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Needed: Tailored Exercise Regimens for Kidney Transplant Recipients

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KIDNEY TRANSPLANT recipients are expected to engage in myriad self-care activities, including medication and dietary compliance, use of sunscreens, and exercise, among others. However, the role of exercise after kidney transplantation traditionally has not been emphasized. There is no uniform agreement among transplant professionals about the need for or recommended extent of exercise after kidney transplantation. It is unknown whether transplant centers routinely prescribe a standard exercise regimen to kidney transplant recipients. At one academic teaching hospital, for instance, transplant professionals inform new kidney recipients who can exercise that they should do as much as they physically can, but avoid lifting weights more than 10 lb. This report addresses several reasons for the minimal attention in the transplant literature to both developing a standardized approach to exercise regimens and promoting physical activity. More importantly, this article makes the argument for promoting a detailed exercise regimen to kidney recipients to foster improved posttransplantation health and survival. Last, we offer recommendations for promoting physical activity.

JUSTIFICATION FOR PROMOTING EXERCISE

Exercise and physical activity confer a number of benefits to individuals of all ages, among healthy people and those with chronic illnesses.¹ Exercise has been well documented to show positive effects in persons with various chronic illnesses, eg, arthritis, diabetes, and chronic obstructive pulmonary disease. Physical activity also can attenuate the severity of well-known risk factors for diseases, eg, hypertension, obesity, and hyperlipidemia, thus slowing the progression of cardiovascular diseases (CVDs).

There is justification for recommending exercise to kidney transplant recipients. First and foremost, sedentary behavior is a health risk factor. Poor health from sedentary behavior has

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an effect across a broad range of physiological indicators. It is possible that kidney recipients can gain the same benefits from exercise as healthy persons. Second, there may be some benefits from exercise that directly influence adverse events associated with end-stage renal failure requiring a kidney transplant. The primary cause of mortality among kidney transplant recipients is CVD.² Risk factors for CVD include hypertension, diabetes mellitus, hyperlipidemia, smoking, diet, obesity, and sedentary behavior or lack of regular physical activity.³ Some of these risk factors can be ameliorated by regular exercise independent of the effect of exercise on body weight.^{4,5} It also is well established that corticosteroids, used as part of immunosuppressive therapy, often result in numerous adverse effects, including weight gain,⁶ osteoporosis, and sarcopenia (muscle wasting).^{7,8} Physical activity is protective for many of these risk factors.

The work by Painter et al⁹ and others is promising in that they documented the benefits of exercise in kidney transplant recipients. Clinical trials of exercise training in kidney recipients have shown reduction in risk for coronary heart disease⁹; increased exercise capacity and tolerance^{5,10,11}; increased cardiorespiratory fitness, muscle strength, and physical functioning^{11,12}; and improved quality of life.¹³ Thus, exercise training can be beneficial in enhancing physical functioning after transplantation¹³ and substantially ameliorating the adverse sequelae of corticosteroids and deconditioning from years of dialysis therapy. Moreover, there are no documented adverse consequences attributed to physical activity in kidney transplant recipients. These data strongly suggest that prescribing exercise to kidney recipients should be promoted as part of an overall strategy to maintain their health and kidney survival. However, there is not enough research to recommend evidence-based guidelines on physical activity for physicians managing kidney transplant recipients.

Although these data indicate intermediate outcomes, they may portend benefits for global outcomes with a transplant. However, no study has directly investigated the relationship between physical activity and transplant outcomes of serum creatinine levels (although this is related to weight), acute rejection, chronic allograft nephropathy, return to dialysis therapy, self-reported health, and death. However, it is known that physical activity reduces body mass index, a risk factor for both CVD and retransplantation. It is not surprising that there is insufficient documentation given to other priorities for this patient population and the need for a sizable sample population to power a randomized clinical trial.

