ORIGINAL ARTICLE

STRATIFICATION OF RISK FACTORS, DIAGNOSIS AND TREATMENT STRATEGIES FOR UROLITHIASIS

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ABSTRACT

Objectives: To stratify risk factors, diagnosis, and different treatment strategies for urolithiasis

Material and Methods: A prospective observational study was conducted in Urology wards of Mayo Hospital, Services Hospital & Sheikh Zaid Hospital of Lahore-Pakistan, from June 2017 to August 2017. A total of 100 urolithiasis patients of varying age and sex were selected and a structured data collection form was administered and filled while interacting with patients. Data was analysed by utilizing SPSS Version 10.

Results: Among total of 100 patients, mostly (49%) were between age group of 31- 45 years. A high familial predisposition was not observed as 70% of patients had no family history of the ailment. Ailment is more typical in men (60%) as compared to women (40%). Ultrasonography is the mostly used (70%) modality for diagnosis.

Conclusion: Urolithiasis can result in severe pain and emergent situations which require prompt management to ensure protection of the patient's urinary system.

Keywords: Urolithiasis, Risk Factors, Diagnosis, Treatment Strategies.

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INTRODUCTION

Urolithiasis is an across the board malady that influences the urinary framework. Urinary stone infection impacts all age gatherings.The detailed pervasiveness stone ratio malady is 5%-12% in males; 4%-7% in females[1]. Stone arrangements are influenced by sex, geology and age. Male's plausibility of shaping stones is much more than that of females. The extent has reduced from 3:1-male to female transcendence to under 1:3:1[2]. Recent investigations show development of stones in urine and then its progression in all sexual orientation, ethnic and racial origins in the America[3].

Dietary patterns and environmental conditions additionally have a noteworthy demonstration in the development of urinary stones. Diabetes mellitus (DM), gout and obesity are nearly connected with urinary stone development[4,6]. Children represent around 1% of all patients with urolithiasis, who have a just about 100% hazard for recurrent stone arrangement. Both in adults and in children, stone size and area, different components, including stone arrangement, persistent elements, and the renal anatomy, can impact the achievement of particular treatment modalities[7,9].

A couple of hazard factors are seen to raise the potential of vulnerable individual to develop stones. These encompass anatomic aspects in the renal and furthermore in the urinary tract e.g. horseshoe kidney, ureter, lack of citrate in urine, metabolic scatters which increment discharge of solutes e.g. cystinuria (autosomal-recessive aminoaciduria), hyperuricosuria, chronic metabolic acidosis, medications such as diuretics, calcium and vitamin-D supplements, relative lack of hydration, hyper-parathyroidism, family history of kidney stones, hypertension, immobilization and gout. More typical event in hot environments, extended danger of stones in higher money related social affairs, contamination as showed by a spate of melamine-polluted newborn child milk formula[10].

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The ideal clinical administration of victim person with urolithiasis needs the information of the symptomatic systems, balanced treatment of serious stone colic, stone expulsive treatment and the propelled benchmarks of stone discharged[11]. These days, indicators for an active stones expulsion are identified with a few factors e.g. site, size and state of the renal stone at the starting presentation. In this way unconstrained stone section can be depended in up to 80% in patients with stones <4 mm in widths while for stones with a distance across > 7mm, the likelihood of unconstrained entry is low[12,13].

Re-occurrence of renal stones is common and in this way patient who have had a renal stone ought to be encouraged to adjust and embrace a few ways of life measures which will defer the relapse. Increment liquid administration to keep renal output at[2,3] liters daily, diminish salt admission, diminish the measure of meat and proteins in meat of eatable animals, diminish oxalate consumption (sustenance rich in oxalate involve rhubarb, chocolate, nuts) and urate-rich supports e.g. (certain and offal fish) , decrease oxalate and phosphate release and expands citrate secretion, contingent on the plan of the stone, optimum calcium intake, medications to halt stone development e.g. allopurinol(for urate stones), calcium citrate (for oxalate stones) and thiazide diuretics (for calcium stones) are some of the preventable strategies[14].

