

Khadgi S.¹, Darrad M.², Al-Terki A.³, El-Nahas A.R.³

¹Vayodha Hospital, Dept. of Urology, Kathmandu, Nepal, ²University Hospitals Birmingham NHS Foundation Trust, Dept. of Urology, Birmingham, United Kingdom, ³Amiri Hospital, Dept. of Urology, Kuwait City, Kuwait

Introduction & Objectives: Current international guidelines suggest primary treatment for renal stones greater than 20 mm is standard percutaneous nephrolithotomy (PCNL) which is usually performed via a 24-30Fr renal access sheath. Although this technique offers excellent stone-free rates, it has a relatively high incidence of complications. In an attempt to reduce the morbidity, miniaturisation of renal access in PCNLs was first introduced to a paediatric population in 1997. We describe one of the largest prospective studies evaluating the outcomes of mini-PCNL for large renal stones greater than 20 mm and to identify different variables that predict the likelihood of successful stone clearance.

Materials & Methods: In this prospective case series, we identified consecutive patients who underwent tubeless mini-PCNL (16-20F) with non-contrast CT confirmed renal stone burden greater than 20 mm in 2 referral centres between July 2015 – November 2018. Primary outcomes evaluated were stone-free rates, 30 day procedure-related complications, length of postoperative hospital stay, and need for blood transfusion. Chi2 or Fisher's exact test were used for categorical variables and Student's t test or the Mann-Whitney U test for continuous variables. A p-value < 0.05 was considered to indicate statistical significance.

Results: We identified 225 renal units from 218 adult patients for the study. The mean average age was 42.9 years old and 75% of patients were male. The mean cumulative stone size was 30.2 mm per renal unit, of which 63 renal units contained staghorn calculi. The overall single stage stone-free rate was 87.6% with overall 30 day procedure-related complication rates of 8.4% (Clavien-Dindo I-II of 7.6%, III of 0.9%, IV-V of 0%). None of the patients required blood transfusion and the average length of postoperative hospital stay was 3.0 days. Cumulative stone size was the best predictor of the stone-free rate ($p < 0.001$). Other significant variables affecting the stone-free rates was multi-calyceal stone locations ($p=0.001$), multiple stones ($p=0.014$), Guy's stone score ($p=0.018$), and the presence of staghorn calculi ($p=0.02$). Patients under 40 were more likely to develop 30 day procedure-related complications ($p= 0.023$).

Conclusions: Tubeless mini-PCNL is an effective treatment option for patients with large renal stones greater than 20 mm with comparable stone-free rates and low procedure-related complication rates compared to conventional PCNL and should be considered as one of the primary treatment options for this population.