

Background & Innovation

Robotic-assisted thymectomy (RAT) has evolved from traditional transthoracic approaches to emerging single-port robotic-assisted thymectomy (SP-RAT). Despite growing interest in SP approaches, comparative perioperative outcomes data remain limited. We report an early institutional comparison of SP and transthoracic robotic-assisted thymectomy (TT-RAT).

Hypothesis

We hypothesized that single-port robotic-assisted thymectomy (SP-RAT) would be associated with shorter length of stay and improved early perioperative recovery compared with transthoracic robotic-assisted thymectomy (TT-RAT).

Methods

A retrospective review of patients who underwent robotic-assisted thymectomy over a 4-year period at a quaternary referral center was conducted. Patients were stratified by surgical approach: SP-RAT or TT-RAT.

Primary outcomes:

- Hospital length of stay
- Postoperative opioid requirements

Secondary outcomes:

- Operative time
- Estimated blood loss
- Chest tube duration
- Pain scores
- Postoperative complications

Statistical Analysis: Multivariable linear regression was used for continuous outcomes and logistic regression for binary outcomes, adjusting for age, body mass index, myasthenia gravis status, cancer diagnosis, and sex.

SP-RAT Technical Considerations:

- Central subxiphoid access facilitating bilateral mediastinal visualization
- Enhanced bilateral phrenic nerve visualization
- Avoidance of intercostal instrumentation

