Dear Sir,

Tubular dysfunction occurs in various kidney diseases. In patients with glomerulonephritis, initial alterations are found at the level of glomeruli, while tubular function is affected in the advanced stage of the disease. On the other hand, Balkan endemic nephropathy (BEN) reported as an interstitial kidney disease of unknown etiology, was followed by the early impairment of tubular function [1]. $^{99m}$Tc-DMSA is proposed as a marker of tubular dysfunction, since this radiopharmaceutical is efficiently extracted from peritubular circulation and bound in high percentage to tubular epithelial cells [2-4]. The present study was aimed to evaluate tubular function in patients with BEN, to assess the relationship between tubular and glomerular function in these patients, and to compare the findings with those obtained in patients with glomerular disease of the kidney.

Forty patients with BEN and 36 patients with glomerulonephritis were included in this study and divided into groups according to serum creatinine levels. Twenty-two BEN patients and 18 glomerulonephritis patients were without renal insufficiency (creatinine < 110 µmol/l), while 18 BEN patients (creatinine 229 ± 114 µmol/l) and 18 glomerulonephritis patients (creatinine 224 ± 40 µmol/l) were with chronic renal failure. The control group (creatinine 80 ± 21 µmol/l) consisted of 20 healthy persons without renal disease. Tubular function was estimated by $^{99m}$Tc-DMSA (Vinca, Yugoslavia) tubular fixation 4 h after intravenous injection of 18.5 MBq/10 kg b.w. It was presented as a percent of bound DMSA related to injected dose [4]. Glomerular filtration rate was evaluated by measurements of $^{99m}$Tc-DTPA (Vinca, Yu-
goslavia) clearance, determined from the volume of distribution obtained by a single blood sample, drawn 3 h after intravenous injection of $111$ MBq. Mean values ± SD were presented and the difference between groups was estimated by Student’s t test. The study of correlation was made by regression analysis.

Considering patients without renal failure, $^{99m}$Tc-DMSA tubular fixation was found markedly decreased only in patients with BEN (table 1). It was also lower in glomerulonephritis patients, but without a statistical significance. Healthy family members of nephropathy patients, known as a group of high risk, were not found to differ from the control group (data not presented). However, in patients with renal failure, $^{99m}$Tc-DMSA tubular fixation was considerably decreased both in BEN and glomerulonephritis patients.

$^{99m}$Tc-DTPA clearance values were found decreased significantly in all groups of patients, being more remarkably lower in patients with chronic renal failure (table 1). Relatively early change to the glomerular filtration rate in BEN patients seems unexpected, but is substantiated by early morphologic changes in glomeruli seen in 90% of patients [5]. The study of correlation between $^{99m}$Tc-DMSA tubular fixation and $^{99m}$Tc-DTPA clearance values showed significant correlation only in patients with renal failure. This study showed that in patients with BEN the impairment of tubular function was associated with the impairment of glomerular function in a relatively early stage of the disease, while in glomerulonephritis patients glomerular alteration was more pronounced. Both functions were more severely damaged in patients with chronic renal failure. $^{99m}$Tc-DMSA tubular fixation was shown suitable to estimate tubular function in BEN patients, being a noninvasive and rather sensitive and reliable method. However, other factors influencing tubular fixation of $^{99m}$Tc-DMSA must be taken into consideration. For instance, apart from the capacity of tubular epithelial cells, DMSA uptake is dependent on the state of renal circulation that enables radiopharmaceutical flow to tubular epithelial cells.

References

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