Fatty Acids Serum Levels in Nephrotic Patients on a Pure Vegetarian Diet

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Dear Sir,

The dietary management of nephrotic syndrome has been recently reconsidered and high protein diets are no longer prescribed [1, 2]. Pure vegetarian, low-protein (0.7 g/kg/day) diet supplemented with essential amino acids and keto analogues (supplemented vegan diet, SVD) lowers proteinuria and serum total cholesterol in nephrotics [3]. The low-protein intake and the vegetarian nature of foods [4] account for the reduction of proteinuria (probably through hemodynamic changes), whereas the extremely low cholesterol content causes the fall of cholesterolemia [5,6]. The high unsaturated/saturated fatty acids ratio is another characteristic of the vegetarian diet that may have an importance on lipid metabolism, membrane composition, blood rheology and renal disease [6-8].

We have evaluated the effects induced by the SVD on serum fatty acids (FA) levels, in 13 steroid-resistant nephrotic patients with normal serum creatinine levels. Both the free and the albumin-bound FA were measured.

Patients were studied at baseline, on a free mixed diet (supplying about 1 g/kg/day of proteins, both from plant and animal foods) and after a mean period of 1 month of SVD. Serum levels of the following free FA were measured in all the patients: linolenic (C 18:3), linoleic (C 18:2), oleic (C 18:1), palmitic (C 18) and stearic (C 16). In 7 of 13 patients, C 18:2, C18:1, C18 and C16 albumin-bound FA were also determined.

Albumin was separated from the other serum proteins by pseudoligand chromatography on Affi-Gel Blue, the extraction of FA from serum was performed according to Bligh and Dyer, and, finally, FA were determined as fluorescent 9-anthryldiazomethane derivatives by a HPLC procedure [9]. Serum creatinine (sCr), serum total cholesterol (sChol) and triglycerides (sTri), serum total protein (sPr) and 24-hour urinary protein excretion (uPr) were also measured at baseline and during SVD.

Results are expressed as mean $\pm$ SEM; statistical analysis was performed using the Student's t test for paired data. Besides the confirmation of the fall of uPr and of sChol, the decrease of palmitic acid and the increase of linoleic acid free serum levels were the only differences we detected after SVD (table 1). The albumin-bound FA compartment had a trend to increase, both as absolute value, for serum volume, and as value relative to albumin (table 2). These data indicate that the increase of the albumin-bound FA compartment is real, probably due to enhanced albumin affinity to FA.

The increase of free linoleic acid serum level is an effective result because also albumin-bound linoleic acid showed a trend to increase. On the contrary, free palmitic acid serum level decreased so producing an increased polyunsaturated/saturated fatty acids ratio. These changes might induce favourable effects on lipid metabolism, blood rheology and on renal disease [7,8]. In conclusion, SVD reduces proteinuria, serum cholesterol levels and may favourably affect FA composition in blood. The effective clinical and biological importance of FA changes remains, however, to be demonstrated.

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Table 1. Serum parameters, proteinuria, and free FA serum levels at baseline and during supplemented vegan diet (SVD): mean $\pm$ SEM

References

Table 2. Albumin-bound FA levels at baseline and during SVD, expressed as nmol FA/ml serum (left), and as nmol FA/nmol albumin (right): mean $\pm$ SEM

SVD

SVD

Baseline

Baseline

Kaysen GA, Gyambertoglio J, Jimenez I, et al: Effect of dietary protein intake on albumin homeostasis in nephrotic patients. *Kidney Int* 1986;29:472-477.

Coggins CH, Cornell BF: Nutritional management of nephrotic syndrome; in Mitch WE, Klahr S (eds): *Nutrition and the Kidney*, Boston, Little, Brown, 1988, pp 239-249. Barsotti G, Cupisti A, Morelli E, et al: Vegan supplemented diet in nephrotic syndrome. *Nephrol Dial Transplant* 1990;(suppl 1):75-77. Kontessis P, Jones S, Dodds R, et al: Renal metabolic and hormonal responses to ingestion of animal and vegetable proteins. *Kidney Int* 1990;38:136-144.

Grundy SM: Management of hyperlipidemia of kidney disease. *Kidney Int* 1990;37:847-853.

The Expert Panel: Report of the National Cholesterol Education Program Expert Panel on detection, evaluation and treatment of high blood cholesterol in adults. *Arch Intern Med* 1988;148:36-69.

Simpson LO: Renal disease, polyunsaturated fatty acids and blood rheology. *Nephron* 1986;44:256-258.

Barcelli U, Pollak VE: Is there a role for polyunsaturated fatty acids in the prevention of renal disease and renal failure? *Nephron* 1985; 41: 209-212.

Ghiggeri GM, Ginevri F, Candiano G, et al: Characterization of cationic albumin in minimal change nephropathy. *Kidney Int* 1987; 32:547-553.

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