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Research Article

RATE OF METABOLIC ANOMALIES IN PATIENTS WITH URINARY STONE DISEASE

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Abstract:

Objective: The objective of this research is to find out the rate of occurrence of metabolic anomalies in the urine of the patients suffering from the disease of urinary stones.

Methodology: Total 200 patients having calculi in their urinary tract discovered with the help of ultrasonography & urography were the part of this research work. The collection of twenty-four-hour samples of urine carried out from every patient and delivered for PH value, uric acid, present of different elements as magnesium, calcium, oxalate & specific gravity. The samples of blood of every patient delivered for levels of serum in urea, uric acid, calcium & phosphate.

Results: The average age of the patients was 38.0 ± 7.75 years. The most common complaint was pain of lumber & 82.50% patients were available to have the stones of calcium oxalate on their analysis chemically. We discovered the metabolic abnormalities in 90.50% patients, while there were no metabolic abnormalities in 9.50% (n: 19). Total 21.50% (n: 40) found with only one anomaly of metabolism & 78.50% (n: 157) found with different complications of metabolism. The very frequent observed anomaly of metabolism was hyperoxaluria available in 64.50% patients. Other important anomalies of metabolism were hypercalciuria, hypocitraturia, hypercalcemia & hyperuricemia.

Conclusion: The results of this work concluded that rate of the metabolic anomalies was very high among the patients suffering from the calculi in their urinary tract. We also concluded some metabolic anomalies in this research work.

KEY WORDS: Calculi, Urinary Tract, Hypercalcemia, Abnormalities, Anomaly, Phosphate, Hypocitraturia, Metabolism.

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INTRODUCTION:

Urolithiasis is a very common complication worldwide that is affecting the life of normal people. It is an estimation that about 2.0% people experience the disease of kidney stones at specific stages of their lives with highest occurrence in the second and third decade of their lives [1]. There are various kinds of the kidney stones in accordance with their composition. The most important component of the most of the kidney stones is calcium oxalate [2]. Different features as age, sex, weather, metabolic anomalies & inheritance a relation to develop the kidney stones [3]. Metabolic anomalies are very vital features because their modification can lead to the prevention from the danger of kidney stones [4]. The assessment of the patients suffering from the disease of urolithiasis comprises of radiography together with the tests of urine & blood.

Some research works have displayed that assessment in very costly for the patients who are suffering because of the formation of single stone [5]. Metabolic anomalies like hyper-calciuria, hyper-uricosuria, hypo-kalemia, hyper-uricemia & less volume of urine that causes the formation of the different stone diseases among various populations because of the features of environment and genetic factors [6]. In the patients having ureteric stones, metabolic assessment & involvement is necessary for the prevention of the recurring of these stones. The patients having multiple types of stones at the time of their first appearance or small age children with a previous history of ureteric stones should have an assessment as a rectifiable anomaly is available in such patients [7, 8]. The main objective of this research work was to find out the rate of metabolic anomalies in the patients of ureteric stones in general populations or the establishment of the design of policy to prevent the recurring of these ureteric stones among these patients.

METHODOLOGY:

The design of this research work was cross sectional research work and this research was carried out in urology department of Allied / DHQ hospital Faisalabad. This duration of this research work was from July 2017 to January 2019. The ethical committee gave the permission of this research work. Total two hundred patients of urolithiasis detected with the utilization of the ultrasonography & urography were the part of this research work. Patients available with only one stone, urinary complications as proteinuria, and recurring infection of the urinary tract, obstruction in the urinary tract & obstruction in the outflow from bladder and with other chronic diseases as failure of kidney, chronic disease of liver & previous history of drug addiction were not the part of this research work.

