

# The Urination Patterns In Elderly Male Patients With Upper Urinary Tract Calculi

S Tobu

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## Abstract

**Objectives:** We investigated the urination patterns in elderly male patients with upper urinary tract calculi. **Methods:** We enrolled 45 patients with upper urinary tract calculi and 52 patients without urinary tract calculi (as controls) who were over 60 years of age for this study. All of the patients had undergone the International Prostate Symptom Score diagnostic process via an interview. **Results:** No significant differences were observed in any of the parameters between these groups with regard to their voiding symptoms. However, the group with upper urinary tract calculi had significantly lower scores on their daytime urinary frequency, storage symptoms and total IPSS scores. The group with upper urinary tract calculi had significantly better results in the analysis of QOL. **Conclusions:** These data suggest that elderly males having upper urinary tract calculi might have fewer lower urinary tract symptoms as a result of the stone formation.

## INTRODUCTION

In Japan, as the population ages, upper urinary tract calculi, originally a disease of young males, is becoming an elderly male's disease<sup>1</sup>. Formerly, upper urinary tract calculi of elderly males occurred primarily in individuals who were bedridden, and the main causes of the calculi was stagnation of the urinary flow and chronic dehydration due to a reduction of body motion. Because their general status was bad, these patients tended to be unsatisfactorily cured, and because of the infrequency of the condition, upper urinary tract calculi of older males was seldom researched. However, as the elderly population has increased, the number of elderly people with a good activity of daily living has also increased. This has inevitably led to an increase in the number of elderly patients with upper urinary tract calculi needing medical attention.

The exact causes of upper urinary tract calculi in younger subjects are not clearly understood. Many of the upper urinary tract calculi in Japan are calcium calculi, and various factors, such as crystallization of supersaturated urinary substances, diminution of inhibitors of calculus formation, and variations in urinary pH are said to be involved in the formation of upper urinary tract calculi<sup>2</sup>. The reason why there is a decrease in the incidence of upper urinary tract calculi with increasing age is not well understood, although it has been suggested that the decline in urinary

concentration with age may be involved. On the other hand, with regard to the increase in the incidence of nocturia with age, various factors have been identified, and nocturia due to a decline in the urinary concentration has been pointed out to be one factor<sup>3</sup>.

It is expected that people who maintain a higher urinary concentration in advanced age present relatively mild nocturia, but have a higher likelihood of developing urinary tract calculi. This led us to hypothesize that the urination status of elderly upper urinary tract calculi patients is better than that of normal elderly persons. In this study, we investigated the urination patterns and backgrounds of elderly patients with upper urinary tract calculi.

## METHODS

Among patients over age 60 who visited our outpatient clinic from November 2007 until June 2008, we picked 45 patients (Group 1) who showed nephrolithiasis in echo and urinary tract plain films as the subjects. None of them had any symptoms from nephrolithiasis. Then we extracted 52 patients (Group 2) who did not show nephrolithiasis plain films for comparison as a control group. All of the control group patients visited our outpatient clinic for a medical check up.

All of these patients had undergone the International Prostate Symptom Score (IPSS) diagnostic process via an interview.

To obtain the details of the patients' backgrounds, we had interviewed them about their medical history. The chronic bedridden patients and the patients with urological malignancies were excluded from this study. The statistical analyses were performed using Mann-Whitney's U-test. Statistical significance was accepted at a P-value of < 0.01.

**Figure 1**

Table 1: Patient Characteristics

|                        | Group 1<br>(n=45) | Group 2<br>(n=52) |        |
|------------------------|-------------------|-------------------|--------|
| Age                    |                   |                   |        |
| Mean ± SD              | 68.2±9.3          | 73.7±7.3          | P=0.10 |
| Urine specific gravity |                   |                   |        |
| Mean ± SD              | 1.014±0.0049      | 1.013±0.0061      | P=0.31 |
| Prostate volume        |                   |                   |        |
| Mean ± SD              | 35.7±12.6         | 37.4±14.5         | P=0.41 |
| Hypertension           | 44.4% (20/45)     | 40.4% (21/52)     | P=0.68 |
| Diabetes mellitus      | 22.2% (10/45)     | 9.6% (5/52)       | P=0.08 |
| Hyperlipidemia         | 15.9% (7/45)      | 5.8% (3/52)       | P=0.11 |

