Effects of a 12-week exercise program on the functional capacity and quality of life in patients with end-stage renal disease on hemodialysis

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ABSTRACT
Introduction: Physical rehabilitation and quality of life of patients on dialysis are usually neglected. Patients with chronic kidney disease frequently complain of lack of energy, fatigue, and depression. Studies on the effects of exercise programs for dialysis patients are still scarce. The objective of this study was to report the institution of an exercise program in two patients on dialysis.

Keywords: exercise program, hemodialysis, quality of life.

INTRODUCTION
Management of patients with end-stage renal disease (ESRD) has changed dramatically over the last several years. Several factors, such as early prevention and diagnosis, improvement in the treatment of complications, and modern and accessible dialysis modalities, contributed for a reduction in mortality rate. Despite those developments, physical rehabilitation and the quality of life of those patients are often neglected. Renal patients frequently complain of lack of energy, fatigue, and depression. Fatigue and lack of energy leading to self-treatment through resting and inactivity, i.e., adoption of a sedentary life style, is probably one of the most important factors associated with skeletal muscle dysfunction. Some studies demonstrated that patients on hemodialysis develop complications such as reduction in physical capacity and worsening of other associated diseases.1,2

The reduced physical capacity of patients with ESRD is characterized by a reduction in flexibility, changes in inter- and intramuscular coordination, reduction in muscular strength and resistance, and reduction in cardiovascular capacity. The combination of those factors leads to a reduction in the ability to perform activities of daily living and reduction in the quality of life.3 Exercise training programs interrupt the cycle of complications of renal disease, which are increased by inactivity, by increasing aerobic or muscular resistance and decreasing the dependency to perform activities of daily living.4

The objective of this study was to determine the effects of a 12-week exercise program, which included resistance training, stretching, and relaxation, in two patients on dialysis.

METHODS
This is a prospective study of a 12-week exercise training program in two patients with ESRD on dialysis. To participate in the study, patients signed an informed consent.

Initially, patients attended a conference on healthy habits and the importance of physical activity. The proposed training was undertaken at the Kidney Clinic in Novo Hamburgo, Rio Grande do Sul, Brazil. Blood pressure (BP) and heart rate (HR) were monitored at the beginning of each training session, and immediately afterwards.

Training sessions consisted of resistance exercises with 1 kg dumbbells, for the upper limbs, and body weight, for the lower limbs. Abdominal exercises, stretching, and relaxation with Chi Kung (oriental physical exercises) were also included in the exercise training program. Patients attended two 60-minute weekly sessions, in alternate days with hemodialysis session, for 12 weeks.

The six-minute walking test was used to evaluate physical capacity, as well as a questionnaire with demographic, anthropometric, and clinical data, and the SF-36: a generic questionnaire to evaluate quality of life (QOL), which consists of eight domains: physical functioning, limitations due to physical factors, pain, global health status, vitality,
social functioning, limitations due to emotional factors, and mental health. One hundred is the higher score for each parameter of the SF-36 and zero is the lowest.

RESULTS

CASE 1

A 60-year-old male with ESRD, on dialysis for two years, with indication of renal transplant had hypertension, controlled with medication, 72 kg, 1,85 m, and body mass index (BMI) 21. The predicted value of the six-minute walking test (WT6) was 669 meters. His baseline WT6 before starting the exercise training program was 297 meters, with BP 156 x 82 mmHg and HR 98 bpm, before walking, and BP 136 x 57 mmHg and HR 78 bpm, after the test. He did not develop any symptoms that interfered with the test. He had a hemoglobin level of 11.3 g/dL before starting the program.

The tests were repeated after the 12-week exercise training program, showing the following results: WT6 426 meters, BP 137 x 60 mmHg and HR 72 bpm, before the test, and BP 136 x 56 mmHg and HR 98 bpm, after the test. He had a hemoglobin level of 9.7 g/dL after the 12-week exercise training program.

Regarding quality of life, evaluated by the SF-36, we observed an improvement in physical functioning from 55% to 85%; limitation due to physical factors went from 50% to 100%; and mental health changed from 36% to 96%. Remaining domains (pain, global health, vitality, and limitations due to emotional factors) remained unchanged, except for social functioning, which decreased from 77.5% to 62.5%.

CASE 2

A 47-year-old female with ESRD, on dialysis for three years and eight months, who had a renal transplant 25 years ago had been treated for hepatitis C, weighed 52 kg, height 165 cm, and BMI 19. Her predictive WT6 was 630 meters. The WT6 before staring the exercise training program was 271 meters, BP 123 x 75 mmHg and HR 85 bpm, before the test, and BP 136 x 56 mmHg and HR 98 bpm, after the test. She did not develop any symptoms that interfered with the test. Her hemoglobin level before the exercise training program was 12.2 g/dL.

The tests were repeated after the 12-week program, with the following results: WT6 336 m, BP 119 x 73 mmHg and HR 86 bpm, before the test, and BP 111 x 69 mmHg and HR 91 bpm after the test. Her hemoglobin level after the 12-week program was 10.3 g/dL.

As for quality of life, we observed an improvement on physical functioning, which went from 60% to 90%; global health from 62% to 67%; limitations due to emotional factors went from 33.3% to 100%; and mental health from 64% to 84%. Limitations due to physical factors, pain, and vitality remained unchanged, and social functioning decreased from 100% to 87.5%.

DISCUSSION

After the 12-week training program, an improvement in functional capacity, assessed by the six-minute walking test, which showed a mean difference of 97 m between the baseline and final tests, was seen. Those results are similar to the results of several studies that used the WT6 to evaluate functional capacity, which demonstrated an improvement in walking speed, time of walking, and distance covered.5,6,7 Those results reflect gain for the patients, especially in activities of daily living. As for quality of life, our study showed an improvement in several domains, corroborating the data in the literature, in which several studies demonstrated improvement, mainly in scores of physical and emotional aspects, global health, pain, life situation, vitality, and working condition.6,7,8,9 Currently, the management of dialysis patients is aimed, mainly, at improving quality of life, which demonstrates the importance of exercises.

Symptoms reported by our patients showed an improvement in physical status, breathing, self-esteem, and concentration, as well as pre- and post-dialysis symptoms.

The findings of the present study, regarding the benefits of the exercise training program on patient performance, cannot be attributed to correction of their anemia, since hemoglobin levels decreased after the 12-week period.

Despite the evidence in the literature and corroborated by the present study, studies on the benefits of physical exercises for patients on hemodialysis are rare and physical exercises are not routinely prescribed for those patients.

REFERENCES


