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TWO TIGHTLY
LINKED CONDITIONS

ABOUT

1 IN 5

adults with hypertension
may have kidney disease

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The critical role of urine albumin-to-creatinine ratio testing in hypertension management

Numerous clinical societies recommend using urine albumin-to-creatinine ratio (uACR) testing when screening for chronic kidney disease (CKD) in patients with hypertension (1, 2). The test is underutilized compared to others for CKD, though, and more awareness of its utility needs to be raised.

BY JEN A. MILLER

Hypertension comes with a cascade of health problems, and not just for the heart. Another organ is often at risk: the kidneys. About 1 in 5 adults with hypertension may have kidney disease (3), according to the Centers for Disease Control and Prevention (CDC), and adults with hypertension are three times as likely to have CKD as those without (4).

Key to this connection is that high blood pressure damages the blood vessels in the kidney, according to Amy B. Karger, MD, PhD, medical director of the West Bank Lab, point of care, and biochemical genetics at MHealth Fairview, and professor of laboratory medicine and pathology at the University of Minnesota. "Failing kidneys will then lead to extra fluid in the body, which raises the blood pressure even more and worsens kidney disease," she said.

The reverse can also be true. "Disorders that cause kidney disease can cause uncontrollable hypertension," said Melanie Hoening, MD, associate professor of nephrology at the Harvard Medical School and nephrologist at the Beth Israel Deaconess Medical Center. "When there's reduced kidney function, you can't get rid of salt and water, which can contribute to hypertension. It really is a chicken or the egg thing. You don't know how it unfolded."

Because of the tight link between the two conditions, people with hypertension should be screened for kidney disease even if they are not currently showing any signs of having kidney problems (1). The uACR is a key test for doing this.

NEW CKD TESTING RULES FOR HYPERTENSION

In early 2024, Kidney Disease: Improving Global Outcomes (KDIGO), published new recommendations for screening adults who are at risk for CKD, including specific recommendations for those with hypertension (1). KDIGO is a global organization focused on developing and implementing evidence-based clinical practice guidelines for kidney disease.



The 2024 guidelines suggest two initial tests for staging and stratifying CKD. One is an assessment of estimated glomerular filtration rate (eGFR), performed using a blood test that measures the kidneys' abilities to filter toxins and waste from the blood. The other is the uACR, a urine test that compares the amount of albumin to creatinine in the urine. While there were recommendations about eGFR and uACR in the group's previous guidance released in 2012 (5), better data has helped to improve these.

The guidelines also support a holistic approach to CKD treatment and risk modification, including lifestyle recommendations for disease management and endorsement of sodium-glucose cotransporter-2 (SGLT2) inhibitors as a first-line drug therapy option (1).

New emphasis on the importance of doing both eGFR and uACR testing is a significant development (6). As recently as 2013, the American College of Physicians guidelines recommended against routine testing or monitoring for albuminuria, including in adults with diabetes who were taking an ACE inhibitor or angiotensin receptor blockers for cardiovascular disease (7). But that has been changing. The 2017 American College of Cardiology/American Heart Association guidelines (2) and 2020 International Society of Hypertension Global Hypertension Practice Guidelines (8) recommended routine urine and/or ACR testing. The 2024 European Society of Cardiology/European Society of Hypertension also recommended measuring serum creatinine, eGFR, and uACR for all patients with hypertension. If moderate-to-severe CKD is diagnosed, these tests should be repeated at least annually (6).

The importance of uACR was also underscored in the 2023 The European Federation of Clinical Chemistry and Laboratory Medicine (EFLM) European Urinalysis Guideline. A urine test measuring the albumin-to-creatinine ratio is the preferred method to avoid errors that can occur with timed collections (9).

"The value of including uACR in the initial screening for CKD is that eGFR and uACR can be used together to diagnose CKD and then are both necessary for determining the stage of CKD and determining the risk of progression," Karger said.

uACR can also be used in combination with eGFR to stratify patient risk of having or developing CKD using a heat map published by the National Kidney Foundation. The map features eGFR ranges (from 0 to over 90) on the Y-axis, and uACR ranges (lower than 30 to over 300) on the X-axis (10). Where the two ranges meet indicate a patient's risk.

In practice, however, these tests are not being used together as much as they should. "Unfortunately, uACR is underutilized compared to eGFR, so more education is needed to encourage measurement of both for the screening and diagnosis of CKD," Karger said.

HOW OFTEN TO TEST?

The KDIGO guidelines recommend testing for albuminuria and GFR at least annually in people with CKD, and more often in people with higher risk of CKD progression when those measurements will affect treatment (1).

In her practice, "how often to test depends on the patient," said Hoenig. If their test results are sub-optimal and the patient is actively working to improve them, she will

test more frequently to track that progress. "It may be something we do annually until it's abnormal and then twice annually until they get back on track," she said.

Karger noted that many guidelines exist for screening frequently in individuals with diabetes, who undergo annual screening for eGFR and uACR. The importance of regular monitoring for people with other conditions, like CKD, may not be so obvious. "It is incumbent on providers to be in tune with the other non-diabetes risks for CKD, such as hypertension, and continue to assess kidney function in these patients over time to detect CKD early, if possible."

CLINICAL VALUE OF POC ACR TESTING

Measuring the level of albumin in urine can be done in a few ways. One is urinalysis via a simple dipstick test.

It is important for providers to keep in mind that the dipstick tests do not always paint the entire picture, according to Hoenig, because they only give a measurement of the concentration of albumin at that exact moment. A variety of variables can make it seem more or less concentrated at any given time, including time of day and how much water the person drank prior to testing. Dipsticks also typically only test for albumin or creatinine, but not both.

