Urolithiasis in the elderly

John-Paul McCarthy, MD, Thomas A. A. Skinner, MSc, Richard W. Norman, MD
Department of Urology, Dalhousie University, Halifax, Nova Scotia, Canada

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Objectives: *Urolithiasis is an increasing problem in patients ≥ 80 years. Our objective was to compare patients ≥ 80 years with urolithiasis to a younger cohort in terms of presentation and management.*
Methods: *Patients referred to a tertiary care stone clinic for management of urolithiasis over a 5 year period were reviewed. Data collected on clinical parameters for patients ≥ 80 years were compared with a random sample of those < 80 years.*
Results: *There were 26 patients ≥ 80 years and 102 in the sample < 80 years; mean age was 83.5 ± 0.6 and 50.1 ± 1.3 years, respectively. The older group had more comorbidities. The presenting complaint was more often flank pain in younger patients. Patients ≥ 80 years had larger stones. Early ureteric stent insertion was more likely in the elderly compared with the younger group (27% versus 7%, $p < 0.01$). Definitive therapy for patients ≥ 80 years was most often percutaneous nephrolithotomy (PCNL) (23%) compared with only 9% in the younger group. In contrast, the most common definitive treatment modality used for patients < 80 years was extracorporeal shock wave lithotripsy (ESWL) (35% versus 8%, $p < 0.01$). There was no difference in intraoperative complications. Thirty nine percent of the older group was managed as outpatients. More of the older group had postoperative complications but all were minor.*
Conclusion: *Urolithiasis in the elderly is challenging to treat because they have more comorbidities and are less likely to present with classic symptoms of renal colic. This may lead to later presentation with larger and more complex stone disease. Early ureteric stent is often required and definitive PCNL is more likely than in the younger cohort. Despite these issues most can be treated safely and often as an outpatient.*

Key Words: urolithiasis, geriatrics, comorbidities

Introduction

Urolithiasis is a common condition among North American adults and is associated with considerable pain and high health care costs.[1] Epidemiological investigations have demonstrated the lifetime occurrence of kidney stones to be 10%-15%.[2-5] The peak increases in men and women until the sixth decade of life, with men affected up to three times the rate of women.[2,6,7] Both genders experience high recurrence rates, reaching 50% within 5 years of initial onset, however, these events remain unpredictable and can occur more than 10 years after the first stone.[8-11]

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Address correspondence to Dr. Richard W. Norman, Suite 620, 5991 Spring Garden Road, Halifax, Nova Scotia B3H 1Y6 Canada

As the life expectancy in most developed nations increases, the burden of stone disease among elderly patients is also expected to rise. Geriatric stone formers comprise 10%-12% of all stone formers and may have a proclivity to develop stones due to metabolic changes associated with aging.[12,13] For these reasons, the volume of octogenarian stone patients will continue to grow. This cohort can present treatment challenges because of additional comorbidities and stone complexities. 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.[12] There are limited data on the differences in treatments used for geriatric urolithiasis patients and their complication rates compared to a younger cohort.

To address these issues, we compared elderly patients (80 years of age and older) with urolithiasis to younger stone patients (79 years of age and younger).

Methods

A retrospective case-control study was used to compare differences in stone disease between patients ≥ 80 years with those < 80 years. All were newly referred to our adult tertiary care stone clinic between January 1, 2004 and December 31, 2008. Those ≥ 80 years on the date of their first visit defined the elderly group regardless of whether they had previously received surgical intervention or been seen for stones at a different center. A randomized sample of 102 patients < 80 years on the date of their first visit to the clinic were chosen from 1542 new referrals.

One hundred and twenty eight patients were studied – 26 in the elderly group and 102 in the younger cohort. Information on clinical parameters was collected including age, medical comorbidities, stone size and location, treatment and complications.

Data were analyzed by univariate statistics. Values are reported as mean ± SEM or percent of the population affected. Means were compared with t-test. chi-square and Fisher's exact test were used to compare categorical data. A value of $p \leq 0.05$ was considered significant.

Results

The mean age of the elderly group was 83.5 ± 0.6 years compared with 50.1 ± 1.3 years for the controls ($p < 0.0005$). Elderly and control patients' medical records were compared for 12 medical comorbidities and revealed that there were many more comorbidities in the elderly group, Table 1.

