Perfusion Index Derived from a Pulse Oximeter Can Detect Changes in Peripheral Microcirculation during Uretero-Renal-Scopy Stone Manipulation (URS-SM).

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BACKGROUND: The objective of this study was to test the effect of removal of a ureteral obstruction (renal calculus) from anesthetized patients on the perfusion index (PI), as measured by a pulse oximeter, and on the estimated glomerular filtration rate (eGFR).

PATIENTS AND METHODS: This prospective study enrolled 113 patients with unilateral ureteral obstructions (kidney stones) who were scheduled for ureteroscopy (URS) laser lithotripsy. One urologist graded patient hydronephrosis before surgery. A pulse oximeter was affixed to each patient's index finger ipsilateral to the intravenous catheter, and a non-invasive blood pressure cuff was placed on the contralateral side. Ipsilateral double J stents and Foley catheters were inserted and left indwelling for 24 h. PI and mean arterial pressure (MAP) were determined at baseline, 5 min after anesthesia, and 10 min after surgery; eGFR was determined at admission, 1 day after surgery, and 14 days after surgery.

RESULTS: Patients with different grades of hydronephrosis had similar age, eGFR, PI, mean arterial pressure (MAP), and heart rate (HR). PI increased significantly in each hydronephrosis group after ureteral stone disintegration. None of the groups had significant post-URS changes in eGFR, although eGFR increased in the grade I hydronephrosis group after 14 days. The percent change of PI correlates significantly with the percent change of MAP, but not with that of eGFR.

CONCLUSION: Our results demonstrate that release of a ureteral obstruction leads to a concurrent increase of PI during anesthesia. Measurement of PI may be a valuable tool to monitor the successful release of ureteral obstructions and changes of microcirculation during surgery. There were also increases in eGFR after 14 days, but not immediately after surgery.