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Age at onset and clinical presentation of urolithiasis in Ajman, UAE

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RESEARCH

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Abstract

Background
Urolithiasis is an increasing problem in the United Arab Emirates (UAE). The mean age at onset of urolithiasis varies according to region.

Method
Records of urolithiasis cases confirmed by ultrasonography during the period 2007 to 2009 were retrieved from the Department of Medical Records. PASW 17 version was used for data analysis.

Results
Out of 458 patients 83.8% were males and 16.2% females. The male to female ratio was 5.2:1. The mean age at onset of urolithiasis was 33.1years with a SD of 8.6 years. There was no statistically significant difference in age at onset of urolithiasis among male and female. With regard to different anatomical sites, there was no statistically significant difference in age at onset. With regard to different anatomical sites, there was no statistically significant difference with age at onset, except an earlier onset seen for stone in kidney in females and for stones at multiple sites in males ($p<0.05$). As far as clinical presentation is concerned, ureteric colic was the dominating presenting symptom, irrespective of anatomical sites.

Conclusion
The study concluded that urolithiasis is a disease in the productive age and ureteric colic is the most common clinical presentation.

Key Words
Urolithiasis, Age at onset, Anatomical sites, Clinical presentation

Background
Urinary calculus disease in the human beings is a universal problem. However, its presentation differs in different parts of the world and also differs in the same region at different times. The reason for this variable presentation is the influence of several factors which are assumed to contribute to the formation of stone in the urine (1). Evidence shows that the incidence of urinary stone disease has been increasing continually in the past decades (2). Studies also report that the prevalence varies from 2-13% in developed countries to 0.5-1% in developing countries (3-6). The likelihood of urinary stone formation varies in different parts of the world. Its risk is 1–5% in Asia, 5–9% in Europe, 3% in North America and 20% in Saudi Arabia (4-7). High incidence of urinary calculi has been reported in countries in the Afro-Asian stone belt. Countries in tropical and subtropical areas have also reported a high incidence of urolithiasis (8). Urolithiasis is an increasing problem in the United Arab Emirates (UAE). Renal calculosis has become very frequent in the affluent countries of Arabian Gulf like the UAE, Kuwait and Saudi Arabia, probably because of change in life style (9-10). Men are twice as likely as women to develop calculi, with the first episode occurring at an average age of 30 years. Women have a bimodal age of onset, with episodes peaking at 35 and 55 years (11). The process of

stone formation depends on factors like urinary volume, concentrations of calcium, phosphate, oxalate, sodium, and uric acid ions, and natural calculus inhibitors, and the urinary pH (12).

Although new and effective therapeutic methods to treat urolithiasis have been introduced, urinary stones continue to occupy an important place in everyday urological practice. The clinical manifestations are more related to size, location of the stone, the amount of urinary outflow obstruction, movement of the stone, and presence of infection (4). Usually wedged ureteral stones are found in the ureteropelvic junction. Continuously moving and partially obstructing stones produce the maximum renal colic. But sometimes urinary stone disease can be symptomless (13). In some cases macroscopic hematuria may be the only presenting symptom and uninfected stones may present with pyuria (14). Urinary stone disease is a major health issue among productive age group in the Middle East and therefore it is imperative to know the age at onset to apply appropriate non-pharmacological interventions at the right time. Hence, the purpose of this paper was to assess the mean age at onset of urinary stones and the clinical manifestations of urinary stone disease with regard to anatomical location of the stone.

Method

This retrospective descriptive study was conducted among patients presenting with variable symptoms of urolithiasis at the Dept. of Surgery and Urology of Gulf Medical College Hospital and Research Centre (GMCHRC), Ajman, UAE from 2007 to 2009. The diagnosis of stone disease was based on the findings of history and physical examination followed by ultrasonography. Records of urolithiasis cases confirmed by ultrasonography during the period 2007 to 2009 were retrieved from the Department of Medical Records and included in the study.

A checklist was used for extracting data from case records (Appendix). A well defined protocol was prepared and approved by the Research and Ethics Committee of Gulf Medical University. Age, gender, anatomical site of stones, and clinical manifestations were collected from the case records. The data were analysed using PASW 17 version. One way ANOVA was used to find whether there is any significant difference in the mean age at onset of stone in different anatomical locations. To test the significant difference in mean age at onset of urolithiasis, t-test was used.