Data presented as the means ± SD

## RESULTS

**Figure 2**

Table 2: The comparison of IPSS and agents between two groups

|                        | Group 1<br>(n=45) | Group 2<br>(n=52) |         |
|------------------------|-------------------|-------------------|---------|
| I-PSS (total)          | 7.42 ± 5.28       | 10.9 ± 7.10       | P=0.02  |
| Storage symptom        | 3.8 ± 2.84        | 5.71 ± 3.81       | P=0.01  |
| Frequency              | 1.33 ± 1.39       | 2.19 ± 1.78       | P=0.01  |
| Urgency                | 0.6 ± 0.96        | 1.09 ± 1.49       | P=0.15  |
| Nocturia               | 1.86 ± 1.37       | 2.42 ± 1.49       | P=0.07  |
| Voiding symptoms       | 2.93 ± 2.79       | 4.21 ± 3.93       | P=0.18  |
| Intermittency          | 0.71 ± 1.12       | 1.13 ± 1.40       | P=0.14  |
| Weak stream            | 1.51 ± 1.47       | 1.86 ± 1.72       | P=0.40  |
| Straining              | 0.71 ± 1.14       | 1.21 ± 1.49       | P=0.12  |
| Incomplete emptying    | 0.71 ± 0.94       | 1.0 ± 1.35        | P=0.51  |
| QOL                    | 2.57 ± 1.54       | 3.34 ± 1.54       | P=0.007 |
| α-blocker              | 20.0% (9/45)      | 51.9% (27/52)     | P=0.01  |
| Anti-cholinergic agent | 8.8% (4/45)       | 25.0% (13/52)     | P=0.11  |

Data presented as the means ± SD

## DISCUSSION

In this study, we demonstrated that the urinary status of patients with urinary tract calculi is better than that of controls. The storage symptom score of the calculi group was significantly better than that of the control group, and all of the other parameters were also demonstrated to have a tendency to be better in the calculi group than the controls. Previous reports have revealed that chronic dehydration and

inadequate fluid intake often elicit nephrolithiasis,<sup>4,5</sup> and idiopathic calcium stones occur more frequently in patients without guidance about adequate fluid intake than in patients who are receiving proper guidance about adequate fluid intake<sup>6</sup>. However, as we did not measure their daily fluid intake, we cannot discuss this point. In terms of the etiology of stone formation, the urine concentrating ability of the calculi patients might have been better than that of the controls. In this study, no significant differences were observed regarding urine specific gravity on arrival between these groups. Some difference may exist regarding the urine concentration at night, when urinary stones often form, between these groups<sup>7</sup>, but we do not have any data regarding this aspect.

Pyelonephritis induced by impaction of a stone often becomes potentially lethal, so relapse prophylaxis is very important. The natural history of calcium stone disease is reported to be associated with a recurrence rate of 15% one year after the first stone episode, 42-48% after 4 years and 61-67% after 9 years<sup>8</sup>. Prophylactic treatments for nephrolithiasis are reported to include an increased fluid intake, dietary treatment, the use of cellulose phosphate, and thiazide treatment, of which fluid intake is suggested as the first choice because of its safety and efficacy. In fact, an increased fluid intake is the only nutritional modification that may be applied universally for all forms or causes of idiopathic calcium urolithiasis. However, it is unknown whether an increased fluid intake is appropriate for elderly patients with calculi, because such an increased fluid intake might induce pollakisuria and polyuria in older patients. Nakagawa et al. demonstrated that elderly individuals with nocturia were at a greater risk for fracture and death than those without nocturia<sup>9</sup>. Therefore, the encouragement of excessive fluid intake by older people might increase their risk of death.

