

The success of extracorporeal shock-wave lithotripsy based on the stone-attenuation value from non-contrast computed tomography

Abstract

Objective: To determine the utility of the urinary stone-attenuation value (SAV, in Hounsfield units, HU) from non-contrast computed tomography (NCCT) for predicting the success of extracorporeal shock-wave lithotripsy (ESWL).

Patients and methods: The study included 305 patients with renal calculi of ≤ 30 mm and upper ureteric calculi of ≤ 20 mm. The SAV was measured using NCCT. Numerical variables were compared using a one-way analysis of variance with posthoc multiple two-group comparisons. Univariate and multivariate regression analysis models were used to test the preferential effect of the independent variable(s) on the success of ESWL.

Results: Patients were grouped according to the SAV as group 1 (≤ 500 HU, 81 patients), group 2 (501-1000 HU, 141 patients) and group 3 (>1000 HU, 83 patients). ESWL was successful in 253 patients (83%). The rate of stone clearance was 100% in group 1, 95.7% (135/141) in group 2 and 44.6% (37/83) in group 3 ($P = 0.001$).

Conclusions: The SAV value is an independent predictor of the success of ESWL and a useful tool for planning stone treatment. Patients with a SAV ≥ 956 HU are not ideal candidates for ESWL. The inclusion criteria for ESWL of stones with a SAV <500 HU can be expanded with regard to stone size, site, age, renal function and coagulation profile. In patients with a SAV of 500-1000 HU, factors like a body mass index of >30 kg/m² and a lower calyceal location make them less ideal for ESWL.