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Fitness and quality of life in kidney transplant recipients: Case-control study☆

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ABSTRACT

Background and objectives: We analyzed the levels of fitness, muscle structure and quality of life of adults after kidney transplant and healthy adults.
Patients and methods: A total of 16 kidney transplant patients and 21 healthy controls performed several fitness test, isokinetic evaluation of knee flexion and extension and ultrasonography muscle thickness assessment. They also completed the quality of life questionnaire SF-36.
Results: Physical fitness, muscle structure and quality of life of the kidney transplant recipients were significantly poorer than the controls. The transplant patients performed less well in the "get up and go" and "sit to stand" test ($p < 0.001$) as well as in assessments of muscle structure, strength and power. The patients had a poorer score in their quality of life assessments, differing from the controls in domains of physical function, physical role, general health and social function ($p < 0.001$).
Discussion: Fitness, strength and muscle mass are diminished in kidney transplant patients, resulting in a poorer quality of life which might entail an increased risk to their health.

Forma física y calidad de vida en pacientes trasplantados de riñón: estudio de casos y controles

Palabras clave:
Trasplante renal
Forma física
Calidad de vida
Masa muscular

RESUMEN

Antecedentes y objetivos: El objetivo del estudio fue analizar los niveles de forma física, estructura muscular y calidad de vida de adultos con trasplante de riñón y adultos sanos.
Pacientes y métodos: En este estudio participaron 16 trasplantados renales y 21 controles. Se evaluó la forma física, la fuerza isocinética de flexión y extensión de rodilla, así como el cuestionario de calidad de vida SF-36. Además, se realizó una ecografía muscular para analizar la estructura muscular.
Resultados: Se observaron valores inferiores en el grupo de trasplantados en los test de agilidad y sentarse y levantarse de la silla ($p < 0{,}001$) y en todos los parámetros de estructura muscular, fuerza y potencia. Los pacientes evaluaron peor su calidad de vida en todos los niveles, encontrándose diferencias significativas con respecto a los pacientes en los dominios de función física, rol físico, salud general y la función social ($p < 0{,}001$).
Discusión: La forma física, fuerza y masa muscular y calidad de vida de personas trasplantadas de riñón está disminuida, situación que podría conllevar un mayor riesgo para su salud.

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Introduction

Physical inactivity is a characteristic factor in patients with chronic kidney disease that, together with the hypercatabolic aetiology of renal disease, leads to decreased fitness and poor quality of life.[1] The ability of patients to perform some type of physical activity is about 40–60% lower than in healthy people, decreasing even further during renal replacement therapy.[2]

The assessment of fitness and quality of life in patients with chronic kidney disease is important to (i) make a health status diagnosis and (ii) prepare an individualized exercise prescription considering the baseline fitness level. From a clinical and public health point of view, it is important to know if the fitness level of patients with chronic kidney disease differs from healthy people.

Therefore, the objective of this study was to determine the levels of fitness, muscle structure and quality of life of adults with kidney transplant and healthy adults.

Methodology

Participants

In this case-control study, a total of 16 renal transplant patients were involved from the Clinical Hospital of Valladolid. Having been transplanted at least one year before the start of the study, all transplant patients were clinically stable, did not suffer severe cardiovascular disease, uncontrolled hypertension or musculoskeletal problems such as osteoporosis that hindered carrying out the tests. Fig. 1 shows the process of selecting participants. In addition, 21 healthy people were included; 6 were patient relatives and 15 were teachers and administrative and services staff of the Valladolid university. Participants were informed about the risks and benefits of the study, and all gave their informed consent in writing. The research project was conducted in accordance with the Declaration of Helsinki and with the approval of the Ethics Committee of the Miguel de Cervantes European University in Valladolid.

All participants attended a test familiarization session at the research centre (September 2012). The following parameters were evaluated before (second week of September 2012) and after (second week of December 2012) the intervention programme (October–December 2012): (i) single-leg balance test "*Star Excursion Balance Test* (SEBT)"; (ii) handgrip strength test by dynamometer; (iii) lower limb flexibility from the sitting position; (iv) flexibility of upper limb trying that both hands touch on the back; (v) agility test, walking 2.44 m, turn around a cone placed on the floor and return to starting position; (vi) sit and rise from the chair for a minute; (vii) Six-Minute Walk Test. An isokinetic evaluation of the knee flexion and extension was also performed at $60^\circ\,s^{-1}$ and $180^\circ\,s^{-1}$ together with an assessment of the muscular structure, rectus femoris and vastus lateralis by ultrasound. All evaluations were performed on the dominant side. Also, we evaluated the quality of life using the FS-36 Questionnaire.[3]

Statistic analysis

All analyses were performed using SPSS (v. 20.0 for Windows, Chicago). Data normality was confirmed through the Kolmogorov Smirnov test. To compare the transplant group to the healthy subjects group, an unpaired two sample Student *t* test was used for quantitative variables and a chi-square test for qualitative variables. In addition, an analysis of covariance where the group variable was the independent variable was performed, the parameter of fitness, muscle structure and the quality of life was introduced as the dependent variable and the variable sex and age were entered as covariates. Statistical significance was set at $p \leq 0.05$ and the values are expressed as mean ± standard deviation.

Results

The demographic characteristics of the sample are reflected in Table 1. There are significant differences between the groups in age, being the transplanted subjects older than healthy ones, justifying the age adjustment in all subsequent comparisons. The transplanted group showed a lower level in the *get up and go* test, sit and rise from the chair ($p < 0.001$), in the 6-minute walk and the medial and posteromedial balance (Table 2). As for the parameters of muscle structure, strength and power, the transplanted group obtained significantly lower values than the control group

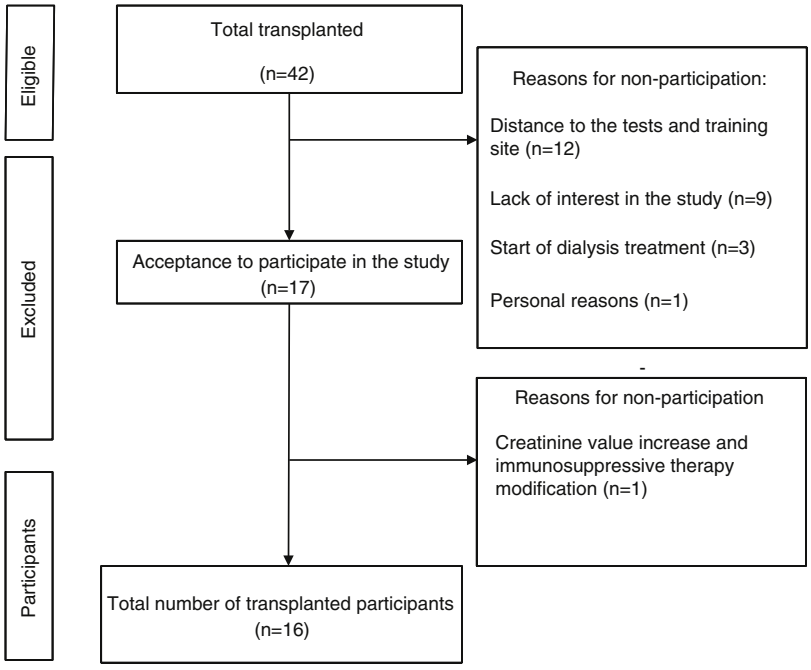

Fig. 1. Transplanted participants' selection process.