EFFECTS OF MAGNETIC INFRARED LASER THERAPY ON RENAL FUNCTION IN PATIENTS WITH CHRONIC PYELONEPHRITIS CONCURRENT WITH DIABETES MELLITUS

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Diabetes mellitus is one of the most common diseases with a reported rate in the range of 0.3 to 0.7 percent. This disease often affects both renal vessels and the parenchyma. The rate of infectious inflammatory renal and urinary tract diseases in patients with diabetes mellitus is four times the figure in patients without it. Pyelonephritis coexisting with diabetes mellitus has scarce symptoms and leads to renal functional disorders. Available diagnostic methods (measurement of serum urea and creatinine levels, glomerular filtration and tubular reabsorption) do not always detect early renal functional impairment. This prompts the need for new revealing methodologies for early identification of renal dysfunction.

The urology clinic of the Russian University of People Friendship has developed a method for early identification of renal functional impairment through evaluation of urinary excretion kinetics of 5-NOC drug. Experimental and clinical trials showed its efficiency to be comparable with that of radioisotope, radioimmune and biochemical studies. A maximum 5-NOC urinary level of 277.9+-14.4 mcg/ml and excretion of 79+-2.9 mg at 9 hours following the intake of 100 mg were adopted as an upper normal limit. Excretion rates and maximum urinary concentrations were correlated with five grades of renal functional impairment consistent with the classification of chronic renal failure.

A total of 218 patients with diabetes mellitus have been evaluated for renal functional disorders in our study. A group of patients with type 1, insulin-dependent diabetes comprised 106 (48.6 percent): 66 (62 percent) women and 40 (40 percent) men. The second group was 112 patients with type 2, insulin-independent diabetes, including 84 (75 percent) women and 28 (25 percent) men. The patients ranged in age from 16 to 77 years and their disease histories from one to 33 years. Most of diabetes patients were women (68.8 percent).

Renal functional disorders were found out virtually in all patients with type 1 diabetes. Grade 1 functional impairment was identified in 62 (28.4 percent) patients, grade 2 in 18 (8.3 percent), grade 3 in 22 (10 percent), and grade 4 in 4 (1.4 percent). However, there was no direct correlation between renal functional disorders and disease durations.

Examination of 112 patients with type 2 diabetes revealed an earlier onset of renal dysfunction. Thus functional disorders were found in 24 patients with one to five-year history of diabetes. The disease duration was six to ten years in 32 patients, 11 to 15 years in 22 patients and over 15 years in 24. Renal functional disorders were diagnosed actually in all patients with type 2 diabetes. Evaluation of 5-NOC urinary excretion kinetics revealed grade 1 renal functional abnormalities in 54 (44.2 percent) patients, grade 2 in 30 (24.6 percent), grade 3 in 28 (23 percent) and grade 4 in 10 (8.3 percent) patients.

Therefore, our methodology detected preclinical chronic renal failure and allowed us to recruit relevant therapeutic and preventive measures. Apart from drugs, a magnetic infrared laser therapeutic device (MILTA) was used in treatment of all patients. The device combines infrared laser, infrared and red light diode radiation, and a static magnetic field, providing for a deeper tissue exposure, with improvement of blood and lymph circulation in the affected organ, in particular in the renal parenchyma.

Efficacy of MIL therapy was evaluated clinically and by biochemical tests, ultrasound monitoring, urinary bacteriological assays and 5-NOC urinary
excretion kinetics.

Clinical studies showed that MIL therapy combined with conventional interventions produced a marked improvement of renal function, which presented as a significant improvement of the general condition and a more rapid return of normal blood glucose levels confirmed by 5-NOC urinary excretion findings.

Thus renal function with grade 1 impairment restored to normal in 58 of 62 patients (93.5 percent), grade 2 reverted to grade 1 in 15 of 18 (83.3 percent), grade 3 to grade 2 in 17 of 22 (77.3 percent) and grade 4 to grade 3 in 2 of 4 patients (50 percent). The total rate of renal functional improvement in patients with type 1 diabetes mellitus was 86.8 percent.

Renal functional improvement after MIL therapy was seen in 99 of 122 (81.1 percent) patients with type 2 diabetes. Renal function returned to normal in 51 of 54 (94.4 percent) patients. Grade 2 functional impairment was reversed to grade 1 in 23 of 30 patients (75.5 percent), grade 2 to 1 in 23 of 30 (75.7 percent) and grade 3 to 2 in 19 of 28 (67.9 percent) patients. Finally, grade 4 renal dysfunction improved to grade 3 in 6 of 10 (60 percent) patients.

CONCLUSIONS

This study found no clear relationship between the duration of insulin-dependent diabetes mellitus and severity of renal functional disorders, while insulin-independent diabetes was associated with an earlier impairment of renal function. Inclusion of the magnetic infrared laser in therapy of diabetes mellitus significantly improved renal function, presumably by activation of reserve nephrons due to improved microcirculation in the renal parenchyma. This evidence suggests that MIL therapy is helpful in prevention of progressive chronic renal failure in patients with diabetes mellitus.