

Factors Affecting Neck Dissection Lymph Node Yield in Head and Neck Squamous Cell Carcinoma



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Introduction

In the setting of head and neck squamous cell carcinoma (HNSCCa), neck dissection (ND) has important implications with respect to staging and treatment. Lymph node yield (LNY), the number of lymph nodes present in a lymphadenectomy specimen, and lymph node ratio (LNR), the number of cancerous nodes divided by total LNY, have been shown to have prognostic significance. However, LNY is highly variable across the population. We hypothesize that the reason for this variability is multifactorial including patient and treatment factors, surgical technique, and pathological processing of lymphadenectomy specimens.

Methods

Retrospective Chart Review

Inclusion: Patients that underwent neck dissection for head and neck squamous cell carcinoma at DHMC between 2003 – 2019

Patient Demographics

- Age
- Sex
- BMI

Tumor Characteristics

- Site
- Stage (TNM, AJCC)
- Grade
- HPV Status
- Lymphovascular Invasion
- Perineural Invasion
- Extranodal Extension

Prior Treatment

- Radiation
- Chemotherapy
- Neck Dissection
- Biopsy
- Chemotherapy for Non-H&N Malignancies

Dissection/Processing

- Neck Levels Dissected
- Operating Surgeon
- Pathologist Type

Outcomes of Interest

Lymph Node Yield
Number of Positive Nodes
Lymph Node Ratio

- Negative binomial regression was used to evaluate the association between the covariates of interest and LNY (a count variable)
- Linear regression was used to evaluate the association between the covariates of interest and LNR (a continuous variable)
- Unilateral and bilateral dissections were considered separately for all analyses

Results

$n = 695$ neck dissections (476 unilateral and 219 bilateral) involving 665 unique subjects

