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Influence of pre-existing cavitations in primary tract stones on success rate of extracorporeal shock wave lithotripsy

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Urinary calculi are one of the most debilitating and painful medical conditions that lead into multiple comorbidities. Treatment modalities of urinary calculi have developed dramatically during the last decades. Currently, Extracorporeal Shock Wave Lithotripsy (ESWL) is the most popular noninvasive treatment modality in clinical practice. The clinical outcome of ESWL depends on a number of factors such as size and chemical composition of the calculi, anatomical location, body habits of patient and type of the ESWL machine. In order to study the influence of other factors involving the clinical outcome, 68 urinary calculi, extracted from different anatomical locations of urinary tract were analyzed.

Cross sectional analysis was carried out by binocular petrographic microscope and crystalline nature of calculi were studied by polarized microscope under plane and crossed polarized light. Selected samples were studied under Scanning Electron Microscope (SEM) for the understanding of micro crystalline materials. The variation of content of organic matter in samples from different anatomical locations was determined using thermo gravimetric analysis.

Present study revealed the increasing of porosity was an important factor for success rate of ESWL but not the micro cavitation within the calculus. Further, it was noted that the content of organic matter influences on the extent of cavitation. Calculi with organic matters can easily undergo biological degradation leaving an air filled cavity behind. When organic matter content is high in calculi, it has higher porosity and higher success rate which is highly fulfilled by pelvicalyceal calculi. In contrast, calculi with high-crystallinity are more stable and therefore, the success rate of ESWL is less. Since the crystallinity of the pelvicalyceal calculi are low, higher success rate of ESWL can be obtained. Bladder calculi that have high crystallinity show higher failure rate of ESWL.

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