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Original Article

Prevalence of Kidney Stone Diseases in Benghazi; Libya

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Abstract

Background: Kidney stone disease (KSD) is a common disorder globally. Despite some improvements in detection methods and prevention strategies for kidney stones, but increase in KSD prevalence remain a problem.

Objectives: The purpose of the present study is to assess the prevalence of kidney stone disease in Benghazi; Libya based on the location of the stones, age, and gender of the patients; the comorbid conditions have been determined

Materials and Methods: In this work, 155 cases were reported between the 1st. January 2020 until March. 2021 were evaluated retrospectively with all recorded clinical and demographic data. Excel has been used for data collection and descriptive analysis.

Results: Highest prevalence of renal calculus disease was in the age group 40-49 in males. The disease was more common in males than females, giving a male: female ratio of 2:1. Stones located in the ureter were the most common type with a percentage of 73%. Hypertension is the most comorbid condition with kidney stones representing 43% of all studied cases.

Conclusion: it is concluded that the highest prevalence of kidney stone diseases is in the middle age group and male is the most affected gender, number of medical co-morbidities such as Hypertension and diabetes have been associated.

Keywords: Kidney stone diseases, Prevalence, comorbid condition

Introduction:

Kidney stones disease (KSD) is one of the most common and painful urologic disorders. Unfortunately, a large number of people are suffering from the urinary stone problem all over the world. The prevalence of renal calculus disease becomes the third most common urology disorder. The incidence of KSD has been increasing worldwide in the recent decade due to lifestyle changes such as lack of physical activity, dietary habits, and global warming (Ahmad, Ansari & Shad, 2016)[1]. Renal stones can form as a result of the precipitation or crystallization of minerals and urinary constituents in the kidney, such as calcium oxalate, calcium phosphate, cystine, or uric acid. The presence of mixed-type stones shows a complex etiology for the production of renal calculi. Kidney stone disease (KSD) negatively impacts kidney function, which can result in chronic kidney disease and end-stage of renal failure. (Rule *et al.*, 2009)[2].

Genetic factors that play a major role in the pathogenesis of this condition have been recognized. kSDs are quite common and usually affect middle age group people. They affect men more than women. The male predominance is due to the androgens hormone, androgens appear to enhance oxalate excretion and the formation of

crystals in the kidney, whereas estrogen reduces oxalate excretion in the urine. Salt intake, hot weather, and dry climate cause more fluid loss and a decrease in urine volume, which causes a lowering in urine pH and an increase in uric acid excretion. (A & Hassali, 2018)[3]. KSD is usually linked to gout, obesity, metabolic derangement, and diabetes (Fan, Kalim & Ye, 2017)[4].

KSD can range from an asymptomatic coincidental finding with asymptomatic limited clinical importance to an excruciating repetitive disorder with considerable morbidity (Vinay, 2013))[5]. Renal stones may cause trauma, ulceration, and bleeding; which stimulates prostaglandin synthesis, resulting in inflammation, and edema, and predisposing patients to bacterial infection (Ahmad, Chaughtai & Khan, 1991)[6]. Despite positive outcomes following the intervention, the recurrence of KSD is alarmingly high (Zenga *et al.*, 2019) [7].

Aim: The current study aims to determine the prevalence of renal calculus disease in Benghazi; Libya based on the location of the stones, age, and gender of the patients; the comorbid conditions also have been determined.

Methods:

The study was a retrospective study designed on the prevalence of renal calculus disease in Benghazi city. Samples of both genders were included in the study and age groups ranging from 13 years up to 84 years were collected from the medical records of all patients who had KSD treated in Urology Department at AL Hawari Hospital –from 1st. January 2020 until March. 2021 with the total number of cases 155. All required basic information and data regarding the history of comorbid diseases such as diabetes and hypertension were obtained from their medical documentation. Excel has been used for data collection and descriptive analysis.

Results:

The study was conducted among 155 patients. Out of them, 106 (68%) were males and 49 (32%) were females as shown in (figure 1). Male to female ratio in this study was 2.2:1. The patient's ages encountered in the study ranged in age between 13 and 84 years with a mean of 46.6 (±13.5). Prevalent between ages is shown in Table 1 shows that the peak age group of the high prevalence of KSD observed was 40-49 (30%), followed by 50-59 (23%) and then 30-39 (16%). The last number (1.9%) of stone formers were present in both age groups of 80 s, and younger age groups between 10-19 years.

Details of the anatomical distribution of the 155 kidney stones were assessed. The data showed that a ureteric stone is the most common location found in 94 (60.6%) of patients. Ureteric stones were much more prevalent in the males in our sample, 62 (40%) compared to 32 (20.6%) for females (figure 2). The second site of kidney stone is renal stone either unilateral or bilateral. The prevalence of unilateral renal stones was 42 (27.1%), and bilateral renal stones were found in 19 (2.3%) of patients, there was a higher prevalence of renal stones in males (25.7%) than in females (13.5%) in both unilateral and bilateral types.

