial.

Keyword: Kidney Stone; Phosphate; Urea; Calcium and Electrolytes

1. Introduction

Offal stone bug represents lone of the greatest public illnesses of the urinary county, with momentous injury, healthcare burden, and return risk. In spite of eras of observation, advances in makeup, molecular biology, (particularly through 2025) have substantially expanded our understanding of the tools by which stones form, persist, and prime to hitches.

Rock of kidney infection moves entities diagonally all eons, genders, and cultural clusters. The incidence takes bigger distinctly complete the antique eras globally. Bargagli, Scoglio, & Fuster (2025) note that nephrolithiasis is now aware as a widespread criticism, done growing incidence nonetheless with age, sex, or culture [1]. In a cross-sectional study studying NHANES statistics from 2007–2018, Ding et al. (2025) create an overall commonness of ~10.20%, with much sophisticated risk among metabolically unhealthy obese people [2].

One duty distinguish in what way a vigorous meat devices solutes, water, and acid–base balance. 1. Filtration, Reabsorption, Secretion – Proper reabsorption of ingredients like calcium and oxalate. 2. Urine Size and Flow – Higher fluid intake increases urine volume, dilutes solute concentrations, and aggregation. 3. Urinary pH – Acidic vs. alkaline urine determines solubility: uric acid precipitates at low pH.

4. Urinary Inhibitors of Crystallization – Citrate, magnesium, citrate cuts free calcium concentration and avoids illustration [3]. 5. Supervision of Oxalate – Endogenous and dietary oxalate poorly metabolized, excreted renally. gut microbiota temper engagement. 6. Acid-Base Stability and Ammoniogenesis – Suitable ammonium excretion regulates urine pH, minimizing uric acid shingle hazard.

Bump, Conservation – Crystals aggregate and observe to cylindrical epithelium or interstitial. Bruised epithelium develops custody, redness, oxidative stress, ferroptosis –these rocks activate oxidative tension, inflammation. Inflammasome activation primes to IL-1 β /IL-18 production also fibrosis [4]. Ferroptosis [5]. Genetic and Metabolic Predisposition – Monogenic disorders and polygenic variations influence calcium, oxalate, and citrate absorption [1].

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2. Materials and methods

2.1. Samples collection

The serum samples were collected from different hospitals in Babylon province and private laboratories, that were saved by frozen at -20 °C after centrifuged blood sample until biochemical test.

2.1.1. Biochemical tests: 1-creatinine test by neogen, Canadian company

Include creatinine progress in the procedure specific for it :

- Find around one hundred μL of deionized aquatic and dwelling hooked on a exam cylinder for use as Average 4 (S4) mg/dL.
- Increase twenty-five μL of canons and dilute trials in duplicate to the apposite pits of the microplate.
- Enhance the insides of the R2 Alkali answer to the R1 Creamy Picric Caustic explanation. If the complete salver is not to be castoff at once, assortment the components in a unique portion to five dividends percentage.
- Improve one hundred and eighty μL of the chalky/picric acerbic explanation to respectively healthy.
- Blend innards by quivering platter gently
- Shelter platter with flexible flick or salver refuge and rear at scope for ten actions.
- Achieve the primary plate analysis at 500 nm.
- Complement fifteen μL of R3: Acerbic component to apiece well.
- Assortment insides systematically by introduction platter on a microplate shaker for 60 instants.
- Shelter bowl with pliable flick or salver refuge and raise at room malaise for five notes.
- Complete the subsequent plate construing at 500 nm.

2.1.2. Urea: from neogen company

- Serum and plasma mockups must be centrifuged to eradicate any particulates and before thinned ten-fold in disinfected water.
- Urine should be diluted 500-fold in purified water (DF = 500).
- Drain tasters should be blank by fraternization six hundred μL of drain with one hundred μL of six N HCl. Sieve for five actions at fourteen thousand.
- Duck practice of cubicle nation broadcasting holding phenol reed. Further radio tin be analyzed unswervingly.
- Tasters would be rich and pale with pH accustomed to seven - eight.
- Handover twenty μL of each Trial into replacement discrete bores of a clear 96 well plate. Once glowing will be castoff as the answer Illustration and the spare well the Sample Blank.

2.1.3. uric acid: was use kit of sigma company

- Transfer 20 μL of Sample, Blank, and Standard to appropriately labelled test tubes.
- Improve 1000 μL of Waged Chemical to each tube, mix.
- Incubate the tubes for 30 minutes.
- Measure the ocular density (OD) at 590 nm.

2.1.4. potassium: OFI testing equipment

The OFI TE Potassium assessment is right as a swift superintendent assessment for potassium in water, drilling fluids, and extracts from soil samples. A particular advantage of the test is that potassium can be semi-quantitatively resolute in the occurrence of ten epochs its quantity of sodium. The test strips have a color scale proceeded as tracks: Range: 0 - 300 - 700 - 1,000 – two thousand mg/L (ppm) K⁺.

