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Screening for Chronic Kidney Disease in Cardiology Departments: Real-World Findings From a Multicenter Registry

Denis Nikolov

d.nikolov88@gmail.com

Heart and Brain Center of Clinical Excellence, Pleven, Bulgaria https://orcid.org/0000-0003-4778-807X

Gergana Todorova

Heart and Brain Center of Clinical Excellence, Pleven, Bulgaria

Iana Simova

Heart and Brain Center of Clinical Excellence, Pleven, Bulgaria https://orcid.org/0000-0002-3458-3684

Hristo Stoev

Heart and Brain Center of Clinical Excellence, Pleven, Bulgaria https://orcid.org/0000-0001-7772-024X

Borislava Ninova

Heart and Brain Center of Clinical Excellence, Pleven, Bulgaria

Petar Iliev

Heart and Brain Center of Clinical Excellence, Burgas, Bulgaria https://orcid.org/0009-0002-5864-002X

Yana Mileva

Madara Specialized Hospital for Cardiology, Shumen, Bulgaria

Mihail Mihaylov

Specialized Hospital for Cardiology, Veliko Tarnovo, Bulgaria

Asen Asenov

Specialized Hospital for Cardiology, Varna, Bulgaria

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Abstract

Background:

Chronic kidney disease (CKD) is highly prevalent among patients with cardiovascular disease and frequently remains undetected in its early stages, particularly in individuals with preserved estimated glomerular filtration rate (eGFR). Routine assessment of the urinary albumin-to-creatinine ratio (UACR) may improve early detection of CKD and facilitate the timely initiation of kidney- and cardiovascular-protective therapies.

Objective:

To assess the prevalence of CKD among patients hospitalized in cardiology departments using the combined assessment of eGFR and UACR, and to evaluate the impact of routine UACR testing on the identification of patients eligible for sodium-glucose cotransporter 2 (SGLT2) inhibitor therapy.

Methods:

A multicenter observational study was conducted across four cardiology hospitals within the Bulgarian Cardiac Institute network between May and September 2024. A total of 4,918 consecutive hospitalized patients were included. Serum creatinine, eGFR, and UACR were assessed, and CKD was defined according to Kidney Disease: Improving Global Outcomes (KDIGO) criteria.

Results:

Reduced eGFR (< 60 mL/min/1.73 m²) was present in 29.7% of patients, while albuminuria (UACR > 30 mg/g) was detected in 30.4%. The combined assessment of eGFR and UACR enabled the identification of patients with early kidney damage who would have remained undetected if eGFR alone had been used for CKD assessment. Following nephrology consultation, SGLT2 inhibitor therapy was initiated in 1,288 patients (26.2%).

Conclusions:

Routine combined assessment of eGFR and UACR improves the early detection of CKD, enables more comprehensive cardiorenal-metabolic risk assessment, and facilitates the timely initiation of contemporary kidney- and cardiovascular-protective therapies in patients at high cardiovascular risk.

INTRODUCTION

Chronic kidney disease (CKD) represents a major medical and public health burden, affecting approximately one in ten adults worldwide [2,15]. The disease is often asymptomatic in its early stages and may therefore remain undiagnosed until advanced kidney damage or cardiovascular complications develop. In recent years, CKD has increasingly been recognized not only as a kidney disease but also as a key component of the cardiorenal-metabolic continuum, characterized by the close interrelationship

between kidney dysfunction, heart failure (HF), type 2 diabetes mellitus (T2DM), and arterial hypertension [4,5,17].

In routine cardiology practice, assessment of kidney function has traditionally relied on serum creatinine and estimated glomerular filtration rate (eGFR). Although these parameters are essential for CKD staging, their use as the sole diagnostic approach may result in failure to identify patients with early kidney damage. In a substantial proportion of patients, albuminuria may precede a significant decline in eGFR and may represent an early objective marker of structural kidney damage [1,3].

