Exercise May Slow Kidney Disease Progression

Patients with stage 3 to 4 chronic kidney disease (CKD) assigned to an exercise/rehabilitation intervention have better maintenance of kidney function at one-year follow-up, according to preliminary research presented at Kidney Week 2014.

In a pilot study, consultant renal physiotherapist Sharlene A. Greenwood of King’s College London and colleagues evaluated an exercise training program for patients with predialysis CKD. Ten patients received the study intervention, which consisted of thrice-weekly exercise sessions at a gym setting in a community hospital. Another 10 patients received usual care.

The exercise programs were individualized, accounting for patient choice and aiming for a combination of aerobic and resistance exercises. Aerobic exercise was predominantly performed on recumbent stationary exercise cycles, at an intensity corresponding to 80 percent heart rate reserve with maximum heart rate, based on incremental exercise testing. Resistance training was prescribed at 80 percent of one repetition maximum. The intervention also included an individual session with a senior renal physiotherapist for discussion of exercise and personal goals with use of a motivational interviewing approach.

Kidney function was assessed by comparing the rate of change in serum creatinine-based estimated GFR (eGFR) for each participant for 12 months before the study versus during the 12-month intervention period. Other outcomes of interest included pulse wave velocity, exercise capacity (VO₂ peak), waist circumference, and body weight. Eight patients in the intervention group and 10 control individuals completed the study.

At the end of 12 months, patients assigned to the exercise/rehabilitation group had better preserved kidney function. The mean difference in eGFR was 7.8 mL/min/1.73 m²/year, compared with the usual care group.

Exercise/rehabilitation was also associated with reduced body weight and improved exercise capacity. After adjustment for baseline differences, patients in the intervention group had a 5.6 kg reduction in body weight and a 7.1 cm reduction in waist circumference, with a 5.7 mL/kg/min increase in relative VO₂ peak.

There was also a significant 2.30 m²/second reduction in pulse wave velocity in the intervention group. The eGFR benefit was inversely correlated with the changes in pulse wave velocity and waist circumference.

Patients with stage 3 to 4 CKD have reduced exercise capacity, which may contribute to their risk of cardiovascular disease—the leading cause of death in CKD. Exercise training has the potential to preserve kidney function and improve cardiovascular risk factors in predialysis patients with CKD.

This pilot study suggests substantial benefits of an exercise/rehabilitation program for patients with stage 3 to 4 CKD. The benefits include a slower decline in kidney function after 12 months of exercise training, compared with usual care.

Together with improvements in exercise capacity and body weight, the exercise/rehabilitation program may be associated with improved quality of life in this group of patients. “Although small, our study suggests that long-term tailored exercise prescription with motivational interviewing is a feasible approach for exercising patients with progressive CKD, and sets the scene for a large multicenter study,” Greenwood said.

New Findings on Diet and Kidney Disease

Research presented at Kidney Week 2014 highlights dietary factors affecting kidney disease outcomes—including a study reporting that a “healthy diet” and lower sodium intake are associated with a reduced risk of major renal outcomes. Another report draws attention to the potentially high levels of potassium added to some “reduced-sodium” foods.

Nephrologist Andrew Smyth, MB, of National University of Ireland Galway and his colleagues presented the results from the Diet and Health Study of the National Institutes of Health and the American Association of Retired Persons. On the basis of findings on food frequency questionnaires completed by nearly 545,000 participants, the researchers evaluated the relationship between diet quality, sodium and potassium intake, and major renal outcomes—dialysis or death from renal causes. The study evaluated several different definitions of a “healthy diet”: the Healthy Eating Index, the Alternate Healthy Eating Index, the Mediterranean Diet Score, and the Recommended Food Score, along with sodium and potassium intake.

On three of four diet quality measures, a healthy diet was associated with a lower risk of dialysis or death from a renal cause; there was no association with the Recommended Food Score. On multivariate analysis, the risk of the combined outcome was 16 to 23 percent lower for participants in the highest quintile of dietary quality, compared with the lowest quintile.

Said Smyth: “We found that high sodium intake, average 4.7 g/day, was associated with an increased risk, but no difference between low and moderate intakes: average 2.0 and 3.1 g/day.” High potassium intake was associated with a reduced risk.

They found that sodium-reduced products contained 25 to 55 percent less sodium than their non–sodium-reduced counterparts: the mean difference was 460 mg per 100 g. The sodium-reduced products also contained on average 47 percent more potassium, with a wide variability in potassium content: from 210 to 1500 mg per 100 g. Potassium-containing additives were found on the ingredients list of 63 percent of sodium-reduced products, compared with 25 percent of non–sodium-reduced products.

Phosphorus and protein levels did not differ for the two groups of products. “Potassium additives are frequently added to sodium-reduced meat and poultry products in amounts that significantly contribute to the potassium load for CKD patients,” the researchers conclude. “Patients requiring a potassium restriction should limit their intake of sodium-reduced meat and poultry products.”