Evaluation of urinary citrate and serum hemoglobin as new prognostic factors in autosomal dominant polycystic kidney disease: a prospective cohort study

Nicolas Faller, MD-PhD, Department of Nephrology and Hypertension, Bern University Hospital

Summary for laypersons

Autosomal dominant polycystic kidney disease (ADPKD) is the most common hereditary kidney disease and is characterized by the progressive development within the kidneys of multiple fluid-filled cavities called cysts. The disease results in end-stage renal disease requiring dialysis or transplantation in up to 75% patients by 70 years of age. Treatment includes general kidney protective measures such as optimal blood pressure management, and, for patients at risk for rapidly progressive disease, a new drug called Tolvaptan that has been showed to slow disease progression. Nevertheless, the course of disease is highly variable, including in patients from the same family; hence the need for new prognostic factors to identify patients at risk for rapidly progressive disease.

In advanced chronic kidney disease, the capacity to excrete the acid load generated by cell metabolism is reduced, resulting in a decrease of blood pH, a process called metabolic acidosis. Metabolic acidosis is a classical complication of chronic kidney disease and is usually diagnosed by showing low bicarbonate blood levels. In ADKPD patients, the capacity to excrete acid in urine is altered, even in early stages of disease. In addition, a recent study found an association between low bicarbonate levels within the normal range and accelerated worsening of kidney function in ADPKD patients. This suggests that early bicarbonate supplementation might be beneficial in APDKD patients. However, measuring bicarbonate blood levels do not allow to identify patients with subtle alterations in their capacity to excrete acid, as would be the case in early stages of disease. For this purpose, urinary citrate has been recently proposed to be a better parameter. Although low urinary citrate is a frequent finding in ADPKD patients, including in early stages, whether urinary citrate might serve as a prognostic marker for rapidly progressive disease in ADPKD remains unknown.

Low hemoglobin levels called anemia is another well-known complication of chronic kidney disease and contribute to poor prognosis. It is a common observation that ADPKD patients have higher hemoglobin than chronic kidney disease patients of other causes. To date, only one study identified anemia as a possible risk factor for disease progression in non-dialysis ADPKD patients.

Therefore, the objective of this project is to examine whether urinary citrate and serum hemoglobin are prognostic factors for disease progression in ADPKD. For this purpose, we will analyze data from the Bern ADPKD registry, which is a cohort of around 190 ADPKD patients seen at least once a year since 2015 in the outpatient clinic of the Department of Nephrology and Hypertension at Bern University Hospital. This project aims to improve patient care in ADPKD.