The urinary albumin-to-creatinine ratio (UACR) is an established method for the early detection of albuminuria and for assessing the risk of CKD progression. In addition to its diagnostic value, elevated UACR is an independent predictor of adverse cardiovascular events, hospitalization for heart failure, and all-cause mortality. Accordingly, international guidelines recommend the combined use of eGFR and UACR for the assessment of kidney function and CKD risk [15,18].

Despite clear guideline recommendations, routine UACR testing has not yet been widely implemented in everyday cardiology practice. This may contribute to underrecognition of early CKD and failure to identify patients who could benefit from the timely initiation of kidney- and cardiovascular-protective therapies.

OBJECTIVE

The aim of this multicenter study was to assess the prevalence of CKD among patients hospitalized in cardiology departments using the combined assessment of eGFR and UACR. In addition, we evaluated the impact of routine UACR testing on the identification of early kidney damage and characterized the patients for whom initiation of SGLT2 inhibitor therapy was recommended in accordance with current guidelines.

MATERIALS AND METHODS

This multicenter observational study was conducted between May and September 2024 in the cardiology departments of four hospitals within the Bulgarian Cardiac Institute network: Heart and Brain Center of Clinical Excellence, Pleven; Specialized Hospital for Cardiology, Varna; Madara Specialized Hospital for Cardiology, Shumen; and Specialized Hospital for Cardiology, Veliko Tarnovo.

Consecutive hospitalized patients were included in the analysis. Serum creatinine, eGFR, and UACR were routinely assessed. CKD was defined according to KDIGO criteria as eGFR < 60 mL/min/1.73 m² and/or UACR > 30 mg/g. Patients meeting the criteria for CKD underwent nephrology consultation to assess the need for initiation of SGLT2 inhibitor therapy in accordance with current therapeutic guidelines and national reimbursement requirements [1–5].

Demographic characteristics, prevalence of CKD, HF, T2DM, and AH, distribution of UACR values, and patterns of SGLT2 inhibitor initiation were analyzed.

ETHICAL CONSIDERATIONS

An anonymized dataset containing no direct patient identifiers was used for the analysis. The study was reviewed and approved by the hospital's Ethics Committee. Given the observational nature of the study and the use of anonymized clinical data, the requirement for individual informed consent was waived by the Ethics Committee.

RESULTS

A total of 4,918 consecutive hospitalized patients from four cardiology hospitals in Bulgaria were included in the study. The mean age of the study population was 65.3 ± 12.1 years. Men accounted for 61.4% (n = 3,018) and women for 38.6% (n = 1,900).

AH was the most common comorbidity, affecting 3,504 patients (71.2%). HF was present in 1,956 patients (39.8%), T2DM in 1,788 (36.4%), and CKD, defined by eGFR < 60 mL/min/1.73 m², in 1,461 patients (29.7%).

Table 1. Baseline characteristics of the study population

Routine UACR assessment identified albuminuria (UACR > 30 mg/g) in 1,496 patients (30.4%). Of these, 1,350 patients (27.5%) had microalbuminuria (30–300 mg/g), while 146 (3.0%) had macroalbuminuria (> 300 mg/g).

Figure 1. Distribution of patients according to UACR values

Diagnostic Value of UACR

The combined use of eGFR and UACR enabled more accurate identification of CKD compared with assessment based on eGFR alone. Pathological albuminuria was detected in a substantial proportion of patients with preserved eGFR, representing an early marker of kidney damage. These patients would have remained unidentified if eGFR alone had been used as the diagnostic criterion.

These findings highlight that UACR not only complements the assessment of kidney function but also enables the identification of patients at an earlier stage of CKD, when timely initiation of kidney- and cardiovascular-protective therapy remains possible.

Initiation of SGLT2 Inhibitor Therapy

Following nephrology consultation, SGLT2 inhibitor therapy was initiated in 1,288 patients (26.2%). The highest rate of treatment initiation was observed among patients with both reduced eGFR and elevated UACR, whereas the rate of SGLT2 inhibitor initiation was substantially lower among patients with isolated UACR elevation.

