Evaluation of CROES Nephrolithometry Nomogram as a Preoperative Predictive System for Percutaneous Nephrolithotomy Outcomes

Abstract

Purpose: Scoring systems have been devised to predict outcomes of percutaneous nephrolithotomy (PCNL). CROES nephrolithometry nomogram (CNN) is the latest tool devised to predict stone-free rate (SFR). We aim to compare predictive accuracy of CNN against Guy stone score (GSS) for SFR and postoperative outcomes.

Materials and methods: Between January 2013 and December 2015, 313 patients undergoing PCNL were analyzed for predictive accuracy of GSS, CNN, and stone burden (SB) for SFR, complications, operation time (OT), and length of hospitalization (LOH). We further stratified patients into risk groups based on CNN and GSS.

Results: Mean ± standard deviation (SD) SB was 298.8 ± 235.75 mm^2. SB, GSS, and CNN (area under curve [AUC]: 0.662, 0.660, 0.673) were found to be predictors of SFR. However, predictability for complications was not as good (AUC: SB 0.583, GSS 0.554, CNN 0.580). Single implicated calix (Adj. OR 3.644; p = 0.027), absence of staghorn calculus (Adj. OR 3.091; p = 0.044), single stone (Adj. OR 3.855; p = 0.002), and single puncture (Adj. OR 2.309; p = 0.048) significantly predicted SFR on multivariate analysis. Charlson comorbidity index (CCI; p = 0.020) and staghorn calculus (p = 0.002) were independent predictors for complications on linear regression. SB and GSS independently predicted OT on multivariate analysis. SB and complications significantly predicted LOH, while GSS and CNN did not predict LOH. CNN offered better risk stratification for residual stones than GSS.

Conclusion: CNN and GSS have good preoperative predictive accuracy for SFR. Number of implicated calices may affect SFR, and CCI affects complications. Studies should incorporate these factors in scoring systems and assess if predictability of PCNL outcomes improves.