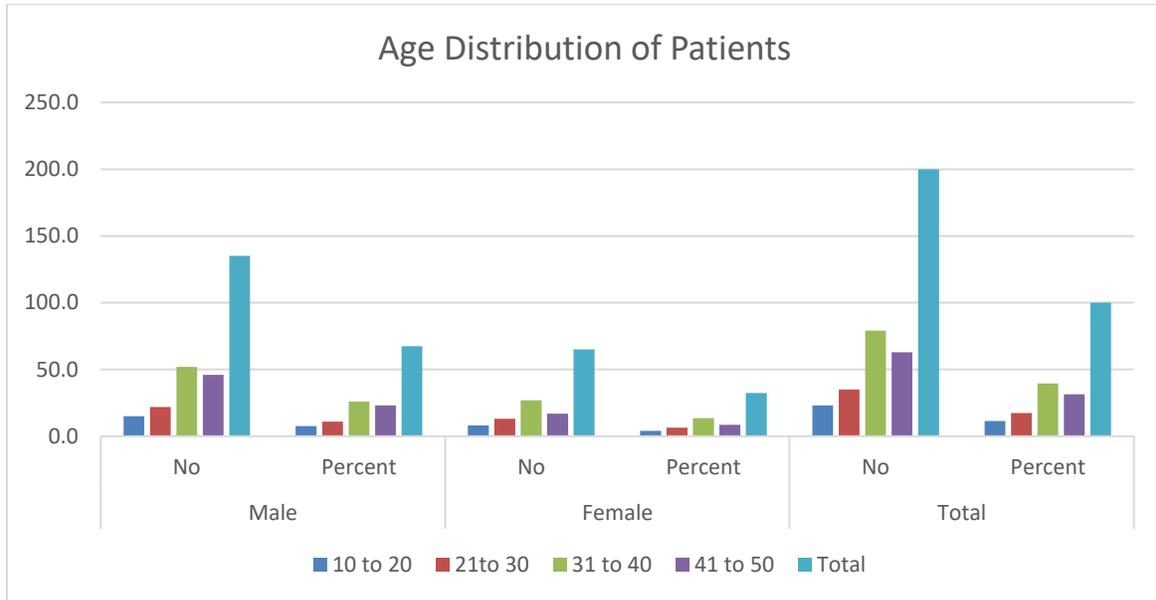
Patients with confirm metabolic anomaly & hyperthyroidism were also not the part of this research work. All the patients gave their willing to participate in the work. The collection of twenty-four-hour sample of urine carried out from every patient and sent to laboratory for the check of PH value and the presence of different elements as calcium, magnesium, and etc. Boxes of plastic were in use for the collection of the samples and they stored in two to eight centigrade of temperature. The collection of blood samples from every patient also carried out to check the urea level, calcium & phosphate. The levels of serum of metabolic features measured according to the procedures of chemical standards. SPSS V. 16 was in use for the analysis of the gathered information. The calculation of averages and SD values carried out for the quantitative variables. Chi square method was also in use. P value of less than 0.050 was the significant one.

RESULTS:

The range of the age of patients was 10-50 years with an average age of 38.0 ± 7.750 years. Most of the patients, 39.50% (n: 79) were in the age group of 31-40 years as available in Table-1.

Table-I: Percentage of Patients According to Age Group (n=200)

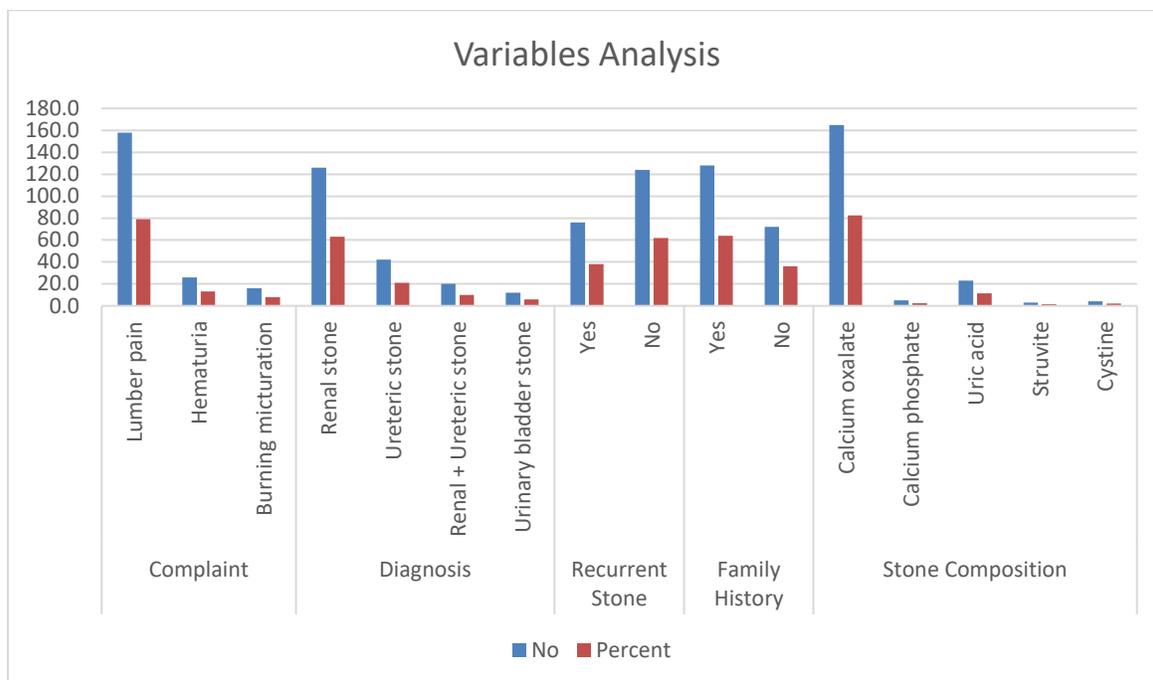
Age (years)	Male		Female		Total	
	No	Percent	No	Percent	No	Percent
10 to 20	15.0	7.50	8.0	4.00	23.0	11.50
21 to 30	22.0	11.00	13.0	6.50	35.0	17.50
31 to 40	52.0	26.00	27.0	13.50	79.0	39.50
41 to 50	46.0	23.00	17.0	8.50	63.0	31.50
Total	135.0	67.50	65.0	32.50	200.0	100.00



