The burden of physical inactivity in chronic kidney disease: is there an exit strategy?

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Keywords: chronic kidney disease; dialysis; exercise; physical activity

Physical inactivity among adults with chronic kidney disease (CKD), particularly among patients undergoing haemodialysis (HD), is a long-standing clinical problem and a scarcely investigated issue. Although purely descriptive, the study by Avesani et al. [1] published in this issue of Nephrology Dialysis Transplantation is a worthwhile contribution to this important clinical research area. The authors assessed the number of footsteps per day, the activity-related energy expenditure and the physical activity level in HD patients using a device that objectively monitors the patients’ activity. The daily number of footsteps (<5000/day) and the calculated parameters in patients enrolled into this study are in line with a sedentary condition and physical activity was particularly low during the dialysis day. These findings confirm the low degree of physical activity previously reported by other investigators using pedometers [2, 3] or patient self-reports [4]. The study [1] which has the merit of collecting data from different centres and countries also confirms findings in an international survey performed between 1996 and 2004 [4]. Thus, a low degree of physical activity in HD patients is a common and persistent burden in various countries. The enrolment of CKD patients in exercise programmes is a challenging undertaking at all CKD stages, from the early stages to chronic kidney failure [5]. A recent Cochrane systematic review [6] underlined the potential benefits of regular exercise in all CKD and kidney transplant patients by describing the positive effects of proper physical training of the cardiovascular system, health-related quality of life, walking capacity and aerobic fitness. Aerobic improvements can be achieved after just a few months of regular training performed at low or high intensity and after both supervised and home-based exercise programmes. However, higher effectiveness is observed for high intensity and supervised interventions [6]. Additional relevant benefits of exercise therapy, especially in relation to vascular health, have been described in recent years. These effects include the improvement of vascular tone and blood pressure regulation, angiogenesis and vascular regeneration by the up-regulation of endothelial nitric oxide production and antioxidant enzymes [7]. Conversely, as in other chronic diseases, a sedentary lifestyle leads to progressive deconditioning in CKD patients, a phenomenon characterized by decreased stroke volume, reduced muscle mass with poor oxygen utilization and insufficient control of metabolic risk factors, impaired control of peripheral circulation, endothelial dysfunction and hypertension [8]. Chronic physical inactivity is a predictor for high risk of unfavourable cardiovascular outcomes and higher mortality rate and these relationships held true in patients with peripheral arterial disease [9] and in dialysis patients [4, 10]. Prevention of the functional decline associated with a sedentary lifestyle and relief from severe deconditioning attributable to low mobility is of paramount importance in CKD patients. Adequate
amounts of exercise in the framework of non-demanding programmes is a priority. Hence, the identification of the minimal effective volume of physical activity needed to obtain health benefits in sedentary patients is at centre-stage if we have to effectively promote physical exercise in this population. Constant-load low-volume interval training improves muscle oxidative capacity and induces beneficial metabolic adaptations in sedentary adults [11]. Functional benefits are observed when HD patients simply add 800–1000 steps/day distributed into short bouts of exercise at moderate, progressively increasing intensity [12]. Small but regular doses of exercise might both motivate the initiation of a programme and offer significant protective health benefits. In a prospective cohort study, 15 min/day or 90 min/week of moderate-intensity exercise predicted a 14% reduced risk of all-cause mortality and a 3-year increase in life expectancy even for individuals who were at risk of cardiovascular disease [13]. In HD and coronary artery disease patients, a lower mortality risk was observed in those exercising only once a week compared to patients who exercised less than once a week or patients who were never physically active [4, 10, 14].

Although interest in physical exercise programmes for CKD patients is increasing, crucial questions still remain. Exercise programmes are offered at rehabilitation departments or in cardiovascular centres but such programmes are rarely offered in nephrology departments or in free-standing dialysis units. The establishment of multiprofessional teams including exercise training specialists in the dialysis units [15] may overcome many organizational and logistic problems hindering application of such programmes but whether this proposal is cost-effective still needs to be tested.

A positive attitude of the stakeholders should be achieved [15]. Factors that prevent the inclusion of exercise in patients’ daily schedules and long-term adherence to exercise programmes have been identified. These include time availability, changes in clinical status, co-morbidities, problems of transportation in the case of centre-based programmes and post-dialysis fatigue for HD patients. CKD patients and family members’ awareness of the benefits of exercise might help to overcome organizational as well as physical and psychological limitations. Post-dialysis fatigue is perceived as the most common physical limitation in HD patients [16]. In this respect, it should be emphasized that knowledge that symptoms are more debilitating in patients with lower physical fitness [17] and that they could be reversible with physical training [12] may motivate patients and doctors alike. The clinicians’ attitude, especially nephrologists, is crucial. They should encourage patients to achieve the positive effects of exercise by regular training [5]; unfortunately, their counselling activity remains insufficient [18]. The safety of exercise may be a possible concern [15]. However, the reassuring numbers of patients safely undergoing cardiological and vascular rehabilitation as well as the data from studies on exercise in CKD patients should be considered. With the proviso that we still lack solid studies and guidelines specific to CKD, the guidelines of the American College of Sports Medicine and the American Heart Association developed for patients with chronic disease [19] may be applied to the CKD population [20]. In general, custom-made programmes offered to CKD patients according to the level of exercise tolerance and to the stage of disease should minimize the risks. Finally, physicians’ awareness about the efficacy of exercise should be increased. By now, the reality remains that awareness is scarce and that exercise therapy is largely underutilized in chronic diseases particularly so in CKD and in dialysis patients. Clinical trials testing simple, widely applicable home-based physical programmes, in dialysis patients are underway.

Exercise programmes in CKD patients should aim at safely inducing favourable physiological adaptations. Exercise planning should be scheduled at optimal volume and intensity and be based on the patient’s age and co-morbidities. Exercise in this high-risk population should be structured to favour compliance and cost-effectiveness. In this respect, nephrology departments represent the crossroad where all roads meet: care and therapy, patient counselling and possible integration of competences. From an organizational point of view, this may be an effective ‘exit strategy’ from physical inactivity in CKD patients but research is needed to see whether this approach may be cost-effective.

Conflict of interest statement. None declared.


References


Received for publication: 30.1.12; Accepted in revised form: 7.3.12