MATERIAL AND METHODS

A prospective observational study was conducted in urology wards of Mayo Hospital, Services Hospital & Sheikh Zaid Hospital of Lahore, Pakistan. The study was conducted from June 2017 to August 2017 involving the urolithiasis patients. Study population was 100 urolithiasis patients of varying age and sex. Patients were randomly selected via simple random sampling technique. Patients with other kidney diseases like chronic kidney diseases, acute renal failure and malignant conditions of the urogenital tracts were excluded from the study. A semi-structured data collection questionnaire containing the variables to be measured was used i.e. patient's demographics, family history, diet and fluid intake, risk factors, medications regimen etc. Data analysis was performed by SPSS Version 10 and results were presented in the form of frequency and percentages.

RESULTS

Table-1 shows the demographic characteristics of patients. This includes age, gender and family history. In this table, out of total (n=100), 25% (n=25) patients with age between 15-30 years, 49% (n=49) patients with age between 31-45 years, 20% (n=20) with age between 46-60 years and 6% (n=6) patients with age above 60 years, were suffering from urolithiasis.Table-1 also shows that 64% (n=64) males and 36% (n=36) females were suffering from urolithiasis thus the prevalence of bladder stone is more in males than in females in this study.

Table-2 depicts that 70% (n=70) patients had no family background of urolithiasis while 30% (n=30) patients had familial background of urolithiasis. Table-2 also shows that with reference to diet, 42% (n=42) of the patients were taking diet high in oxalate (beets, spinach), 38% of the patients were taking food rich in calcium (raw milk, yogurt, cheese, broccoli),13% (n=13) of the patients were taking diet high in sodium like fast food, restaurant food while 7% (n=7) of patients were taking food rich in vitamin c (grapes, grape fruit /citrus fruits, mega-doses of vitamin-c).Table-2 further shows that 67% (n=67) of the patients were taking water about 1.5 litre per day,15% (n=15) were taking about 1 litre per day, 14% (n=14) were taking about 2 litres per day, 2% (n=2) were taking about 2.5 litres per day, similarly 2% (n=2) of patients were taking water more than 2.5 litres per day. Table-3 depicts that patients of urolithiasis were suffering from other co-morbidities like hypertension 30% (n=30), hyperparathyroidism 20% (n=20), gout 15% (n=15), and diabetes 35% (n=35). Table-4 shows that mostly used diagnostic technique was ultrasonography about 70% (n=70) while in 20% (n=20) x-rays and 10% (n=10), CT-scan was used as diagnostic modality. Table-5 shows that mostly used treatment strategy for removal of stones was surgery. It was found to be 60% (n=60) while symptomatic treatment, stone expulsion and other strategies was also used for 25% (n=25), 5% (n=5) and 10% (n=10) patients respectively. Table-6 shows that NSAIDs were prescribed for 40% (n=40) patients, supplements, other drugs e.g. antibiotics, calcium channel blockers, anti-emetics, were prescribed for 25% (n=25), 20% (n=20), and 15% (15) respectively.

Table 1: Demographic characteristics of Patients

Characteristics	Variables	Percentages
Age	15-30 years	25%
	31-45 years	49%
	46-60 years	20%
	Above 60 years	6%
Gender	Male	64%
	Female	36%

Table 2: Risk factors strtification

Parameters		Percentages
Family History	Yes	30%
	No	70%
Diet Intake	Food rich in calcium	38%
	Food rich in oxalate	42%
	Food rich in sodium	13%
	Food rich in vitamin-c	7%
Water Intake per Day	1 litre	15%
	1.5litres	67%
	2 litres	14%
	2.5 litres	2%
	More than 2.5 litres	2%

Table 3: Co-Morbidities in patients

Other Co-morbidities	Hypertension	30%
	Hyperparathyroidism	20%
	Gout	15%
	Diabetes	35%

Table 4: Diagnostic modalities in current study

Parameters		Percentages
Diagnostic Techniques	Ultrasonography	70%
	X-rays	20%
	CT-scan	10%

Table 5: Treatment strategies

Treatment strategy	Percentages
Symptomatic treatment	25%
Surgery	60%
Stone expulsion	05%
Others	10%

Table 6: Medications for Treatment

Drugs for Treatment	Percentages
NSAIDs	40%
Antibiotics	25%
Anti-emetics	20%
Calcium channel blockers	15%