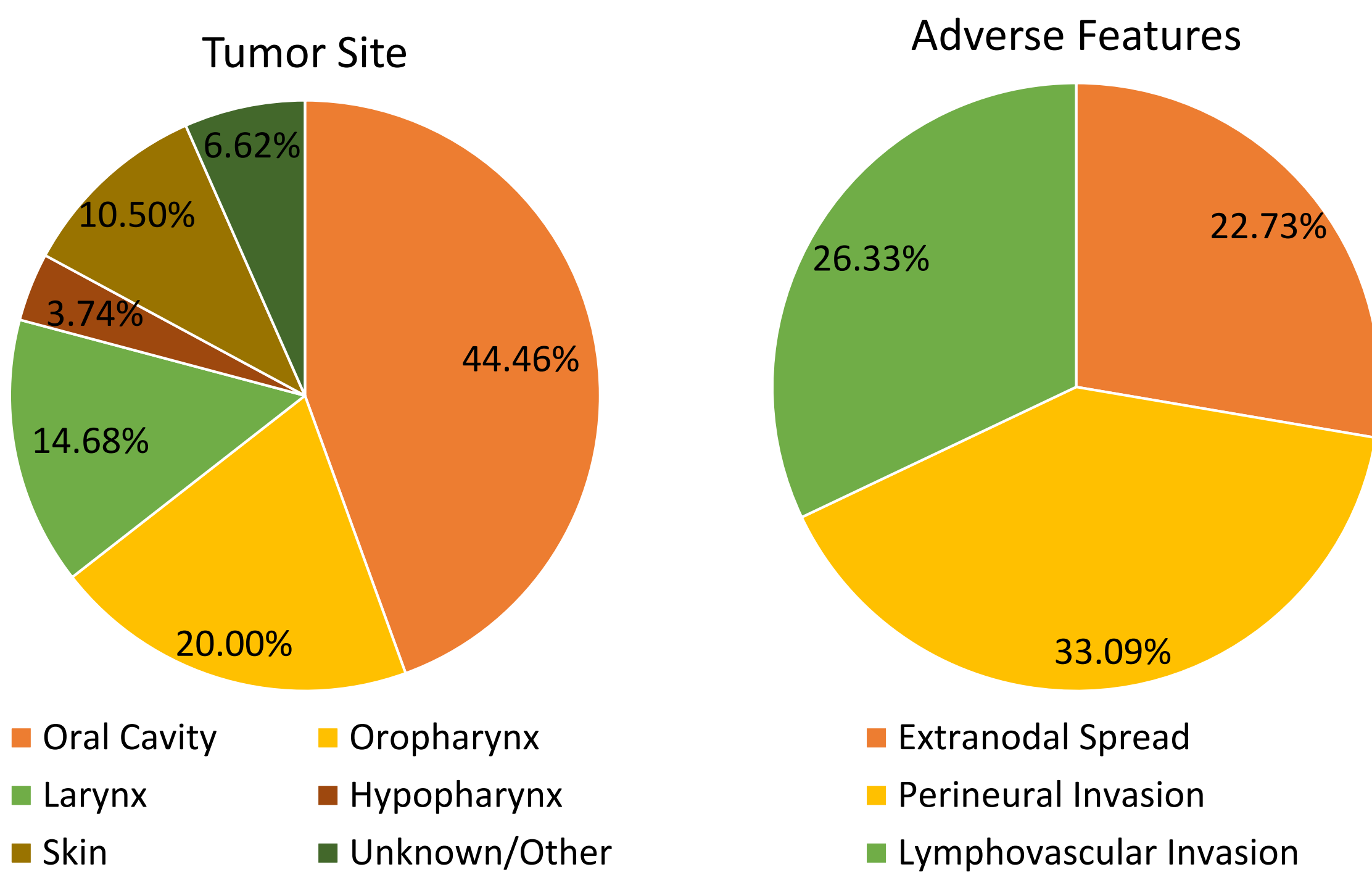
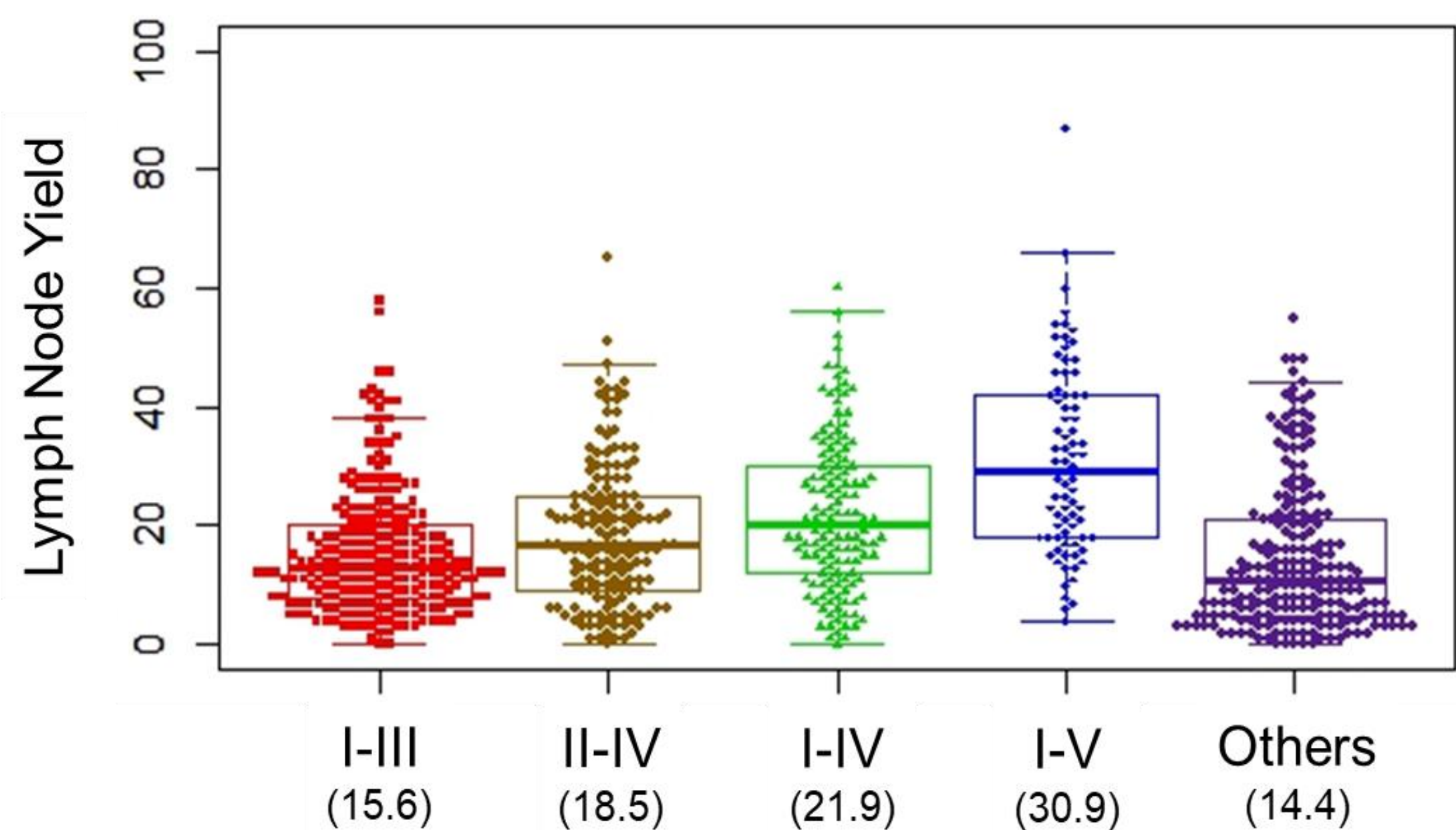
Mean LNY (unilateral)	18.9
Mean LNY (bilateral)	33.7
Mean Age	62 years
Mean BMI	26.2
Gender Distribution	74.5% Male 25.5% Female

