Background and Objectives

In the imperative setting there is lack of surgical and clinical predictors of renal function worsening after minimally-invasive partial nephrectomy. The aim of this study was to identify predictors of newly onset of severe chronic kidney disease (sCKD) in patients who underwent MPN for an imperative (I) or elective (E) indication on a large multicentric series.

Material and Methods

Between July 2007 to October 2020, a collaborative minimally-invasive renal surgery dataset was queried for "elective" (E) and "imperative" (I) indications. We analyzed perioperative, oncologic and functional outcomes of 2218 patients who underwent MPN, 1812 with E and 406 with I indications, respectively. Elective and imperative cohorts were matched for baseline, perioperative, oncologic and functional data. Categorical and continuous variables were reported as IQRs or frequencies, and compared with χ2 – and Student t tests, respectively. Univariable and multivariable Cox regression analyses were performed to identify predictors of pCKD (stages ≥3b) in both groups. For all statistical analyses, a two-sided p < 0.05 was considered significant.

Univariable and multivariable Cox regression analysis for identifying predictors of sCKD in the elective setting

Univariable and multivariable Cox regression analysis for identifying predictors of sCKD in the imperative setting

Conclusions

Compared to the elective setting, I-MPN is associated to an increased rate of perioperative complications and significant renal function decline. In this scenario, a purely-off clamp approach may provide a significant benefit in preservation of eGFR at mid-term follow-up.

Results

Out of 406 I-MPN patients, 36 were solitary kidneys, 259 had impaired preoperative renal function, 1 had horseshoe kidney and 110 had bilateral renal tumors. I-MPN patients were older (p=0.001), they showed significantly lower baseline eGFR (p<0.001), and a trend towards a significantly higher ASA score, RENAL stage, CT stage, CKD stages, lower preoperative hemoglobin levels and increased rate of major comorbidities (each p<0.05). All other baseline data were comparable (all p>0.1). Warm ischemia time, positive surgical margins rates, length of hospital stay and trifecta were comparable between groups (each p>0.05), while I-MPN patients had significantly higher pT stages, eGFR at discharge decrease and Clavien3 complication rates (each p<0.001). On multivariable Cox regression analysis, in the elective series, hypertension (HR 3.17; 95% CI 1.34-7.46; p=0.008), ASA score (HR 2.66; 95% CI 1.13-6.28; p=0.025) preoperative eGFR (HR 0.93; 95% CI 0.90-0.96; p=0.001) and warm ischemia time (HR 1.06; 95% CI 1.02-1.10; p=0.003) were all independent predictors of sCKD. In the imperative cohort RENAL score (HR 5.33; 95% CI 1.35-20.9; p=0.016), warm ischemia time (HR 1.04; 95% CI 1.05-1.08; p=0.025) and hilar control (HR 0.35; 95% CI 0.14-0.91; p=0.032) were all independent predictors of sCKD.