

Clinical presentation of urolithiasis in older and younger population

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Summary *Aim of the study: We compared stone size, localization, complaint at the time of applying, comorbidity, treatment and complications between older (60 years of age and older) and younger patients with urolithiasis (59 years of age and younger). Materials and Methods: We retrospectively reviewed the records of 950 consecutive patients who presented to our clinic and underwent surgery for urolithiasis from January 2007 to March 2012. The patients were divided into two groups: patients ≥ 60 years and patients < 60 years. Results: There were 174 men and 61 women in elderly group, 528 men and 187 women in younger group. Ureteral stones were found more often in the younger group compared to elderly patients ($p < 0.05$). Conversely, bladder stone was more frequent in the elderly group. In the elderly group comorbidities are more frequent (diabetes mellitus, hypertension, ischemic heart disease, congestive heart disease, osteoarthritis and chronic obstructive lung). Patients ≥ 60 years significantly had larger kidney and bladder stones compared the younger, but ureteral stone sizes were not statistically different between the two groups. Older patients had a higher postoperative complication rate than younger patients (16% versus 3%, $p < 0.05$) although postoperative complications (e.g. urinary retention, cardiac dysrhythmia, fever, constipation) were not serious and resolved with medical treatment. The average length of stay in hospital was longer in the elderly group, but the difference was not statistically significant. Conclusions: Elderly patients with urolithiasis usually have larger and more complex stone disease, more comorbidities and atypical presentation.*

KEY WORDS: Urinary calculi; Elderly; Comorbidities.

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INTRODUCTION

Urolithiasis is the third most common urological disease affecting the urinary tract after urinary infection and prostatic pathology (1). The prevalence of urolithiasis varies between 2 and 20% throughout the world (2). The worldwide prevalence of the disease appears to have increased in the last quarter of the twentieth century for

both men and women (3,4). The lifetime recurrence risk is 50% with an estimated time to recurrence < 1 year in 10% of cases, < 5 years in 35 to 50% of cases and < 10 years in 50% or greater (5).

Stones along the urinary tract can be located in the kidneys, ureters and urinary bladder. While approximately 90% of stones are successfully passed out of the urinary tract, the remaining stones generally have to be surgically removed by ureteroscopy or percutaneous nephrolithotomy or comminuted by non-invasive shock wave lithotripsy (6).

Stone occurrence is relatively uncommon before age 20 but peaks in incidence in the fourth to sixth decades of life. Geriatric stone formers comprise 10%-12% of all stone formers and may have a proclivity to develop stones due to metabolic changes associated with ageing (7, 8). Although it has been shown that geriatric patients with stones tend to have their first episode after age 50, it is not well described how the presentation of stones differs in elderly patients (7). According to the World Health Organization (WHO), ageing is defined as living beyond 60 years in a developing country or 65 years in a developed country. The number of ageing people is increasing faster than is any other age group; in 2025, there will be an estimated 1.2 billion individuals over the age of 60, and this number could reach 2 billion by 2050 (9). So, we reported a study of clinical presentation of urolithiasis in elderly compared to younger. We compared the stone size, localization, complaint at the time of applying, comorbidity, treatment and complications between the old (60 years of age and older) and young patients (59 years of age and younger).

MATERIAL AND METHODS

We retrospectively reviewed the records of 950 consecutive patients who presented to our clinic and underwent surgery for urolithiasis from January 2007 to March 2012. The diagnosis of urolithiasis was assessed by either ultrasonography, intravenous urography or abdominal CT. We excluded the patients who did not have surgery or ESWL and were followed by medical therapy because

the follow up of these patients is difficult in our hospital. We also excluded the patients who have hormonal therapy which is associated with urolithiasis. The patients were evaluated by internal medicine specialist and consent was acquired in all the patients. The patients were divided into two groups: patients ≥ 60 years and patients < 60 years. There were 235 patients in the elderly group and 715 patients in the younger group. Stone size, localization, complaint at the time of applying, comorbidity, treatment and complications were compared between groups. A retrospective case-control study was used and data were analyzed by univariate statistics. Frequency analyses and descriptive statistics, i.e. mean and standard deviation (SD), were performed. The Student's t test was used to compare the groups.

RESULTS

There were 174 men and 61 women in elderly group, 528 men and 187 women in younger group. The mean age of elderly patients was 66.86 ± 0 years and $35 \pm 2,82$ years in young group. There were 85 (36.2%) patients with renal stones, 76 (32.3%) patients with ureteral stones and 74 (31.5%) patients with bladder stones in the elderly group and 257 (36%), 411 (57.4%) and 47 (6.6%) patients respectively in the younger group. So, ureteral stones were found more often in younger group compared to elderly patients ($p < 0,05$). Also bladder stone was more frequent in the elderly group as shown in Figure 1.

