

Capitanio U.¹, Terrone C.², Antonelli A.³, Minervini A.⁴, Volpe A.², Castiglione F.¹, Furlan M.³, Matloob R.¹, Regis F.², Zegna L.², Vittori G.⁴, Di Trapani E.¹, Carini M.⁴, Simeone C.³, Bertini R.¹

¹San Raffaele Scientific Institute, Dept. of Urology, Milan, Italy, ²University of Piemonte Orientale, Dept. of Urology, Novara, Italy, ³Universita' Degli Studi E Spedali Civili Di Brescia, Dept. of Urology, Brescia, Italy, ⁴Clinica Urologica I, Azienda Ospedaliera Universitaria Careggi, Università Degli Studi Di Firenze., Dept. of Urology, Florence, Italy

INTRODUCTION & OBJECTIVES: Some reports suggested that nephron sparing surgery (NSS) may protect against renal function impairment (RFI) when compared with radical nephrectomy (RN) in patients with small renal masses. In the current study, we aimed to test the effect of treatment type (NSS vs. RN) on prevalence of RFI and renal end-stage kidney disease (ESRD) after accounting for clinical characteristics, comorbidities and individual cardiovascular risk.

MATERIAL & METHODS: A multi-institutional collaboration among four European Tertiary Care Centres allowed collecting 2024 patients with a clinical T1a-T1b N0 M0 renal mass and complete functional follow-up data. Patients underwent RN (n=765, 37.8%) or NSS (n=1259, 62.2%) and showed normal estimated glomerular filtration rates (eGFR) before surgery (defined as a pre-operative eGFR \geq 60 milliliters per minute per 1.73 m²). Descriptive, univariable and multivariable Cox regression analyses predicting RFI were performed. To adjust for inherent baseline differences among patients, we included as covariates: preoperative creatinine, age, clinical tumour size, gender, presence of hypertension or diabetes at diagnosis, baseline Charlson comorbidity index (CCI), body mass index and smoker status.

RESULTS: Mean patient age resulted 60.6 years (median 62). Mean body mass index resulted 26 kg/m². Overall, 20.0% and 9.9% of the patients had uncontrolled hypertension or diabetes, respectively. CCI resulted 0-1 in 71.9% of the patients. At a mean follow up period of 68.2 months, 81.1% vs. 55.8% patients showed normal renal function after NSS vs. RN, respectively (p<0.001). The prevalence of mild RFI, severe RFI and ESRD resulted 25.3, 1.0% and 2.1%. However, after stratifying for treatment type, the prevalence of mild RFI, severe RFI and ESRD resulted higher in the group of patients treated with RN relative to NSS (39.7 vs. 16.6%, 1.4 vs. 0.8% and 3.0 vs. 1.5%, respectively, p<0.001). At multivariable analyses, patients who underwent PN showed significantly lower risk to harbour RFI compared with their RN-treated counterparts (hazard ratio [HR]: 0.63; 95% confidence interval, 0.44-0.89; p=0.008). Increasing age (HR: 1.06, p<0.001), larger tumours (HR: 1.04, p<0.001), presence of hypertension (HR: 5.39, p=0.006) and presence of diabetes (HR: 1.56, p=0.05) resulted independent predictors of RFI.

CONCLUSIONS: Although the risk of severe renal function impairment and ESRD is negligible, up to 30% of the patients with clinical T1a-T1b renal masses and a normal preoperative kidney function harbour mild RFI after surgery. Also after accounting for clinical characteristics, comorbidities and cardiovascular risk at diagnosis, NSS significantly decrease the risk of RFI relative to RN.