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Original Article

Study on urolithiasis diagnosed in a private medical centre in Rajshahi City

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Abstract

It was a cross-sectional descriptive study. Sample size was 12227 of which 4148 were male and 8079 were female. Data were collected from all the patients attending the private medical centre, selected purposively, to have ultrasound examination for different reasons, during the calendar year 2016. A semi-structured questionnaire was used as the instrument of the study. It was observed that 18.32/1000 males and 9.90/1000 females had been diagnosed as cases of urolithiasis. Overall occurrence was calculated as 1.27%. Majority of the females had urolithiasis in the age-group of 'up to 20 years' (70%). In case of males, the problem was more common in '41 to 60 years' and '61 years and above' age-groups (62.5% and 66.7% respectively). Majority of the respondents had single stone only (68.6%). Kidney was the commonest site for the localization of both single (85.9%) and multiple stones (97.2%).

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Introduction

Urolithiasis or calculus in urinary tract is a common problem in medical practice and its prevalence is gradually increasing worldwide.[1] It may be found anywhere in urinary tract from kidney to urinary bladder. They may be present for years without any symptom and may be discovered incidentally during radiological examination for some other disorder. It may also be present with symptoms like lumber and loin pain, recurrent urinary tract infection or complications of urinary tract obstruction.[2]

Ultrasonography (US) is considered as the first line of choice to find out urinary tract stones as it is safe, without any radiation hazard, non-invasive, painless and comparatively less costly. Some radiolucent stones cannot be discovered by X-Ray, hence it has an advantage over X-Ray. But the disadvantage is that some ureteric stone can be missed due to deep retroperitoneal location and overlapping bowel shadow which interferes sound wave penetration. Sonography has a 96% sensitivity for urinary stones. However if stone size is considered then 100% sensitivity was reported in case of stones greater than 5 mm in size.[3] On Sonography calculi are seen as echogenic foci with posterior acoustic shadow.

Sufficient information regarding occurrence and pattern of urinary tract calculi on the basis of ultrasound findings is not much available in Bangladesh. So this study was done among all the patients attending to perform abdominal US for any purpose in a private diagnostic center of Rajshahi metropolitan area and occurrence and pattern of urinary calculi was found out from the US findings.

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Material and Methods

This is a cross-sectional descriptive study. Data were collected from all the patients attending in a private medical centre of Rajshahi Metropolitan area for the purpose of having abdominal ultrasound, during the calendar year 2016 CE. A total of 12,227 patients were included in the study of which male were 4148 and female were 8079. Written consent was taken from the respondents after explaining the nature and purpose of the study. The medical centre was selected purposively for the convenience of the researchers. Diagnosis was done on the basis of ultrasound findings by two qualified ultrasound experts (among the authors), using Phillips Affinity 70G scanner. Diagnosis of stone was confirmed when an echogenic structure was found in urinary tract with definite posterior acoustic shadow. Any doubtful lesion or lesion without any acoustic shadow was further evaluated by X-Ray KUB. If no radio-opaque shadow was found, the case was discarded from the study. A semi-structured questionnaire was used to collect information necessary for the study.

Results

Out of a total 12227 respondents, 76 males among 4148 (18.32/1000) and 80 females among 8079 (9.90/1000) i.e. 156 respondents had been diagnosed as the cases of urolithiasis (Figure 1). Overall occurrence of urolithiasis among all the patients was 1.27%. The male predominance was found here much more high and the difference was highly significant statistically at $p < .05$ ($X^2 = 15.4262$, df=1, p=.000086). The mean age of the respondents with urolithiasis was calculated as 37.69 years with standard deviation ± 14.74. The minimum age was 15 years and the maximum 80 years.

In the age-group of 'up to 20 years', majority of the females had urolithiasis (70%) but in the age-groups of '41 to 60 years' and '61 years and above', majority of the respondents were males (62.5% and 66.7% respectively) (Table 1). The difference was statistically significant at $p < .05$ ($X^2 = 8.6348$, df=3, p =.034563).

Majority of the respondents (68.6%) had single stone only and the rest 31.4% had multiple stones. The sites of multiple stones were mostly kidney (85.7%), only 14.3% were in both kidney and ureter. The site for single stone was also kidney in most of the cases (97.2%). Ureter and bladder had only 1.9% and 0.9% of the single stones (Table 2). The chi-square calculation showed highly significant result at $p < .05$ ($X^2 = 12.3102$, df = 3, $p = .006393$).