Results

Out of 458 cases which were reported during the period 2007-2009, 384 (83.8%) were males and 74 (16.2%) were females. The male to female ratio was 5.2:1; age ranged between 4 and 65 years. Majority (84.1%) of the patients belonged to less than 40 years of age. 15.9% were greater than 40 years of age. In the group aged more than 40 years, 83.6% were males and 16.4% females. Table 1 shows the age and gender wise distribution of patients with urolithiasis.

Table 1
Age and Gender wise distribution of patients with urolithiasis

Age group	Gender					
	Male		Female		Total	
	No	%	No	%	No	%
<= 40 years	323	84.1	62	83.8	385	84.1
> 40 years	61	15.9	12	16.2	73	15.9
Total	384	83.8	74	16.2	458	100.0

Table-2 shows the mean age at onset of urolithiasis according to anatomical site. The mean age at onset of urolithiasis observed was 33.1±8.6 years. Of the total patients with urolithiasis, 281 were ureteric stone formers with a mean age of onset of 33.6±9 years. There were 141 kidney stone patients with a mean age at onset of 32.4±8 years. Among 12 patients with urinary bladder stones, the mean age at onset was 31.3±9 years. Stone in multiple sites was observed in 24 patients and the mean age at onset was 32.1±7.8 years. One way ANOVA showed no statistically significant difference in age at onset of stones in the different anatomical sites.

Table 2
Mean age at onset of urolithiasis according to anatomical site

Location	Number	Mean	S.D
Ureter	281	33.6	9.0
Kidney	141	32.4	8.0
Urinary Bladder	12	31.3	9.0
Multiple sites	24	32.1	7.8
All Sites	458	33.1	8.6

Table -3 shows the mean age at onset of urolithiasis according to anatomical site of stone and gender. Among men, the mean age at onset was 33.3±8.1 years and among women 32.2±10.8 years and this difference was not statistically significant. Among male ureteric stone formers, the age at onset was 33.8±9 years whereas among female ureteric stone formers the age at onset was 32.8±9.7 years. The difference observed was not statistically significant. In the case of patients with stone in the kidney, among males the mean age at onset was 32.9± 7.2 years and among females the mean age at onset was 26.8± 12.1 years respectively. The difference observed was statistically significant ($p<0.05$). As far as kidney stones are concerned, there is an early age at onset among females as compared to males. Mean age at onset of urinary bladder stones among the two genders were 30.0±4 years and 33.8±15.6 years respectively and the difference observed was not statistically significant. In the present study we observed 24 patients with stone in multiple sites and among them the mean age at onset was 30.7±5.3 years among males and 39.3±14.2 years among females. The difference observed was statistically significant. Among males, stone in multiple sites occurred at an earlier age compared to females.

Table 3
Mean age at onset of urolithiasis according to anatomical site and gender

Location	Male			Female			p value
	No.	Mean	S.D	No.	Mean	S.D	
Ureter	227	33.8	9.0	54	32.8	9.7	NS
Kidney	129	32.9	7.2	12	26.8	12.1	<0.05
Urinary Bladder	8	30.0	4.0	4	33.8	15.6	NS
Multiple sites	20	30.7	5.3	4	39.3	14.2	<0.05
All Sites	384	33.3	8.1	74	32.2	10.8	NS

The disease presented clinically as ureteric colic in 97.1%, followed by dysuria in 13.3%, urinary tract infection (UTI) in 12.9%, hematuria in 3.5% of cases and vomiting in 5.7%. About 4.4% had other symptoms like nausea, abdominal pain, polyuria etc. Among patients with ureteric stone, ureteric colic was the commonest symptom reported. With regard to gender and ureteric colic, 92.1% of males and 98.1% of females presented with ureteric colic. 13.9% of the patients with ureteric stone reported dysuria. 14.1% males and 13.0% females reported dysuria among ureteric stone formers and UTI was present in 13.5%. None of the female patients with ureteric stone reported history of hematuria.

Among patients with kidney stone, 88.7% had ureteric colic which was the commonest symptom reported. 89.9% of males and 75.0% of females with kidney stone reported to have ureteric colic. Of the total patients with kidney stone 12.1% reported to have dysuria. 12.4% males and 8.3% females with kidney stone presented with dysuria. Among the total patients with kidney stone disease 13.5% had UTI. None of the females with kidney stone had UTI whereas 14.7% of males had UTI.

