

A comparison of treatment modalities for renal calculi between 100 and 300 mm²: are shockwave lithotripsy, ureteroscopy, and percutaneous nephrolithotomy equivalent?

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Background and Purpose: Shockwave lithotripsy (SWL) is considered a standard treatment for patients with upper-tract stones that are less than 10 mm in diameter, whereas stones that are larger than 20 mm are best managed by percutaneous nephrolithotomy (PCNL). The management of stones between these sizes remains controversial. Our purpose was to review our contemporary series of SWL, ureteroscopy (URS), and PCNL outcomes for intermediate-sized upper tract calculi (100-300 mm²).

Patients and Methods: Analysis was restricted to those patients who were treated for a renal calculus that measured between 100 and 300 mm² during a 4-year span. Demographic, stone, patient, treatment, and follow-up data were collected from a prospectively maintained database.

Results: A total of 137 patients were referred with nonstaghorn calculi with an area between 100 and 300 mm². Fifty-three (38.7%) patients were treated with SWL, while 41 (29.9%) and 43 (31.4%) underwent ureteroscopy and PCNL, respectively. Mean stone area was higher in the PCNL group ($P < 0.001$), whereas stone density was higher for patients undergoing SWL ($P = 0.002$). Single treatment success rates were better for PCNL at 95.3%, vs 87.8% for ureteroscopy and 60.4% for SWL, $P < 0.001$. When allowing for two SWL treatments, the success rate improved to 79.2%, thus equalizing the success of the three treatment modalities ($P = 0.66$). Auxiliary treatments were more common after SWL (42.3%; $P < 0.01$).

Conclusions: For intermediate-sized upper-tract stones, when allowing for up to two SWL treatments, there was no significant difference between treatment modalities. Thus, SWL is a reasonably successful treatment alternative for patients who are not fit for a general anesthetic or who prefer SWL over competing treatments, provided they accept a potentially higher number of treatments.

Editorial Comment

This study has significant limitations. Selection bias may impact choice of treatment. The authors state that stone characteristics impacted selection of treatment modality, yet they do not elaborate on what characteristics were considered or how they impacted the decision tree. Stone density was higher in the SWL group, while stone size was larger in the PCNL group. Post-operative imaging modality was not standardized. Different definitions for success were used between the three groups; with a more stringent definition for PCNL, and liberal definition for URS and SWL. The authors correctly note that the higher retreatment rates with SWL may be counter-balanced by the lower hospitalization rate, length of stay and need for ureteral stents. They appropriately conclude that the final choice of treatment depends on the patient preference, clinical scenario, and available equipment and expertise.

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