Elderly and young patients were compared for comorbidities and in the elderly group comorbidities are more frequent (Table 1). There was a statistically significant difference for diabetes mellitus, hypertension, ischemic heart disease, congestive heart disease, osteoarthritis and chronic obstructive lung disease prevalence between groups. The presenting complaints were compared as flank pain, hematuria, dysuria, urinary tract infection and no symptoms (Figure 2). Flank pain seems more often in the younger population and other complaints seems more often in the elderly group, but no statistically significant difference was shown.

Table 1.
Comparison of some comorbidities between groups.

Comorbidity	Prevalence in ≥ 60 years group (%)	Prevalence in < 60 years group (%)
Diabetes mellitus	32.3	11
Hypertension	57.4	29
Congestive heart failure	17.4	1
Ischemic heart disease	34.1	9
Gastroesophageal reflux disease	31.9	17.4
Stroke	5.5	1.9
Chronic obstructive lung disease	27.6	7.1
Osteoarthritis	43.4	7.5

Mean stone size was found 28 ± 5.65 mm for the largest stone diameter in ≥ 60 years group and 20 ± 14.14 mm in < 60 years group. Elderly patients had larger stones compared the younger ($p < 0.05$). For localization as kidney, ureter and bladder; mean stone size was measured 34.23 ± 5.65 mm, 14.28 ± 12.72 mm and 25.94 ± 6.36 mm in elderly patients and 21 ± 12.72 mm, 15 ± 7.07 mm and 19 ± 1.41 mm in younger patients respectively (Figure 3). Patients ≥ 60 years significantly had larger kidney and bladder stones compared the younger, but ureteral stone sizes were not statistically different between groups.

Figure 1.
Comparison of stone location between younger and elderly groups.

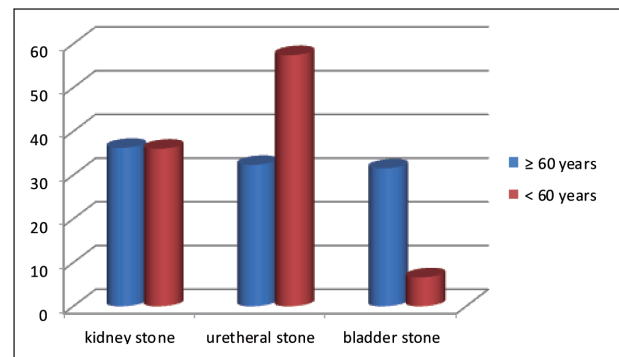


Figure 2.
Comparison for presenting complaints between groups (no significant difference was found for each complaint) (UTI= Urinary tract infection).

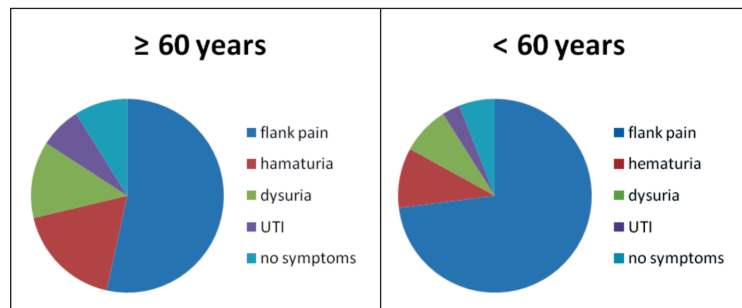
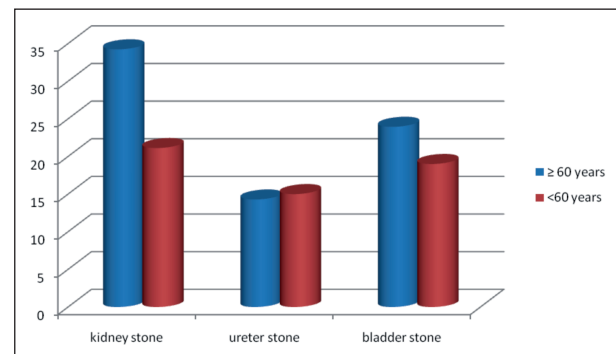


Figure 3.
Comparison of mean kidney, ureter and bladder stone size between elderly and younger groups.



Patients in both groups were treated by similar treatment methods as *percutaneous nephrolithotomy* (PCNL), *ureteroscopy* (URS), *Extracorporeal Shock Wave Lithotripsy* (ESWL), *cystolithotripsy* or open surgery according to stone localization. In younger group, 9 patients (19%) underwent cystolithotomy and 38 (81%) cystolithotripsy for bladder stone. Cystolithotomy was seen more frequently in older patients, in fact 24 patients (32%) underwent open surgery for bladder stone in the older group. In the older group 3 patients (3%) underwent open surgery for kidney stones, 26 patients (30%) ESWL and 26 patients (65%) PCNL. In the younger group the numbers of patients were respectively 32 (12%), 84 (32%) and 141 (56%). In elderly populations, PCNL was used more frequently for kidney stones, but difference was not statistically significant. In younger group, 21 patients (5%) underwent open surgery, 156 patients (38%) ESWL and 234 (57%) URS for ureteral stones. Similarly, in the older group 55% of patients underwent URS and 40% of ESWL.