Ureteric colic was their commonest symptom (83.3%) reported by patients with vesical stone as well 75% of males and all female vesical stone formers reported to have ureteric colic. Dysuria was the next commonest symptom reported by them. Of the total patients with vesical stone 16.7% reported with dysuria. 12.5% males and 25.0% females with vesical stone presented with dysuria.

Among the patients with stones in multiple sites, ureteric colic was the commonest symptom observed (95.8%). 95.0% of males and all females with stone in multiple sites had ureteric colic. 8.3% had UTI. None of the females had UTI whereas 10% males had UTI. The details are given in table-4.

Table 4
Clinical presentation according to anatomical site of stone and gender

Site	Symptom	Gender			
		Male		Female	
		No	%	No	%
Ureter	Ureteric colic	209	92.1	53	98.1
	Vomiting	8	3.5	4	7.4
	Hematuria	11	4.8	--	--
	Dysuria	32	14.1	7	13.0
	UTI	33	14.5	5	9.3
	Others	5	2.2	2	3.7
Kidney	Ureteric colic	116	89.9	9	75.0
	Vomiting	10	7.8	1	8.3
	Hematuria	3	2.3	1	8.3
	Dysuria	16	12.4	1	8.3
	UTI	19	14.7	--	--
	Others	9	7.0	2	16.7
Urinary Bladder	Ureteric colic	6	75.0	4	100.0
	Dysuria	1	12.5	1	25.0
	Others	1	12.5	--	--
Multiple sites	Ureteric colic	19	95.0	4	100.0
	Vomiting	3	15.0	--	--
	Hematuria	1	5.0	--	--
	Dysuria	3	15.0	--	--
	UTI	2	10	--	--
	Others	1	5.0	--	--

Discussion

This study emphasizes the age at onset of urinary stone disease and clinical presentation. In the present study, the mean age at onset was 33.1 years. A study by Lancina Martin observed the mean age at onset of urinary stone disease as 38 years, ranges from 4-73 years (15). Studies also observed that age at onset was lower in patients with family history of urolithiasis, hypercalciuria and hyperuricosuria (15-16). Another study by Ahmadi Asr Badr et al. observed the mean age at onset of urinary stone among men with and without a positive family history was 37.2 years and 39.3 years, respectively. But they could not find such a difference in female patients (17). Koyuncu et al. reported that age at onset of the stone disease among males was 31.7±10.2 years and among females 37.5 ± 12.8 years and overall 34.0 ± 13.4 years (16). Age at onset of stone disease also depend upon other factors like fluid intake, climate etc. The age at onset was significantly earlier in patients with the habit of low fluid intake compared to those with high fluid intake (16). Studies have reported the potential inhibitory role of female hormones in urinary stone formation. Male gender has been associated with greater number of stone episodes (16,18-19). Memon et al.(20) observed the mean age at onset of urinary stone as 25.8 years which is not consistent with the observation made in the present study. In Iran, the mean age at presentation was 41.5±16.3 years and the peak incidence was between 55 and 65 years (21).

Memon et al. reported that the male to female ratio in urinary stone disease was 230:100 (20). Basiri et al. who investigated the demographic profile of urolithiasis across Iran observed that male-to-female ratio was 138:100 (21). Abomelha et al. (22) in Saudi observed that the male to female ratio was 500:100, which is almost comparable to the present study.

Clinical presentation of urolithiasis varies depending on the location and size of the stone. The wide-ranging symptoms include acute renal or ureteric colic, hematuria both microscopic and/or gross, UTI, vomiting and or dysuria. Urolithiasis is a major problem with ureteric colic as the commonest symptom observed and a high frequency of upper urinary tract stones and male predominance has been observed in our study. Most of the vesicle stones might have formed in the kidney or ureter and subsequently passed down to the bladder and led to ureteric colic (23). History of hematuria was absent in female patients with ureteric stone. This could be due to the small size of the stones and anatomy of the female urinary system. Sometimes non-obstructing stones produce no symptoms (24). A study by Fazil Marickar et al. emphasize the role of clinical presentations like, age, gender, red blood cells, pus cells, calcium oxalate dihydrate, calcium oxalate monohydrate, urine albumin, urinary infection, pH, etc. while calculating the clinical risk index (25). Lim et al. (26) in their study observed that majority had lower urinary tract symptoms whereas our study is not in consistent with the observation made by them.

Conclusion

Urolithiasis affecting the productive age group is a rapidly increasing public health problem which has an important effect on the health care system and which leads to a high economic burden on the victim. The commonest clinical manifestations reported were dependant on the anatomical location of the stone.

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