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Original Research Article

Chronic kidney disease in elderly – Fact or fiction?

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ABSTRACT

Introduction: Chronic kidney disease (CKD) affects up to 10% of modern societies and its prevalence increases with age. In most epidemiological reports CKD is diagnosed based mainly or exclusively on estimated glomerular filtration rate (eGFR) assessment. Since no ''gold standard'' or reference method of eGFR calculation exists and other diagnostic criteria of CKD are rarely employed, the true prevalence of clinically significant CKD seems to be lower than reported in large epidemiological studies.

Aim: We aimed to analyze the prevalence of CKD and its clinical significance in the cohort of patients aged 65 years and older in general practice, applying all recommended criteria.

Material and methods: 108 consecutive patients (40 men and 68 women) aged 65 years and older (mean age 72 ± 5.2 years; range 65–87 years) were analyzed. Biochemical tests available in general practice with eGFR calculation using modification of diet in renal disease (MDRD), CKD epidemiology collaboration (CKD-EPI), Cockcroft–Gault formula and renal ultrasound were performed.

Results and discussion: 50% of patients were characterized with significantly reduced MDRD/CKD-EPI-eGFR (<60 mL/min/1.73 m^2). Detailed analysis revealed that patients with low eGFR do not differ from those with eGFR more than or equal to 60 mL/min/1.73 m^2 in terms of serum biochemical parameters (except for urea and creatinine), proteinuria/albuminuria, urinalysis, renal ultrasound, blood pressure or history of cardiovascular disease.

Conclusions: Stage 3 CKD (eGFR < 60 mL/min/1.73 m^2) in patients aged 65 years or older seems to be a ''benign'' finding with no important clinical consequences. It should be emphasized that these results apply to ambulant elderly patients with relatively low co-morbidities.

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1. Introduction

Estimating renal function is essential in medicine. Knowing glomerular filtration rate (GFR) is important in planning sophisticated procedures (such as imaging tests with use of contrast media) and for ''common'' purposes (such as drug dose adjustment in everyday practice). Choosing the method of GFR assessment is a matter of debate. Three most popular formulas – namely, Cockcroft–Gault (C–G), modification of diet in renal disease (MDRD), and most recent chronic kidney disease (CKD) epidemiology collaboration (CKD-EPI) – produce different results in different populations and do not strictly correlate with each other and reference methods. In addition doubts arise concerning the true significance of ''borderline'' CKD, i.e. stage 2 and stage 3.[1–3] Several prospective studies suggest that many patients with eGFR between 30 mL/min and 60 mL/min do not progress to end-stage renal disease (ESRD), nor have worse outcome in terms of cardiovascular (CVS) morbidity and mortality, unless other co-morbid conditions contribute.[4,5] Last but not least, it seems that accepting definition of CKD stage 3 based solely on eGFR as a ''true'' disease would create ''artificial'' epidemics of CKD and result in unnecessary referral to specialized renal care.[6]

Older patients appear the fastest-growing group in health-care system. This is also the case for CKD – patients over 65 years are the leading age category starting renal replacement therapy. Mean values of eGFR in elderly population approximate 50–60 mL/min/1.73 m^2 and are lower than 60 mL/min/1.73 m^2 in 20%–70% of individuals.[7,8] A long-lasting and ongoing debate – whether lower GFR in elderly is just a sign of aging, or reflects clinically significant renal damage – seems to be unresolved to date.[9]

General practitioners (GP) remain the first-line medical professionals to diagnose diseases with significant population burden. They also serve as gatekeepers, limiting referral to specialized care. Hence it is important to recognize the real significance of CKD criteria at the GP practice level, especially in the population with the higher risk of this disease, i.e. elderly.

2. Aim

The aim of this study was to calculate eGFR using different formulas (C–G, MDRD and CKD-EPI) in unselected group of patients aged 65 years and older who attended single GP office. We compared prevalence of CKD when using different formulas and analyzed other parameters of kidney damage in patients with different ranges of GFR.

3. Material and methods

In total, 298 consecutive patients aged 65 years and older visiting GP practice for any reason were invited to participate (except for those unable to read and understand information for patient and sign informed consent due to cognitive impairment). Only 108 patients agreed to participate, which corresponds to ~30% of all subjects aged 65 years and older supervised in the practice. None of the patients visited GP due to emergency or acute illness and all were clinically stable. The population can be considered as socially underprivileged, with only 2 persons with academic and 13 with high school education level; 104 patients were on retirement salary and 4 patients on disability living allowance; 21 participants were the residents of a small city (30 000 inhabitants) and remaining 83 – of the rural region.

In all patients physical examination was performed and medical history was collected. Blood pressure was measured according to the present ESH/ESC standards, using certified Omron M6 Comfort equipment (Omron, Kyoto, Japan). Body weight and height were measured and BMI was calculated. We measured serum creatinine, urea, lipid profile, glucose, sodium, potassium calcium, phosphate, urine creatinine and albumin (Olympus Life and Material Science Europe GmbH, Clare, Ireland; enzymatic method used for creatinine assays), studied blood morphology (ADVIA 2120) and performed urinalysis (Clinitec Atlas, Siemens Healthcare Diagnostics Inc., Tarrytown, USA). In all patients abdominal ultrasound was performed (General Electric Logiq 7 with 3.5C convex transducer; GE Healthcare Technologies, Milwaukee, USA) with special attention paid on size and structure of kidneys. C–G, abbreviated MDRD and CKD-EPI formulas were used to calculate eGFR.[10]

3.1. *Statistical analysis*

Statistical analysis was performed using Statistica 9 (StatSoft, Tulsa, OK, USA). W Shapiro–Wilk and Kolomogorow–Smirnow tests were used to check the data. All results were presented as mean and standard deviation. Pearson test was used to find correlation between variables; inter-group comparisons were performed with Student's *t*-test. *P* value of less than or equal to 0.05 was considered statistically significant.

4. Results

The mean age of patients equaled 72 ± 5.2 years (range 65–87); there were 40 men (37%) and 68 women (63%), with no age difference between the two sexes. Table 1 displays their

Table 1 – Prevalence of chronic diseases in the study group.[a]

Underlying chronic disease	Number of cases
Arterial hypertension	99 (91.7)
Chronic arthrosis	53 (49.1)
Coronary artery disease	30 (27.8)
Benign prostatic hypertrophy	23 (21.3)
Diabetes type 2	21 (19.4)
Thyroid disease	14 (13)
History of stroke	8 (7.4)
Kidney disease (any renal impairment in medical records)	7 (6.5)
History of renal stones	6 (5.6)
Carotid atherosclerosis	6 (5.6)
Peripheral artery disease	2 (1.9)

[a] Values are given as no. (%).