

## Urolithiasis Visits and Trends

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**Background:** Urolithiasis is the third most frequent urological disease in the world, affecting both males and females. It is one of the most common conditions encountered in Emergency Departments (ED) worldwide.

**Objective:** To evaluate the frequency of visits and hospital admissions related to urolithiasis.

**Design:** A Retrospective Review.

**Setting:** Emergency Department, King Hamad University Hospital, Bahrain.

**Result:** Four hundred eighty-six patients were diagnosed for the first time with urolithiasis. The mean number of the patients is 40.5 per month; the highest was 70 (14.4%) patients in May 2014 and the lowest was 23 (4.7%) patients in December 2014. Four hundred four (83.1%) males were diagnosed with urolithiasis. There was almost no difference between the number of Bahraini patients and non-Bahraini patients, 237 (48.8%) and 249 (51.2%) respectively.

The age group frequently affected are those between 20 to 49 years. The majority of the stones were located in the ureter and/or in the kidney. Two hundred thirty-six (48.6%) patients had ureteric stones, and 109 (22.4%) patients had kidney stones. One hundred twenty (24.7%) patients had both kidney and ureteric stones. Thirteen (2.7%) patients had stones in the bladder and 3 (0.6%) patients in the urethra. Two (0.4%) patients had stones in the bladder and the kidney. Three (0.6%) patients had stones in the bladder and ureter.

**Conclusion:** This study is the first to address urolithiasis incidence in emergency department and trends of hospitalization. Further multicentric studies investigating contributing factors and prevalence of urolithiasis are needed.

*Bahrain Med Bull 2016; 38(4): 211 - 213*

Urolithiasis is the third most frequent urological disease in the world, affecting both males and females alike<sup>1</sup>. It is one of the most common conditions encountered in ED worldwide<sup>2</sup>. For many years in prehistoric centuries, urolithiasis had a tragic outcome that often led to mortality. Examinations of Pharaoh mummies have shown renal and bladder stones. In 1901, the English archeologist, Smith, discovered a 5,000-year-old bladder stone at the funeral site of El Amrah, Egypt<sup>3</sup>. In the late 20th century, the frequency of renal and ureteric stones was rising in Western countries. Endemic juvenile bladder stone disease was common in many areas of developing countries<sup>4</sup>.

Currently, there is no data in Bahrain regarding emergency department visit with urolithiasis. In GCC countries such as Kuwait, Saudi Arabia and the United Arab Emirates, studies had revealed that 20% of males would have had at least one episode of kidney stone disease by the time they reached 60 years of age<sup>5</sup>. Numerous risk factors, such as the weather, gender and age were suggested to be associated with renal

stone formation<sup>6-8</sup>. In Saudi Arabia, the overall probability of forming stones is around 20% compared to other parts of the world such as Asia (1% to 5%), North America (13%) and Europe (5% to 9%)<sup>9</sup>.

The aim of this study is to evaluate emergency department (ED) visits and trends in admissions due to urolithiasis and evaluate the number of newly diagnosed patients with urolithiasis.

### METHOD

Patients who presented to the ED with initial symptomatic episodes of urolithiasis were reviewed.

Data were collected from the I-SEHA electronic record system through the emergency access and urology outpatient clinic access. The sample was further analyzed to calculate incidence rates and the estimated annual percentage change.

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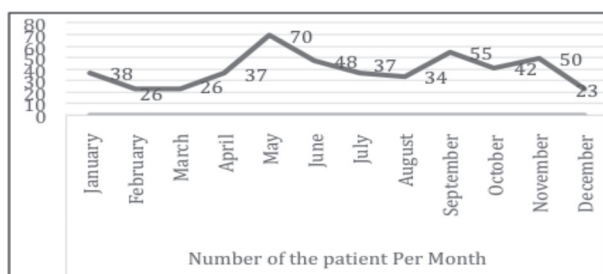
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Patients were diagnosed with urolithiasis for the first time in the ED using the confirmatory imaging (CT, USG or X-ray). Initial management commenced in the ED, and a urologist was consulted for either admission or a follow-up plan.

All patients who presented to the Emergency Department with initial symptomatic episodes of urolithiasis were included. Patients who were known to have previous history of urolithiasis were excluded.

**RESULT**

From 1 January to 31 December 2014, 700 patients visited the ED for the first time with symptoms suggesting urolithiasis, such as flank pain, hematuria and dysuria. A total of 486 of those patients were diagnosed for the first time to have urolithiasis. The mean number of patients was 40.5 per month; the highest was 70 (14.4%) patients in May 2014, and the lowest was 23 (4.7%) patients in December 2014, see figure 1.



**Figure 1: Number of Patients per Month**

In this study, urolithiasis was found to occur more frequently in males than in females; for every female, four males were diagnosed with urolithiasis. The study revealed that 404 (83.1%) males were diagnosed with urolithiasis. Two hundred thirty-seven (48.8%) patients were Bahraini patients, and 249 (51.2%) were non-Bahraini. Three hundred sixty-four (74.9%) patients were from Al-Muharraq and 122 (25.1%) patients from other areas in Bahrain. Patients involved in the study were of different age groups; the patients least affected were those aged <20, 4 (0.8%) and ≥70, 6 (1.2%). One hundred forty-two (29%) patients were in the age group from 30 to 39, 119 (24.5%) patients were 40 to 49 and 107 (22%) patients were 20 to 29, see table 1.