The level of physical activity among kidney transplant recipients is undetermined. Kidney recipients generally increase their physical activity (leisure, sports, and household chores) in the years after transplantation because of improved quality of life.¹⁴ Although reports have not explicitly indicated whether improvements in physical activity met Centers for Disease Control and Prevention, Institute of Medicine, and American Heart Association recommendations, there is sufficient reason to be doubtful. Kidney transplant recipients tend to have lower-than-normal glomerular filtration rates and exercise tolerance if glomerular filtration rate declines over time.¹⁵ Although there are no reports of exercise rates posttransplantation, exercise training studies showed generally low rates of exercise posttransplantation.^{11,12,16} For example, in a randomized trial of exercise training, 36% of kidney recipients in the usual-care arm exercised compared with 67% of the exercise-intervention arm at 1 year posttransplantation.¹²

FACTORS CONTRIBUTING TO LOW EXERCISE RATES

There are 3 basic contributors to low exercise rates in kidney transplant recipients: patients, health care professionals, and the health care system. First, patients may have attitudes or beliefs about exercise in relation to their health status that may minimize their engagement in physical activity. Second, health care professionals managing kidney recipients may not

provide sufficient counseling on the benefits of exercise for long-term health, perhaps because of other priorities within self-care management. Finally, structural aspects of the health care system may undermine the ability of health care providers to systematically provide the appropriate guidance to patients necessary for improving health outcomes.

Patient Attitudes, Cultural Beliefs, and Values

Low exercise rates in kidney transplant recipients may be related to factors pertaining to individual patients, including their knowledge, motivation, values, attitudes, beliefs, and health status. Little is known about kidney transplant recipients' concerns about engaging in physical activity. Kidney and other organ transplant recipients report low activity levels because of fear of injuring the transplanted graft.^{5,17} One could imagine transplant recipients fearing that the wound site will dehiscence or rupture with exercise. As reasons for their low rates of exercise, dialysis patients reported lack of motivation and interest, fear of injury, increased pain, and making health worse.¹⁸ Fears that physical activity will exacerbate illness are common among other patients with chronic illness.^{19,20} It has been suggested that kidney recipients' fears may derive in part from transplant professionals' silence about the benefits of exercise.⁵ Moreover, patients of diverse ethnic and cultural backgrounds may place differential values on exercise and selfcare more generally.^{21,22} To illustrate, transplant professionals in Taiwan encountered problems encouraging heart transplant recipients to exercise because of the Taiwanese cultural tendency to not value regular exercise as much as Americans do.²³

Health Care Professionals

As noted, health care professionals may be less likely to suggest exercise to kidney transplant recipients until there is sufficient evidence on the efficacy and effectiveness of physical activity. Health care professionals may not rigorously promote exercise to kidney transplant recipients as part of routine posttransplantation patient management for various reasons. Because of a lack of significant empirical support, physicians may lack knowledge of the benefits of exercise in kidney transplant recipients and/or simply do not incorporate the promotion of exercise into routine patient management.

Although both transplant professionals and community nephrologists participate in the management of kidney recipients, no standard timing has been established for when kidney transplant recipients should return to nephrologists for routine nephrological care in conjunction with their transplant *care*.²⁴ The extent of kidney transplant professionals' exercise counseling practices is unknown. Nephrologists in the United States and internationally have a low rate of providing exercise counseling to dialysis patients.⁴ Causes for this include time constraints, lack of confidence in their ability to counsel patients, lack of conviction that patients will respond to counseling, and the belief that other medical issues are more important than exercise.⁴ Similarly, hemodialysis staff report not encouraging exercise to dialysis patients because of perceptions that patients lacked motivation to exercise, lack of skills to motivate patients to exercise, and perceived non-responsibility for counseling.²⁵ Given the need for multiple and consistent exposure to the health education message concerning the need for exercise, all health care professionals should be responsible for promoting exercise. The confusion over when nephrologists should resume management of kidney recipients in addition to low counseling rates may further exacerbate physicians' exercise counseling practices. Nonetheless, the transplant community can be said to show support for regular exercise posttransplantation through the US Transplant Games, which are held every 2 years.

