EDITORIAL OPEN ACCESS

Frailty, chronic kidney disease and falls: A vicious circle

Fabio Fabbian, Alfredo De Giorgi, María Aurora Rodríguez Borrego, Pablo Jesús López-Soto

Chronic kidney disease (CKD) is a major public health problem worldwide, Zhang et al. (2008) performed a systematic review and found a median prevalence of CKD around 7% in persons aged 30 years or older. However, in subjects aged 64 years or older prevalence of CKD varied from 23.4–35.8% [1]. Chronic kidney disease is a component of a complex clinical picture involving dysfunctions of several organs and determining significant medical, social and economic burdens [2, 3]. An accidental fall is defined as inadvertently coming to rest on the ground, floor or other lower level excluding intentional change in position to rest on the furniture, wall or other objects [4]. Age increases risk of falling, and one-third of people aged ≥65 years fall at least once per year [5]. In 2010, the cost of falls in the US was $30 billion [6]. In a recent review, we analyzed the relationship between falls and renal disease. We found that incidence of falls in CKD ranged between 1.18 and 1.60 fall/patient year, being frequently recognized in frail older adults on hemodialysis treatment. In the latter group, falling relapses were frequent, causing serious consequences. On the other hand, data on pre-end stage renal disease (ESRD) were scarce. The quality of evidence was evaluated, obtaining very low quality for age and polypharmacy; while the variables frailty and previous falls had a low quality of evidence. [7]. Moreover, falls are a leading cause of adverse events in patients admitted to hospitals, [8, 9] constituting up to 70% of inpatient accidents [10].

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Searching in PubMed using the words “falls and chronic kidney disease” gets 376 items, and filtering the same research for case reports gets 26 items.

Shlipak et al. evaluated cross-sectionally data collected from the cardiovascular health study, enrolling nearly 6,000 community-dwelling adults aged ≥ 65 years from four clinical centers in the United States. Renal dysfunction was defined as a serum creatinine level ≥ 1.3 mg/dL in women and ≥ 1.5 mg/dL in men. The presence of three abnormalities such as unintentional weight loss, self-reported exhaustion, measured weakness, slow walking speed, and low physical activity, defined frailty. Moreover, disability was defined as any self-reported difficulty with activities of daily living. They found that prevalence of frailty and disability was greater in participants with renal dysfunction compared with those with normal renal function [11].

Odden et al. examined the cross-sectional association between cystatin C level and performance on several tests of physical function and found that each standard-deviation increase in cystatin C concentration was associated with inability of completing a 400-m walk, slower 400-m walk time, reduction in lower extremity performance score, lower grip strength, and lower knee extension strength. On the other hand, when kidney function was measured by estimated glomerular filtration rate (GFR), the association between kidney function and physical function was only evident if GFR was below 60 ml/minute/1.73 m^2 [12].

In 2008, Padilla et al. suggested that patients with CKD had reduced physical functioning as measured using objective laboratory tests such as peak oxygen uptake, lower physical performance measures and lower self-reported functioning [13].

In 2009, Wilhelm-Leen et al., using data from the Third National Health and Nutrition Examination Survey, reported that the overall prevalence of frailty of 2.8%, but considering patients with moderate to severe CKD (GFR < 45 mL/min/1.73 m^2), frailty prevalence raised to 20.9% [14].

It has been shown that quantitative gait markers are independent predictors of falls in older adults [15], and gait is considered an important indicator of health.

In community-dwelling older adults, CKD was associated with instrumental activities of daily living (IADL) and basic activities of daily living (BADL) decline [16].

Recently, CKD was associated with higher odds of incident mobility disability and greater decline in gait speed, highlighting the loss of physical independence in older adults [17].

Analyzing these case report studies, consequences of falls in CKD patients appear to be underreported.

In recent years, multiple epidemiological studies have been conducted to identify intrinsic risk factors (biological and behavioral) of falls, such as age, chronic medical conditions, adverse effects of medication, poor lifestyle habits, and extrinsic (socioeconomic and environmental, many of which can be modified), such as, quality of housing, design, floor surface and lighting [18–20]. However, obtaining a full report of the circumstances and symptoms that have occurred during the fall is crucial [18]. To know where, how, what and when the falls occur provide additional useful information to establish comprehensive falls prevention programs [21].

Falls have as main consequences disabilities and deaths. In the United States, unintended injuries have been considered the fifth leading cause of death in older people (after cardiovascular disease, cancer, stroke and lung problems), and in people older than 65 years, falls constitute two-thirds of these deaths [22]. In addition, between 30–50% of falls have resulted in minor injuries such as bruising or lacerations and 5–10% of them in major injuries such as fractures or traumatic brain injury [23]. In relation to fractures, hip and femur fractures are the most prevalent and with worst consequences [23]. In fact, although the rate of hip fractures following falls is only 1%, 90% of all hip fractures are caused by a fall. Data show that one year after the fracture, 25% of the elderly die, 76% have a decrease in mobility, 50% are not able to perform the basic activities of daily living and the 22% are admitted to a residence [24, 25]. To all this, it is added that half of the elderly people after the fall is not able to walk again, leading this circumstance to de-hydration, rhabdomyolysis, pneumonia and pressure ulcers [26]. On the other hand, other consequences arising from falls appear, such as the fear of falling again, isolation and depression [27]. In fact, a vicious circle is established causing a decrease in physical activity, social isolation and depression, and consequently leading to a greater increase in the risk of falling [28].

Therefore, more studies are necessary, especially case reports dealing with consequences of falling in CKD patients, in order to increase health care professionals' awareness about these complex events. In this way health care professionals could evaluate all variables previously proposed to effectively and efficiently define relationship between falls and CKD and to be able to define effective preventive measures in this population.

Keywords: Falls, Frailty, Chronic kidney disease

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Conflict of Interest
Authors declare no conflict of interest.

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