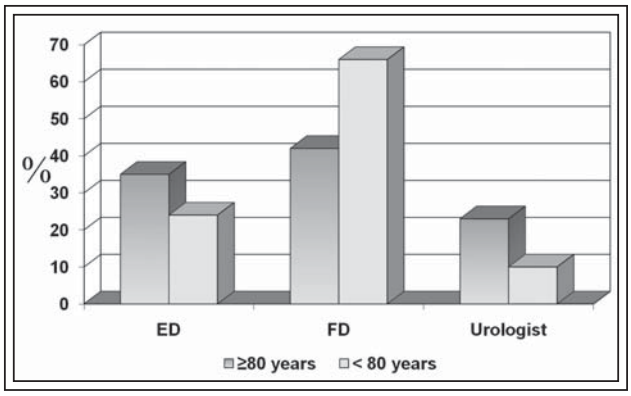

Figure 1. Identification of referral source in patients with urolithiasis ≥ 80 years compared with those < 80 years ($p < 0.05$ for all three comparisons).

Younger patients were more likely to have a family history of urolithiasis compared to the elderly group (26% versus 4%, $p < 0.01$) but there was no difference in personal history of stone (58% versus 42%, n.s.). Patients ≥ 80 years had larger stones (13.2 mm ± 1.3 mm for the largest stone diameter compared with 7.9 mm ± 0.7 mm for those < 80 years ($p < 0.001$)). This was also true when more than one stone was present (6.5 mm ± 1.2 mm for the second largest stone diameter in patients ≥ 80 compared with 4.3 mm ± 0.5 mm for those < 80 ($p < 0.05$)). Older patients had more renal pelvic stones than younger patients (27% compared with 8%, $p < 0.05$). No other differences in stone location, number of stones, presence of bilateral stones or presence of hydronephrosis were detected.

TABLE 1. **Comparison of comorbidities in stone patients ≥ 80 with < 80 years**

Comorbidity	**Prevalence if ≥ 80 years (%)**	**Prevalence if < 80 years (%)**	**p value**
Ischemic heart disease	35	10	< 0.01
Chronic obstructive lung disease	31	7	< 0.01
Hypertension	81	28	< 0.001
Congestive heart failure	19	0	< 0.001
Osteoarthritis	46	6	< 0.001
Chronic renal failure	19	4	< 0.05
Atrial fibrillation	23	2	< 0.001
Diabetes	31	15	0.08
Hypothyroidism	19	9	0.16
Gout	4	2	0.50
Stroke	8	3	0.27
Gastroesophageal reflux disease	27	16	0.25

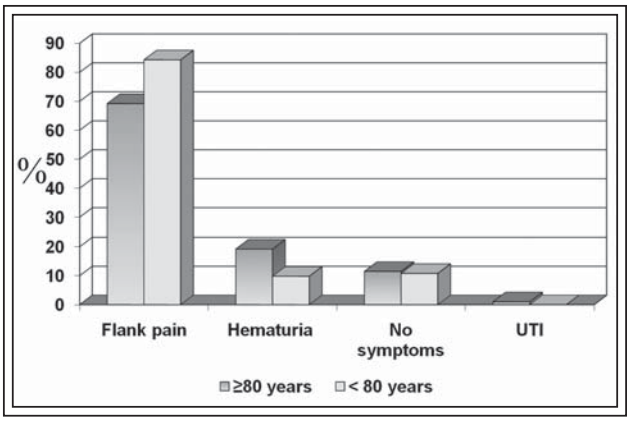

Figure 2. Comparison of predominant symptoms in stone patients ≥ 80 years compared with those < 80 years. (No significant difference for each comparison.) UTI = urinary tract infection.

Patients ≥ 80 years were more likely to be referred to the stone clinic by an emergency room physician or urologist, while younger patients were more often referred by their family physician ($p < 0.05$ for all three comparisons), Figure 1. There was a trend for patients < 80 to present with ipsilateral flank pain (84% versus 69%, $p = 0.07$) whereas the elderly group had more variation in their symptoms, Figure 2.

Early adjuvant ureteric stent insertion was more likely in the elderly compared with the younger group (27% versus 7%, $p < 0.01$), Figure 3. Definitive therapy for patients ≥ 80 years was most often PCNL (23%) compared with only 9% in the younger group (< 0.05), Figure 3. In contrast, the most common definitive treatment modalities used for patients < 80 years were ESWL (35%) and ureteroscopy (URS) (19%), Figure 3.

