The Importance of Falls Assessments and Prevention in Chronic Kidney Disease- A Review

Abstract

This article provides an overview of falls in people with chronic kidney disease. Particular attention is made to causes of falls, assessments, and types of intervention for this group. The article will explore the importance of taking advantage of all opportunities to consider the need for assessments of falls and consideration of appropriate interventions. The need for systematic MDT assessment processes to implement targeted falls prevention measures will be discussed. The aim is to reduce harm and improve quality of life, in particular for older people living with frailty and CKD.

Key words

Chronic kidney disease

Falls

Frailty

Background

Falls in older people with CKD are a particular concern, not least because of the increased risk of falls and injury in this population. In secondary care settings, falls prevention remains an ever-present focus. Multiple campaigns have attempted to raise awareness to improve falls prevention, typically in relation to activity levels and deconditioning, for example *#endPJparalysis*. There is a continual drive within secondary care to mitigate potential adverse effects linked to hospitalisation and associated immobility . However, falls are typically multi-factorial and occur frequently in the community setting. This article will consider falls in older people with CKD, exploring the potential causes of falls along with the falls assessment process and suggested interventions for falls prevention.

Context-The Why

Worldwide, there is a growing aging population and by 2066 it is predicted that 20.4 million people over the age of 65 will be living in the UK, making up 26% of the total population (Storey, 2018). Advanced age brings increasing likelihood of living with multimorbidity, disability and frailty. The association between increasing age and higher prevalence of CKD stage 3-5 is also a concern, with an estimated 13.5% of people aged 65-74 and 32.7% of people aged 75 and over being affected (Phe, 2014). This is reflected in the significant percentage of patients accepted for renal replacement therapy (RRT) aged over 75, ranging from 17% to 45% of patients >75 years on RRT (Walker et al, 2015).

Frailty is conceptually different to aging, disability and multi long-term conditions; it is a recognised state characterised by an increased vulnerability to external stressors, associated with adverse health related outcomes (Clegg et al, 2015). Identification of frailty is advocated, not only to provide individualised and comprehensive assessments but also to improve outcomes. However, as health and social care costs associated with the older population rise, there is increasing pressure to

respond to demand and reduce the burden to the individual and to society (Kojima G, 2019). This is of relevance to the care of older people living with both CKD and frailty.

For older people with CKD, frailty is highly prevalent and can predict negative outcomes including all-cause mortality, all cause hospitalisation and falls (Hurst et al, 2022, Mei et al, 2021). Frailty assessments have been recommended in the management of people with CKD (Farrington et al, 2017, Voorend et al, 2021), including a comprehensive geriatric assessment (CGA) and individualised approach to care planning. This provides a holistic assessment of biopsychosocial factors, moving away from medical focus on a single disease process. The construct of frailty also incorporates the previously termed 'geriatric giants' of older peoples care, now often referred to as frailty syndromes: '*instability, immobility, iatrogenesis, impaired cognition and incontinence'* (Greenstein L, 2019). More recently, frailty syndromes have been referred to as the five 'M's'*: mind, mobility, medications, multi-complexity and 'matters most to me'* (Tinetti et al, 2017). Such descriptors provide a useful aide-memoir for the assessment of older patients. Falls may be viewed as a frailty syndrome, as they represent a failure of multiple physiological systems to maintain an upright stance (Clegg et al, 2013); a fall may be the first indication to consider the need for frailty assessment / CGA. 'Falls' is not a diagnostic category in itself but indicates the need for further assessment and management.

Falls- The facts

A fall is defined by the National Institute for Health and Care Excellence (NICE) NICE as ''*an unintentional or unexpected loss of balance resulting in coming to rest on the floor, the ground, or an object below knee level'* (Nice, 2013). The effects of falls on older adults are well documented, being associated with adverse health outcomes such as physical disability, fractures, functional impairment, increased dependency and increased morbidity and mortality (Yeung et al, 2019). Falls are also estimated to cost the NHS £2.3 billion per year and account for 250,000 emergency

admissions annually (data from 2013) with one third of people over the age of 65 falling at least once per year (Nice, 2013).

Fear of falling (FoF) is also highly prevalent in older adults, limiting activity and reducing quality of life (Schoene et al, 2019); this is not necessarily linked to a history of falls. Interventions may therefore be required to target falls-related anxiety alongside the other risk factors and identified causes for falls.

Risk Factors and Causes of Falls in Chronic Kidney Disease

Falls are always multifactorial, resulting from a complex interaction of multiple aspects. Increased attention is now being paid to falls in people with CKD, in particular those with advanced CKD (ACKD) or on dialysis. A number of studies and systematic reviews have highlighted the increased falls risk within this patient group, along with associated outcomes such as fractures (Goto et al, 2020). There is considerable overlap between risk factors identified in the general population and those associated with CKD and dialysis, however advanced CKD adds an additional burden of risk. Individuals with multiple long-term conditions including ACKD may have specific skeletal (renal osteodystrophy), haematological and endocrine abnormalities increasing the risk of fractures, as well as vitamin D deficiency, postural hypotension, diabetic neuropathy, sarcopenia, gait abnormalities and polypharmacy (Papakonstantinopoulou and Sofianos, 2017, Tran et al, 2019).

