Relationship Between Dietary Protein Intake and Creatinine Clearance

To the Editor:

Recently, Lew and Bosch (1) reported a relationship between creatinine clearance and urinary urea nitrogen in young and elderly healthy subjects; they claim that this observation had not been made previously. We published (2) a similar relationship between these two parameters \( r = 0.62; P < 0.05 \) in smokers ingesting ad libitum \( (N = 11) \) and high-protein diets \( (N = 20) \). The subjects studied by Lew and Bosch had no protein intake greater than 1.7 g/kg per day, but in our study, 12 subjects were eating more than 2 g/kg per day of protein for a period of at least 12 months before the beginning of the investigation.

We, as did they, calculated the protein intake as Maroni et al. described (3), but we think we underestimated this intake, because sport and hyperalimentation could have increased the excretion of non-urea nitrogen. In this way, Lemon (4) has described a 4.7 g/day nitrogen excretion average, by feces and sweat, in sportsmen during 1 month of strength training with high-protein intake \( (34.8 \pm 1.3 \text{ g of nitrogen/day}) \). In our own observation, the estimated protein intake was \( 1.3 \pm 0.1 \) and \( 2.2 \pm 0.4 \text{ g/kg per day in the ad libitum and high-protein diet groups, respectively.} \)

It has been postulated that endogenous creatinine clearance is not a good measure of GFR when it is above 120 mL/min per 1.73 m\(^2\). However, several articles have reported a good correlation between creatinine clearance and inulin clearance (as gold standard). Dhaene et al. (5) found, after oral protein overload, that inulin clearance values agreed well with the respective creatinine clearances \( C_{\text{creatinine}} = 0.9 \times C_{\text{inulin}} + 24.4; r = 0.94 \), and Molina et al. (6) described a ratio between these two clearances of \( 1.04 \), in basal levels, and 0.96 after overload. On the other hand, Wiegmann et al. (7) could not demonstrate changes in GFR (measured with inulin clearance) in six individuals with chronic high dietary protein intake, although Lew and Bosch (1) have confirmed that there is good correlation between creatinine and inulin or iothalamate clearances under different dietary conditions.

It is a fact that a high-protein diet produces glomerular hyperfiltration, and in conditions where this hyperfiltration is chronically present, it can produce increased glomerular protein permeability. In our study, the oral protein stimulus was longer in time than ever reported (mean, 48 months; range, 12 to 180) and creatinine clearance was found to be \( 156 \pm 38 \text{ mL/min per 1.73 m}^2 \). Taking the above fact into account, we investigated to find out if there was microalbuminuria. However, we could not demonstrate the existence of a greater albumin excretion rate in the long-standing high-protein diet group than in the control group, as would be expected on the basis of the studies of conditions such as diabetes mellitus (8).

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