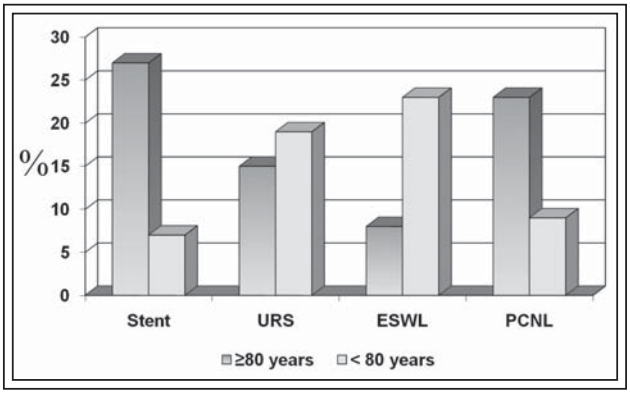

Figure 3. Comparison of interventions in patients ≥ 80 years compared with those < 80 years ($p < 0.01$ for stent, n.s. for URS, $p < 0.01$ for ESWL and $p < 0.05$ for PCNL).

Patients in the younger group were significantly more likely to receive ESWL than those in the older group (35% versus 8%, $p < 0.01$), Figure 3.

While there was no difference in the rate of intraoperative complications between groups (3 in the younger group and none in the older), older patients had a higher incidence of postoperative complications than younger patients (27% versus 7%, respectively, $p < 0.05$); none were serious (e.g. urinary retention, cardiac dysrhythmia) and all resolved with treatment. Younger individuals were more likely to be treated as outpatients compared to the older group (77% versus 39%, respectively, $p < 0.0001$). For patients who were admitted, the average length of stay was longer in the elderly group compared with the younger group (2.6 versus 1.7 days, $p < 0.05$).

Discussion

Understanding the intricacies of managing geriatric patients is becoming an increasingly important endeavor as our population ages. Currently, baby-boomers are the largest generation, comprising nearly one third of the North American population, with the number of elderly individuals predicted to double over the next two decades.[14,15] The impact of stone disease is also expected to grow, as the prevalence of obesity and diabetes swells.[16] Urolithiasis presents new challenges in geriatric patients.[12] Our study highlights a number of differences that exist in elderly stone-forming patients compared with a younger cohort.

The older group was less likely to have a family history of stone disease but had a similar personal history of stones compared with patients < 80 years. It is known that elderly stone formers experience their first episode later in life than younger patients and that the pathogenesis of stone disease in the elderly is different from that of young patients as a result of metabolic processes that change with age.[12] Patients with a family history of urolithiasis develop stones at a younger age than those without a family history implying that there are both genetic and environmental factors acting throughout the life of the patient that contribute to stone disease.[17-20]

Our findings confirmed others showing significantly more comorbidities in the elderly group.[21,22] These include cardio-pulmonary, osteoarthritis and renal disorders. Although there were no statistically significant differences between the groups for metabolic conditions such as diabetes and gout, these conditions were found in higher levels in our ≥ 80 cohort. In fact, metabolic syndrome, a term used to describe a constellation of symptoms associated with a sedentary

lifestyle and poor diet, has been linked to the formation of uric acid stones.[23,24] This term includes both the cardiovascular effects as well as metabolic diseases such as insulin resistance and gout and as our population ages there will be a greater number of individuals with metabolic syndrome entering their eighties.[23,24]

In addition to having more comorbidities, patients ≥ 80 also had more advanced stone disease than younger patients, presenting with larger stones and more renal pelvic stones. This poses treatment challenges and requires careful consideration when treating elderly urolithiasis patients. A trend in our data suggested that elderly patients had a more atypical presentation of disease and that they were more likely to be referred by a specialist. With an atypical presentation, patients may not seek medical attention or obtain an accurate diagnosis from their family physician as promptly as patients who present with typical renal colic. This delay likely contributed to the larger stones in the ≥ 80 group. Another possibility 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.[25-28]

Elderly patients received different treatments for urolithiasis than their younger counterparts. More patients ≥ 80 received early stent insertion and underwent percutaneous nephrolithotomy than those < 80 who were most often treated with ESWL. This can be explained by differences in stone burden and patient comorbidities. Additionally, others have shown PCNL to be a safe and effective treatment for urinary calculi in both elderly patients and those with comorbid conditions.[29,30] More of our elderly patients required hospitalization because of the increased number of PCNLs performed in this group and the higher incidence of postoperative complications.

Conclusions

Urolithiasis can be challenging in those ≥ 80 years because of the atypical presentations, greater likelihood of comorbidities and presence of larger and more complex stone disease. Fortunately, most of them do well and can often be managed in an outpatient setting. □

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