Variant of Bartter's Syndrome with a Distal Tubular Rather than Loop of Henle Defect

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Dear Sir,

In their article Puschett et al. [1] described a patient with all clinical features of Bartter's syndrome, but with a normal capacity to form solute-free water during water loading. The latter was concluded from the finding of a normal diluting segment reabsorption, expressed as $\text{Ch}_2\text{O}/(\text{Ch}_2\text{O} + \text{Ccl})$, when related to delivery to this segment, expressed as $(\text{C}^{34}\text{O} + \text{Ccl})/\text{Cizulin}$. Since originally described patients with Bartter's syndrome had a substantial dilution defect [2], the authors suggested that their patient had a variant from of Bartter's syndrome. However, they also found an impaired increase in NaCl excretion after chlorothiazide, from which they concluded that there was a NaCl reabsorption defect in the distal convoluted tubule [1]. Since during water loading the distal convoluted tubule is a part of the diluting segment, it seems paradoxical to assume a reabsorption defect in the distal tubule without a general dilution defect. Diverging reports on some NaCl reabsorption defect in patients with Bartter's syndrome have been discussed recently [3]. This made us collect in a recent report [4] all maximal free water clearance data from patients with this syndrome we could trace in the literature or studied by ourselves. Since percent diluting segment reabsorption falls with increasing delivery, and since this delivery varied greatly due to different study conditions, the data were compared to findings in normal subjects in whom a large range in distal deliveries had been induced by diet. Figure 1 summarizes these data. The dotted line denotes the ratio of 0.60 between diluting segment reabsorption and diluting segment delivery. This was the maximal percent reabsorption in the 5 patients described by Gill and Bartter [2]. Clearly, according to the normal standards, most patients demonstrate a dilution defect, but this defect is seldomly as pronounced as in the patients of Gill and Bartter [2].

Fig. 1. Diluting segment reabsorption $[(\text{C}^{34}\text{O}/\text{GFR}) \times 100\%]$ and diluting segment delivery $[(\text{distal delivery}/\text{GFR}) \times 100\%]$ during maximal water diuresis in normal subjects (closed circles, shaded area) and in patients with the clinical picture of Bartter's syndrome (open circles), as

reported in the literature or studied by ourselves. GFR = Glomerular filtration rate. Details have been given elsewhere [4]. The open triangle represents an exceptional patient described by Norby et al. [5]. The asterisk represents the patient described by Puschett et al. [1]. The dotted line denotes a fractional diluting segment reabsorption of 60%. The figure has been reproduced, in adapted form, with permission of the American Journal of Nephrology.

From the patient data given by Puschett et al. [1] we calculate a distal delivery $[(C_{\text{Na}}^{\text{distal}} + C_{\text{Cl}}^{\text{distal}})/C_{\text{inulin}}] \times 100\%$ of 9.4%; $[V_{\text{Na}}/Q_{\text{inulin}}] \times 100\%$ was 7.3%. Plotted in figure 1, these data suggest a modest dilution defect also in this patient, comparable to that present in many other hitherto reported patients with Bartter's syndrome.

Clearly, the finding of a reduced free water clearance relative to diluting segment delivery is not sufficient to define in which part of the diluting segment the defect is localized. In this respect, the study with chlorothiazide of

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Puschett et al. [1] may present an important new lead, although this thiazide is perhaps not ideal in testing distal function because of its proximal tubular effects. Finally, we would like to emphasize that 'variant' forms represent the rule rather than the exception in patients presenting the clinical picture of Bartter's syndrome.

References

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