Medical history as reported in inpatient medical records was used as a source of associated comorbid conditions. Our data indicated that the prevalence of kidney stones was higher among hypertensive patients 66 (43%), 45 (29%) patients were associated with Diabetes and 22 (14%) patients were associated with recurrent urinary tract infection (UTI). Only 5 (3%) patients were associated with hydronephrosis. We observed that 17 (11%) patients were associated with renal failure on dialysis.

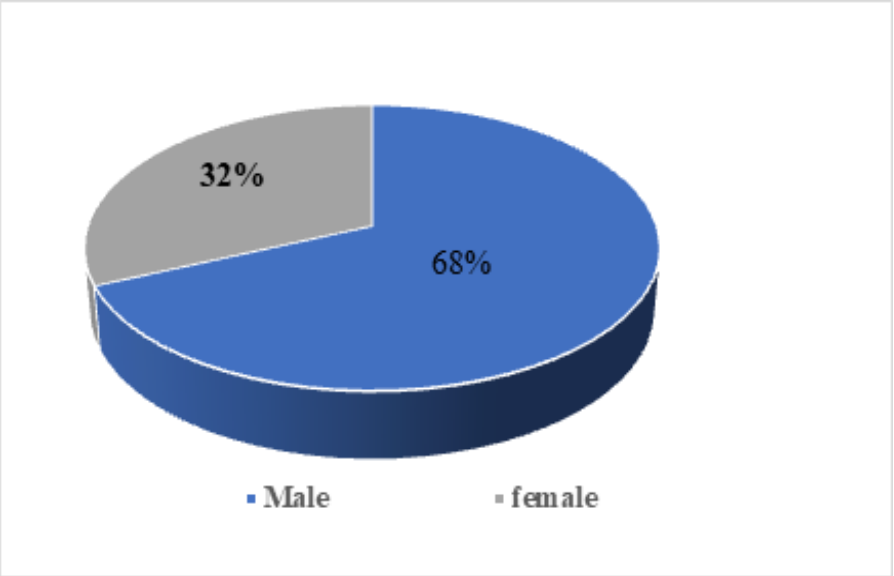

Figure-1. The overall prevalence of renal stones in males and female

Table-I. Age and gender-specific prevalence of kidney stones in patients

Age group (years)	Male	Female	Total N (%)
10-19	2	1	3 (1.9%)
20-29	11	4	15 (9.7%)
30-39	18	7	25 (16%)
40-49	**32**	14	**46 (30%)**
50-59	23	13	36 (23%)
60-69	15	8	23 (15%)
70-79	2	2	4 (2.5%)
80-89	0	3	3 (1.9%)