There was no difference in the rate of intraoperative complications between groups, but older patients had a higher postoperative complication rate than younger patients (16% versus 3%, $p < 0,05$). Postoperative complications (e.g. urinary retention, cardiac dysrhythmia, fever, constipation) were not serious and resolved with medical treatment.

In our study, all patients underwent surgery or ESWL, and 465 patients of the younger group and 179 patients of the older group stayed in hospital for a period. The average length of stay in hospital was longer in the elderly group compared to the younger group (2.3 and 2 day, respectively), but difference was not statistically significant.

DISCUSSION

The geriatric population is the fastest growing segment in many parts of the world. Most developed countries have accepted the chronologic age of 65 years as a definition of "elderly" or older person; however, the United Nations agreed a cut off of 60 years to refer to the older population. Age itself is not an illness, however, the changes in cardiopulmonary reserve of the elderly patients make them less tolerant to certain stressors, such as an increase in demand during the perioperative period, bleeding, or medical complications (10, 11). On the other hand, increasing incidence and considerable recurrence along with severe renal functional consequences make urolithiasis a surgical and a medical problem which needs a prompt diagnosis and appropriate management in elderly populations (12, 13). Therefore, careful selection and preparation of the patients are very important in the geriatric population with urolithiasis for decreasing life-threatening complications. Accordingly, in this study we compared comorbidities, stone size, localization, treatment options and complications between elderly and younger populations in order to contribute in treatment choice and patient selection in the elderly population with urolithiasis.

Like in our study, bladder stones have been found to be frequent in the elderly as reported by some studies (14) but not in others (15). According to *Daudon et al.* (14),

40.0% of the patients they analyzed were men over 80 years. In our study, 6.6% of the stones were from the bladder in the younger group, but elderly men were most affected (31.35%). In contrast to, ureteral stone rate was found higher in the younger group. Prostatic hyperplasia, which is considered a frequent cause of bladder outlet obstruction, is frequent in old men and could be a possible explanation for the high frequency of bladder stones in the elderly (14, 16).

Our findings confirmed that older patients with urolithiasis had more comorbidities than younger as shown in previous studies (17-19). In our study, especially comorbidities related to metabolic syndrome seems to be more frequent in the elderly group. The association between metabolic syndrome and kidney stones has been established by some studies (20-22). Furthermore, the risk of a stone former to develop diabetes mellitus is partially supported by two recent investigations (23, 24) and some studies provide evidence of an association between kidney stone formation and cardiovascular disease (25, 26). In fact these comorbidities were more frequent in the elderly group and may be cause of stone formation in these patients.

Our data suggest that elderly patients had a more atypical presentation of disease as shown in Figure 2 and these atypical presentations cause delay in the diagnosis. This may explain why mean kidney stone size was found larger in older group compared to the younger.

This finding confirm what previously described by *Mccarthy et al.* (19) although in their study were described only 26 older patients whereas in our study we reported a larger number of 235 older patients. Another explanation is the steady decline in renal function that occurs with advanced age, as supersaturation and stone formation have been attributed to renal tubular cell damage (27-29).

For the treatment modalities, there were no statistical difference between groups. According to comorbidities, stone size and localization, patients underwent different treatment options. In previous studies, PCNL was demonstrated to be a safe and effective treatment for urinary calculi in both elderly patients and those with comorbid conditions (30, 31) and we did not found statistical difference for different treatment options between older and younger patients. The average length of stay in hospital was longer in the elderly group, probably owing to the occurrence of more postoperative complications in older patients.

In fact, in our study, older patients had a higher postoperative complication rate than younger patients (16% versus 3%, $p < 0.05$). Urinary retention may be caused by benign prostate hyperplasia (BPH) that is more frequent in older patients. Other comorbidities like cardiac problems and hypertension are more often in older group, consequently older patients are usually at risk of ischemic cardiac disease and arrhythmia. Infections be cause fever in postoperative period in consideration of the poor immune system of older patients.

In conclusion, elderly patients with urolithiasis usually have larger and more complex stone disease, more comorbidities and atypical presentation. Because of that physicians have to be careful in the preoperative and

postoperative period for the treatment of urolithiasis in elderly populations. Treatment of stones in elderly patients can be delayed and they may be admitted to the hospital due to other problems, because they usually have silent stone disease. Like in our study, older patients may have larger stones when they are admitted to hospital. We must plan carefully the treatment algorithm in older patients with urolithiasis because of the risk of postoperative complications. The complaints of older patients may be serious and require prompt intervention.

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