

Recurrences during a 10-year follow-up after first renal stone episode

C. Ahlstrand and H.-G. Tiselius

Department of Urology, University Hospital, Linköping, Sweden

Accepted: February 1, 1990

Summary. Each of 92 patients in a Swedish district served by only one hospital had been treated for their first renal stone in 1977 and was evaluated 10 years later. Recurrent stone formation during the observation period was observed in 26% of the patients, with no difference between men and women. Of all the patients who had sought medical advice in 1977 because of urinary stone colic, 51% were experiencing their first stone episode. Ten years later 37% of the original patients were still classified as single stone formers. The recorded recurrence rate was lower than that previously reported in the literature.

Key words: Urinary stone – urinary stone colic – recurrence rate

The natural history of renal stone disease has been investigated in epidemiological studies of the population [6, 7] and by retrospective evaluation of patients with stone disease [8]. Studies with a prospective design are rare [5], and we have therefore re-evaluated patients who were studied in 1977 after a visit to our emergency unit because of their first episode of urinary stone colic. During this year, 191 patients in the catchment area of the University Hospital of Linköping were treated for urinary stone colic. Because of the organization of Swedish health care it can be assumed that almost all patients from our district with the clinical diagnosis of urinary stone colic were treated at the hospital. The diagnosis was mostly established on a clinical basis; typical pain, typical findings at the physical examination and macroscopic or microscopic haematuria. If the diagnosis was in doubt an acute intravenous pyelography (IVP) was performed, but most often the patients were referred for IVP within 3 weeks of the acute episode. Of the 191 patients, 121 were experiencing their first stone episode, whereas 70 were considered at that time to have recurrent stone disease [1].

Patients and methods

All patients (87 men and 34 women) who had reported their first stone episode in 1977, were given a questionnaire 10 years later. The patients were asked about stone episodes before and after 1977, when the stones resulted in clinical symptoms, and what kind of treatment was given. Information was also collected concerning medical stone-preventive treatment. The medical records for the period 1977–1986 were also studied.

There were 19 men and 1 woman who corrected their medical records in the questionnaire, reporting stone episodes before 1977. Another 7 men and 2 women recorded as single stone formers in the previous study did not return the questionnaire; it was impossible to trace 2 of these men and 1 of the women. The others were still alive and resident in our district. According to medical records none of these patients had sought medical advice at our hospital because of symptoms of urinary calculi after 1977. However, all these patients were excluded from the study.

Questionnaires were completed by 56 men and 29 women; 5 men and 2 women, registered as single stone formers in 1977, died 3–8 years later. According to their medical records none of them had had recurrent stone formation during their remaining life-time. These patients were included in the study, which thus referred to 61 men and 31 women.

Statistics

Differences between groups were evaluated by Wilcoxon's test for unpaired samples. In life-table analysis 95% confidence intervals were calculated [9].

Results

The mean (\pm SD) age at the first stone episode was 43.9 ± 13.6 years for men and 40.4 ± 16.8 years for women. In all 15 men and 9 women experienced stone recurrence after a mean (\pm SD) of 3.5 ± 3.2 and 4.6 ± 2.6 years, respectively (Table 1). Most of these recurrences were confirmed by radiography. There was no age difference between men and women or between single and recurrent stone formers.

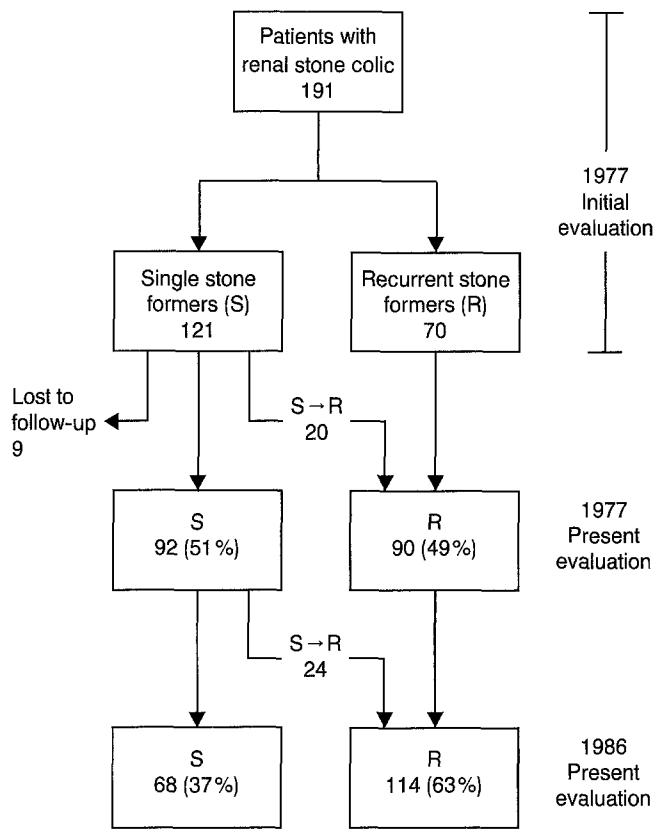


Fig. 1. Patients with single and recurrent stones in 1977 (initial and present evaluation) and 1986

Four women and one man were surgically treated because of their first stone. One woman was operated on because of her second stone.