Many health care professionals and staff caring for dialysis patients maintain an overcautious stance toward patient exercise during dialysis, fearing the risk for myocardial infarction from exercise,²⁶ a concern that may continue posttransplantation. Health care professionals may

share the beliefs that the end-stage renal disease (ESRD) process and debilitation prevents kidney transplant patients from exercising, and that such patients are unable to surmount the effects of corticosteroids.²⁷ Transplant professionals also may be concerned about the impact of exercise on the kidney transplant graft.²⁸ This fear of promoting exercise is not unique to ESRD. Physicians also are concerned about the safety of physical activity in pediatric heart transplant recipients.²⁹ However, these fears are not founded. The scientific studies discussed showed that exercise training can be beneficial to kidney recipients' health and fitness and can reduce risks for CVD.

The Health Care System

Reimbursement patterns illustrate the general lack of structural support in health care for health promotion practices aimed to enhance long-term outcomes, such as exercise counseling. For instance, transplant professionals generally do not get financially reimbursed for physical activity counseling. Although third-party reimbursement for exercise programs are appearing in health care settings, to date, this is fairly limited.²⁷ However, there is a parallel literature on physical activity best practices for patients with chronic illness. Specifically, reimbursement for physical activity counseling is being considered for Medicare coverage.³⁰ A survey of nephrologists (n = 47) at the World Congress of Nephrology held in Berlin in 2003 found that for 21% of respondents, financial support for tailored exercise regimens was provided by the health care insurance system of the respective country.³¹ However, the US Surgeon General's Call to Action to Prevent and Decrease Overweight and Obesity,³² along with the 2002 Internal Revenue Code tax ruling 2002-19 (§213d)—that when physicians diagnose taxpayers as obese, the fees for joining prescribed weight-loss programs qualify as deductible medical care—may help encourage physicians to provide physical activity counseling and referrals.³³ Insurance companies understandably may be reticent to reimburse counseling programs because of abuse in the system.

A related hospital structural factor possibly contributing to the inattention to exercise relates to how physicians are paid and/or rewarded for their work. As one transplant social worker noted, some transplant teams may feel less inclined to provide ongoing medical care to kidney recipients for their underlying ESRD or to hear medical complaints from kidney recipients with stable grafts.³⁴ Rather, transplant professionals tend to focus their energy on the procedure of transplantation and its immediate outcomes or success (eg, see Cohen and Galbraith³⁵). Moreover, insurance companies provide coverage to transplant centers based on the volume of patients treated, rather than on patient outcomes pertaining to quality of life. Perhaps when providing care that serves to improve quality of life becomes fiscally rewarded, quality of life will become more central to long-term posttransplantation kidney recipient management.

RECOMMENDATIONS

We propose several recommendations aimed to increase the promotion of physical activity in kidney transplant recipients. First, we recommend exercise regimens tailored to the needs and resources of the individual. Such an exercise regimen would be based on patients' clinical status, prior exercise activity, and capability. Health care professionals can tailor their counseling of patients according to recommendations; provide written materials about physical activity; refer patients to physical therapists, exercise facilities, or other outside providers to increase physical activity; and provide exercise training programs and equipment for use in-center. This tailored approach is necessary to address unique clinical concerns, personal considerations, and cultural values patients place on physical activity.

Granted, some kidney recipients have comorbidities that challenge their ability to exercise. Nevertheless, the literature of physical activity with older adults with specific chronic conditions is extensively researched. There is a general consensus³⁶ that individuals with such

specific chronic conditions as heart disease, chronic obstructive pulmonary disease, and arthritis are capable of exercise and benefit from participation (Prohaska et al, unpublished data). Based on recent studies (Prohaska et al, unpublished data),³⁶ even older adults with chronic health problems can engage in low-intensity activity. Unfortunately, there is very little research on the effects of exercise on transplant recipients with multiple chronic illnesses.