Although it is necessary to refrain from indiscriminately prescribing increased fluid intake for elderly patients, there is no evidence indicating that enforced drinking induces polyuria in elderly patients with upper urinary tract calculi. On the contrary, Ljunghall, et al. reported that the urinary volume increases very little when fluid intake guidance is given to urinary tract calculi patients<sup>10</sup>, and it is not easy to ensure a daily urine volume of more than two liters, which is considered to ideal. Therefore, it is expected that the urine concentration is still effective in urinary tract calculi patients, and this may be the reason why the IPSS is more satisfactory in the elderly patients with upper urinary tract

calculi than in control patients.

Therefore, based on the findings of the present study, it may be effective for the prevention of the recurrence of calculi without any significant adverse effects on the patient's daily life. The data obtained in this study showed unexpected results. As can be seen in Table 1, although there was a tendency for the group of elderly patients with upper urinary tract calculi to have a higher incidence of diabetes, hypertension and hyperlipidemia, better results for the voiding parameters were found for these patients as compared to the controls. It has already been reported that the incidence of these metabolic disorders, which are usually thought to induce metabolic syndrome, are high in patients with calculi.<sup>11</sup> Further, these metabolic disorders have been reported as risk factors for lower urinary tract symptoms.<sup>12,13</sup> The results of our present study indicated that, in spite of the tendency for the incidence rate of metabolic syndrome to be higher for the elderly upper urinary tract calculi group, the International Prostate Symptom Scores showed satisfactory results. In addition, this was likely related to the significantly lower rate of  $\beta$ -blocker and anticholinergic drug use in these patients, as shown in Table 2.

In conclusion, we demonstrated that the group with upper urinary tract calculi had significantly lower scores regarding their daytime urinary frequency, storage symptoms, QOL score and total IPSS score. Although prescribing an increased fluid intake for elderly patients may be associated with such problems as polyuria and nocturia, it is not considered to induce severe LUTS because their urination status tends to be good.

## References

1. Yoshida O, Terai A, Ohkawa T et al: National trend of the incidence of urolithiasis in Japan from 1965 to 1995. *Kidney Int*; 1999; 56: 1899-1904
2. Phillip MH: Nephrolithiasis: Treatment, causes, and prevention. *Cleveland clinic journal of medicine*; 2009; 76: 583-591
3. van Kerrebroeck P et al: The standardisation of terminology in nocturia: report from the Standardisation Sub-committee of the International Continence Society. *Neurourol Urodyn*; 2002; 21: 179-183
4. Embon OM et al: Chronic dehydration stone disease. *Br J Urol*; 1990; 66: 357-362
5. Borghi L et al: Hot occupation and nephrolithiasis. *J Urol*; 1993; 150: 1757-1760
6. Borghi L et al: Urinary volume, water and recurrences in idiopathic calcium nephrolithiasis: a 5-year randomized prospective study. *J Urol*; 1996; 155: 839-843
7. Robert M et al: Circadian variations in the risk of urinary calcium oxalate stone formation. *Br J Urol*; 1994; 74(3): 294-297
8. Coe, F L.: Clinical stone disease. In: *Nephrolithiasis, Contemporary Issues in Nephrology*. Edited by F. L. Coe, S. M. Brernner and J. H. Stein. New York : Churchill Livingstone; 1980; vol 5 chap. 1: 1-12
9. Nakagawa H et al: Impact of nocturia on bone fracture and mortality in older individuals: A japanese longitudinal cohort study. *J Urol*; 2010; 184: 1413-1418
10. Ljunghall S et al: Prophylactic treatment of renal calcium stones. Experiences with dietary advice, cellulose phosphate and thiazides. *Scand J Urol Nephrol*; 1980; 53: 239-252
11. West B et al: Metabolic syndrome and self-reported history of kidney stones: the National Health and Nutrition Examination Survey (NHANES) 1988-1994. *Am J Kidney Dis*; 2008; 51: 741-747
12. Huai-Ching et al: Metabolic syndrome components worsen lower urinary tract symptoms in women with type 2 diabetes. *J Clin Endocrinol Metab*; 2010; 95(3): 1143-1150
13. Geun Sik Hong et al: Correlation between metabolic syndrome and lower urinary tract symptoms of males and females in the aspect of gender-specific medicine: A single institutional study. *Korean J Urol*; 2010; 51: 631-635

**Author Information**

**Shohei Tobu**

Department of Urology, Goto Chuo Hospital