A uACR test detects the presence of both albumin and creatinine as well as the ratio between the two of them, giving a more accurate picture than urinalysis alone. The sample is often collected during the first urine expression of the day at home and then brought to a provider for analysis.

Despite these limitations, dipstick testing offers unique benefits, including not losing patients to

follow-up and enabling greater access due to its ease of use and low cost.

Studies have demonstrated that uACR is not only accurate and reliable, but that the test can improve patient outcomes and reduce healthcare costs (11). Its ease of use and cost-effectiveness also makes it a promising tool for improving health equity for underserved communities. In fact, data show only 40% of people with diabetes have even a single annual ACR test as recommended (12).

MEASURING CKD RISK AS PART OF VALUE-BASED CARE

Ensuring that patients with hypertension are regularly screened for CKD in a simple and cost-effective manner is a core principle of value-based care (13). The “value” in value-based care refers to the quality of care provided based on what an individual values most, relative to the cost, with an emphasis on improving patient outcomes and overall health. This is described by the Centers for Medicare & Medicaid Services, which supports this care model (14).

For example, if the primary care physician conducts CKD testing and finds the patient's levels are normal and the risk is low, they are not only monitoring hypertension complications but also saving the patient a potential visit to a nephrologist. Conversely, if the test results raise concerns, the patient can receive the appropriate care promptly, even if there are no current signs of kidney failure.

This is why recognizing nuance is so important, as seen in the new KDIGO recommendations, which consider various aspects of a person's life, such as age, sex, and socioeconomic status. Value-based care aims to enhance patient outcomes by addressing

social determinants of health and considering factors that impact an individual's health at different stages of life. 🍎

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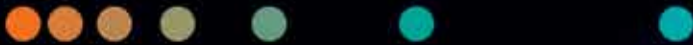
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References

1. Kidney Disease: Improving Global Outcomes (KDIGO) CKD Work Group. KDIGO 2024 Clinical practice guideline for the evaluation and management of chronic kidney disease. *Kidney Int* 2024; doi: 10.1016/j.kint.2023.10.018
2. Whelton PK, Carey RM, Aronow WS, et al. 2017 ACC/ AHA/ AAPA/ ABC/ ACPM/ AGS/ APhA/ ASH/ ASPC/ NMA/ PCNA guideline for the prevention, detection, evaluation, and management of high blood pressure in adults. *Hypertension* 2018; doi: 10.1161/HYP.0000000000000066
3. U.S. Centers for Disease Control and Prevention. Risk factors for chronic kidney disease. <https://www.cdc.gov/kidney-disease/risk-factors/> (Accessed April 2025).
4. U.S. Centers for Disease Control and Prevention. Chronic kidney disease and high blood pressure. www.cdc.gov/kidney-disease/risk-factors/chronic-kidney-disease-ckd-and-adults-with-high-blood-pressure.html (Accessed November 2024).
5. Kidney Disease: Improving Global Outcomes (KDIGO) CKD Work Group. KDIGO 2012 clinical practice guideline for the evaluation and management of chronic kidney disease. *Kidney Int Suppl* 2013; 10.1038/kisup.2012.73
6. McEvoy JW, McCarthy CP, Bruno RM, et al. 2024 ESC Guidelines for the management of elevated blood pressure and hypertension. *European Heart Journal* 2024; doi: 10.1093/eurheartj/ehae178
7. Qaseem A, Hopkins RH, Sweet DE, et al. Clinical Guidelines Committee of the American College of Physicians. Screening, monitoring, and treatment of stage 1 to 3 chronic kidney disease: A clinical practice guideline from the American College of Physicians. *Ann Intern Med* 2013; doi: 10.7326/0003-4819-159-12-201312170-00726
8. Unger T, Borghi C, Charchar F, et al. 2020 International Society of Hypertension global hypertension practice guidelines. *Hypertension* 2020; doi: 10.1161/HYPERTENSIONAHA.120.15026
9. Gertsen JB, Merens A, Pestel-Caron M; Task and Finish Group for Urinalysis (TFG-U), European Federation of Clinical Chemistry and Laboratory Medicine (EFLM). The EFLM European urinalysis guideline 2023. *Clin Chem Lab Med* 2024; doi: 10.1515/cclm-2024-0070
10. National Kidney Foundation. Quick reference guide on kidney disease screening. <https://www.kidney.org/quick-reference-guide-kidney-disease-screening> (Accessed February 2025).
11. Pesce F, Bruno GM, Colombo GL, et al. Clinical and economic impact of early diagnosis of chronic kidney disease in general practice: The Endorse Study. *Clinicoecon Outcomes Res* 2024; doi: 10.2147/CEOR.S470728
12. Ferrè S, Storf-Isler A, Kinderknecht K, et al. Fulfillment and validity of the kidney health evaluation measure for people with diabetes. *Mayo Clin Proc Innov Qual Outcomes* 2023; doi: 10.1016/j.mayocpiqo.2023.07.002.
13. Tummalapalli SL, Mendu ML. Value-based care and kidney disease: Emergence and future opportunities. *Adv Chronic Kidney Dis* 2022; doi: 10.1053/j.ackd.2021.10.001
14. Centers for Medicare and Medicaid Services. Innovation center, key concepts. www.cms.gov/priorities/innovation/key-concepts/value-based-care (Accessed January 2025).
15. Yau K, Dharia A, Alrowiyti I, et al. Prescribing SGLT2 inhibitors in patients with CKD: Expanding indications and practical considerations. *Kidney Int Rep* 2022; doi: 10.1016/j.ekir.2022.04.094

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