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INTRODUCTION & OBJECTIVES: To compare perioperative outcomes of open partial nephrectomy (OPN) with those of robotic assisted partial nephrectomy (RAPN), in a prospective multicenter dataset.

MATERIAL & METHODS: The AGILE project is a 2-Year prospective observational study that includes patients treated with OPN or RAPN between 2010 and 2011 at six Italian urologic centers. All clinical variables including tumor nephrometry (PADUA score) and laboratory analyses were recorded. Surgical results and complications, stratified with Clavien system, and pathological data were registered. All significant differences in OPN versus RAPN group were assessed. Independent predictors of surgical complications were evaluated with multivariate analysis.

RESULTS: 198 and 104 patients were enrolled in the OPN and RAPN group, respectively. As summarized in the table, Charlson comorbidity index was significantly higher in RAPN group while clinical tumor diameter and imperative surgical indication were higher in OPN group. Pedicle clamping was used in 48% and 62,5% of OPN and RAPN group, respectively. In RAPN group 1 procedure was converted to open due to vascular lesion. At univariate analysis, there was no significant difference in warm ischemia time, intraoperative complications, postoperative medical complications, delta of serum creatinine, positive surgical margin and benign tumor rates. The operative time resulted significantly higher in RAPN group, while the estimated blood loss, the delta of serum Hemoglobin and the postoperative surgical complications were significantly higher in OPN group. 9,6% of Clavien grade 3-4 surgical complications occurred in OPN group, while 1 in RAPN group (p=0,001). Ureteral stenting for urinary fistula was needed in 4% and 0% in the OPN and RAPN group, respectively (p=0,008). Revision of postoperative bleeding was needed in 2,5% and 1% (p=0,07). At multivariate analysis, the imperative indication and the surgical approach (Open vs Robotic) resulted independently correlated with postoperative surgical complications (RR=3,8; p=0,05 and RR=4,2; p=0,01, respectively).

Partial nephrectomy	OPN	RAPN	P
N patients	198	104	Ns
Male gender	62%	65.4%	Ns
Age (years)	63,8 ± 12,4	63 ± 11	Ns
BMI	27,2 ± 4,9	26,1 ± 4	Ns
ASA score 3	14,6%	14%	Ns
Charlson Index ≥ 2	5,6%	26%	0,04
Imperative indications	5,05%	1%	0,07

Clinical tumor diameter	3,5 ± 1,8	2,8 ± 1,5 cm	0,0002
PADUA score ≥ 10	7,1%	6,3%	Ns
Reduction of Hb (g/dL)	3,1 ± 1,9	2,3 ± 1,5	0,0019
Increase of serum creatinine (mg/dL)	0,2 ± 0,3	0,3 ± 0,1	Ns
WIT (min)	18,7 ± 8,1	18,2 ± 7	Ns
Operative time (min)	123 ± 43	168 ± 56	<0,0001
EBL (mL)	230 ± 208	115 ± 107	0,0004
Intraoperative complications (%)	5,1%	2,9%	Ns
Conversion to open	-	1/104 1%	Ns
Overall postoperative complications	48/198 24,2%	9/104 8,7%	Ns
SURGICAL postoperative complications	42/198 21,2%	6/104 5,8%	<0,0001
MEDICAL postoperative complications	3,0%	2,9%	Ns
Clavien 3-4 surgical complications	19/198 9,6%	0	0,001
Urinary fistula with ureteral stent	8/198 4,0%	0	Ns
Clavien 3-4 postoperative bleeding	5/198 2,5%	1/104 1%	0,07
Benign tumors	21,2%	13,5%	Ns
pT3a (invasion of perirenal fat)	6,0%	9,6%	Ns
Positive surgical margins	5,8%	5,3%	Ns

CONCLUSIONS: In our analysis the robotic approach clearly improved the incidence of postoperative complication and the reintervention rate. Further studies are needed to evaluate surgical, functional and oncological results of RAPN.