

Original article

Role of surgical approach on lymph node dissection yield and survival in patients with upper tract urothelial carcinoma

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Abstract

Objectives: With increasing utilization of robot-assisted surgery in urologic oncology, robotic nephroureterectomy (RNU) is becoming the surgical modality of choice for patients with upper tract urothelial carcinoma (UTUC). The role of surgical approach on lymph node dissection (LND) and lymph node (LN) yield is unclear, and potential therapeutic effects are unknown. Here we analyze the effects of surgical approach on LN yield, performance of LND, and overall survival (OS).

Methods and materials: Patients with UTUC who underwent nephroureterectomy from 2010 to 2013 were identified in the National Cancer Database. Outcomes of interest included rate of LND, LN yield, and OS. Logistic regression analyses were used to predict performance of LND. Negative binomial regression was used to derive incidence rate ratios for LN yield. Cox proportional hazards models were used to quantify survival outcomes.

Results: A total of 3,116 patients met inclusion criteria. LND was performed in 41% (314/762) of RNU, 27% (380/1385) of LNU cases, and 35% (340/969) of ONU ($P < 0.001$). Compared with an ONU, patients who underwent a LNU had significantly lower odds of receiving a LND (OR = 0.70, 95% CI: 0.55–0.87) and had fewer LNs removed (IRR = 0.69, 95% CI: 0.60–0.80), while RNU trended toward increased LN yield (IRR = 1.14, 95% CI: 0.98–1.33). In a Cox proportional hazards model, increasing LN yield was associated with improved OS in patients with pN0 disease (HR = 0.97 per 1 unit increase in LN yield, 95% CI: 0.95–0.99).

Conclusions: Compared with an ONU, RNU does not compromise performance of a LND and may be associated with improved LN yield. LNU is associated with the lowest rates of LND and LN yield. Increasing LN yield is associated with improved OS in patients with pN0 disease. Despite differential rates of LND and LN yield, surgical approach did not independently affect OS. © 2018 Elsevier Inc. All rights reserved.

Keywords: Urothelial carcinoma; Upper urinary tract; Lymph node dissection; Nephroureterectomy; Outcomes

1. Introduction

Upper tract urothelial carcinoma (UTUC) accounts for 5% to 10% of all urothelial carcinomas [1]. The gold standard treatment for high-grade lesions or invasive disease is radical nephroureterectomy with bladder cuff excision. Although routinely performed during radical cystectomy for urothelial carcinoma of the bladder, a formal lymph node dissection (LND) during nephroureterectomy is not a universally agreed

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Table 1
Clinicopathologic demographics stratified by surgical approach

Variable	Surgical approach				P value
	Overall	RNU	LNU	ONU	
No. of patients	3,116	762	1385	969	
Age, years (SD)					
< 65	875 (28.8)	234 (30.7)	382 (27.6)	259 (26.7)	0.24
65–79	1553 (49.8)	354 (46.5)	698 (50.4)	501 (51.7)	
≥80	688 (22.1)	174 (22.8)	305 (22.0)	209 (21.6)	
Mean age, year (SD)	70.4 (10.6)	70.0 (10.9)	70.6 (10.4)	70.6 (10.5)	0.48
Sex					
Male	1778 (57.1)	469 (61.6)	772 (55.7)	537 (55.4)	0.02
Female	1338 (42.9)	293 (38.5)	613 (44.3)	432 (44.6)	
Race					
White	2859 (91.8)	709 (93.0)	1266 (91.4)	884 (91.2)	0.51
Black	129 (4.1)	30 (3.9)	57 (4.1)	42 (4.3)	
Other	128 (4.1)	23 (3.0)	62 (4.5)	43 (4.4)	
CDCC					
0	2031 (65.2)	481 (63.1)	892 (64.4)	658 (67.9)	0.15
1	810 (26.0)	216 (28.4)	370 (26.7)	224 (23.1)	
≥2	275 (8.8)	65 (8.5)	123 (8.9)	87 (9.0)	
Insurance					
Medicare	2011 (64.5)	493 (64.7)	880 (63.5)	638 (65.8)	0.07
Private	889 (28.5)	225 (29.5)	399 (28.8)	265 (27.4)	
Medicaid/other	125 (4.0)	22 (2.9)	72 (5.2)	31 (3.2)	
None	54 (1.7)	14 (1.8)	22 (1.6)	18 (1.9)	
Unknown	37 (1.2)	^a	12 (0.9)	17 (1.8)	
Income					
< \$30,000	334 (11.0)	87 (11.4)	139 (10.0)	118 (12.2)	<0.01
\$30,000–\$35,999	573 (18.4)	110 (14.4)	283 (20.4)	180 (18.6)	
\$36,000–\$45,999	893 (28.7)	243 (31.9)	361 (26.1)	289 (29.8)	
≥\$46,000	1306 (41.9)	322 (42.3)	602 (43.5)	382 (39.4)	
Percent with no high school degree					
≥29%	400 (12.8)	81 (10.6)	180 (13.0)	139 (14.3)	0.03
20%–28.9%	746 (23.9)	190 (24.9)	313 (22.6)	243 (25.1)	
14%–19.9%	792 (25.4)	176 (23.1)	363 (26.2)	253 (26.1)	
< 14%	1178 (37.8)	315 (41.3)	529 (38.2)	334 (34.5)	
Region					
Atlantic	1148 (36.8)	262 (34.4)	516 (37.3)	370 (38.2)	<0.01
New England	164 (5.3)	31 (4.1)	84 (6.1)	49 (5.1)	
East Central	872 (28.0)	258 (33.9)	365 (26.4)	249 (25.7)	
West Central	506 (16.2)	120 (15.8)	213 (15.4)	173 (17.9)	
West	426 (13.7)	91 (11.9)	207 (15.0)	128 (13.2)	
Urban/rural					
Rural	76 (2.4)	11 (1.4)	40 (2.9)	25 (2.6)	0.08
Metropolitan	2521 (80.9)	619 (81.2)	1135 (82.0)	767 (79.2)	
Urban	519 (16.7)	132 (17.3)	210 (15.2)	177 (18.3)	
Facility type					
Academic/research	1203 (38.6)	356 (46.7)	518 (37.4)	329 (34.0)	<0.01
Not academic/research	1913 (61.4)	406 (53.3)	867 (62.6)	640 (66.1)	
Primary site					
Renal pelvis	2166 (69.5)	548 (71.9)	979 (70.7)	639 (65.9)	0.01
Ureter	950 (30.5)	214 (28.1)	406 (29.3)	330 (34.1)	
Laterality					
Left	1520 (48.8)	409 (53.7)	647 (46.7)	464 (47.9)	<0.01
Right	1596 (51.2)	353 (46.3)	738 (53.3)	505 (52.1)	
Mean tumor size, mm (SD)	41.2 (32.3)	39.1 (26.5)	40.2 (24.9)	44.5 (43.6)	0.02
Tumor grade					
Low grade	808 (25.9)	226 (29.7)	355 (25.6)	227 (23.4)	0.01
High grade	2308 (74.1)	536 (70.3)	1030 (74.4)	742 (76.6)	
cN status					
N0	2594 (83.3)	634 (83.2)	1181 (85.3)	779 (80.4)	<0.01
N+	162 (5.2)	35 (4.6)	49 (3.5)	78 (8.1)	
NX	360 (11.6)	93 (12.2)	155 (11.2)	112 (11.6)	

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