Methods



Figure 1. Subxiphoid SP Access

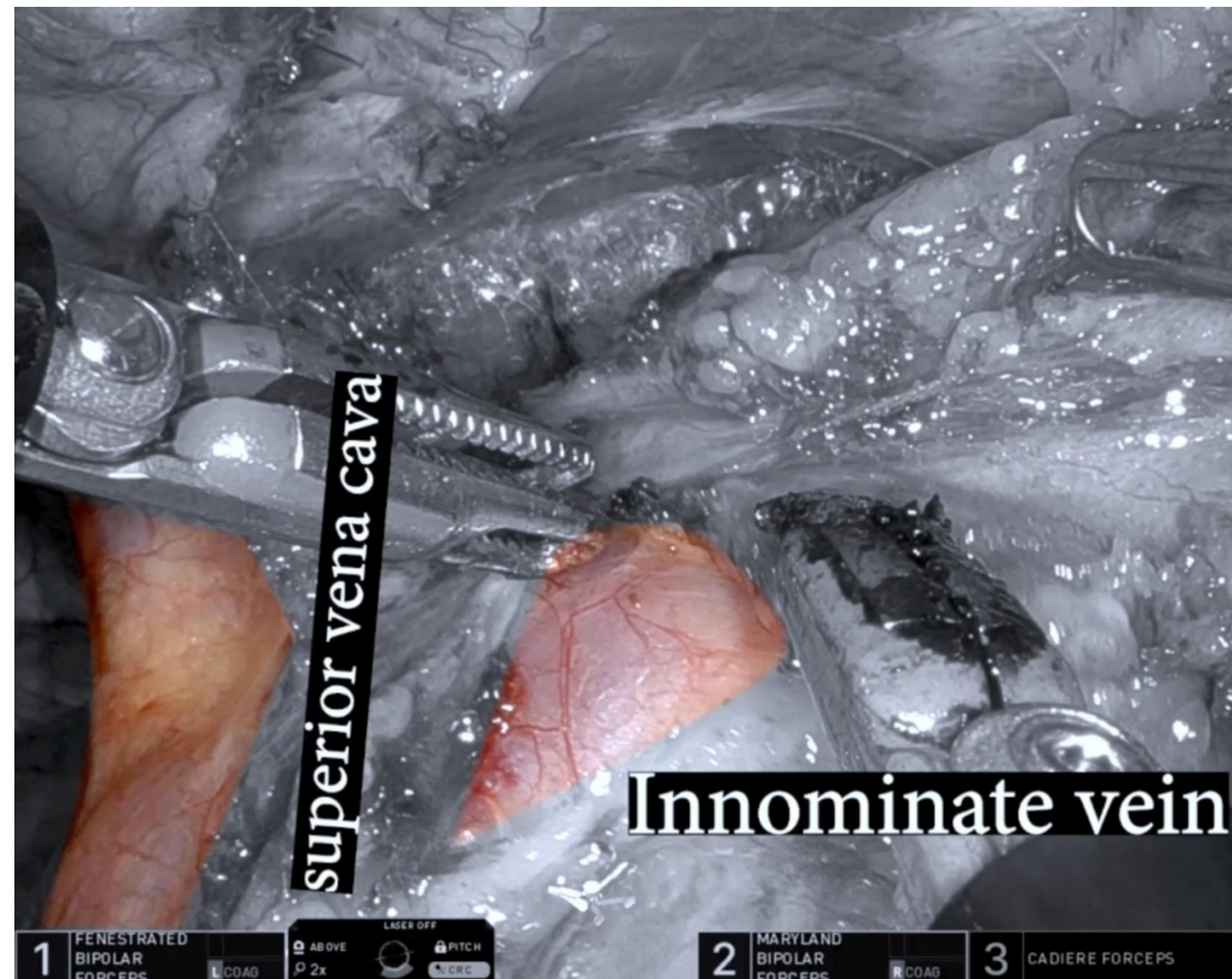


Figure 2. SP robotic view of the superior vena cava (SVC) and innominate vein during thymic dissection.

