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INTRODUCTION & OBJECTIVES: The aim of this study is to compare the perioperative, pathological and functional outcomes in two contemporary, large series of patients in different institutions and who underwent open partial nephrectomy (OPN) or robot-assisted partial nephrectomy (RAPN) for suspected renal tumours.

MATERIAL & METHODS: This was a retrospective, multicentre, international, matched-pair analysis comparing patients who underwent RAPN or OPN for suspected renal cell carcinoma (RCC). Data on patients who underwent OPN were extracted from the preliminary analysis of the REgistry of COnservative Renal surgery database (RECORD Project) that collected data from 19 different centres (368 patients), promoted by the 'Leading Urological No profit foundation Advanced research' (LUNA) of the Italian Society of Urology (SIU). Data on patients who received RAPN were extracted from a multicentre, international database collecting cases treated in four high-volume referral centres of robotic surgery (415 patients). The propensity score was calculated for each patient using multivariable logistic regression based upon the following covariates: age, clinical tumor size, longitudinal location (upper or inferior poles vs middle pole) and tumor exophytic rate (< 50% exophytic vs others). The matching was in a 1:1 ratio for the surgical approach and included 200 patients in each arm.

RESULTS: The mean warm ischaemia time (WIT) was shorter in the OPN group than in the RAPN group (15.4±5.9 vs 19.2±7.3 min; $P < 0.001$). Conversely, the median (interquartile range, IQR) estimated blood loss (EBL) was 150 (100-300) mL in the OPN group and 100 (50-150) mL in the RAPN group ($P < 0.001$). There were no differences in operative time ($p=0.18$) and the intraoperative complication rate ($p=0.31$) between the approaches. Postoperative complications were recorded in 43 (21.5%) patients who underwent OPN and in 28 (14%) who received RAPN ($p=0.02$). Moreover, major complications (grade 3-4) were reported in nine (4.5%) patients after OPN and in nine (4.5%) after RAPN. Positive margins were detected in nine (5.5%) patients after OPN and in nine (5.7%) after RAPN ($p=0.98$). The mean \pm SD 3-month estimated glomerular filtration rate declined by 16.6±18.1 ml/min from preoperative value in the OPN group and by 16.4± 22.9 ml/min in the RAPN group ($p=0.28$).

CONCLUSIONS: RAPN can achieve equivalent perioperative, early oncological and functional outcomes as OPN. Moreover, RAPN is a less invasive approach, offering a lower risk of bleeding and postoperative complications than OPN.