We recommend the development of evidence-based guidelines on physical activity to assist transplant professionals and nephrologists in counseling kidney recipients as a routine part of patient management. Opportune teaching moments for health care professionals to promote exercise with kidney transplant recipients would occur both before transplantation and routinely afterward. Others have argued for transplant professionals to provide kidney transplant recipients with detailed instruction on exercise regimens before hospital discharge after transplantation.²⁷ Emphasis can be placed on how exercise directly improves health outcomes by reducing the risk for transplant-related comorbidities.

Second, collaboration between transplant and cardiac departments is necessary to effectively tailor exercise regimens to various groups within this patient population. Patients can be grouped according to risk profiles and undergo levels of cardiac rehabilitation as part of a coordinated multidisciplinary approach to patient management. Cardiac rehabilitation is especially essential for patients requiring retransplantation. A high body mass index poses a risk factor for cardiovascular problems, which in turn jeopardize subsequent transplantations. Counseling should address misperceptions and beliefs held by kidney transplant recipients about the value of exercise for their health. Such counseling may serve to encourage patients to increase their physical activity levels. Obtaining reimbursement for this collaboration, as well as potential liability for adverse events pursuant to referral for exercise training, remain challenges that need to be addressed. However, reimbursement may be more likely to be provided given the increasing emphasis that ESRD policymakers are placing on quality improvement strategies to improve the functional status and outcomes of patients with ESRD.³⁷ To minimize concerns about liability, nephrologists should learn about exercise, provide recommendations within the bounds of their knowledge, monitor patients' exercise programs, and/or refer patients to more knowledgeable providers, such as physical therapists, cardiologists, and rehabilitation physicians, when appropriate.

Last, we recommend a line of research that investigates the impact of exercise on health outcomes among kidney transplant recipients. The same set of research questions concerning physical activity raised for heart transplant recipients could be applied to kidney transplant recipients: "(i) how would chronic immune suppression alter recommendations [regarding physical activity] because of their adverse effects on renal function, glucose metabolism and bone mineralization?; and (ii) what safety precautions should be in place to assure risk free participation?"^{29, p 267} Such research could help identify precisely what kinds of exercise programs are best suited to kidney recipients⁵ and how transplant longevity is affected by exercise. Research should be conducted that documents the utility of physical activity for kidney transplant patients, especially noting the health benefits and protective benefits in the context of the disease. Because transplant recipients are a heterogeneous group, research also should inquire into the extent to which subgroups based on, for example, age, comorbidities, or years with transplantation, have activity recommendations beyond basic guidelines for all kidney recipients. Not knowing what constitutes a safe level of exercise for kidney transplant patients undermines appropriate health promotion efforts. Such a line of research could then foster evidence-based recommendations for exercise about the type, level, intensity, and duration of the exercise and recommendations on determining base level and gradual progression of the exercise program.

Research to date suggests that exercise is likely to be beneficial and should be promoted among kidney transplant recipients. Health professionals may refer to recently developed principles of exercising for patients with ESRD and model exercise training program³⁸ for ways to manage kidney transplant recipients' exercise regimens. Posttransplantation exercise regimens should be assessed and managed on an ongoing basis to optimize kidney recipients' physical functioning and minimize the risk for CVD. New motivational techniques may be needed for promoting physical activity among kidney recipients.

In conclusion, there is a strong argument for exercise to be part of the posttransplantation medical regimen in kidney transplant recipients. The patient, physician, and health care system all have a role in incorporating exercise into routine patient management. Aerobic exercise is necessary to reduce the risks for CVD, minimize osteoporosis, and facilitate weight loss, whereas strength-based exercise is necessary to minimize sarcopenia. To foster this health change, we must reward the counseling by physicians, the behavior in patients, and the system for promoting it. Finally, research must be done to investigate the specific impacts of exercise on graft and patient outcomes among kidney recipients to provide more effective physical activity counseling and devise evidence-based recommendations.

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