2.1.5. Na

This test is achieved when indicators of a sodium disparity are existing, or as soon as ailments linked with atypical sodium points change. Sodium is the foremost constructive ion in the solutions external of cubicles. The attention of sodium secret cells is one round five mEq/L associated with 140 mEq/L exterior. Notwithstanding the fundamental rapport between sodium and water, the body regulates them independent of each other if necessary.

The Extant scheme is constructed on feedback of sodium with a choosy chromoogen varying a color from mauve to azure in the company of chealating intermediary whosse absorbancce diverges right as the awareness of sodiium in the assessment example

2.1.6. Ca

Take the blood from the person.

Centrifuge the blood to gets the serum.

The additions as in the shown Table:

Table 1 Components of Ca preparation kit for assay

	Blank	Standard	Test
R1	5000 ul	5000 ul	5000 ul
R2	5000 ul	5000 ul	5000 ul
R3		25 ul	
Serum			25ul
Distal water	25ul		

Blend glowing and let for 5 records at 377c.

Speak the absorbance for standard and test against the blank at wave length 570 nm.

2.2. Statistical analysis

With SPSS software, the statistical analysis was carried out. The study's results are reported as the mean $\pm$ standard deviation (SD). Using correlate bivariate test of the correlation between the various parameters was ascertained; a p-value of less than 0.05 and less than 0.01 is deemed significant.

3. Results and discussion

The results showed higher ratio of samples from male upon female in figure 1 and large number of samples in younger patient between 18-38 year has 45%, second group 39-59 year configure 38% and last group 68-80 year has 25% from all ratio of sample (figure 2).