DISCUSSION

An observational study was conducted to stratify the risk factors; diagnosis, treatment strategies and prevention of urolithiasis patients in Mayo Hospital, Services Hospital and Sheikh Zaid Hospital of Lahore. A total of 100 patients of urolithiasis were included in the study. A high family predisposition was not reported in our study. Majority of the patients themselves was suffering from Type II diabetes mellitus, hypertension, hyperparathyroidism and gout. With regard to age, 49% of patients were suffering from urolithiasis belonging to 31-45 years of age group. However in another study this event was reported for 14-24 years old in Germany, 21-30 years olds in Milan, Italy, 60-79 years old in Korea, 20-29 years old in United States of America and 3 age sections in Greece (age < 20, age 30-39 years and age 50-59 years)[15,19].

As in this study, men were more likely to have urolithiasis than female. Hypercalciuria is common in man and this may be the underlying phenomenon. In another study, there were 57.92% males and 42.08% female patients. Most of the patients complained about flank pain[20].

There is a verifiable proof of the impact of normal eating style on stone formation. In current study, with reference to food, 42% of the patients were taking diet high in oxalates (beets, spinach), 38% of the patients were taking food rich in calcium, 13% were taking diet high in sodium. There is documented evidence that calcium utilization is a risk factor for urolithiasis. Having maximum oxalate utilization has additionally been shown to enhance the stone development process. Epidemiologic examinations have shown that increase sodium and protein in meat consumption have an equivocal impact on stone risk. In any case, a randomized dietary intervention study exhibited that lessening of sodium and protein in meat of animals and maintenance of typical dietary calcium intake constricts urolithiasis. It is proved that utilization of protein in meat of animals has expanded in various nations, paralleling the quick progression of urolithiasis[21].

The study demonstrates that 67% patients were taking water about 1.5 litre per day which is usually low. Low urine output is an essential hazard that causes renal stone development. Epidemiological audit has demonstrated that people having chronic dehydration due to extreme temperature of environment, extreme level of practice or physical training or activities, and

lacking substitution of drinkable liquids have an especially high frequency and commonness of urolithiasis. In Israel, the hazard of development of renal stones previously observed to be generously more noteworthy like people living in towns and in the dry regions contrast to those living in little mild areas[22]. Moreover a high fluid intake could limit stones development by cutting down the urinary convergence of stone shaping constituents, however in the mean time debilitate the urinary centralization of inhibitors[22].

In addition to diagnosis, stones imaging is a vital analytic method and starting step in picking which medicinal contrasting options to use for treatment and curing of urolithiasis. Determination of stone size and location from imaging empowers hazard stratification in regards to spontaneous stone passage without surgical intervention. Choosing the right methodology for urinary stones includes many elements including clinical setting, patient body habitus, cost and resistance of ionizing radiation. Various imaging modalities are accessible but widespread clinical utilize is at present limited to ultrasonography, CT scanning and X-rays. In this study diagnosis and location of stone were regularly foreseen through ultrasonography. Patients presented to emergency department with flank pain experienced ultrasonography as major aspect of workup for urinary stones[23,24]. As in this study, NSAIDs were prescribed for 40% patients, for the help of extreme torment. NSAIDs also are much more efficacious and have fewer tendencies to cause nausea. Anti-emetics, antibiotics and calcium channel blockers were prescribed to 20%, 25%, and 15% respectively. A simple demographic descriptive study limited to one city is the main limitation of this study. Prospective longitudinal cohorts involving multicentres across the major cities of country will be of much more epidemiologic and diagnostic significance.

CONCLUSION

Urolithiasis can result in severe pain and emergent situations which require prompt management to ensure protection of the patient's urinary system.

RECOMMENDATIONS

The frequency and predominance of urolithiasis is expanding globally and is seen across sex,age, and race. Protection of urinary system is of most significance and clinicians should be aware of renal and ureteric calculi while analyzing a patient with stomach, back, flank and groin pain. Changes in dietary practices and increase fluid intake are one of the most important and least expensive forms to prevent recurrence of urolithiasis.

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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under:

Baghdadi HM: Designed Research study, Literature search, Data Collection, Data Analysis and Manuscript writing.

Naseer S: Conceived Data, Data collection, Data Analysis.

Sheraz BA: Manuscript writing, Final Reading and approval.

Sadeeqa S: Final Reading and approval for research work.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.