UT SOUTHWESTERN MEDICAL CENTER NEWS

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EMBARGOED UNTIL 11 A.M. CDT WEDNESDAY, APRIL 5, 2006

Type 2 diabetics' acidity heightens risk for kidney stones

DALLAS – April 5, 2006 – People with type 2 diabetes have highly acidic urine, a metabolic feature that explains their greater risk for developing uric-acid kidney stones, researchers at UT Southwestern Medical Center have found.

The study – the first to compare the urinary biochemical characteristics of type 2 diabetics with those of normal volunteers – is available online and will be published in the May issue of the *Journal of the American Society of Nephrology*.

Individuals with type 2 diabetes (non-insulin dependent diabetes mellitus) are at increased risk for developing kidney stones in general, and have a particular risk for uric-acid stones. The mechanisms for this greater risk were previously not entirely understood. This new study demonstrates that the propensity for type 2 diabetics to develop uric-acid stones is elevated because their urine is highly acidic.

"Our next step is to find out what causes type 2 diabetics to have an abnormally acidic urine, and what other urinary factors protect some diabetics who do not form uric-acid stones," said Dr. Mary Ann Cameron, the paper's lead author and a postdoctoral trainee in internal medicine.

Obesity and a diet rich in animal protein are associated with abnormally acidic urine. In earlier studies, UT Southwestern researchers also concluded that uric-acid stones are associated with insulin resistance and type 2 diabetes.

But when researchers in this latest study accounted for these components, type 2 diabetics continued to have more acidic urine levels when compared to nondiabetics. These findings suggest that other factors associated with type 2 diabetes or insulin resistance account for the overly acidic urine in this population.

"Diet intake and obesity, those two factors alone, don't explain the whole picture," said Dr. Naim Maalouf, an author and assistant professor of internal medicine. "So, other unrecognized factors may play a role."

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Dr. Khashayar Sakhaee, senior author of the study and chief of mineral metabolism, said: "Our group at UT Southwestern was the first to determine that the more overweight a person is the more likely he or she is to form uric-acid kidney stones."

More than 18 million people in the United States live with diabetes, a chronic disease that affects the body's ability to produce or respond to insulin and that can lead to life-threatening illness, including heart disease and stroke.

Kidney stones are solid deposits that form in the kidneys from substances excreted in urine. When waste materials in urine do not dissolve completely, microscopic particles begin to form and, over time, grow into stones. These solid deposits can remain in the kidney or they can break loose and travel down the urinary tract. Small stones can pass out of the body naturally, but larger stones can get stuck in a ureter, the bladder or the urethra, possibly blocking the flow of urine and often causing intense pain.

Uric acid stones are more difficult to diagnose than other types of stones because they don't show up on regular abdominal X-rays, often delaying the diagnosis and leading to the continued growth of the stone.

Other UT Southwestern researchers contributing to the study were Dr. Orson Moe, director of the Charles and Jane Pak Center for Mineral Metabolism and Clinical Research, and Beverley Adams Huet, assistant professor of clinical sciences and internal medicine.

The research was supported by the National Institutes of Health and the National Kidney Foundation.

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