

Submission No.: GN01-9114

Session Title: Geriatric Nephrology

Date & Time, Place: April 29 (Sat), 12:50 - 14:50, Room 4

Normal Reference Values for Glomerular Filtration Rate in Older Adults: Fixed or Age Adjusted?

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In the last decades, life expectancy has been increasing and the proportion of the population made up of elderly individuals has been steadily rising. As a result, the number of patients diagnosed with chronic kidney disease (CKD) has been rapidly increasing. Aging leads to changes in the structure and function of the kidneys, including glomerulosclerosis, a decrease in the number of nephrons, an increase in the size and number of cysts, and a decrease in cortical volume. Functionally, while the GFR of a single nephron remains stable, the total kidney GFR decreases. Even without underlying diseases, these changes due to aging are a major cause of the increased prevalence of CKD in the elderly when the diagnostic criteria for CKD, which uses a reduced glomerular filtration rate of less than 60 ml/min/1.72m², is applied. According to data released by the Korea Centers for Disease Control and Prevention (CDC) in 2020, the prevalence of CKD in Korea is 6.7%, with a rate of 11.1% in those aged 60-69 and a rapid increase in prevalence to 27.3% in those over 70. However, since GFR continues to decrease with age, applying a fixed-threshold definition can result in underdiagnosis in young age groups and overdiagnosis in elderly populations.

Early detection and appropriate treatment of chronic kidney disease (CKD) are crucial to delay the progression of CKD and reduce the risk of kidney failure, as well as lower the incidence of cardiovascular disease and other related complications that may lead to death. However, being diagnosed with CKD can also result in additional economic and time costs due to medical interventions, and patients may experience psychological distress and social limitations, leading to unmeasured social costs. Previous studies have shown that a decrease in GFR below 60 ml/min/1.72m² in older individuals does not always result in an increase in kidney failure or mortality. This suggests that the appropriate threshold for GFR, which is currently used to diagnose CKD, may need to be re-evaluated in older individuals.

Several studies have suggested an age-adapted definition of CKD based on eGFR thresholds for different age groups: <75, 60, and 45 mL/min/1.73 m² for individuals under 40 years old, between 40 and 64 years old, and over 65 years old, respectively. However, long-term cohort studies are needed to confirm these findings, and additional investigations on the risk of polypharmacy-related pharmacokinetic and pharmacodynamic changes, drug toxicity, and AKI in older individuals are necessary, beyond the outcomes of kidney failure and mortality.

To accurately measure GFR, it is necessary to measure measured GFR, but frequent testing of measured GFR is challenging in clinical practice due to cost and time constraints. Various formulas have been developed to calculate eGFR that approximate measured GFR more accurately, but combining two markers such as creatinine and cystatin C in the formula is better than using a single marker. However, the formula for eGFR that approximates mGFR values more accurately varies depending on factors such as race, gender, age, and GFR level. Therefore, additional research and considerations are necessary to determine the most appropriate eGFR measurement method, particularly in older individuals.

In conclusion, it is appropriate to apply the appropriate GFR value based on age to diagnose CKD in the elderly. However, in order to use it clinically, additional considerations and approaches are needed regarding drug toxicity and the risk of AKI.