Evaluation and Management of the Older Adult with Chronic Kidney Disease

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KEYWORDS

• Chronic kidney disease (CKD) • Acute kidney injury (AKI) • Kidney failure
• Renal replacement therapy (RRT) • Older adult

KEY POINTS

- The medical and economic burden of chronic kidney disease (CKD) is borne disproportionally by the geriatric population.
- The older kidney is capable of maintaining homeostasis of body fluids and electrolytes but has limited physiologic reserves.
- Avoidance of nephrotoxic agents is an important aspect of the management of patients with CKD.
- The geriatric population with CKD is at heightened risk for acute kidney injury, which predisposes to worsening CKD.
- Comprehensive geriatric assessment and shared decision making are vital for determining the appropriate management of older adults with CKD.

EPIDEMIOLOGY OF CHRONIC KIDNEY DISEASE

In the United States, 20 million adults have chronic kidney disease (CKD). Less than 2% progress to end-stage renal disease (ESRD), as most patients with CKD will die of a cardiovascular event before then.[1–4] The incidence of CKD in the United States is increasing, most rapidly in people aged 65 years and older. The incidence of recognized CKD in people aged 65 years and older more than doubled between 2000 and 2008.

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The prevalence of CKD in people older than 60 years increased from 19% to 25% in the last decade. The numbers underestimate the reality, as 40% of diabetic patients have unknown stage 1 and 2 CKD. Recent data also reveal that by 65 years of age, almost half of the population will have moderate impairment of kidney function (stage 3 CKD), and around 45% of that will be attributed to diabetes mellitus.[5,6] In addition, acute kidney injury (AKI) continues to be a challenge in all settings of elder care and has implications for CKD. AKI affects 2% to 7% of hospitalized patients, 35% of critically ill patients in the intensive care unit, with a significant amount being in the elderly population. There has been a paradigm shift from the belief that elderly patients with AKI returned back to their premorbid renal states. Rather, studies have shown that AKI may, in turn, cause worsening of preexisting CKD and advance those patients into the more severe stages of CKD.[7–9]

The number of patients older than 65 years with ESRD nearly doubled in the last 25 years.[10] The fastest growing population of patients with ESRD is older than 75 years. More than 44% of the new cases of ESRD are related to diabetes.[11]

DEFINITION OF CHRONIC KIDNEY DISEASE

Accepted as a definition internationally, The National Kidney Foundation Kidney Disease Outcomes Quality Initiative (NKF/DOQI) workgroup defines CKD as the following:

1. The presence of markers of kidney damage for 3 or more months, as defined by structural and functional abnormalities of the kidney, with or without decreased glomerular filtration rate (GFR) or
2. The presence of GFR less than 60 mL/min/1.73 m^2 for 3 or more months with or without other signs of kidney damage[12]

PHYSIOLOGIC CHANGES OF AGING KIDNEY

Kidney function declines after 40 years of age at a mean rate of approximately 1% per year and accelerates slightly in the later years. This finding was reported in a cross-sectional study and confirmed in a population of normal aging persons followed over time. The Baltimore Longitudinal Study demonstrated that two-thirds of a population followed up for 20 years, developed a decline in GFR, whereas the other third remained intact, concluding that age by itself is not necessarily a risk factor for kidney dysfunction.[13]

Renal mass decreases by 25% to 30% between 30 and 80 years of age, with the steepest decline after 50 years. Fat and fibrosis replace some of the remaining functional parenchyma. Loss occurs primarily in the renal cortex and preferentially affects those nephrons most important to maximal urine concentration. Thus, nocturia or frequency with dilute urine is a common finding. Although there is a loss of glomerular mass with aging, the loss of tubular mass is proportional, so that glomerular-tubular balance is usually maintained.

Normal aging is associated with diffuse sclerosis of glomeruli to the extent that 30% of glomeruli are destroyed by 75 years of age. The remaining glomeruli have impaired filtering ability.[14] Intrarenal vascular changes include spiraling of the afferent arterioles, narrowing of the larger arteries, interstitial fibrosis, and shunts between afferent and efferent arterioles allowing blood to bypass the glomeruli.[15] These changes may exacerbate essential hypertension (HTN). At baseline, renal plasma blood flow is 40% lower in healthy normotensive older men than in young men.