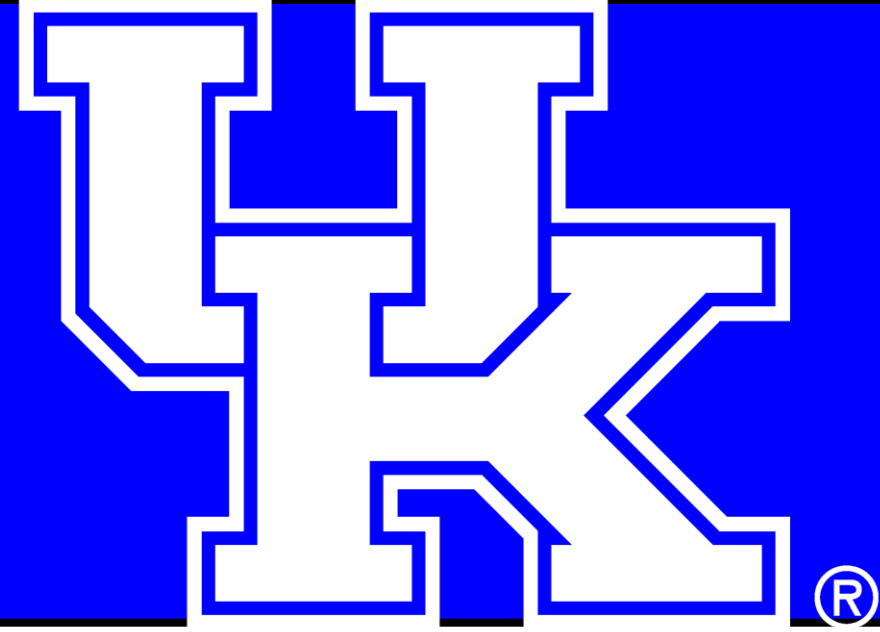


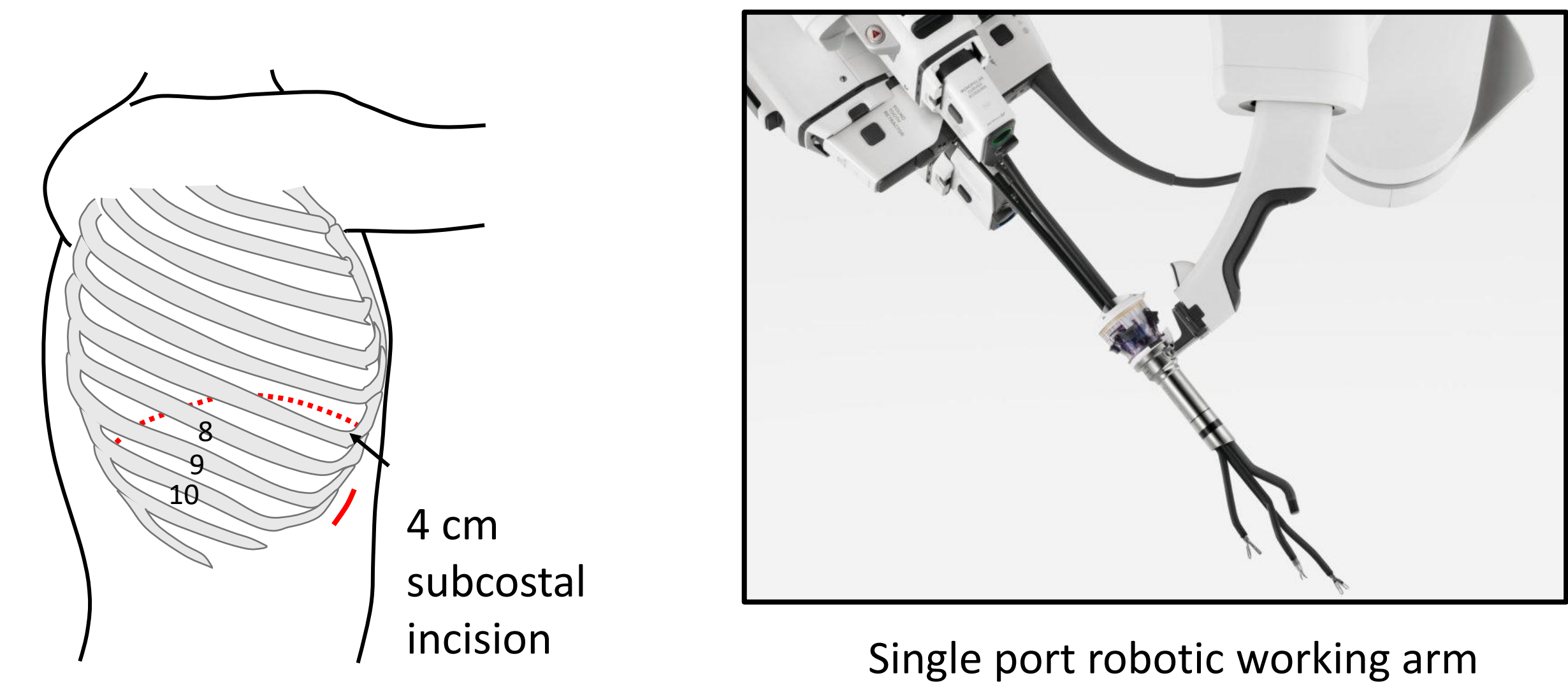


Single Port Robotic Surgery Decreases Pain After Thoracic Surgery

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Introduction

Single port robotic technology (SP) was approved for thoracic surgery in the United States in June 2024. Although early studies have demonstrated the feasibility and safety of this technique in thoracic surgery, there is currently minimal data describing its impact on patient outcomes, especially pain control.