Conditions such as cardiac arrythmias, epilepsy and benign paroxysmal positional vertigo (BPPV, *sudden intense dizziness with nausea associated with head movement*) are all common in older people (Harper and Wilkinson, 2021) and can also affect people with ACKD, yet may often be overlooked if a careful history and examination is not undertaken. People receiving haemodialysis (HD) may additionally present with increased balance dysfunction, potentially due to fluid shifts and electrolyte imbalances, intradialytic hypotension, prolonged immobilisation, fatigue and decreased

cerebral blood flow following dialysis treatment which may further contribute to falls (Cook et al, 2006, Erken et al, 2016, López-Soto et al, 2015, Magnard et al, 2014, Plantinga et al, 2018, Roberts et al, 2003, Shen et al, 2017, Sherrington et al, 2019, Zanotto et al, 2020). They may also be particularly susceptible to vestibular dysfunction due to uraemia, neuropathy, anaemia, electrolyte imbalance, hypotension, exposure to otoxic medications and the impact of metabolic derangements (Buetti and Luxon, 2014, Gabr et al, 2019, Jung et al, 2017). One component of frailty, sarcopenia, is particularly prevalent in people with ACKD, described as '*a degenerative syndrome mainly characterized by the atrophy of skeletal muscle, along with the decrease of muscle strength and function*' (Ren et al, 2016). It is known that sarcopenia is related to malnutrition-inflammation-atherosclerosis (MIA) syndrome and is particularly relevant as it causes weakness, fatigue and ultimately affects function and mobility (Isoyama et al, 2017, Kamijo et al, 2018).

Another important consideration highlighted in the general population also affecting those with CKD is the impact of COVID, with many older people being less active due to isolation. A report from Public Health England on deconditioning also demonstrated that inequalities in physical activity have persisted, with older people in the most deprived group being more likely to be inactive than those in the least deprived group in both 2019 and 2020 (Phe). The report predicts that an increased number of people are now at risk of falls and advocates for a national response to identification of those at greatest risk. Targeted interventions are to be provided in community settings to improve activity levels and support initiatives focused on strength and balance to prevent further deconditioning.

Falls Assessments

Whilst falls risk assessments have become an integral part of a nurse's role, these often do not follow a systematic approach to identification of possible causes of falls. A full falls assessment may help to identify many underlying issues, necessitating a multidisciplinary (MDT) approach to both

prevention and intervention. There are different ways to structure assessments for falls, divided as either syncopal (loss of consciousness) or non- syncopal (Harper and Wilkinson, 2021). Within that division, it is useful to consider a categorisation of intrinsic (patient related) or extrinsic (environmental) factors. One of these factors in isolation is unlikely to lead to a fall, however it is the presence of multiple factors and the interplay between these which increases the likelihood of falls (Harper and Wilkinson, 2021). A falls assessment considers each of the potential factors in order to identify which are relevant, and of these which are potentially reversible or amenable to targeted intervention. Whilst not all factors can be resolved, small changes to others can have a positive overall impact. The assessment process is described in Table 1; if the fall occurs in an acute setting the immediate action will be acute assessment for illness and injury following the A-E approach.

Table 1

Falls Assessment
History of fall (s) **What** were they doing at the time of the fall and prior to this? **Where** did the fall happen? **Who** was present at the time of the fall? 1. Did they lose consciousness? (**TIP:** if the patient says they do not know, ask if they could remember waking up). If yes, how long were they unconscious? (neurological tend to be prolonged, cardiogenic tend to be short with quick recovery). 2. Could they get up by themselves following the fall? If not how long before they were upright or assisted? 3. Did they sustain any injuries? 4. How many falls have they had in the past year? Describe each one.

5. Have they experienced any dizziness, particularly on standing? Any vertigo symptoms? (short episodes may be BPPV), Any chest pain or palpitations? Any other symptoms?
6. Dialysis-specific issues may need to be considered (e.g does it happen more on a dialysis day i.e post HD), BP and fluid management
7. Speak to family/carers for collateral history if appropriate

Examination

1. Lying and standing BP
2. Physical examination focus on -vision

-cardiac

-muscle strength

-neurology

-peripheral sensation

-feet/footwear

-cognition

Mobility

1. Ask about current mobility: do they use any walking aids, distance walked, fatigue.
2. Home hazards and risks should be assessed.
3. Access to therapists (Occupational Therapy and Physiotherapy)for more detailed functional and mobility assessments e.g hand grip strength, timed up and go.

