Letters to the Editor

Does Exercise Training During Hemodialysis Really Improve Dialysis Efficacy?

Parsons et al¹ have produced an excellent study. They examined the impact of intradialytic exercise on dialysis efficacy, physical performance, and quality of life (QOL) in hemodialysis patients. However, 4 details in this study need further clarification.

First, the study lacks a real control group. The control group should have included subjects who did not exercise at all rather than subjects in the extradialytic exercise group. Twelve of 13 (92.3%) patients in the study received erythropoietin treatment. However, Parsons did not mention the percentage of patients, from among the total of 50 subjects recruited, who received erythropoietin. Use of erythropoietin in patients on dialysis has significant effect on dialysis efficacy (as measured using Kt/V). It is possible that the improvement in dialysis efficacy noted in the study (attributed entirely to exercise) could have been partly attributable to erythropoietin use.

Second, using Kt/V as a measure for dialysis efficacy is not without controversy.² In addition to urea, most other higher molecular weights of uremic toxins have not been linked to urea removal, as evaluated by Kt/V.^{3,4} Kt/V also should be adjusted to residual renal function.⁴ Parsons's study did not make mention of this.

Third, as Parsons noted, patients in the study had higher QOL ratings than the normative patients on hemodialysis. They had even better physical performance than the ambulatory hemodialysis patients in our study.⁵ (The mean distance walked, measured using the 6-minute walk test, for Parsons's patients was 520m, which is considerably farther than the 398.8m of our patients.) Therefore, it is not clear whether the result from patients with high QOL and high physical performance in Parsons's study can be generalized to normative patients on hemodialysis.

Last, the physical and functional performance and QOL of hemodialysis patients are influenced by, among other things, age, sex, biochemical variables and nutritional status, comorbidities, number of medications prescribed, depression, and the duration of dialysis; it is not clear whether Parsons's study took these factors into account.

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The authors respond

Hsieh and Lee made some good points about our study.¹ The lack of a control group was a limitation, which was addressed in the conclusions of the article. Hsieh and Lee suggest that the control group should consist of people undergoing hemodialysis but not participating in an intradialytic exercise program. This would serve to show that exercise during dialysis was associated with the changes noted in our study; however, our intent was to show that exercise during dialysis is superior to exercise off-dialysis due to the enhanced clearance of toxins with resultant attenuation of negative effects of the uremic syndrome on cardiovascular and muscle function. The optimal but logistically difficult design is to have 3 groups: those that exercise during dialysis, those that do not exercise during dialysis, and those that exercise off-dialysis at the same duration and intensity of exercise as those in the intradialytic exercise group.

Hsieh and Lee also had concerns about the use of erythropoietin and that it may have influenced the increase in dialysis efficacy that we noted with the exercise program. Had subjects started using erythropoietin during the course of the intradialytic program, this would have been a valid concern. However, all participants who were receiving erythropoietin had been on a regular stable regime of this hormone. So, the effects of erythropoietin would have been consistent throughout the study. We believe that the dialysis efficacy was not affected by erythropoietin use.

We fully accept the argument that using Kt/V as a measure for dialysis adequacy has been questioned. However, there is support both for and against the use of Kt/V urea as a measure of dialysis efficacy. Locatelli et al describe the background history of the use of Kt/V urea as a dialysis efficacy measure and indicate that because the "... real toxins that account for the uraemic syndrome are not known, the clearance of urea can be used to gauge the effectiveness of dialysis, since the clearance of all toxins correlates to some extent with urea clearance."^{2(p286)} Further, in the K-DOQI Guidelines 2006 Update, the use of urea clearance as a measure of dialysis adequacy is substantiated by the statement: "Urea clearance determined from a ratio of concentrations, rather than from an absolute value, is a sensitive marker of small-solute diffusion