Table 2. Frequency of SGLT2 inhibitor initiation

This prescribing pattern indicates that the combined assessment of eGFR and UACR had a substantial impact on therapeutic decision-making and the decision to initiate SGLT2 inhibitor therapy.

Relationship Between CKD and Cardiovascular Disease

Analysis of comorbidities demonstrated substantial overlap among CKD, HF, T2DM, and AH. With advancing stages of kidney impairment, the prevalence of T2DM and AH increased, further demonstrating the close interrelationship among these conditions within the cardiorenal-metabolic continuum.

Figure 2. Venn diagram illustrating the overlap among HF, T2DM, and CKD

The findings indicate that patients with HF and T2DM represent a particularly high-risk population for CKD and should therefore undergo active screening using the combined assessment of eGFR and UACR.

DISCUSSION

Our findings demonstrate that CKD is highly prevalent among patients hospitalized in cardiology departments. Approximately one-third of the study population had reduced kidney function, while a similar proportion had abnormally elevated albuminuria. One of the most important findings of the present study is the clinical value of routine UACR assessment. In everyday clinical practice, evaluation of kidney function is often limited to serum creatinine and eGFR. Although eGFR remains a key marker of kidney function, it does not allow the identification of patients with early structural kidney damage and preserved filtration function. Our findings demonstrate that the combined assessment of eGFR and UACR substantially improves the identification of CKD by detecting patients who would remain undiagnosed if eGFR alone were used. Albuminuria is recognized not only as an early marker of kidney damage but also as an independent predictor of CKD progression, cardiovascular events, and all-cause mortality. Therefore, its routine assessment is important both for establishing the diagnosis and for evaluating future risk.

The present study also demonstrates the close relationship among CKD, HF, T2DM, and AH. The high prevalence of their coexistence supports the concept of the cardiorenal-metabolic continuum, in which dysfunction of one organ system contributes to the progression of the others. For this reason, early detection of kidney damage should be an integral component of the comprehensive assessment of patients with cardiovascular disease.

The introduction of SGLT2 inhibitors has substantially changed the management of patients with HF, CKD, and T2DM. The DAPA-CKD, EMPA-KIDNEY, DAPA-HF, and DELIVER trials have demonstrated that this class of drugs reduces the risk of CKD progression, slows the decline in kidney function, reduces HF hospitalizations, and improves clinical outcomes irrespective of the presence of T2DM. In this context,

early detection of albuminuria enables timely identification of patients who may benefit from the initiation of evidence-based kidney- and cardiovascular-protective therapy [6–14].

The present study has several limitations. The analysis was conducted among hospitalized patients in specialized cardiology hospitals; therefore, the findings cannot be directly extrapolated to the general population. In addition, long-term follow-up of clinical outcomes after treatment initiation was not available, which precluded assessment of the impact of early screening on subsequent kidney and cardiovascular outcomes. Despite these limitations, to our knowledge, this study represents one of the largest studies conducted in Bulgaria evaluating the role of combined eGFR and UACR assessment among patients hospitalized in cardiology departments. Our findings support the routine incorporation of UACR into the diagnostic assessment of patients at high cardiovascular risk. Such an approach may enable earlier detection of CKD, more accurate risk stratification, and timely initiation of contemporary kidney- and cardiovascular-protective therapy.

CONCLUSION

Given the increasing prevalence of HF, T2DM, and CKD, cardiologists are increasingly becoming the first specialists with an opportunity to identify early kidney damage. The present study demonstrates that routine combined assessment of eGFR and UACR in patients hospitalized in cardiology departments improves the early detection of CKD, enables more accurate assessment of cardiorenal-metabolic risk, and facilitates the timely initiation of contemporary kidney- and cardiovascular-protective therapy. Incorporating UACR into standard laboratory assessment represents a simple, clinically justified strategy that should become part of the routine diagnostic approach in patients at high cardiovascular risk.

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TABLES

Table 1 and 2 are available in the Supplementary Files section.