Four men and two women had residual concretions when the follow-up period started. Two men passed these stones but did not form new stones and were classified as single stone formers. Two of these men, both receiving prophylactic treatment with magnesium oxide, and one woman receiving thiazide treatment continued to form stones. One woman with a small residual stone was free of symptoms during the observation period.

Only one of the patients who had no recurrent stone formation was prophylactically treated in order to decrease the risk of recurrence, initially with thiazide and later with ortho-phosphate.

The fractions of patients free of recurrent stone formation are shown in Fig. 2 (all patients), Fig. 3 (men) and Fig. 4 (women). Thus, after 5 years $83.0 \pm 8.5\%$ and after 10 years $74.3 \pm 9.6\%$ (95% confidence intervals) were free of clinical recurrence. The corresponding figures for men were $85.1 \pm 10.1\%$ and $74.7 \pm 10.8\%$ and for women $83.1 \pm 15.3\%$ and $68.8 \pm 16.8\%$ respectively.

Accordingly, 51% of the patients who sought medical advice because of renal stone colic were experiencing their first stone. Ten years later only 37% of the original group of patients were still classified as single stone formers (Fig. 1).

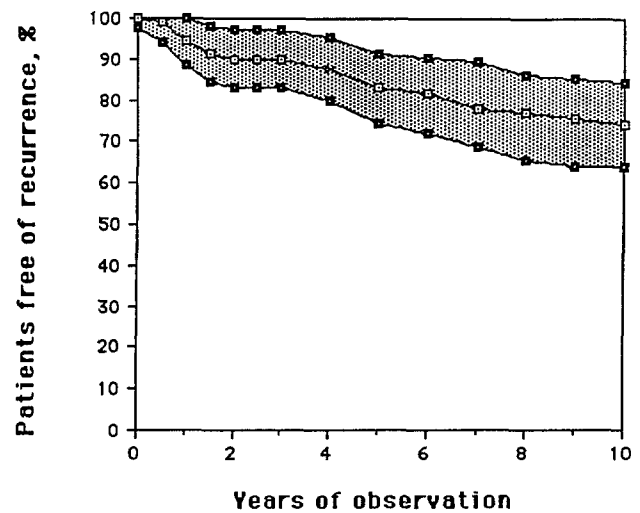


Fig. 2. Proportion of patients without recurrence. Shaded area indicates 95% confidence interval

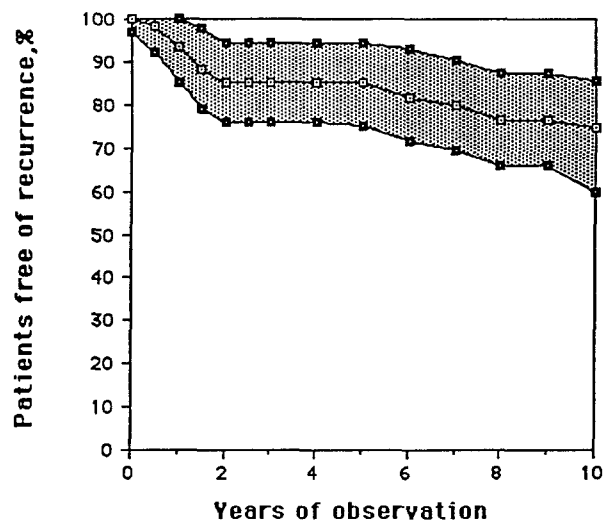


Fig. 3. Proportion of men without recurrence. Shaded area indicates 95% confidence interval

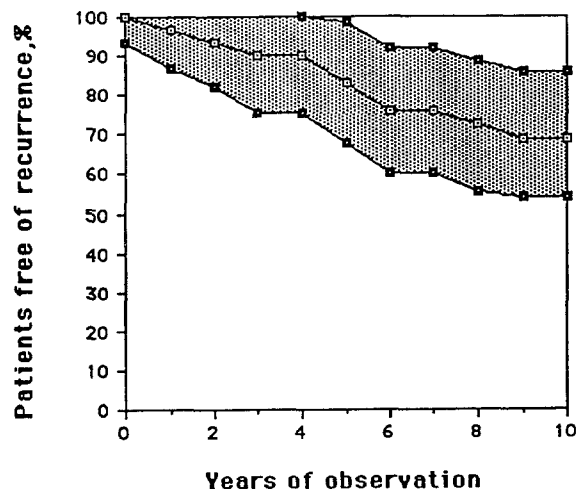


Fig. 4. Proportion of women without recurrence. Shaded area indicates 95% confidence interval