Medications

Look at all medications and potential risks either in relation to causing the fall or harm from the fall e.g. anticoagulation

Nutrition

MUST (Malnutrition universal screening tool) assessments

Access to dietician for more detailed assessments e.g subjective global assessment (SGA)
I**nvestigations:** **Depending on history** ECG +/- 24hr or longer monitoring (especially important if unexplained) Bloods in particular anaemia, infection, malnutrition, bone and thyroid function Imaging if spinal or arthritis suspected Dix-Hallpike manoeuvre (diagnostic test often can be performed by GP or specialist vestibular services) if BPPV suspected

(Bgs, 2015, Harper and Wilkinson, 2021)

For people with ACKD identified as frail, a falls and mobility history should be considered as part of the CGA in order to identify potential risks, anxieties and more importantly, modifiable interventions which may prevent falls. Many patients do not report falls to their renal team, viewing it as unrelated to their renal condition (Young et al, 2019). Table 1 details appropriate assessment, demonstrating the multidisciplinary nature of possible interventions. Figure 1 provides an example of the MDT approach to falls assessment and prevention; this is not exhaustive and other MDT members may be involved, such as podiatry.

Figure 1

Interventions and Prevention

Several interventions to prevent falls have been examined in community dwelling older adults. Multifactorial interventions, where two or more modifiable risk factors specific to the individual are targeted, have been found to reduce the rate of falls compared with usual care, but have little effect upon the risk of sustaining one or more falls; sustaining recurrent falls; experiencing a fall that required hospital admission or that requires medical attention (Hopewell et al, 2020). Multicomponent interventions, where people receive a fixed combination of two or more fall prevention interventions irrespective of their individual underlying risk factor profile, have been shown to reduce the rate of falls and the risk of sustaining one or more falls (Hopewell et al, 2020). The common denominator within each of these approaches is an exercise component, comprising appropriately dosed, progressive functional resistance and balance training. A Cochrane review by Sherrington et al. (2019) indicates that well-designed exercise programmes reduce the rate of falls and the number of people experiencing falls as a stand-alone intervention in community dwelling older people (Sherrington et

al, 2019). Within the CKD population, a small number of studies have specifically examined the impact of exercise on falls and falls-related outcomes, primarily in an HD population. Intradialytic cycling may reduce the incidence of falls, but not fear of falling (Greenwood et al, 2021, Young et al, 2020). Intradialytic resistance training and intradialytic cycling, combined with 'interdialytic' exercise or nutritional supplementation, appear to improve balance, and reduce falls risk (Bennett et al, 2015, Frih et al, 2018, Hristea et al, 2016, Nonoyama et al, 2010). The added impact of progressive balance training, known to be a key part of effective exercise programmes in the general older population, has received far less attention (Frih et al, 2018, Sherrington et al, 2019).

Overall, people with CKD who have fallen, or are at risk of falling, are likely to benefit from the exercise-based falls prevention programmes that are widely available to older people within the general population. It is incumbent upon kidney care professionals to promote appropriate physical activity as a preventative measure amongst those at risk, and to refer to falls prevention programmes. The kidney team should also be ready to address the barriers that this patient group can experience when accessing such services. These include scheduling clashes with dialysis and perceived unsuitability amongst programme providers (Young et al, 2019). Emphasising that exercise-based falls prevention programmes can maintain independence and build social connections may also be an effective method of responding to the commonly held belief amongst people with CKD that falls are an unavoidable consequence of ageing and dialysis treatment (Gardiner et al, 2017, Mcinnes and Askie, 2004, Mcmahon et al, 2011, Young et al, 2019).

Accessing services outside of the 'kidney team' may be required and appropriate but the default position should not be to direct individuals who have fallen to these services without first undertaking a full assessment. Once an assessment has been undertaken appropriate interventions can then be recommended.

Summary

This article has provided an overview of the risks associated with falls in older people with CKD, highlighting the importance of a detailed, systematic MDT assessment process to implement targeted falls prevention measures. Health care professionals working in kidney care have opportunities to assess and intervene to prevent further harm from falls. Ensuring that identification of those at risk is an integral component of the care we provide and will have long-term benefits to our vulnerable cohort of patients.

Summary Points

- Regularly and proactively take all opportunities to ask key questions regarding falls history and risk factors
- Undertake detailed falls assessments when risk factors are identified, utilising the skills of the multidisciplinary team
- Consider need for appropriate targeted interventions, including encouraging physical activity to promote strength and balance
- When providing information to individuals at risk or who have fallen, emphasising independence is likely to be better received than focusing upon falls prevention.

Reflective Questions

1. What have you learned from this review?
2. How might you change or consider changes in your practice?
3. Using a case study from your practice of someone you know who has suffered from a fall, what additional information or plan would you change now?

4. Consider the risk factors described and how you might identify people you come into contact within practice and what key information you need to consider for interventions that may help.

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