

Introduction and Objectives

- The operating room (OR) is a costly area of hospital operations with many variables affecting efficiency
- Surgeons aim to minimize surgery time to reduce likelihood of surgical and anesthesia-related complications
- This study aims to evaluate patient and surgeon factors affecting total operative time of robot-assisted radical prostatectomy (RARP)

Methods

- 131 RARP cases performed by 28 surgeons from 2016-2017
- Cases were quartile-ranked based on total operative time
- The 12 RARP steps were also quartile-ranked by operative time
- Each analysis determined associations between variable factors and the operative time of each individual RARP step



*Quartile-ranking based on operative time was considered for analysis ¹Vesicourethral anastomosis ²Lymph node dissection

Center of Robotic Simulation and Education

Surgeon and patient factors impact total operative time of robot-assisted radical prostatectomy

Ryan S. Lee, Runzhuo Ma, Jessica H. Nguyen, Andrew J. Hung USC Institute of Urology

Results

Figure 1. Quartile ranking of each RARP step's operative time color-coded to identify associations with total operative time and surgeon experience.



Analysis 1. Quartile-ranking of individual step operative time associated with quartile-ranking of total RARP operative time.

RARP Step	Median Operative Time (Range) (minutes)	Pearson Chi Square	p Value
Bladder Drop/Colon Mobilization	17.3 (2.0 – 204.6)	32.37	<.001
Anterior Bladder Neck Dissection	2.5 (0.8 - 8.6)	24.51	0.004
Posterior Bladder Neck Dissection	8.6 (2.1 – 42.7)	14.32	0.111
Seminal Vesical Dissection	10.3 (2.0 - 31.5)	16.52	0.057
Posterior Plane Dissection	2.7(0.2 - 12.1)	15.61	0.075
L Neurovascular Bundle Dissection	8.0 (1.9 – 42.9)	11.64	0.230
R Neurovascular Bundle Dissection	8.6 (0.7 – 38.9)	14.36	0.110
Apical Dissection	5.9 (1.1 – 32.0)	20.80	0.014
Posterior VUA ¹	5.6(2.1 - 28.0)	23.08	0.006
Anterior VUA ¹	7.7 (1.1 – 30.6)	17.01	0.049
$L LND^2$	15.1 (1.0 - 66.9)	44.38	<.001
R LND ²	17.3 (2.5 – 92.7)	66.29	<.001
Total Operative Time	122.38 (42.3 – 332.2)		

Surgeon Experience

Experts ≥ 100 Cases Novices < 100 Cases

Patient Factors

Ex: BMI, Gleason

surgeon experience.

RARP Step

Bladder Drop/Colon Mobilizat Anterior Bladder Neck Dissec Posterior Bladder Neck Dissect **Seminal Vesical Dissection** Posterior Plane Dissection L Neurovascular Bundle Dissec R Neurovascular Bundle Dissec **Apical Dissection Posterior VUA¹** Anterior VUA¹ $L LND^2$ R LND²

Analysis 3. Notable patient factors associated with the fastest and slowest quartiles of the lymph node dissection steps.

Patient Factor

Body Mass Index (BMI) Percentage of High-Grade Preoperative Gleason scores Number of lymph nodes dissed **Based on Likelihood Ratio



Results

Analysis 2. Fastest and slowest quartiles of individual step operative times associated with

	Median operative time of <i>expert</i> surgeons (minutes)	Median operative time of <i>novice</i> surgeons (minutes)	Pearson Chi Square	p value
tion	10.7	22.7	39.92	<.001
tion	2.3	3.0	14.03	0.001
ion	8.3	12.3	8.04	0.090
	9.0	17.8	46.26	<.001
	2.6	4.3	2.88	0.237
tion	7.8	9.0	2.33	0.312
ction	8.6	11.1	4.19	0.123
	5.9	5.1	1.51	0.47
	5.5	12.6	14.51	0.001
	6.3	13.2	29.77	<.001
	15.9	13.7	3.28	0.512
	17.5	17.9	1.28	0.865

S	Median of <i>slowest</i> quartile	Median of <i>fastest</i> quartile	p value**
	30.5 kg/m2	27.2 kg/m2	.035
>7)	33%	25%	<.046
cted	20 nodes	15 nodes	<.001

Conclusions

Certain steps of an RARP are associated with total RARP operative times • Specific steps are impacted by either surgeon experience or patient factors • Future studies should focus on these steps and factors to improve OR efficiency

USC Institute of Urology

RARP Step	Median Operative Time (Range) (minutes)	Pearson Chi Square	p Value
Bladder drop/colon mobilization	17.3 (2.03 – 204.6)	32.37	<.001
Anterior Bladder Neck Dissection	2.5(0.8 - 8.6)	24.51	0.004
Posterior Bladder Neck Dissection	8.6 (2.1 – 42.7)	14.32	0.111
Seminal Vesical Dissection	10.3 (2.0 – 31.5)	16.52	0.057
Posterior Plane Dissection	2.7(0.2-12.1)	15.61	0.075
L Neurovascular Bundle Dissection	8.0 (1.9 – 42.9)	11.64	0.23
R Neurovascular Bundle Dissection	8.6 (0.7 – 38.9)	14.36	0.11
Apical Dissection	5.9 (1.1 – 32.0)	20.80	0.014
Posterior VUA ¹	5.6 (2.1 28.0)	23.08	0.006
Anterior VUA ¹	7.7 (1.1-30.6)	17.01	0.049
L LND ²	15.1 (1.0 - 66.9)	44.38	<.001
R LND ²	17.3 (2.5 – 92.7)	66.29	<.001

RARP Step	<pre>Median operative time of expert surgeons (≥100 cases) (minutes)</pre>	Median operative time of <i>novice</i> surgeons (< 100 cases) (minutes)	Pearson Chi Square	P value
Bladder drop/colon mobilization	10.67	22.72	39.923	<.001
Anterior Bladder Neck Dissection	2.25	2.98	14.016	0.001
Posterior Bladder Neck Dissection	8.32	12.25	8.04	0.09
Seminal Vesical Dissection	8.95	17.77	46.26	<.001
Posterior Plane Dissection	2.63	4.25	2.879	0.237
L Neurovascular Bundle Dissection	7.82	8.98	2.332	0.312
R Neurovascular Bundle Dissection	8.63	11.12	4.189	0.123
Apical Dissection	5.88	5.08	1.512	0.47
Posterior VUA ¹	5.45	12.55	14.505	0.001
Anterior VUA ¹	6.28	13.23	29.767	<.001
L LND ²	15.88	13.65	3.282	0.512
R LND ²	17.45	17.93	1.278	0.865