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Acute kidney injury biomarkers in patients with ureteric stones after retrograde ureterolithotripsy

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Introduction: The conventional diagnosis of acute kidney injury is based on serum creatinine measurement, but this marker is not appropriate for early recognition. During last decade there were a lot of studies evaluating biomarkers of kidney injury after minimally invasive treatment of kidney stones. However, there is no published data about biomarkers level after treatment of ureteric stones. The aim of our study was to evaluate impact of different treatment methods on kidney parenchyma in patients with proximal ureteric stones.

Materials & Methods: From 1st January to 31st October 2017 a total of 75 patients with unilateral large proximal ureteric stones were prospectively included in our study. They were randomized in three groups. In group 1 patient's undergone to retrograde ureterolithotripsy, in group 2 ESWL was performed and in group 3 mini-percutaneous antegrade ureterolithotripsy was treatment method. In all groups some biomarkers level were measured, including KIM-1, NAG and cystatin C, preoperatively, 2 hours, 24 hours and 72 hours after procedure. Also, we evaluate stone-free rate (residual fragments < 4 mm) and complications rate. In all cases KUB and renal ultrasound were performed one month after intervention.

Results: The mean stone size was 12 mm (9-13), 11 (8-12) and 13 mm (8-14) ($p < 0.05$). The mean age was 56 years (64, 57 and 62 years respectively). Stone-free rate in group 1, 2 and 3 was 76%, 60% and 88%. In all groups there was no significant difference in baseline biomarker level, except slight elevation of cystatin C in group 2 ($p > 0.05$). In all groups the mean KIM-1, cystatin C and NAG level increased two hours after intervention. However, after 1 and 7 days in group 1 the level of all biomarkers was not significantly different compared to baseline level. In group 2 and 3 KIM-1 and NAG level increased after 1 and 7 days after intervention, but in group 2 elevation at 7 days was not significant. Complication rate in group 1, 2 and 3 was 16%, 8% and 28%. There was greater grade 2 complication (according to Clavien-Dindo).

Conclusions: Our study showed that retrograde ureterolithotripsy is safe treatment method, which cause minimal kidney parenchyma injury, according to biomarkers level change. Percutaneous antegrade ureterolithotripsy is the most invasive but the most efficient method; however, first day after intervention biomarker elevation is comparable with ESWL, despite on its minimally-invasive nature. These data must be confirmed in large study with strict laboratory and clinical follow-up.

Biography

Kirill Shiranov has completed Medicine from Rostov State Medical University and graduated in Urology from Urologic Residency in 2013. He has surgical experience that includes ESWL (> 200 case per year), flexible endoscopy (> 50 cases per year), PCNL (25 cases per year), TUR (> 20 cases per year), TURP (20 cases per year), TURBT (20 cases per year) and HoLEP (20 cases per year). In 2012-2013, he was a member in ESRU NCO, Russia. He worked as EAU guidelines translator from English to Russia in 2010, 2011, 2014, 2016, and 2017.

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