MAGNESIUM EXCRETION IN URINE ON CONDITION OF INDIVIDUAL AS WELL AS STANDARD DIET IN HEALTHY CONTROLS AND CALCIUM OXALATE STONE FORMERS

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With our investigations we tried to answer the following questions:

1. Is there any subnormal excretion of magnesium (Mg) in calcium (Ca) oxalate stone-formers?

2. Do calcium oxalate stone-formers and healthy controls show any difference in their Mg excretion on condition of standard diet as well as of individual diet?

3. Is the Ca/Mg ratio qualified for estimating any risk of stone formation?

MATERIAL AND METHODS

In 33 calcium oxalate stone formers and 16 healthy controls as out-patients we analyzed the 24 h urine for Mg and Ca on one day individual diet. Sixty-seven calcium oxalate stone formers and 18 healthy controls were investigated as in-patients for 10 days on standard diet. Daily Mg and Ca intake was kept at 390 mg and 880 mg respectively. Liquid intake was maintained at 2400 ml/day. Twenty-four hour urines were collected daily and analyzed for Mg and Ca and other lithogenic and inhibiting substances. Ca and Mg were measured by atom absorption spectrophotometry (AAS).

The normal values we achieved from previous investigations with normal subjects in a steady state on a standard diet using five consecutive 24 h urines for the calculation of the mean value of urinary constituents, was as follows:
normal range for urinary Mg: 2.83 ± 0.70 mM

normal range for urinary Ca: 2.80 ± 1.05 mM

RESULTS

Urinary Mg while on a standard diet is shown in Table 1. The Mg excretion and concentration by calcium oxalate stone-formers and healthy controls on a standard diet are only slightly different and within the normal range. Table 1 also shows that Mg excretion by calcium oxalate-formers equals that of healthy controls on individual diet and is within the normal range. The mean concentration is greater in healthy controls, the difference, however, is not significant. When administering a standard diet it was observed that males, whether healthy or stone formers, show a higher Mg excretion and concentration than do females. (See Figures 1 and 2) Division of the mean of the daily Ca excretion and the mean of the daily Mg excretion results in the Ca/Mg ratio. Compared to the Ca/Mg ratio of healthy controls this value was found to be elevated in calcium oxalate stone formers both on individual diet and standard diet. See Table 1.

Figure 1. Mg excretion in 24 h urine on standard diet in male and female controls.