

Childhood kidney stones associated with atherosclerosis, study shows

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A recent study published in the *Journal of Pediatrics* is the first to examine and identify a link between kidney stones in children and thickened or hardened arteries—precursors to a wide variety of cardiovascular diseases. Understanding the connection between kidney stones and cardiovascular risk factors in children may help physicians and parents implement prevention measures to reduce future risk of stroke, heart attack or other forms of vascular disease for affected children.

Kidney stones in kids are increasingly common, and until recently they were believed to be an isolated medical problem. Research has established a connection between [kidney stones](#) and atherosclerosis in adults, but this study, conducted by clinician-scientists at Nationwide Children's Hospital, is the first to identify a significant association between the two health concerns in children.

"If the processes of kidney stone formation and hardening of the arteries are somehow linked in adults, it makes sense that a similar link may exist in children, despite the fact that people don't associate heart and vascular diseases with kids," said Kirsten Kusumi, MD, a nephrology fellow at Nationwide Children's and lead author on the paper. "We wanted to learn whether and why children who have kidney stones may already be showing damage to their arteries."

The study used ultrasound exams to evaluate and compare the thickness of key arteries for 15 children with kidney stones and 15 children

without them. None of the participants were diagnosed with conditions known to cause atherosclerosis, so that any damage to the arteries could reasonably be associated with children's kidney stones.

Dr. Kusumi and her collaborators detected a significant increase in the thickness of the right carotid artery and average artery thickness—potential risk factors for cardiovascular complications or disease—in children with a recent kidney stone.

"Our findings suggest that there is something going on in the body related to kidney stone formation that also impacts the health of children's arteries," said Dr. Kusumi, who also is a researcher in the Center for Clinical and Translational Medicine at The Research Institute at Nationwide Children's.

The study shows the first evidence of early vascular disease in children with kidney stones who are free of accompanying risk factors in adults, and it points to these children having increased cardiovascular risk that has not been previously recognized.

"Now that we have a clear indication that the association between kidney stones and arterial thickening or hardening begins in childhood, we can take steps as clinicians to treat these vascular symptoms or implement preventive measures, such as exercise and diet programs," Dr. Kusumi says.

The researchers have not yet defined the exact mechanism that connects kidney stones to vascular hardening, but they hypothesize that inflammation may play an important role. The team screened the urine of participants for different biomarkers. In the urine of children with arterial abnormalities, key inflammatory markers appeared at higher levels.

"It could be that different types of kidney stones have different causes and even different [risk factors](#)," said Andrew Schwaderer, MD, research director of Nephrology at Nationwide Children's, principal investigator in the Center for Clinical and Translational Medicine and senior author on the publication. "If we can determine what is going on in the body to cause both kidney stones and atherosclerosis, we may be able to simultaneously target or treat both conditions."

Dr. Kusumi and Dr. Schwaderer are already studying the potential shared mechanisms for kidney stones and vascular health problems in animals. They are also expanding their studies of urine biomarkers to obtain new clues about the subtypes of kidney stones and potential molecular processes at play in both conditions.

"Our ultimate goal is to help practitioners identify and treat childhood kidney stones with improved accuracy and attention to a child's overall health. Long term, we hope to improve these children's cardiac morbidity and mortality as is done for other diseases such as diabetes and hypertension," Dr. Kusumi says. "If kidney stones are putting [children](#) at risk for serious cardiovascular problems as adults, we need to know sooner rather than later so that we can intervene and make a difference in their future health."

More information: Kusumi K, Smith S, Barr-Beare E, Saxena V, Schober MS, Moore-Clingenpeel M, Schwaderer AL. Pediatric origins of nephrolithiasis-associated atherosclerosis. *The Journal of Pediatrics*. 2015 Sep 10. [Epub ahead of print]

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