Dihydrate and calcium phosphate crystals were observed embedded along the apical face of the spheroid and protruding into the lumen. Alendronate-fluorescein staining confirmed the presence of calcium-containing crystals in the lumen of the cyst.

CONCLUSIONS: We have demonstrated that hollow MDCK spheroids cultured with crystal-forming media can generate calcium-containing crystals in the spheroid lumen. This model is the first in vitro tissue culture-based model to reliably develop calcium-based crystals and can be used to investigate their pathogenesis or to perform high-throughput drug screening. Furthermore, it paves the way for personalized medicine by building the foundation for a cell system where renal tissue can be harvested and cultured to identify individual intrinsic risk factors that might contribute to stone development.

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Risks of Carotid Artery Stenosis and Atherosclerotic Cardiovascular Disease in Patients with Calcium Kidney Stone: Assessment of Systemic Inflammatory Biomarkers
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INTRODUCTION AND OBJECTIVE: To assess the clinical significance of preoperative inflammatory biomarkers combined with atherosclerotic cardiovascular disease (ASCVD) risk score to evaluate carotid artery stenosis in patients with calcium kidney stones.

METHODS: We conducted a prospective observational case-control study, enrolling seventy four patients with calcium kidney stones and sixty six age- and sex-matched healthy controls. We calculated the inflammatory biomarkers including the neutrophil-lymphocyte ratio (NLR), monocyte-lymphocyte ratio (MLR), and systemic inflammation response index (SIRI). Ultrasound of the carotid arteries was performed on all participants to identify the severity of the stenosis.

RESULTS: All inflammatory biomarkers and the severity of carotid artery stenosis were higher in the calcium kidney stone group than in controls. After stratification of ASCVD, inflammatory biomarkers and carotid artery stenosis severity were still significantly higher in the calcium kidney stone group. Multivariate analyses showed that calcium kidney stones significantly increased the risk of ASCVD and carotid artery stenosis. In multivariate linear logistic regression analyses, calcium kidney stone and ASCVD score had a significant association with carotid artery occlusion, but SIRI did not.

CONCLUSIONS: Calcium kidney stone is associated with higher levels of inflammatory biomarkers and carotid artery stenosis.
FLUID TEMPERATURE EFFECT ON SUPERPULSE THULIUM FIBER LASER STONE ABLATION

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INTRODUCTION AND OBJECTIVE: The absorption coefficient measures the energy lost to the medium through which a laser beam passes. Prior mid-infrared laser studies have shown that as the temperature of the medium increases, there is less loss of energy into the medium. Accordingly, we evaluated the impact of irrigation temperature on the amount of stone ablation when using the superpulse Thulium fiber laser (sTFL).

METHODS: Optical coherence tomography (OCT), a non-invasive, high-resolution imaging technique, was used to generate a detailed surface image during single pulse sTFL lithotripsy (0.5 J, 1.0 Hz, 1.25 ms) of 12 samples of each of the following stone compositions: calcium oxalate monohydrate (COM), calcium oxalate dihydrate (COD), and uric acid (UA). Stones were immersed in either room temperature (20°C) or body temperature (37°C) irrigation for COM stones (p = 0.014) and UA stones (p = 0.007), respectively (Table 1). Additionally, we demonstrated that from 90 mmHg onwards, the changes in pH were statistically significant when RPP exceeds 90 mmHg.

RESULTS: Regardless of stone composition, the mean volume of stone ablated during sTFL at 37°C was significantly greater than at room temperature. The single pulse of the sTFL ablated 12.4%, 24.4% and 28.6% more stone at 37°C irrigation for COM stones (p = 0.034), COD stones (p = 0.014) and UA stones (p = 0.007), respectively (Table 1). Additionally, we demonstrated that from 90 mmHg onwards, the changes in pH were statistically significant when RPP exceeds 90 mmHg.