Will extra protein and exercise help dialysis patients?

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University of Illinois scientists will learn whether protein supplements and cycling during treatments can help dialysis patients fight cardiovascular disease and retain physical function, thanks to a $2.1 million grant from the National Institutes of Health (NIH).

"Patients with kidney failure face many health problems. They are at high risk for the more common forms of heart disease, and they also develop a peculiar condition called vascular calcification that makes their arteries stiff," said Ken Wilund, a faculty member in the U of I's Department of Kinesiology and Community Health and Division of Nutritional Sciences, and the study's principal investigator.

Vascular calcification interferes with constriction and dilation of the arteries, which can affect patientsí blood pressure and have other negative consequences, he said.

Many dialysis patients are also anemic; suffer from a loss in muscle tissue and declines in physical function; and have weak bones due to their abnormal mineral metabolism.

And, when they are being dialyzed, patients lose amino acids across the dialysis membrane. Adding protein to patientsí diets has long been recommended, but no long-term studies have actually administered protein supplements and reported on their effectiveness, he said.

"Chronic inflammation, loss of amino acids during dialysis, and the

often sedentary lifestyle of dialysis patients combine to cause them to lose muscle. In the first year of dialysis, patients with diabetes typically lose 5-1/2 pounds of muscle, and persons who don't have diabetes can expect to lose 2-1/2 pounds of lean tissue.

"They're in a catabolic state--their muscle and skeletal tissue are breaking down," he noted.

Receiving dialysis for three to four hours a day three days a week takes an emotional and financial toll on patients too. "Many of those affected are hurting economically. They feel horrible, may have to travel some distance to a dialysis clinic--perhaps by bus, and are often unable to hold down a job because of their condition. Any improvement in their physical function would be such a plus for them, he said.

The five-year study will take place at two dialysis clinics in Chicago and one clinic in Champaign. Approximately 30 patients will complete a one-year diet and exercise intervention annually, for a total of 150 patients in a five-year period. The scientist hopes to have the study up and running this fall.

How do Wilund and his co-investigators hope to improve their patients' health and quality of life? They'll replace the amino acids dialysis patients are losing by making sure they consume added protein, and introduce them to what the researchers call intradialytic cycling—we'll put a cycle in front of their chair and encourage them to exercise while they're on dialysis."

Wilund has seen cycling while dialyzing attempted in other clinics and wasn't very impressed, but he believes he has a way around what he perceives as the problem. He said nurses are too busy to supervise the patients' cycling and make sure that the pace of their exercise exceeds that of "a Sunday stroll in the park."

In the new study, students will be involved with the patients one-on-one to motivate them "so they're really moving and strengthening those muscles. Dialysis takes three to four hours, so this is a unique opportunity to help this population become more active," he said.

Wilund and his colleagues hope to answer some very basic questions: What effects do protein supplementation and simple exercise have on heart disease, physical function, retention of muscle tissue, and bone strength in dialysis patients? And, when patients who are in a catabolic state expend more energy, will the breakdown of muscle tissue be arrested or exacerbated? The researchers will be assessing patients at the beginning of the study and again at 6 months and 12 months to find out.

"We think we'll see benefits because we hear anecdotes about dialysis patients who have begun to exercise and are able to walk into the clinic for the first time in years instead of arriving in a wheelchair, or patients who, after beginning an exercise program, are able to go upstairs and clean the second floor of their house after having not been able to do that," he said.

To date, no long-term trials have been conducted that would confirm that anecdotal evidence, he said.

Provided by University of Illinois at Urbana-Champaign