INTRODUCTION

There are many reports on the differences between the urine of stone-formers and that of healthy controls. Some authors have emphasized, however, that the main difference is not between healthy persons and stone-patients in general but between the single and multiple (recurrent) stone-formers. It should not be overlooked that the reported differences represent the differences between the mean values of the groups whereas the mean values of individuals within each group and the values of the individual urinary sample may be scattered widely around the mean value of the group, producing a broad overlap between patients and controls. This may be demonstrated in the case of the urinary magnesium measured every day for eighteen days in a group of 16 recurrent stone-formers and 11 healthy controls.

Figure 1 shows the mean (± 1 SD) values in both groups of their morning (A), midday (B), evening (C) and 12 h urines. There is a clear difference in the Mg concentration in all daily urine portions. If, however, the corresponding 18-day mean values for the individual subjects are examined, the overlap becomes more evident.

The question arises whether or not a single urinary analysis allows a clear, unequivocal separation and classification of stone-formers and healthy controls. We have therefore set out to determine if a single urinary analysis gives a sufficient information to allow unequivocal separation of stone-patients and healthy persons.
Figure 1. Individual mean values and standard deviations of the Mg-concentration in recurrent stone-patients and controls after 18 days of observation. The wide overlap-zone is obvious.

MATERIAL AND METHODS

In the morning (A), midday (B), evening (C) and 12 h urines of eleven recurrent stone-formers and 10 controls the following variables were analyzed during a period of 6 days: calcium (total), magnesium and sodium (by AAS 400/Perkin & Elmer), ionised calcium (by Ca²⁺-selective electrode Orion 93 - 20, combined with Orion Ionalyzer 801 A, both Colora Messotechnik/Lorch), citric acid (by Boehringer test combination 139076), ammonia (by NH₄⁺-sensitive electrode Orion 95 - 10), titratable acidity (by pH meter E 510/Impulsomat E 473/Dosimat E 535, all Metrohm/Herisau), crystalluria (by Coulter Counter ZF/Size Distribution Analyzer P 128), osmolarity (by vapour pressure osmometer 5130, Wescor/Logan) and microscopic hematuria both by Sangur test (Boehringer/Mannheim) and by the light-microscopic evaluation (Leitz/Wetzlar) of urinary sediment.

RESULTS

The basic idea was to combine, in the form of quotients, all those urinary parameters that proved to be different between the stone-patients and their healthy controls. In this way, the minimal differences in the single urinary parameters could be amplified and the overlap between the individual 6-day mean values could be