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Latest Perspectives Concerning Renal Rehabilitation for Chronic Kidney Disease (CKD)

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Abstract

Renal rehabilitation for patients with chronic kidney disease (CKD) has been recently in focus. Its standard concept includes improved physical improvement of exercise tolerance, protein-energy wasting (PEW), and quality of life (QOL). International Society of Nephrology (ISN) conducted broad survey and presented a Global Kidney Health Atlas. Kidney Disease: Improving Global Outcomes (KDIGO) has conducted the nomenclature to describe CKD and the glossary in scientific publications. As for renal protective effect, some markers include unchanged/decreased creatinine or Cystatin C, reduction rate of urinary protein excretion (>20%), and reduction of estimated glomerular filtration rate (eGFR) or eGFRcys reduction rate (>30%).

Keywords: Renal Rehabilitation; Chronic Kidney Disease (CKD); Global Kidney Health Atlas. Kidney Disease: Improving Global Outcomes (KDIGO); End-Stage Renal Disease (ESRD); Estimated Glomerular Filtration Rate (eGFR)

Commentary

Recently, renal rehabilitation has been in focus and more prevalent [1]. Among them, standard concept and protocol of renal rehabilitation was presented [2]. It showed comprehensive renal rehabilitation, including physical improvement of exercise tolerance, protein-energy wasting (PEW), and quality of life [2]. For patients with chronic kidney disease (CKD), some studies concerning adequate exercise has been found [3]. Clinical efficacy of exercise therapy is investigated from renal and cardiometabolic points of view [4]. Furthermore, a systematic review for end-stage renal disease (ESRD) was also reported [5].

In the light of historical development of rehabilitation, a paradigm shift has been observed. The target organs were conventionally spread from certain physical region to the entire body. Firstly, cardiac rehabilitation was initiated for chronic heart failure (CHR) and after that for post-acute myocardial infarction (AMI) [6]. Successively, pulmonary rehabilitation was begun for chronic obstructive pulmonary disease (COPD) [7]. Combined these organs, the guideline of cardiac and pulmonary rehabilitation was developed [8].

Authors and co-researchers have continued clinical practice and research for patients with diabetes, CKD, ESRD and dialysis [9,10]. In addition, we have presented the research of biomarkers concerning chronic renal disease and hemodialysis [11,12]. Renal rehabilitation has been characterized for its combined related rehabilitation, such as pathophysiology of respiratory, cardiovascular, immunology, neurology, metabolism and so on. Some kinds of guideline of renal rehabilitation have been proposed [2,13]. The discussion from renal and cardiovascular points of view has been crucial key for development of practice and research [14].

For clinical management of CKD, daily exercise was restricted in the past. On the other hand, a drastic change has been found for required exercise treatment [13,14]. It is crucial point for renal rehabilitation, associated with improvement of ADL, QOL, frailty, renal function by prevention of cardiovascular and renal diseases [13]. Several points of benefit and risk for renal dysfunction are understood for related each patient and medical staff. As to the prevalence of CKD, an example of Japan is observed, in which CKD 13 million, DM 10 million in totally 120 million population. By estimated glomerular filtration rate (eGFR), CKD is found in 1/4 subjects of >70 years and 1/2 subjects of >80 years [11]. More CKD patients are observed by the diagnosis of microhematuria and proteinuria. From these circumstances, CKD management would be important epidemiologically [14].

In order to improve medical care for CKD patients, considerable efforts were continued in many countries [15]. As to closing the gaps initiative, International Society of Nephrology (ISN) conducted the first survey of global kidney care concerning CKD and acute kidney injury (AKI). The results were presented in a Global Kidney Health Atlas [15]. Successively, further evaluation has been continued for integrated ESRD for universal health and medical coverage [16]. Investigation of Global Burden of Disease (GBD) in CKD Collaboration was continued and summarized by a systematic analysis [17]. Recent study presented the distribution and variability of CKD care across the world [15].

As to investigating CKD, Kidney Disease: Improving Global Outcomes (KDIGO) conducted a conference for refining the nomenclature to describe kidney disease and developing the glossary in scientific publications [18]. Among them, five-part glossary was proposed as specific items with general agreement. Some recommended technical terms and usage include kidney, kidney failure, albuminuria, decreased glomerular filtration rate (GFR), KDIGO definition and classification and so on. Successively, clinical practice guideline was summarized in KDIGO conference [19]. KDIGO association continued investigation for identification and intervention of CKD in earlier stages [20]. As a result, several crucial factors include adequate strategies for risk stratification, screening and treatment for detecting early CKD.

For exercise therapy in patients with CKD, standard methods and judgments have been shown [21]. Before starting exercise, try strengthening muscles and stretching for 2 months. As details, it is recommended to expand the range of motion (ROM) three times a week on a Borg scale 12 for about 30-45 minutes using the ergometer. Recently, the effect of exercise therapy on CKD has been reported. Pu et al. conducted a systematic review based on 16 studies for aerobic exercise, 4 studies for resistance exercise and 7 documents for the combination [22]. As a result, it was reported that the maximal oxygen uptake was significantly increased and the 6-minute Walk Distance was significantly prolonged by the intervention for 8 to 48 weeks. The coexistence of renal dysfunction in patients with AMI increases subsequent total mortality and cardiovascular-related mortality. Therefore, treatment methods that maintain and improve renal function in AMI patients are important. Keeping a higher level of exercise after the onset of AMI leads to suppression of renal dysfunction [23]. Exercise is effective even in patients with cardiac and renal dysfunction and improves both cardiac and renal function.

From lifestyle point of view, clinical management for CKD is indispensable for each patient. As a standard guideline, exercise prescriptions for CKD are provided by American College of Sports Medicine (ACSM) [24]. In the guideline, frequency, intensity, time, and type are set for each of aerobic exercise, resistance exercise, and flexibility exercise. The strength is indicated by the Borg index (rating of perceived exertion, RPE), and the 12-13 points level would be recommended [24]. In renal rehabilitation, it is expected that CKD patients with sarcopenia and frailty will be detected and intervened at an early stage. Previously, the main purpose of rehabilitation medicine was “adding life to years”. However, by actively working, we can achieve “adding life to years and years to life” for CKD patients. As a criterion for the renal protective effect, the outcomes before and about 3 months after the intervention of the exercise therapy are compared. The three markers are 1) unchanged / decreased creatinine or Cystatin C [25], 2) reduction of urinary protein excretion (>20%), and 3) reduction of eGFR or eGFRcys reduction rate (>30%).

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