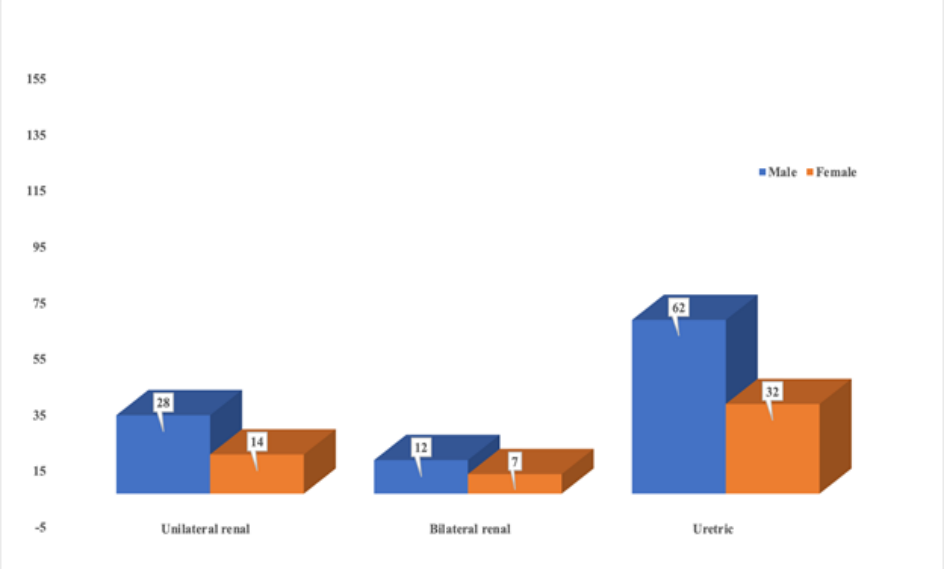

Figure-2. Prevalence of kidney stones according to Location

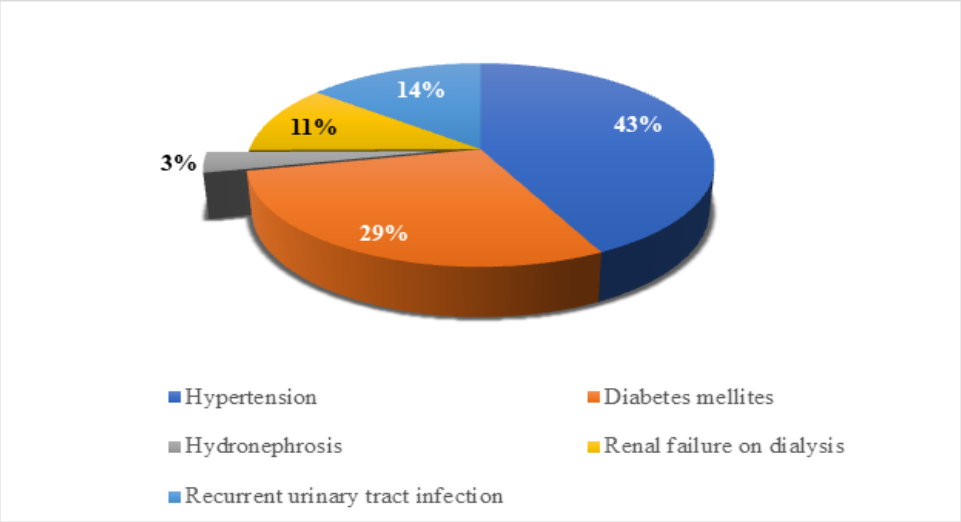

Figure-3. Comorbid medical conditions associated with kidney stone

Discussion:

In the current study, a sample of 155 patients was collected from in Urology Department at AL Hawari Hospital, in Benghazi Libya. Retrospective chart reviews were done to collect the necessary data to assess the prevalence of kidney stone disease and its comorbid conditions.

Regarding gender-specific prevalence, in the present work, the data showed a higher prevalence of KSD in male patients than females with a male to female ratio of 2.2:1, the findings are close to that of M.Bouatia et al, who reported an overall sex ratio prevalence of 2.03:1 (Bouatia *et al.*, 2015) [8]. Other studies have reported that kidney stone was more prevalent among men [9,10]. The sex hormones in both genders can be responsible for the higher risk of kidney stones, Androgen increases the risk of KSD in men. However, estrogen in females prevents the formation of renal stones by increasing the production of citric acid [11].

In this study, the prevalence of KSD was at high preponderance among patients in their 4th and 5th decades (40-49 years, and 50-59 years age group) the most productive period of life, and with minimum cases were found among elderly (70-89 years) and younger (10-19 years) age groups. This result is in agreement with that of Ahmed et al who reported that the maximum number of patients was between the 3rd and 5th decade of life [12].

In terms of the anatomical distribution of KSD in the urinary tract was also noted, Our data found that the ureteric stones 94 (60.6%) were more frequent than renal stones with 61 (39.4%), these results are different from D.S. Qaader et al, who's findings state that kidney stones were (67.4%) renal, and (12.5%) ureteric [13]. Moreover, our results revealed that ureteric stones were more frequent in males 62 (40%) than in females 32 (20.6%). This result is in agreement with the findings of some other researchers who indicated that ureteric stone predominates in males [14]. In this study, the highest numbers of renal stones were found unilateral (27%). Whereas, bilateral stones were noted only in 12.3% of patients. In agreement with other studies 93.4% of renal stones cases were unilateral and just 6.6% bilateral [15].

Our analyses demonstrated a high frequency of kidney stone formation among hypertensive patients 66 (43%) followed by diabetes mellites 45 (29%). Similarly, other researchers have reported that hypertensive men had a greater risk of developing kidney stones [16]. In this regard, Moreover, Weinberg et al. found that the severity of Type 2 diabetes was an important risk factor for kidney stone disease[17]. Our data also showed that the frequency of renal stones was 14% in patients with recurrent urinary tract infections (RUTI). A similar result was obtained in another study showed the association between recurrent RUTI and stone was 10–15% [18]. In our study, only 11% of the KSD patients had a renal failure on dialysis. However, Foley et a reported more incidence of hemodialysis in patients with renal stones. Further study is needed to more clearly explain the

mechanism of stone formation associated with certain medical conditions

Conclusion

It is concluded that the highest prevalence of kidney stone disease is in the age group 40-49 in males. The disease is more common in males than females. According to the results of the present study, the prevalence of kidney stone diseases is related to gender, and several medical comorbidities like hypertension, and diabetes. The results of this study are helpful to health care providers for preventive planning for kidney stone disease.

Conflict of Interests

The authors have no conflict of interest.

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