Figures

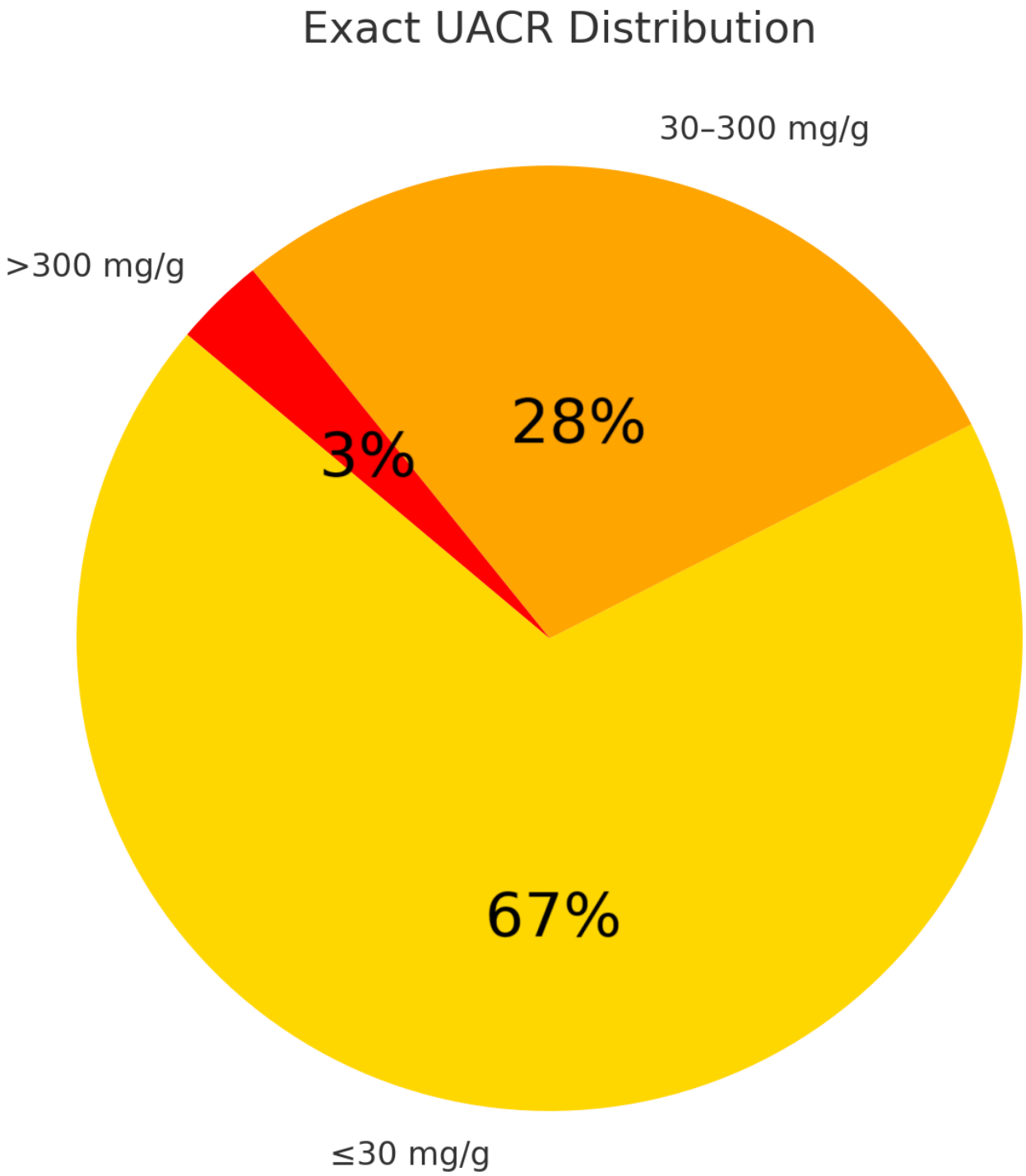


Figure 1

Distribution of patients according to UACR values

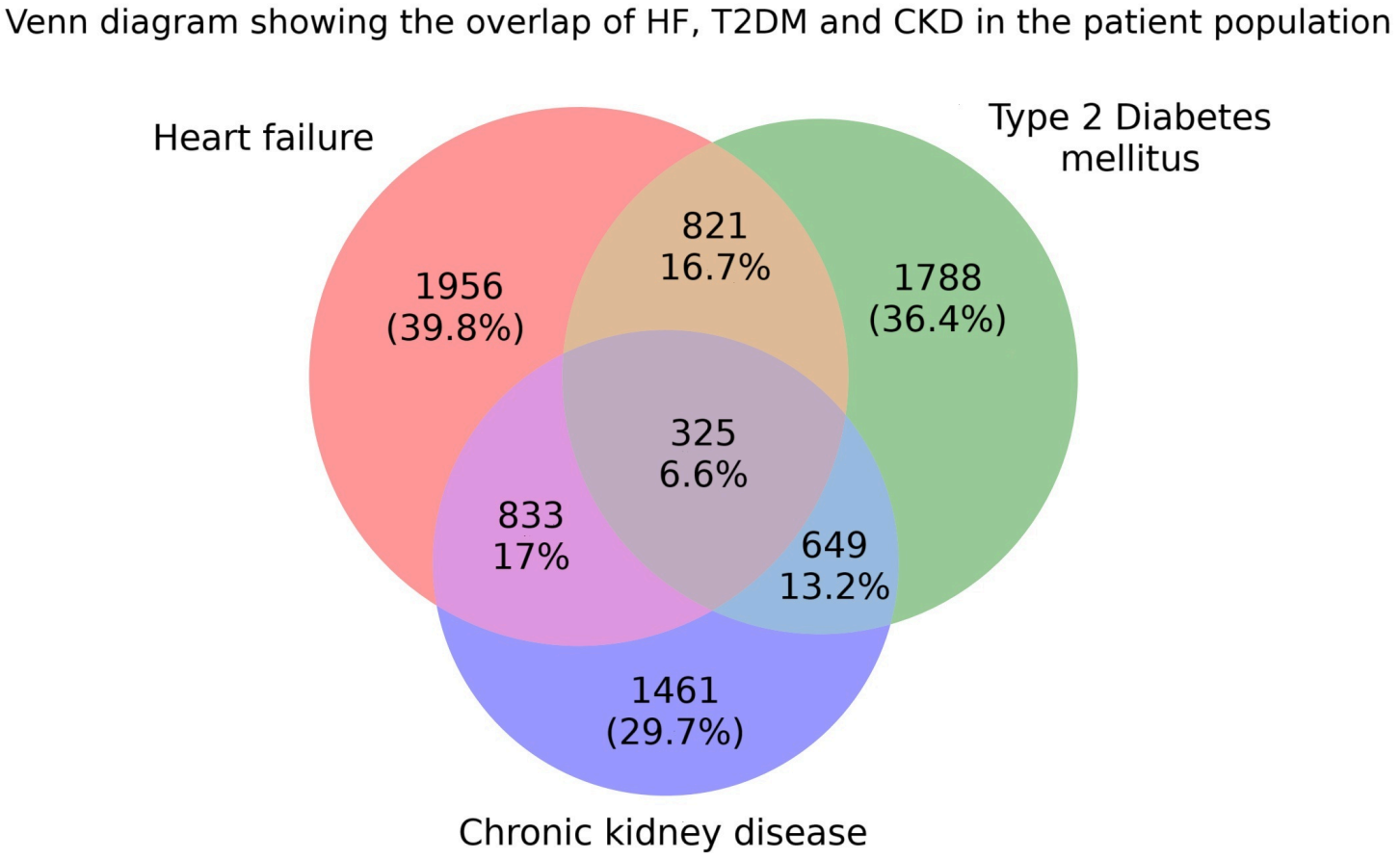


Figure 2

Venn diagram illustrating the overlap among HF, T2DM, and CKD

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- Table1.Baselinecharacteristicsofthestudypopulation.png
- Table2.FrequencyofSGLT2inhibitorinitiation.png