

Patterns of Regional Lymphadenectomy for Clinically Node-negative Patients With Penile Carcinoma: Analysis From the National Cancer Database From 1998 to 2012

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Abstract

Few studies report trends of regional lymphadenectomy (rND) for patients with penile cancer without clinical adenopathy. Using data from a nationwide cancer registry, 7340 cN0M0 patients were identified, of which 29.5% underwent rND during the study period. Available follow-up in 1919 patients demonstrated an increase in early performance of rND, likely owing to referral patterns from community to comprehensive and academic programs. African American patients and those over age 75 years were significantly less likely to receive rND, whereas early rND was associated with improved survival outcomes for these patients.

Purpose: Evidence supports upfront regional lymphadenectomy (rND) when primary penile tumors exhibit high-risk features and negative inguinal adenopathy (cN0). We sought to analyze trends in the utilization of early rND as well as assess factors associated with its use and survival outcomes using a nationwide cancer registry database. **Patient and Methods:** The National Cancer Database was queried for patients with clinically nonmetastatic penile carcinoma and available nodal status who underwent rND from 1998 to 2012. Temporal trends in the utilization of early rND for those with cN0 disease were analyzed, and a multivariable logistic regression model was used to identify predictors for receiving rND. Survival analysis based on rND status was performed using the Kaplan-Meier method and Cox proportional hazard regression. **Results:** From 1919 patients with available clinicopathologic variables, performance of early rND was documented in 377 (19.6%) patients with an increase in utilization over time ($P = .001$). The increase was driven by academic and comprehensive cancer programs compared with community programs ($P < .001$). Positive predictors were treatment facility, clinical tumor stage, and grade (all $P < .05$). African American patients (odds ratio [OR], 0.53; 95% confidence interval [CI], 0.33-0.86; $P = .01$) and those aged > 75 years (OR, 0.42; 95% CI, 0.26-0.68; $P < .001$) were significantly less likely to receive rND. Early rND was associated with improved overall survival (hazard ratio [HR], 0.67; 95% CI, 0.52-0.87; $P = .003$). **Conclusion:** There was increased use of early lymphadenectomy for patients with cN0 penile cancer driven by comprehensive and academic cancer programs. The study demonstrated demographic and socioeconomic differences that can help identify barriers to care for patients with penile cancer in the United States.

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Introduction

Penile cancer is a rare disease in Europe and North America with an incidence of approximately 1 per 100,000 males.^{1,2} A thorough physical examination with palpation of both

groins is an essential component for staging in these patients.³

For patients presenting with no palpable inguinal adenopathy (cN0), the likelihood of micrometastatic disease approaches 25%.⁴ Therefore, appropriate management is derived from

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Trends of Early Lymphadenectomy in the United States

Table 1 Demographic Characteristics of Patients Presenting From 1998 to 2012

Characteristic	Frequency	%
Age, y		
0-54	506	26.4
55-64	392	20.4
65-74	505	26.3
75 or greater	516	26.9
Race		
White	1639	85.4
Black	195	10.2
Other	55	2.9
Unknown	30	1.6
Facility		
Community cancer program	183	9.5
Comprehensive cancer program	833	43.4
Academic/research program	901	47
Other	2	0.1
Location		
Northeast	354	18.4
South/Southeast	807	42.1
Midwest	482	25.1
West	276	14.4
Insurance		
None	106	5.5
Private	690	36
Medicaid	123	6.4
Medicare/other government	939	48.9
Unknown	61	3.2
Income		
<\$38,000	460	24
\$38,000-\$47,999	462	24.1
\$48,000-\$62,999	481	25.1
\$63,000 +	475	24.8
Unknown	41	2.1
No high school degree		
≥21%	437	22.8
13.0%-20.9%	532	27.7
7.0%-12.9%	565	29.4
<7.0%	346	18
Unknown	39	2
Rurality		
Metro	1486	77.4
Urban	308	16.1
Rural	52	2.7
Unknown	73	3.8
Charlson/Deyo Score		
0	1262	65.8
1	290	15.1

Table 1 Continued

Characteristic	Frequency	%
>1	127	6.6
Unknown	4395	34.5
Clinical tumor stage		
≤cT1	1242	64.7
cT2	292	15.2
cT3	104	5.4
cT4	15	0.8
cTx	266	13.9

individual pathologic risk factors found at the time of initial biopsy.

Treatment guidelines and recommendations greatly depend on correct staging in order to provide appropriate treatment strategies and prognostic information based on the extent of disease. Currently, there are few studies reporting on temporal trends for upfront regional lymphadenectomy (rND) in the United States (US). We hypothesized there would be an underutilization of rND for those presenting with cN0 disease prior to the introduction of national comprehensive guidelines.⁵ Thus, we sought to analyze trends in the utilization of rND and assess factors associated with its use in a nationwide cancer registry database, as well as evaluate survival differences based on rND status.

Patients and Methods

Data Source

The National Cancer Data Base (NCDB) is a nationwide hospital-based cancer registry that serves as a comprehensive surveillance resource for cancer care in the US. The NCDB includes about 75% of new cancers in the US and collects data from more than 1400 hospitals that have cancer treatment programs accredited by the US Commission on Cancer.⁶ Data are coded and reported based on the Facility Oncology Registry Data Standards Manual (<http://www.facs.org/cancer/coc/fordsmanual.html>). Institutional review board approval was not required for this study, given that no patient, physician, or hospital identifiers were examined.

Study Inclusion Criteria

The NCDB was queried for cases diagnosed between 1998 and 2012. Cases were limited to patients with clinically nonmetastatic disease (cM0) penile cancer and clinically negative node (cN0) status based on physical examination. Only those with available rND and pathologic node status available were included. Delayed rND was defined when pathologic node data was available but designated as not receiving nodal surgery at time of diagnosis. Patients with missing follow-up and vital status were excluded. Cancer grading was based according to the International Classification of Diseases for Oncology, Third Edition (ICD-O-3). Tumor and node pathologic staging was based on the American Joint Committee on Cancer Cancer Staging Manual edition in use during the year of diagnosis.

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