Initial Multicenter Community Robotic Lobectomy Experience: Comparisons to a National Database

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This article includes a discussion of "Robotic Lobectomy", and more specifically, of "completely portal robotic lobectomy (CPRL)", performed using robotic-assisted *da Vinci*® technology.

This article evaluates a multicenter study of experiences involving these procedures in six community cardiothoracic surgeons' practices. Perioperative data from each surgeon's initial 20, consecutive and unselected CPRL cases (n = 120) were retrospectively gathered and compared with the 2009 and 2010 Society of Thoracic Surgeons (STS) database for video-assisted thoracoscopic surgery (VATS) (n = 4,612) and open lobectomy (n = 5,913). Patient characteristics were similar across all three groups except the one second forced expiratory volume (FEV_1) percentage, which was lower for CPRL patients compared with VATS. Additionally, the CPRL group had a significantly higher proportion of patients with an American Society of Anesthesiologists (ASA) status of 3 or greater versus VATS.

Key Takeaways

- Study authors stated that robotic-assisted surgery was safe and effective in the community hospital setting
- Even for new users, robotic-assisted thoracoscopic surgery delivered outcomes equivalent to VATS
- CPRL demonstrated statistically significant postoperative advantages versus open thoracotomy in some of the studied endpoints including blood transfusion and length of stay
- Over 96% of CPRLs were completed robotically-assisted with no conversions to open
- The absence of patient selection and low conversion rates suggest a broad applicability of CPRL

Study Limitations

- Retrospective, nonmatched comparisons
- Relatively small size of the CPRL cohort compared with VATS and open thoracotomy lobectomy cohorts for chosen database
- Cannot assess the methodologic significance of the voluntary nature of the STS database and difficulties with its quality control and standardization

Data

Preoperative Patient Characteristics

Variable	CPRL (n = 120)	VATS (n = 4,612)	Open (n = 5,913)	*p* value CPRL vs VATS	*p* value CPRL vs open
FEV_1 % predicted[a]	79.1 ± 19	84.1 ± 21.1	80.4 ± 20.2	0.03	NS
n	*90*	*4241*	*5325*		
Clinical tumor stage[b]				NS	NS
T1a	51 (46.4)	1861 (49)	1861 (39)		
T1b	24 (21.8)	947 (24.9)	1060 (22.2)		
T2a	27 (24.5)	844 (22.2)	1428 (29.9)		
T2b	8 (7.3)	144 (3.8)	419 (8.8)		
ASA Status[c]				0.006	0.04
1, 2	12 (10)	1023 (22.2)	969 (16.4)		
3	98 (81.7)	3280 (71.1)	4201 (71)		
4,5	10 (8.3)	309 (6.7)	743 (12.6)		

[a]Among patients who had the FEV_1 test performed. [b]Total sample size available for analysis of this parameter excludes >10% subjects with missing data. [c]Status 1 and 5 ranged from 0% to 0.6% across procedures, so these were combined with scores 2 and 4, respectively.

Intraoperative Parameters

Parameter	CPRL (n = 116)	VATS (n = 4,612)	Open (n = 5,913)	*p* value CPRL vs VATS	*p* value CPRL vs open
Operative time (min)	241.5 ± 64.9	179.8 ± 78.3	175.5 ± 84.2	<0.001	<0.001
Blood transfusion	1 (0.9)	62 (1.4)	281 (5)	NS	NS
Death in OR	0 (0)	0 (0)	2 (0.0004)	NS	NS

Postoperative Complications & Outcomes

Outcome	CPRL (n = 116)	VATS (n = 4,612)	Open (n = 5,913)	*p* value CPRL vs VATS	*p* value CPRL vs open
Air leak >5 days	6 (5.2)	408 (8.9)	634 (10.8)	NS	0.05
Blood transfusion	1 (0.9)	172 (3.8)	458 (7.8)	NS	0.002
Bleeding requiring reoperation	1 (0.9)	48 (1.0)	66 (1.1)	NS	NS
Chest tube duration (days)	3.2 ± 4.0	3.7 ± 8.8	4.8 ± 4.0	NS	<0.001
Pneumonia	2 (1.7)	134 (2.9)	299 (5.1)	NS	NS
Mortality at 30 days postop	0	40 (1.0)	119 (2.2)	NS	NS
n[d]	*114*	*4140*	*5361*		
Hospital length of stay	4.7 ± 3.1	5.3 ± 7.1	7.3 ± 7.6	NS	<0.001

[d]Total sample size available for analysis of this parameter excludes >10% subjects with missing data.

Conclusion

In varied practice settings, early CPRL experience demonstrates that the totally endoscopic, minimally invasive lobectomy technique is safe and reproducible. Outcomes in each surgeons' first 20 cases were equivalent between CPRL and VATS, but CPRL showed statistically significant advantages over open. Clinical background, experience with VATS lobectomy, surgical volume, team composition, and many other variables differed significantly among the surgeons. However each surgeon was able to successfully incorporate the technology into his practice.

Financial Disclosure

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