**Table 1: Population Characteristics**

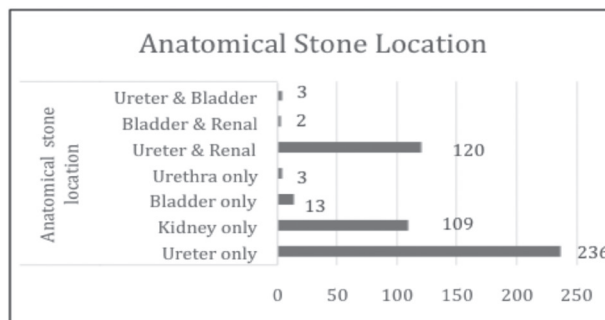
<b>Age Group</b>	< 20 years	4	0.80%
	20 to 29 years	107	22%
	30 to 39 years	142	29.20%
	40 to 49 years	119	24.50%
	50 to 59 years	80	16.50%
	60 to 69 years	28	5.80%
	≥ 70 years	6	1.20%
<b>Gender</b>	Females	82	16.90%
	Males	404	83.10%
<b>Nationality</b>	Bahraini	237	48.80%
	Non-Bahraini	249	51.20%
<b>Residency</b>	Muharraq	364	74.90%
	Manama	122	25.10%

Different imaging modalities were used to diagnose patients with urolithiasis. CT scan KUB was the first imaging modality used in 399 (82.1%) patients, followed by X-ray in 85 (17.5%) and ultrasonography in 2 (0.4%) patients. Three hundred sixty-two (74.5%) patients were discharged from the ED for follow-up in the urology clinic; 124 (25.5%) patients were admitted to the urology unit. One hundred seven (22%) patients visited the ED after discharge with urolithiasis related symptoms during the study duration, see table 2.

**Table 2: Image Modality and Outcome**

<b>Image Modality</b>			
CT Scan	399	82.10%	
Ultrasound	2	0.40%	
X-ray	85	17.50%	
<b>Outcome</b>	ER Visit – Admitted	124	25.50%
	ER Visit – Discharged	362	74.50%
	Recurrent ER Visits for Renal Colic in 2014	107	22%

The study showed that most of the stones were located in the ureter and/or the kidney. Two hundred thirty-six (48.6%) patients were diagnosed with ureteric stones and 109 (22.4%) patients were diagnosed with renal stones. One hundred twenty (24.7%) patients were diagnosed to have both kidney and ureteric stones. Thirteen (2.7%) patients had bladder stones, and 3 (0.6%) patients had urethral stones. Few patients had urolithiasis in more than one location, such as the bladder and kidney, 2 (0.4%) patients, and the bladder and ureter, 3 (0.6%) patients, see figure 2.



**Figure 2: Stone Location**

There were no negative or adverse results.

**DISCUSSION**

The incidence of urolithiasis is difficult to quantify because most patients with asymptomatic stones may never present for evaluation to the hospital. There is no available information or previous studies that determine the frequency or the rate of urolithiasis emergency department visits in Bahrain; however, it is one of the most common urological reasons for visiting the ED<sup>11</sup>.

In our study, seventy-three thousand five hundred forty patients visited the Emergency Department between 1 January 2014 to 31 December 2014; four hundred eighty-six (0.6%) of those patients were diagnosed with urolithiasis for the first time.

The results could be interpreted as 1 to 2 newly diagnosed urolithiasis patients every day in the ED on average. Our result revealed monthly variations in the ED visits, there were more visits during the hottest months; the relationship between upper urinary tract calculi and seasonal changes was described in other studies<sup>12,13</sup>.

Urolithiasis affects males more than females, a ratio of two to four males afflicted for every female<sup>14,15</sup>. In our study, the ratio was 4:1 male to female.

Most urinary calculi develop in patients aged between 20 to 49 years and peak incidence occurs in patients aged between 35 to 45 years<sup>14,15</sup>. The result of our study is comparable with other studies because 75.7% of patients were from the age group of 20 to 49 years<sup>14,15</sup>.

A plain CT KUB is the radiographic image of choice if urolithiasis is suspected<sup>16</sup>. Numerous studies have revealed that CT scan has a sensitivity of 95% to 100% for urolithiasis; accordingly, the CT KUB was the first modality used in our study for urolithiasis diagnosis in 82.1% of patients<sup>17</sup>.

In developed countries, renal and ureteric calculi are more common compared to lower urinary tract calculi; the opposite is true in developing countries. Furthermore, renal stones are more common compared to ureteric stones<sup>18</sup>. However, in our study, the ureteric stones were more than twice the number of renal stones. The patients with bladder and urethral stones were few.

## CONCLUSION

**Urolithiasis is a frequent disease with a high morbidity rate, social and economic impact. Further studies are recommended to evaluate the incidence, risk factors, prevention and definitive management for such common urological presentations in the Emergency Departments.**

**Author Contribution:** All authors share equal effort contribution towards (1) substantial contributions to conception and design, acquisition, analysis and interpretation of data; (2) drafting the article and revising it critically for important intellectual content; and (3) final approval of the manuscript version to be published. Yes.

**Potential Conflicts of Interest:** None.

**Competing Interest:** None.

**Sponsorship:** None.

**Acceptance Date:** 25 October 2016.

**Ethical Approval:** Approved by the Research and Ethics Committee, King Hamad University Hospital, Bahrain.

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