31.80% of cases had prior treatment

25.04% of specimens were processed by pathology assistant, 69.06% by pathology resident

25.61% of cases experienced locoregional (head & neck) recurrence

13.09% of cases experienced metastatic recurrence



Unilateral Neck Dissection

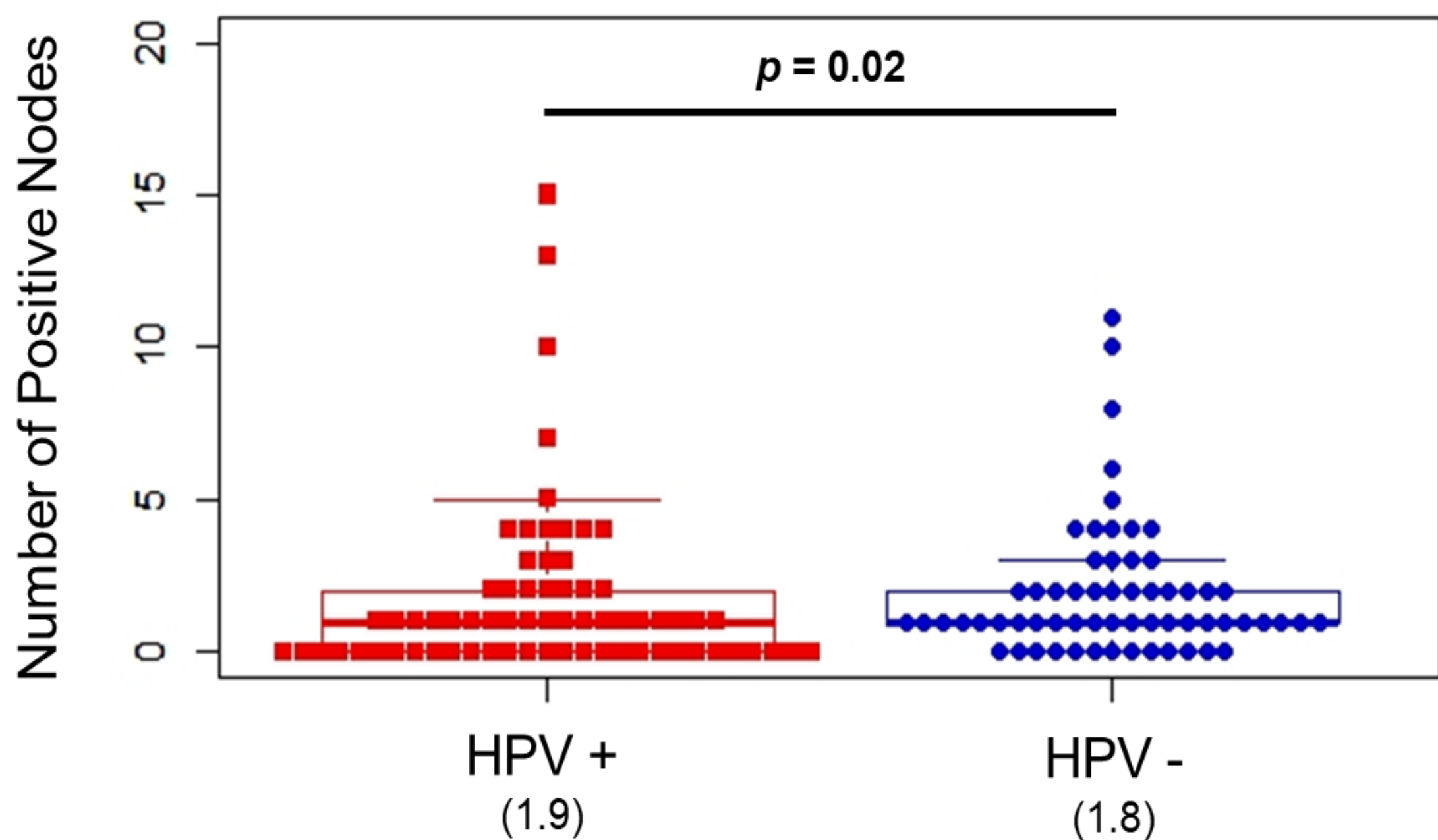
- No change in LNY: Gender ($p=0.08$) and BMI ($p=0.15$)
- Lower LNY: Increase in age ($p=0.0006$), prior radiation therapy ($p=0.01$), and prior neck dissection ($p<0.0001$)

Unilateral & Bilateral Neck Dissection

- No difference in LNY whether a pathology resident, assistant, or medical student harvested the lymph nodes
- Difference in LNY between surgeons ($p<0.0001$; $p<0.001$)
- Lower LNY: Prior radiation therapy ($p=0.01$; $p<0.0001$)
- Higher LNY: Extranodal extension ($p=0.0007$; $p=0.004$)

A higher LNR is associated with locoregional recurrence ($p=0.02$), metastatic recurrence ($p=0.0008$), and decreased overall survival ($p<0.0001$).

Results



Comparison between HPV-positive and HPV-negative

LNY = 25.9 vs 26.1, $p=0.46$

LNR = 0.088 vs 0.069, $p=0.02$

Significant association between HPV status and the number of positive nodes ($p=0.04$), but not LNY ($p=0.51$) or LNR ($p=0.15$)

Discussion

Our findings suggest a relationship between prior radiation, presence of extranodal extension, and surgical technique and LNY; however, factors such as the individual harvesting the lymph nodes and HPV status do not appear to impact LNY. A higher LNR is associated with locoregional and metastatic recurrence as well as decreased overall survival. Future directions include determining the optimal LNY and LNR associated with increased overall survival.

Contact

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