Out of total two hundred patients, 67.50% (n: 135) patients were male & 32.50% (n: 65) patients were females. The most complained presentation was pain of lumber in 79% patients, followed by burning micturition & hematuria. Ninety-four percent patients were available with kidney stones. Recurring stones was the problem of 38% patients whereas the other sixty-two percent patients were suffering from these stones for the very first time. The chemical analysis of the study showed that eighty-two patients were suffering from the stones of calcium oxalate. The descriptive statistics of various variables are available in Table-2.

Table-II: Descriptive Statistics for Different Variables (n=200)

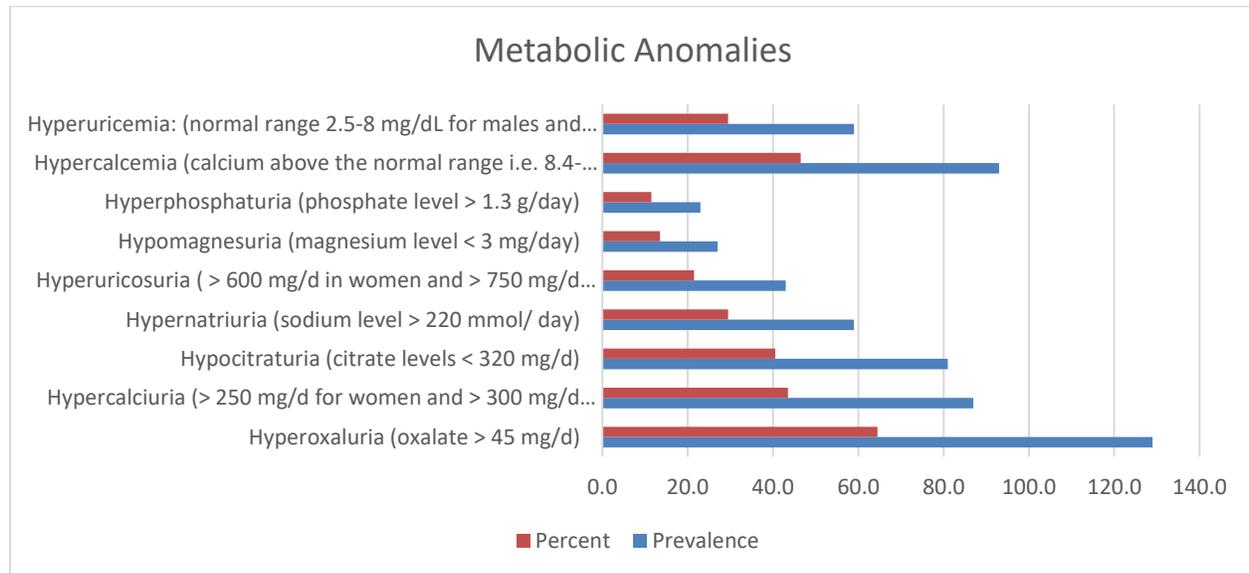
Features	No	Percent	
Complaint	Lumber pain	158.0	79.00
	Hematuria	26.0	13.00
	Burning micturition	16.0	8.00
Diagnosis	Renal stone	126.0	63.00
	Ureteric stone	42.0	21.00
	Renal + Ureteric stone	20.0	10.00
	Urinary bladder stone	12.0	6.00
Recurrent Stone	Yes	76.0	38.00
	No	124.0	62.00
Family History	Yes	128.0	64.00
	No	72.0	36.00
Stone Composition	Calcium oxalate	165.0	82.50
	Calcium phosphate	5.0	2.50
	Uric acid	23.0	11.50
	Struvite	3.0	1.50
	Cysteine	4.0	2.00