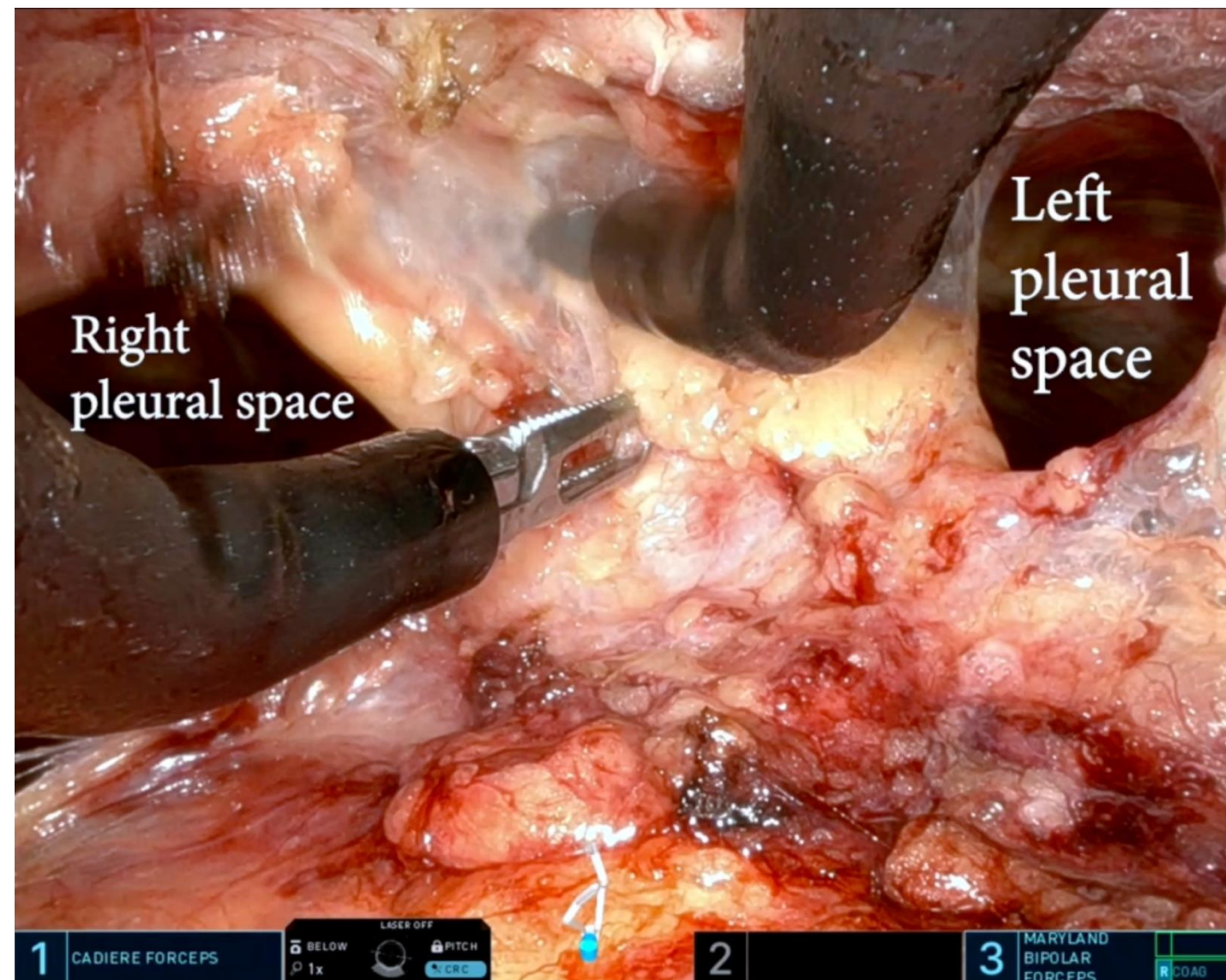


Figure 3. SP robotic view demonstrating bilateral pleural space visualization through a subxiphoid approach.

Results

•Patient Population and Baseline Characteristics:

A total of 64 patients underwent robotic-assisted thymectomy.

Key Baseline Findings

Variable	SP-RAT (n=31)	TT-RAT (n=33)	P-value
Age, median [IQR]	60.0 [48.5, 69.0]	46.0 [35.0, 60.0]	0.022
Myasthenia Gravis	9 (29.0)	20 (60.6)	0.014
Surgical Indication			0.005
Anterior mediastinal mass	16 (51.6)	7 (21.2)	
Myasthenia gravis	5 (16.1)	18 (54.5)	
Thymoma	8 (25.8)	6 (18.2)	
Thymic cyst	2 (6.5)	1 (3.0)	
Thymic basaloid carcinoma	0 (0.0)	1 (3.0)	

Perioperative Outcomes-Unadjusted Analysis

Outcome	SP-RAT (n=31)	TT-RAT (n=33)	P-value
Operative Time (min)	154.0 [132.0, 197.5]	93.0 [63.0, 114.0]	<0.001
Estimated Blood Loss (mL)	5.0 [0.0, 12.5]	20.0 [15.0, 30.0]	<0.001
Chest Tube Duration (hrs)	18.5 [5.7, 23.7]	23.3 [20.0, 25.8]	0.001
Hospital LOS (hrs)	27.5 [22.7, 31.1]	40.1 [26.1, 49.3]	0.042
Opioid Consumption (MME)	22.0 [8.3, 37.5]	50.0 [10.0, 64.5]	0.015

Results

Multivariable-Adjusted Outcomes

Outcome	SP-RAT (n = 31)	TT-RAT (n = 33)	Mean Difference (95% CI)*	P-value
Continuous Outcomes				
Operative Time (min)	171.6 ± 58.2	94.9 ± 38.7	+90.1 (62.5 to 117.8)	<0.001
Estimated Blood Loss (mL)	7.7 ± 8.4	23.9 ± 22.4	−16.3 (−25.6 to −6.9)	<0.001
Chest Tube Duration (hrs)	14.9 ± 9.6	24.7 ± 7.8	−8.9 (−14.0 to −3.7)	0.001
Hospital LOS (hrs)	28.3 ± 14.4	45.5 ± 32.9	−16.2 (−30.9 to −1.5)	0.032
Opioid Consumption (MME)	26.6 ± 31.6	65.9 ± 88.0	−20.1 (−56.6 to 16.4)	0.274
Binary Outcomes				
Postoperative Complications	1 (3.2%)	2 (6.1%)	0.35 (0.01 to 6.54)	0.488
Moderate/ Severe Pain Score	3 (9.7%)	6 (18.2%)	0.77 (0.10 to 5.04)	0.781

Conclusions

In this early institutional experience, single-port robotic-assisted thymectomy was associated with shorter hospital stay, lower estimated blood loss, and shorter chest tube duration, although operative times were longer with otherwise comparable perioperative safety. These findings support the feasibility of the subxiphoid single-port approach and suggest potential early recovery advantages compared with transthoracic multi-port robotic thymectomy.

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