Methods

Between July and November 2025, thoracic SP robotic cases at a single institution were followed to assess outcomes. A comparison group was retrospectively reviewed including all patients undergoing multi-port robotic thoracic surgery over a one-year period by the same surgeons. Demographic and outcome data included length of stay, complications, and pain control (inpatient new gabapentin use or methocarbamol escalation, inpatient oral and intravenous narcotic use, and post-discharge narcotic refills). Variables were compared between the groups using chi square test and t-test as appropriate. The SP patients were then propensity matched to multi-port patients based on differing demographic data ($p < 0.3$) in the unmatched groups (gender, smoking, narcotic use, coronary disease, COPD, and body mass index) as well as type of procedure performed. Patients converted to open surgery for any reason were excluded from both groups. After adequate matching was assured, outcome variables were compared between the matched groups.

Results

Over a five-month period, 32 cases were completed using SP technology. This represented the entire learning curve at the institution from the first case. Five cases were approached subxiphoid for mediastinal masses and the remaining 27 (84%) cases were subcostal and included wedge resection, anatomic resection, diaphragm plication, and posterior mediastinal masses. SP cases were less likely to be anatomic resections related to patient selection during the learning curve. SP patients also had a significantly lower BMI, again related to intentional patient selection during the learning curve. Twenty-seven of the 32 patients were able to be matched to a corresponding multiport patient. After matching, there were no differences between the groups for any of the demographic variables investigated (table 2). SP patients had similar chest tube duration and length of stay (table 3). Complication rates were also similar between the groups. Inpatient pain management followed a standard institutional protocol including Tylenol, ibuprofen, methocarbamol, and oral narcotics as needed. While there were no differences in inpatient pain control requirements, SP patients were significantly less likely to require narcotic prescription refill after discharge (4% vs 30%, $p = 0.01$).

Table 1. Unmatched Demographics	Single Port		Multiport		p value
	n= 32	% or mean	n= 75	% or mean	
Procedure					.004
Wedge	13	41%	20	27%	
Anatomic resection	9	28%	42	56%	
Diaphragm plication	2	6%	8	11%	
Biopsy	1	3%	1	1%	
Mediastinal mass	7	22%	4	5%	
Female gender	22	69%	38	51%	.10
Age (yrs)	63.2 ± 13.6		64.2 ± 13.6		.31
BMI (kg/m2)	19.2 ± 6.9		22.8 ± 9.0		.04
Diabetes	8	25%	26	35%	.79
Preop narcotics	7	22%	28	37%	.26
HTN	23	72%	58	77%	.65
HLD	18	56%	46	61%	.69
CAD	2	6%	19	25%	.02
COPD	6	19%	20	27%	.12
Smoking					.10
Never	11	34%	15	20%	
Former	9	28%	36	48%	
Current	12	38%	24	32%	

Table 2. Matched Demographics	Single Port		Multiport		p value
	n= 27	% or mean	n= 27	% or mean	
Procedure					.60
Wedge	9	33%	9	33%	
Anatomic resection	9	33%	13	48%	
Diaphragm plication	2	7%	2	7%	
Biopsy	1	4%	0	0%	
Mediastinal mass	6	22%	3	11%	
Female gender	18	67%	19	70%	.77
Age (yrs)	65.2 ± 11.3		63.4 ± 11.9		.57
BMI (kg/m2)	20.2 ± 6.2		19.3 ± 7.7		.64
Diabetes	7	26%	9	33%	.55
Preop narcotics	7	26%	7	26%	1.0
HTN	20	74%	21	78%	.75
HLD	16	59%	16	59%	1.0
CAD	2	7%	1	4%	.55
COPD	6	22%	5	19%	.74
Smoking					.82
Never	8	30%	6	22%	
Former	9	33%	10	37%	
Current	10	37%	11	41%	

Table 3. Outcomes	Single Port		Multiport		p value
	n= 27	% or mean	n= 27	% or mean	
Complications	5	19%	3	11%	.44
Readmission	3	11%	2	7%	.64
Pulmonary embolism	1	4%	1	4%	1.0
Hemothorax	1	4%	1	4%	1.0
Prolonged air leak	1	4%	1	4%	1.0
Effusion	1	4%	0	0%	.31
Atrial fibrillation	1	4%	0	0%	.31
New home oxygen	0	0%	0	0%	
Chest tube reinsertion	0	0%	0	0%	
Pneumonia	0	0%	0	0%	
Death	0	0%	0	0%	
Quality measures					
Length of stay (days)	2.6 ± 2.9		2.7 ± 3.6		.87
Chest tube duration (days)	1.8 ± 2.1		2.4 ± 3.4		.39
Pain outcomes					
New gabapentin use	0	0%	1	4%	.31
Robaxin escalation	8	30%	7	26%	.76
Inpt oral narcotic (mg/day)	21 ± 13		27 ± 25		.28
Inpt IV narcotic use	3	11%	7	26%	.16
Outpt narcotic refill	1	4%	8	30%	.01

Conclusions

The SP robotic platform demonstrates similar inpatient pain medication usage, chest tube duration, and length of stay to the more prevalently used multi-port platform. However, it appears to improve post-discharge pain control as measured by need for narcotic refills even during the learning curve.