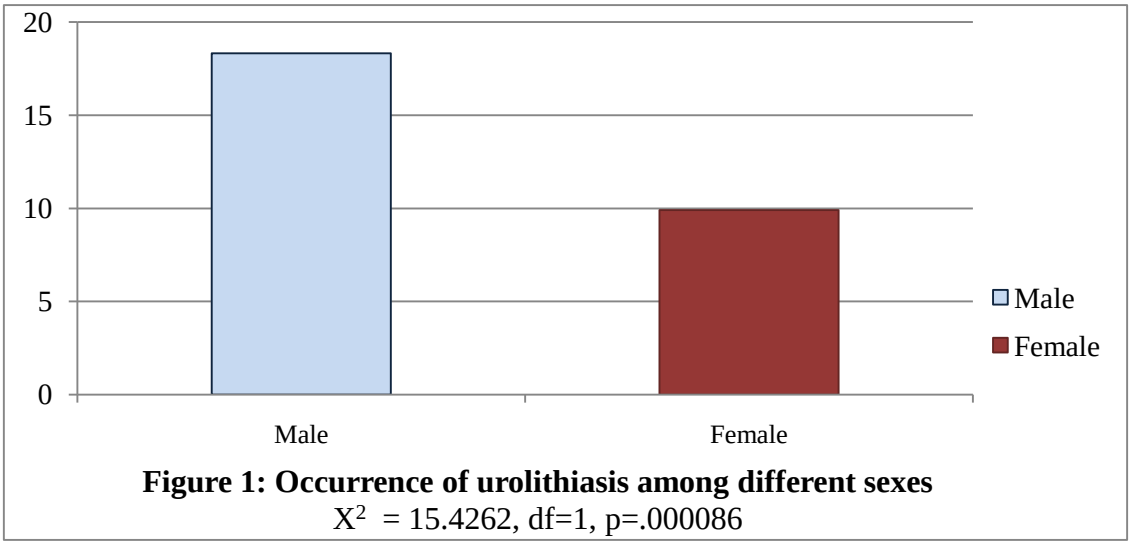

Figure 1: Occurrence of urolithiasis among different sexes
$X^2 = 15.4262$, df=1, p=.000086

Table 1: Age and sex of the respondents with urolithiasis

			Sex		
			Male	Female	Total
Age Group of respondents	up to 20 years	Count	6	14	20
		% within Age Group	30.0%	70.0%	100.0%
		% within Sex	7.9%	17.5%	12.8%
	21 to 40 years	Count	34	45	79
		% within Age Group	43.0%	57.0%	100.0%
		% within Sex	44.7%	56.2%	50.6%
	41 to 60 years	Count	30	18	48
		% within Age Group	62.5%	37.5%	100.0%
		% within Sex	39.5%	22.5%	30.8%
	61 years and above	Count	6	3	9
		% within Age Group	66.7%	33.3%	100.0%
		% within Sex	7.9%	3.8%	5.8%
Total		Count	76	80	156
		% within Age Group	48.7%	51.3%	100.0%
		% within Sex	100.0%	100.0%	100.0%

Mean Age 37.69 years, Minimum Age 15years, Maximum Age 80years, Standard deviation ±14.74. The difference was statistically significant at $p < 0.05$ ($X^2 = 8.6348$, df=3, $p = .034563$).

Table 2: Number of the calculi in relation with their site

			Site of calculus				Total
			Kidney	Ureter	Bladder	Both Kidney & Ureter	
Number of calculus	Multiple stones	Count	42	0	0	7	49
		% within Number	85.7%	0%	0%	14.3%	100%
		% within Site	28.8%	0%	0%	100.0%	31.4%
	Single stone	Count	104	2	1	0	107
		% within Number	97.2%	1.9%	.9%	.0%	100.0%
		% within Site	71.2%	100%	100%	.0%	68.6%
Total		Count	146	2	1	7	156
		% within Number	93.6%	1.3%	.6%	4.5%	100%
		% within Site	100.0%	100%	100%	100%	100%

The result is highly significant at $p < .05$ ($X^2 = 12.3102$, df = 3, $p = 0.006393$).

