

Initial experience with single-port robotic partial nephrectomy in MUSIC-KIDNEY

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INTRODUCTION AND OBJECTIVE: Robotic partial nephrectomy (RPN) has become standard of care for patients with T1 renal masses (T1RMs) amenable to nephron-sparing intervention. Most RPNs use the daVinci Xi (multiport) robot, and urologic surgeons have recently explored the SP (single port) robot. However, there is limited data comparing patient selection and peri-operative outcomes for SP to Xi RPN. We evaluated the outcomes of the initial series of patients undergoing RPN using the daVinci SP compared to the Xi by MUSIC-KIDNEY surgeons.

METHODS: MUSIC-KIDNEY is a statewide quality improvement (QI) collaborative that maintains a prospective registry of newly diagnosed T1RM. All data regarding patients undergoing RPN within a MUSIC-KIDNEY practice between October 2020 and August 2023 were collected. Patient, operative, and post-operative data were compared between patients who received SP and Xi RPN.

RESULTS: A total of 323 RPNs were completed across 4 MUSIC practices by 6 urologists. Of these, 122 (38%) used the daVinci SP platform (Table). Tumor characteristics (size, complexity) were similar, with more complex cysts in the SP group (24% vs. 12%, $p=0.02$). When comparing peri-operative outcomes, SP cases had significantly shorter operative time (141 vs. 181 minutes, $p<0.001$), lower rates of warm ischemia time ≥ 30 minutes (3.4% vs. 13.2%, $p=0.01$), and lower rates of hospital stay > 2 days (4.9% vs. 14%, $p=0.008$). Surgeons performing SP RPN utilized the retroperitoneal approach significantly more than transperitoneal (80% vs. 6.0%, $p<0.001$). Opioid-free discharge was more common after SP RPN (66% vs. 17%, $p<0.001$). At 30 days, the rates of ED visits (10% vs. 13%, $p=0.43$) and readmission (5.0% vs. 6.6%, $p=0.52$) were not statistically different.

CONCLUSIONS: MUSIC-KIDNEY's initial experience with SP RPN demonstrates procedural safety comparable to multi-port and facilitation of retroperitoneal approach. Potential advantages include lower operative time, hospital stay, and opioid prescription after discharge. Limitations include small number of surgeons and cases using SP.

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Table. Patient and tumor characteristics as well as peri-operative outcomes of single-port and multi-port robot-assisted partial nephrectomies performed by MUSIC surgeons. Bolded p-values are significant.

	Xi (N=201)	SP (N=122)	p-value
Patient characteristics			
Age (median, IQR)	62 (53-68)	62 (53-72)	0.2
Male Sex	88 (44%)	57 (47%)	0.6
Tumor size, cm (median, IQR)	2.9 (2.1-4.0)	3.1 (2.4-4.3)	0.1
Tumor stage T1b or higher	47 (23%)	29 (27%)	0.2
RENAL nephrometry score			0.1
Low (4-6)	81 (42%)	32 (54%)	
Intermediate (7-9)	92 (48%)	19 (32%)	
High (≥ 10)	20 (10%)	8 (14%)	
Tumor type			0.02
Solid	169 (84%)	69 (70%)	
Complex cystic	24 (12%)	23 (24%)	
Indeterminate	8 (4.0%)	6 (6.1%)	
Operative Outcomes			
Surgical approach			<0.001
Transperitoneal	189 (94%)	24 (20%)	
Retroperitoneal	12 (6.0%)	98 (80%)	
Operative time, minutes (median, IQR)	181 (122-249)	141 (106-181)	<0.001
Conversion to radical nephrectomy	10 (5.0%)	12 (9.8%)	0.09
Warm ischemia time ≥ 30 minutes	25 (13%)	3 (3.4%)	0.01
Estimated blood loss ≥ 500 mL	10 (5.0%)	5 (4.1%)	0.7
Pathologic Outcomes			
	20 (10%)	19 (16%)	0.1
pT3/4	9 (5.5%)	15 (16%)	0.007
Post-operative outcomes			
Hospital length of stay > 2 days	29 (14%)	6 (5%)	0.008
Opioid-free discharge	35 (17%)	80 (66%)	<0.001
ED visit within 30 days	21 (10%)	16 (13%)	0.43
Readmission within 30 days	10 (5.0%)	8 (6.7%)	0.52

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