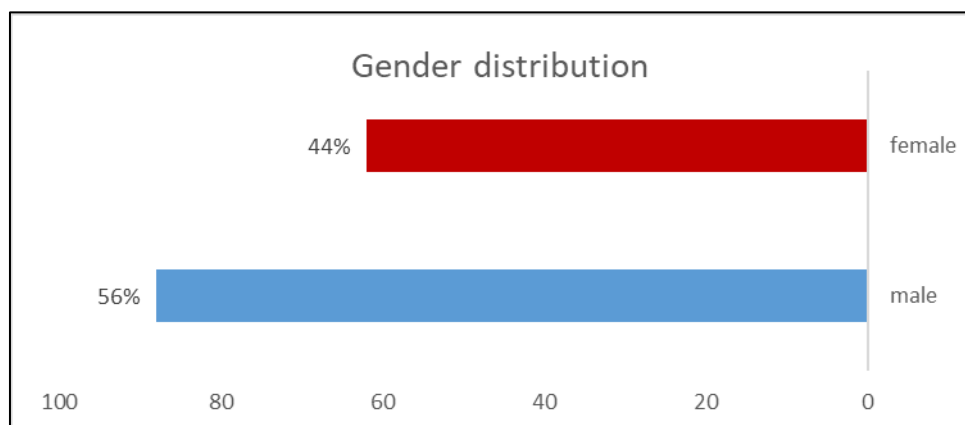


Figure 1 Gender ratio of samples

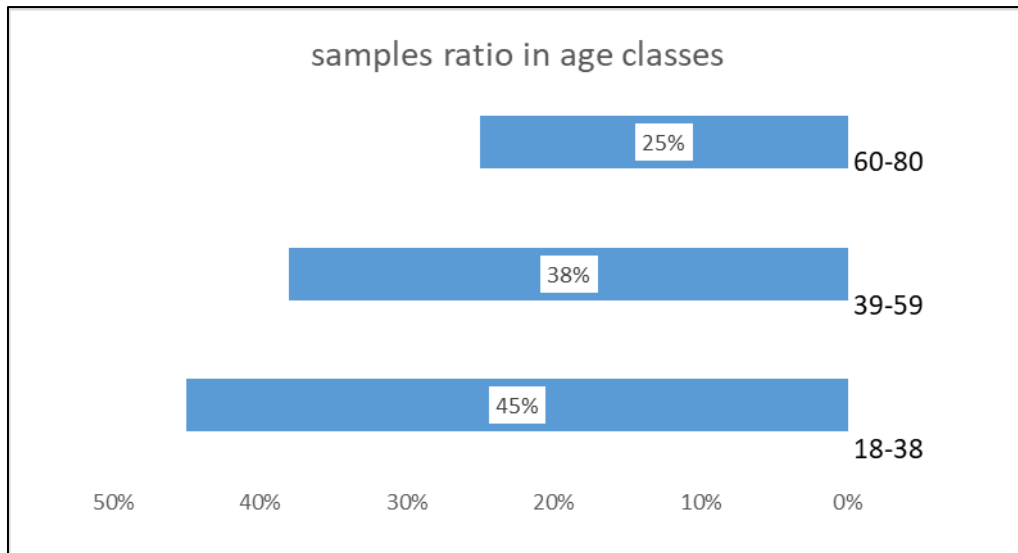


Figure 2 Ratio of samples depend on age classes

The elevation of all parameters in the patients of kidney stone when compare with normal range that appear in table 11, The demographiic spreading of the revision sample revealed that kidney stone disease upsets a varied choice of stage clusters, with a slightly higher prevalence among males (56%) compared to females (44%). This gender difference aligns with previous epidemiological studies reporting that males are more prone to nephrolithiasis, potentially due to hormonal influences, dietary habits, and higher muscle mass contributing to metabolic waste excretion (7).

Table 2 Mean and standard deviation for parameters of kidney stone patients

Parameters	Mean $\pm$ SD.	Normal range	Units
Blood urea	58.76 $\pm$ 17.34	15 - 45	Mg/dl
Uric acid	8.5 $\pm$ 0.32	3.4 - 6	Mg/dl
creatinine	3.84 $\pm$ 0.03	0.7 - 1.1	Mg/dl
Na	167.56 $\pm$ 12.56	135 - 145	mEq/L
K	6.5 $\pm$ 0.55	3.5 - 5	mEq/L
Ca	12.79 $\pm$ 0.87	8.5 - 10.6	Mg/dl

Higher blood urea and creatinine indicate negotiated glomerular filtration rate, a hallmark of renal impairment often associated with the formation of stones (8). Increased uric acid concentration further contributes to liithogenesis by endorsing urate quartz rainfall, especially underneath acidic urinary conditions (9). Similarly, elevated sodium and potassium may reflect dysregulation of tubular handling of electrolytes, which has been linked to stone recurrence and progression (10). The observed increase in calcium is consistent with hypercalciuria, lone of the record public metaabolic abnormaliities predisposing to calciium-based nephrolithiiasis (11). Collectively, the findings of Table 1 suggest that the pathophysiology of kiidney stoness in this cohort is strongly associated by impaired renal clearance mechanisms, heightened uric acid burden, and electrolyte imbalances that together establish a biochemical milieu conducive to stone formation and recurrence.

The results showed significant positive correlation between blood urea with uric acid, sodium concentration and potassium, but it was revealed non-significant correlation with calcium. Creatinine level has significant positive correlations with uric acid, sodium and potassium but non-significant positive correlation with calcium level, also uric acid has significant positive correlations with each of potassium and sodium level but non-significant with level of calcium.

The linking scrutiny only if deeper insights into the interrelationships among the biochemical parameters in patients with kidney stones. Blood urea unveiled a strong and important reformist overtone with creatinine ($r=0.967$, $p<0.01$), prominence the shared dependence of these markers on renal allowance efficiency (12).

Table 3 Correlations among study parameters of kidney stone patients

Parameters controversy	Correlations value
Blood urea × creatinine	0.967**+
Blood urea × uric acid	0.783**+
Blood urea × Na	0.819**+
Blood urea × K	0.918**+
Blood urea × Ca	0.178+
Creatinine × uric acid	0.899**+
Creatinine × Na	0.983**+
Creatinine × K	0.916**+
Creatinine × Ca	0.231+
Uric acid × Na	0.890**+
Uric acid × K	+0.830**
Uric acid × ca	+0.189
Na × Ca	+0.137
Na × K	+0.398**
Ca × K	+0.278

Creatinine verified significant helpful links with uric acid, sodium, and potassium, buttressing the total impact of renal failing on several metabolic lanes. Equally, uric acid was significantly and potassium then not with calcium. This shape stresses the somebody of uric acid a central factor in grit design while celebrity the somewhat liberated ruling of calcium in this easygoing group (15).

Sodium levels uncovered noteworthy relationships with potassium, reflecting the interconnected tubular handling of these electrolytes within the nephron (16). However, the correlations regarding calcium were commonly weak or non-significant, which may designate that calcium elimination in these patients is subject to multifactorial influences beyond the scope of the measured parameters (17).

Inclusive, the matching matrix put forward that kidney stone pathogenesis in this legion is not merely the result of elevated specific markers but rather the outcome of complex, interrelated biological stupidity. These verdicts underscore the neediness for extensive metabolic survey in patients with kidney sands, levelling various conduits to reach actual managing and stoppage policies (18).

4. Conclusion

This study was councluded the physiological parameters that more important to detect efficiency of kidney function also determine the tensive of blood, and conclude no significant correlation among these parameters in control group compare with patients of kidney stones.

Compliance with ethical standards

Disclosure of conflict of interest

This study doesn't contain any Conflict for interest.

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