Discussion

The problems in assessing the rate of stone formation in patients with renal stone disease are considerable [2]. Especially in patients with multiple stones, both over- and underestimation of the number of stone episodes are common. Thus, in our study two clinical stone episodes did not represent recurrences, but passage of previously formed stones. However, only stone recurrences with clinical symptoms were recorded and up to one-third of true recurrences may have been overlooked, as shown in studies where all patients were radiographically examined [10].

Follow-up was not possible in about 10% of the patients. However, most of those who were excluded from the study were still residing in our own area, and none of them sought medical advice because of stone symptoms during the follow-up period. It is therefore not probable that the exclusion of these patients has influenced the results in any significant way. It is also unlikely that the small proportion of patients given prophylactic treatment would have affected the conclusions.

About 25% of our patients had another stone episode during a 10-year follow-up period, which is a lower recurrence rate than has previously been reported. This can probably be explained by the study of different populations or application of different criterias for a stone episode. Marshall et al. [8], who only found 52% of their patients to be free of recurrences after 10 years probably studied patients referred to a urological clinic because of urinary stones. Their patients might therefore represent a population with more severe disease. However, Ljunghall and Danielson [6], who reported an even higher recurrence rate, with about 45% of the patients free of recurrence after 8 years, seem to have studied a similar group of patients to ours, except that their group of patients comprised about 20% women, as against 33% in our study. It is possible that women have a lower recurrence rate than men, as found by Marshall et al. [8], Johnson et al. [4] and Sutherland [10]. Such a tendency was also demonstrated in a retrospective study by Ljunghall and Hedstrand [6], who estimated that about 50% of a population of stone patients will experience at least one recurrence during a 10-year period. In the present study, however, no significant difference was found between men and women.

Ettinger [3] reported a fairly large placebo effect in untreated patients followed in a stone clinic (also called "stone clinic effect"), and thus different follow-up programs may influence the recurrence rate. Most of our

patients were not followed up regularly, and such an effect is therefore unlikely to have influenced the result.

A decreasing incidence of stone disease in Sweden during recent years is another hypothesis that might explain the different recurrence rate observed. However, no other studies have shown such results.

It is obvious from this study, as was also emphasized by Marshall et al. [8], that a very long time can elapse between first and second stones. The diagnostic criteria, inclusion criteria and follow-up routines are important factors that might influence the observed recurrence rates. In this study about 25% of the patients experienced a clinical recurrence during a 10-year follow-up period, which is lower than recorded in earlier studies on similar groups of patients. Clinical trials of prophylactic treatment must therefore be carried on for a very long time or be carefully randomized in order to exclude erroneous conclusions on the effectiveness of the treatment.

References

1. Ahlstrand C, Tiselius H-G (1981) Renal stone disease in a Swedish district during one year. *Scand J Urol Nephrol* 15:143
2. Ahlstrand C, Tiselius H-G, Larsson L, Hellgren E (1984) Clinical experience with long-term bendroflumethiazide treatment in calcium oxalate stone formers. *Br J Urol* 56:255
3. Ettinger B (1976) Recurrent nephrolithiasis: natural history and effect of phosphate therapy. A double-blind controlled study. *Am Med J* 61:200
4. Johnson CM, Wilson DM, O'Fallon WM, Malek RS, Kurland LT (1979) Renal stone epidemiology: A 25-year study in Rochester, Minnesota. *Kidney Int* 16:624
5. Ljunghall S, Danielson BG (1984) A prospective study of renal stone recurrences. *Br J Urol* 56:122
6. Ljunghall S, Hedstrand H (1975) Epidemiology of renal stones in a middle-aged male population. *Acta Med Scand* 97:439
7. Ljunghall S, Christensson T, Wengle B (1977) Prevalence and incidence of renal disease in a health screening programme. *Scand J Urol Nephrol* 41 [Suppl]:39
8. Marshall V, White RH, Mark Chaput de Saintonge, Tressider GC, Blandy JP (1975) The natural history of renal and ureteric colic. *Br J Urol* 47:117
9. Remington RD, Shork MA (1970) Statistics with application to the biological and health sciences. Prentice-Hall, Englewood Cliffs, NJ
10. Sutherland JW (1982) Recurrence following operative treatment of upper urinary tract stone. *J Urol* 127:472

Dr. C. Ahlstrand
Department of Urology
University Hospital
S-58185 Linköping
Sweden