Discussion

The present study showed a clear male predominance in the occurrence of urolithiasis. The prevalence of urolithiasis in the general population also showed a male predominance almost all over the world. In the region of Bangladesh, Pakistan, India, Thailand, Saudi Arabia and Japan – the stone burden remained high in males with a male-female ratio as 2:1.[4] Khan et al (2014) also reported the male-female ratio as 2:1 in their study among 60 children with symptoms of urolithiasis.[5] In the most recent survey by the National Health and Nutrition Examination Surveys conducted upon the adult population of United States, by the seventh decade, it was found that almost 12% of white men and 6% of white women were reported having a kidney stone.[6] Trinchieri (2008) found that renal stones were usually described as more frequent in men. In the western countries, the prevalence of kidney stones varied greatly between geographic locations, ranging from 8% to 19% in males and from 3% to 5% in females.[7] An extensive nationwide Taiwanese study revealed the age adjusted prevalence of urolithiasis in 2010 as 9.01%, 5.79% and 7.38% in male, female and all subjects, respectively.[8]

One dissimilar result was found in the Paraiba Valley study by Silva and Maciel (2016) in connection with the occurrence of urolithiasis among different sexes, where they showed the prevalence ratio as 0.9 men for every woman with no statistically significant difference between them (p-value being >.05).[9]

Regarding occurrence of urolithiasis in different age groups, this study showed the highest occurrence of the problem in the group of 'up to 20 years' for the females. But for the males, the age groups of '41 to 60' and '61 and above' years had the higher occurrence in comparison to other groups. Mehmet and Ender (2015) stated that urolithiasis affects urinary tract in all age groups (contrary to the findings of this study) having no inclination to any age groups.[10] But a Saudi study had almost similar result with present study regarding age groups. Khan et al (2012) carried out a monocentric study among 332 urolithiasis patients of age ranging from 1 to 90 years and found that urolithiasis was present mainly in 51 to 60 years age group (24%), especially males belonging to this group (25.8%). They also found that anatomically, stones were found prevalent in kidneys (79.2%).[11] In the study on 177 Omani people admitted in Sohar Hospital, urolithiasis was found more common in 30 to 39 years age-group, but no association was found statistically. It was also assumed that the risk was generally higher in men than in women.[12] Chand, Shah, Pant and Paudel (2013) got 71.95% patients of urolithiasis in the productive age group (20-60 years) with a male-female ratio as 1.35:1. They also found majority of the stones to be located in kidney (68.69%), similar to the finding of the present study.[13] Sofia, Manickavasakam and Walter (2016) found sex ratio as 1.82:1 and 57.50% patients were between the age of 21 and 40 years.[14] Knoll et al (2006) showed the predominance of male calcium stone formers even higher among elderly patients with a 3.13:1 ratio at ages 60 to 69. In the year of 2006, the overall male-female ratio was 2.7:1 in their study.[15]

A study in Manipur on a sample of 875 individuals with urolithiasis revealed that the disease was observed to be significantly more common (56.7%) in the age group of 25 to 44 years. They also found that males were more affected there.[16] In a 17 years long study from 1959 to 1975, 1192 patients (male 818, female 374) were diagnosed as urolithiasis in the Urological department of Hokkaido university hospital with a male-female ratio as 2.19:1. The ureteral stone was the highest in number among them (54.2%) followed by renal stone (38.4%). The bladder stone and urethral stones were very few (6.4% and 1.1% only).[17] Male-female ratio was found to be 2.5:1 among the hospitalized patients in Baghdad and the highest occurrence of stone was in the kidney (67.4%) there, followed by the bladder (14.6%) and the ureter (12.5%).[18]

Conclusion

This study revealed that males were more prone to have urolithiasis, age-group of 'up to 20 years' for the females and 'over 40 years' for the males showed remarkable occurrence of urinary stones, kidney was the commonest site for the localization of the stones and single stones occurred most frequently than multiple ones. It was stated earlier that the incidence and prevalence of the problem is gradually increasing day by day.[1] But unfortunately sufficient data are very much scarce in this country. The result of the present study demanded an attention from the health care provider of the region to initiate a full scale research work to find out the detailed situation of the problem regarding incidence, prevalence, complications, aetiological factors and socio-demographic characteristics of urolithiasis in this region. Then the limitations of the present study can be avoided and necessary information could be disseminated to all the health care providers for the betterment of the common people.

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