Metabolic anomalies were present in 90.50% (n: 181) patients, while there was no appearance of these anomalies in 9.50% (n: 19) patients. Total 21.50% (n: 40) patients were available with only one metabolic anomaly & 78.50% (n: 157) patients were available with more than one metabolic anomaly. The most frequent metabolic anomaly was hyper-oxaluria and it was present in 64.50% (n: 129) patients. There were some other common abnormalities of metabolism which are available in Table-3.

Table-III: Incidences of Metabolic Anomalies

Metabolic Anomalies	Prevalence	Percent
Hyperoxaluria (oxalate > 45 mg/d)	129.0	64.50
Hypercalciuria (> 250 mg/d for women and > 300 mg/d for men)	87.0	43.50
Hypocitraturia (citrate levels < 320 mg/d)	81.0	40.50
Hypernatruria (sodium level > 220 mmol/ day)	59.0	29.50
Hyperuricosuria (> 600 mg/d in women and > 750 mg/d in men)	43.0	21.50
Hypomagnesuria (magnesium level < 3 mg/day)	27.0	13.50
Hypophosphaturia (phosphate level > 1.3 g/day)	23.0	11.50
Hypercalcemia (calcium above the normal range i.e. 8.4-10.2 mg/dl):	93.0	46.50
Hyperuricemia: (normal range 2.5-8 mg/dL for males and 1.5-6.0 mg/dL for females).	59.0	29.50



DISCUSSION:

Development in the invasive methods have altered the surgical administration of the disease of stones in last ten years. Urolithiasis has the ability to be develop from metabolic anomalies, infection of the urinary tract & other nutritional factors [2]. The detection of metabolic factors in very difficult [9]. Metabolic assessment of the recurring formers of stones discovers the anomaly but it also supports in the determination of the choice of medicine and dose [6]. The average age of patients in this research work was 38.0 ± 7.75 which was lower than the studies of Kirac M [4] & Majalan NN [10] who provide mean ages as forty-two and forty-three years correspondingly. In current years, the occurrence of urolithiasis in females is increasing. Scales [11] in his research work concluded that male to female ration of the patients of urolithiasis reduced from 1.70 to 1.30 in last twenty years in United States of America. But in this research work, male patients outnumbered female patients, which is much similar to the works of Parvin M [6] & Kirac M [4].

Elfadil GA [7] found the pain of flank as the main complaint from patients. Androulakakis [12] in his research work concluded that the major components of the kidney stones in Europe are struvite & calcium oxalate. This this research work, metabolic anomalies were present in 90.50% patients, while there was no metabolic anomaly in 9.50% patients which is similar to many research works of the past [4, 6, 8, 10]. In his research work Amaro [8] stated that 62.20% patients found with multiple anomalies of metabolism. The most common abnormality observed in this research study was Hyperoxaluria and it was available in 64.50% patients. This rate was

not consistent with the other works [4, 8]. But hyperoxaluria was one of the frequent factor of risk according to previous research works but it was second most common factor of risk in accordance with the research work of Hess & his colleagues [13] & it was not much frequent in Thai formers of stones [14]. Different research works have described that the occurrence of hypocitraturia is from nineteen to sixty-three percent [4, 6, 10, 14, 15]. In this research work, there was availability of hypocitraturia in 40.50% patients. In the same manner other studies provided different rates of the metabolic abnormalities.

CONCLUSION:

The results of this research work concluded that the rate of the metabolic anomalies is very high in the patients suffering from urolithiasis. It is very necessary to assess every patient of urinary stone for the formation of calcium stones this help to reduce the risk facto of this disease but it will provide a way for regular treatments for the prevention of the formation of the stones.

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