Lithium Carbonate Orally Increases Renal Sodium Excretion

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Dear Sir,

1.00-
075
0.50
0.25
0.00

The lithium clearance for estimating sodium and water delivery from the proximal tubules has been widely used since Thomsen advanced this technique [1]. A single dose of lithium carbonate makes it possible to calculate proximal sodium reabsorption in man without performing micropuncture. Some investigators feel, however, that the use of the lithium method cannot be made without any reservations because much evidence is circumstantial [2]. Although many studies have dealt with possible lithium reabsorption beyond the proximal tubules, the effect of a single dose lithium carbonate on renal function has not been the subject of thorough research. We studied the effect of 600 mg lithium carbonate on renal sodium excretion. Nine healthy volunteers, aged 25–40 years, were investigated during 3 days. Except for coffee and alcoholics, there were no diet restrictions. Their urine was collected at 10 p.m., 7 a.m., 10 a.m., 1 p.m. and 4 p.m. Blood samples were drawn every morning at 10 a.m. Lithium carbonate was given at 10 p.m. before the start of the 2nd day. Urine collections were measured for volume, sodium and creatinine. Blood samples were investigated for lithium, sodium and creatinine. Fractional sodium excretion (FENa) was calculated.

Serum lithium declined from 0.22 ± 0.04 mmol/l at the 2nd day to 0.09 ± 0.02 mmol/l at the 3rd day of our study. Calculated FENa showed a rhythmic change with a maximum at midday and a minimum during the night (fig. 1). FENa rose significantly (Wilcoxon: $p < 0.01$) during the 2nd day after 600 mg lithium carbonate, compared with values during the 1st day. Calculated FENa during the 3rd day declined to values not significantly different from those of the 1st day.

These results show that even a low lithium level interferes with the renal sodium excretion. This makes the validity of the fractional lithium clearance as a marker of the proximal sodium reabsorption doubtful.

10 a.m.

1 p.m.

4 p.m.

10 p.m.-7 a.m.

Fig. 1. Effect of Li on FE_{Na} . α = 1st day; β = 2nd day (after lithium carbonate); γ = 3rd day.

References

Thomsen K: Lithium clearance: A new method for determining proximal and distal tubular reabsorption of sodium and water. *Nephron* 1984;37:217–223.

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