



Physical Activity in Solid Organ Transplant Recipients: Organizational Aspects and Preliminary Results of the Italian Project

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ABSTRACT

Most of the difficulties when trying to realize the proposal to prescribe physical activity for transplantation patients come from patient attitudes and cultural beliefs that ignore the benefits of exercise, but there also are organizational aspects arising from the difficulties that these patients face in accessing supervised exercise facilities. To address these difficulties, the Italian study project “Transplant ... and Now Sport” was developed based on a model of cooperation among transplantation specialists, sports physicians, and exercise specialists organized as a team combining their specific skills to effectively actuate the physical exercise programs. This preliminary report is based on 26 patients (16 male, 10 female; 47.8 ± 10.0 years old; 21 kidney and 5 liver transplantations; time from transplantation 2.3 ± 1.4 years) who performed prescribed and supervised exercises consisting of 3 sessions per week of aerobic and strengthening exercises for 1 year. Preliminary results show a significant decrease in body mass index ($t = 1.966$; $P < .05$) and a significant increase in peak aerobic power ($t = 4.535$; $P < .01$) and maximum workload ($t = 4.665$; $P < .01$) on the incremental cycling test. Also maximum strength of knee extensors ($t = 2.933$; $P < .05$) and elbow flexors ($t = 2.450$; $P < .05$) and counter-movement jump performance ($t = 2.303$; $P < .05$) significantly increased. Creatinine and proteinuria tended to decrease, but the differences were not significant. In health-related quality of life assessed by the SF-36 questionnaire, the Bodily Pain, General Health, Vitality, Social Functioning, and Role Emotional scale scores showed a significant improvement ($P < .05$). Preliminary results of the study protocol “Transplant...and Now Sport” show the positive effects of the model based on cooperation among transplantation centers, sports medicine centers, and gyms in the administration of a supervised exercise prescription. These data should be considered a contribution to developing

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and promoting further detailed exercise protocols and to fostering improved post-transplantation health and survival, helping to ensure that physical activity becomes a safe routine medical treatment plan of patient management.

IT is well known that cardiovascular and metabolic diseases (hypertension, diabetes, hyperlipidemia, obesity) affect mortality and morbidity in solid organ transplant recipients [1]. It is also well established that immunosuppressive therapy often results in numerous adverse effects, including osteoporosis, sarcopenia, and weight gain [2,3]. Furthermore, most of the patients presenting for transplantation are physically inactive or have very low levels of exercise capacity [4]. On the other hand, there is wide agreement that regular physical activity is protective and can counteract cardiovascular and metabolic diseases, osteoporosis, sarcopenia, and most of the risk factors derived from physical inactivity and a sedentary lifestyle [5].

Notwithstanding this knowledge, until now the role of exercise after transplantation has not been emphasized enough. As pointed out by Gordon et al. [6], there is no uniform agreement among transplant professionals about the need for or recommended extent of exercise after transplantation. There also are many practical difficulties when trying to realize the proposal to prescribe physical activity for transplantation patients. Probably, most of these difficulties come from patient attitudes (ie, lack of motivation and interest, fear of injury) and cultural beliefs that ignore the benefits of exercise, which may derive in part from the silence of transplant professionals about the benefits of exercise and in part from the common belief that other medical issues are more important than exercise [6].

Another organizational aspect that usually is not taken into account arises from the difficulties that transplantation patients have in accessing supervised exercise facilities; this also is a common problem for patients with many other illness [7,8]. Transplantation patients are usually involved in a rehabilitation period before discharge after surgery, and they usually receive only general suggestions to increase their level of physical activity after discharge, without considering the organizational aspects of these suggestions. As a consequence, the preventive role of physical activity is largely underutilized because health care professionals do not rigorously promote exercise to transplantation patients and do not incorporate the promotion of exercise into routine patient management [6]. In other words, after discharge, the main questions should be not only "Which activity is better?" but also "How can patients easily access physical activity?"

To answer these questions, the Italian National Transplant Centre in 2008 set up the "Transplant...and Now Sport" project as a unique proposal aimed at studying the outcomes of a personalized prescription of organized and supervised physical activity for solid organ transplantation patients performed in certified gyms, and at sensitizing physicians to promoting exercise to transplant recipients. In this article, we present the rationale of the project with

some preliminary results of the study, with the aim of contributing to the debate regarding the needs and the effects of physical exercise on transplantation patients, mainly focusing on organizational aspects.

MATERIALS AND METHODS

Organizational Aspects

The project is based on a model of cooperation between transplantation specialists, sports physicians, and exercise specialists (graduates and postgraduates in physical education and/or physiotherapy). In Italy, they are working in transplantation centers, sports medicine centers, and gyms, respectively, and can be organized as a team combining their specific skills to effectively actuate the physical exercise programs. The physicians in the transplantation centers have the duty of selecting patients suitable for physical activity, considering exclusion criteria. The sports physicians are charged to prescribe a personalized program of physical activity based on the results of functional assessments performed at the sports medicine centers. In the gyms, the patients carry out the prescribed program and train under the supervision of certified personnel. This organization aims to check the patients from clinical (transplant center) and functional (sports medicine center) points of view, but also to identify facilities in their home districts where patients can easily perform their training programs.

Study Protocol

This is a multicenter, controlled, prospective, nonrandomized study that considered the enrollment of 120 patients (range 18 to 70 years), 6 months to 8 years after solid organ transplantation (kidney, liver, heart), with clinical and functional stabilities checked by the transplant centers. Exclusion criteria were orthopedic limitations, psychiatric or neurological disorders, and any other cardiovascular contraindication to exercise testing and training [9].

Patients recruited from different transplantation centers were divided into 2 groups: the cases group (A), in which personalized physical activity was prescribed by the sports physicians, and the control group (B), in which some generic lifestyle indications were given without specific prescription and supervision. All subjects (groups A and B) received individualized counselling about the protocol "Transplant...and Now Sports" by the transplantation center. Written informed consent was obtained from the patients before inclusion, according to the procedures approved by the ethical committees of the transplant centers involved in the study.

Blood chemistry, urinalysis, and cardiovascular assessments were performed by the transplantation center to assess the exclusion criteria and to check the function of the transplanted organ. After the administration of the SF-36 questionnaire to evaluate health-related quality of life (HRQoL), the patients who matched the inclusion criteria were sent to the sports medicine center to carry out the functional assessment tests for exercise capacity, muscle strength, and body composition. Based on the results of these tests, the sports physicians prescribed the individual program of exercise only for patients in group A. For the patients in group B, the physicians recommended generic exercises for physical fitness without prescription as routine patient management. Then, patients

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