Lymph node yield variability after radical cystectomy: the effect of pathological processing and microscopic examination

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Background

- Pelvic lymph node dissection during cystectomy has been used to determine adequate surgical quality and assist in accurately staging patients
- Known causes for variations in lymph node count can include the level of dissection, surgical skill, patient anatomy, gross pathological processing, and pathological interpretation
- The relationship between the pathology assistant (PA), who performs the gross processing of lymph nodes, and lymph node yield with RC has not been described

Objectives

- To test the hypothesis that lymph node yield will vary by PA in patients undergoing RC with PLND

Methods

- This retrospective study reviewed all patients who underwent RC with urinary diversion and PLND at our institution between January 1, 2007 and January 1, 2018
- Patients who underwent RC for benign indications, non-bladder malignancies, or for bladder cancer but did not undergo a lymph node dissection were excluded
- Univariate analysis was performed with Pearson Chi squared test or Fisher's exact test.
- Multivariable linear regression was used to assess whether the mean lymph node counts differed between various groups
- The marginal plots of predicted mean lymph node counts were generated, and the most frequent category for each variable was used to compute the predicted value and the 95% confidence interval around the predicted estimate

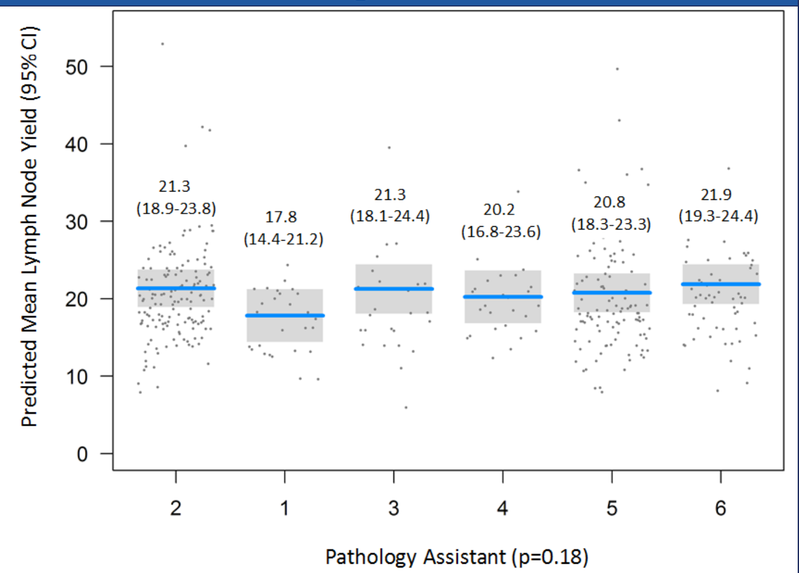
Results

- .430 total patients, mean age 72, 81% males
- Median (IQR) lymph node count 15.0 (11.0-21.0)
- 33.3%, 47.9% and 18.8% of patients underwent a lymph node dissection to the level of the external iliac, aortic bifurcation and IMA, respectively
- 74.9% of patients had pure UCC histology
- 53.4% of those with cT2+ disease received neoadjuvant chemotherapy

Table 1. Univariate analysis

	Median node count (IQR)	P value
Level of dissection		<0.001
External Iliac	12.0 (9.0-18.0)	
Aortic bifurcation	16.0 (12.0-21.0)	
IMA	19.0 (15.0-27.0)	
Clinical Stage		0.002
cTis	13.0 (11.0-20.0)	
cTa	12.0 (9.0-15.0)	
cT1	14.0 (9.0-19.5)	
cT2	16.0 (12.0-21.0)	
cT3	18.0 (13.0-24.0)	
cT4	15.0 (12.0-24.0)	
Surgical approach		<0.001
Robotic	18.0 (14.0-24.0)	
Open	13.0 (9.0-18.0)	
Surgeon		<0.001
1	14.0 (10.0-18.8)	
2	20.0 (15.0-26.0)	
3	12.0 (8.0-15.0)	
4	17.0 (12.5-22.0)	
5	14.0 (9.5-18.5)	
6	15.5 (10.8-22.0)	
Pathologist		0.010
1	12.0 (9.0-19.0)	
2	17.0 (12.0-20.8)	
3	14.0 (11.5-16.5)	
4	13.5 (11.0-19.8)	
5	13.0 (9.8-18.5)	
6	17.0 (11-22)	
Pathology assistant		0.010
1	17 (11.8-22.0)	
2	14 (11.0-20.0)	
3	17.0 (11.0-23.0)	
4	15.0 (11.3-24.5)	
5	13.0 (10.0-15.0)	
6	17.5 (9.0-20.3)	

Figure 1



- Marginal plot illustrating mean adjusted lymph node count using multivariable linear regression for pathology assistant
- On MVA, statistical differences in lymph node remained among surgeons, pathologists, extent of lymph node dissection, clinical stage, but not PA

Discussion/Conclusions

- There was no significant variation in lymph node yield after RC that can be attributed to the individual PA
- At most, the predicted lymph node count varied by almost 4 lymph nodes across 6 different PAs
- There was expected variation in lymph node yield on MVA according to surgeon, extent of lymph node dissection, pathologist, and clinical stage

Limitations

- Retrospective study
- Unmeasured confounders likely present (e.g. patient factors)
- Absence of some covariates in model due to concern of overfitting
- Unable to account for samples submitted in total