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Clinical Investigation: Genitourinary Cancer

Stage Presentation, Care Patterns, and Treatment Outcomes for Squamous Cell Carcinoma of the Penis

Lindsay M. Burt, MD, Dennis C. Shrieve, MD, PhD, and Jonathan D. Tward, MD, PhD

Radiation Oncology Department, Huntsman Cancer Institute, University of Utah, Salt Lake City, Utah

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Summary

Squamous cell carcinoma (SCC) of the penis is a unique entity, with only a few published series describing outcomes. Here, the National Cancer Institute Surveillance, Epidemiology, and End Results (SEER) Program database was used to assess a large population of subjects with SCC of the penis and to review the stage presentations, care patterns, and treatment outcomes. This information can help clinicians to better understand the stage distributions, patterns of care, and treatment outcomes for a US-based population.

Purpose: Penile squamous cell carcinoma (SCC) is a rare entity, with few published series on outcomes. We evaluated the stage distributions and outcomes for surgery and radiation therapy in a U.S. population database.

Methods and Materials: Subjects with SCC of the penis were identified using the National Cancer Institute Surveillance, Epidemiology and End Results (SEER) Program database between 1988 and 2006. Descriptive statistics were performed, and cause-specific survival (CSS) was estimated using Kaplan-Meier analysis. Comparisons of treatment modalities were analyzed using multivariate Cox regression. Subjects were staged using American Joint Committee on Cancer, sixth edition, criteria.

Results: There were 2458 subjects identified. The median age was 66.8 years (range, 17-102 years). Grade 2 disease was present in 94.5% of cases. T1, T2, T3, T4, and Tx disease was present in 64.8%, 17.1%, 9.5%, 2.1%, and 6.5% of cases, respectively. N0, N1, N2, N3, and Nx disease was noted in 61.6%, 6.9%, 4.0%, 3.7%, and 23.8% of cases, respectively. M1 disease was noted in 2.5% of subjects. Individuals of white ethnicity accounted for 85.1% of cases. Lymphadenectomy was performed in 16.7% of cases. The CSS for all patients at 5 and 10 years was 80.8% and 78.6%. By multivariable analysis grades 2 and 3 disease, T3 stage, and positive lymph nodes were adverse prognostic factors for CSS.

Conclusion: SCC of the penis often presents as early-stage T1, N0, M0, grade 1, or grade 2 disease. The majority of patients identified were treated with surgery, and only a small fraction of patients received radiation therapy alone or as adjuvant therapy.

Introduction

Penile cancer is rare in the United States, accounting for less than 1% of male malignancies. In 2013, the American Cancer Society estimated that there will be 1570 new cases and 310 deaths in the United States (1). Although uncommon in the United States and Europe, it is the leading cause of male cancer in Uganda and accounts for up to 10% of male malignancies in the Indian subcontinent, Africa, and Latin America (2).

The majority of penile cancers are epithelial, with squamous cell histology accounting for 95% of cases. Other histologies, including basal cell carcinoma, melanoma, sarcoma, and adenocarcinoma, are

Reprint requests to: Jonathan D. Tward, MD, PhD, Huntsman Cancer Institute, University of Utah, 1950 Circle of Hope Room 1570, Salt Lake City, UT 84112. Tel: (801) 581-2396; E-mail: Jonathan.Tward@hci.utah.edu

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more rare (3). Risk factors associated with the development of squamous cell carcinoma include human papillomavirus (HPV) (4), phimosis, smoking, and human immunodeficiency virus (HIV), whereas circumcision may be protective (5-7). The primary tumor is usually located on the glans (48% of cases) or prepuce (21% of cases) and is found on the shaft in less than 2% of cases (8).

The conventional treatment for squamous cell carcinoma of the penis has been total or partial penectomy, which has achieved greater than 90% local control (9). However, concern for significant functional morbidity and psychosexual issues has led to the emergence of organ-sparing treatment options (10). Penile-conserving procedures include Mohs microscopic surgery, external beam radiation therapy (EBRT), interstitial brachytherapy, laser ablation, and cytotoxic chemotherapy (11). Although penile-conserving treatment options do not yield the same local control as radical surgical techniques, given the reduction in morbidity, there is general consensus that penile-conserving treatments are appropriate for low-grade, low-stage (Tis, Ta, T1) penile cancer.

Because of the low incidence of penile cancer, no randomized studies have been completed comparing penile-conserving treatment with total or partial penectomy. Data on penile cancer is mainly derived from single-center retrospective studies with small sample sizes. Using the National Cancer Institute Surveillance, Epidemiology, and End Results (SEER) Program registry, this study aims to evaluate TMN stage distribution at presentation, care patterns, and treatment outcomes for surgery and radiation therapy (RT) for squamous cell carcinoma of the penis.

Methods and Materials

We used the SEER database to extract information on subjects diagnosed with squamous cell carcinoma of the penis between the years 1988 and 2006. All subjects were staged according to the American Joint Committee on Cancer (AJCC), sixth edition, TNM system based on the SEER Extent of Disease classification (years

Table 1 Demographic characteristics of patients with squamous cell carcinoma of the penis in the SEER database

Characteristic	Surgery alone	EBRT + surgery	EBRT alone	All patients*
No. of patients	2185	180	54	2427
Mean (range) age, y	67 (19-102)	63.1 (17-91)	70.8 (35-94)	66.8 (17-102)
Median follow-up of survivors (mo)	46	46.5	37	45
T stage				
T1	1458	87	23	1573
T2	373	39	2	416
T3	183	38	9	230
T4	40	7	4	51
Tx	131	9	16	157
N stage				
N0	1405	63	25	1496
N1	128	31	8	168
N2	70	25	2	97
N3	55	29	4	89
Nx	527	32	15	577
M stage				
M0	2037	165	38	2247
M1	44	10	7	61
Mx	104	5	9	119
Lymphadenectomy				
Yes	332	60	6	400
No	1835	117	48	2005
Unknown	18	3	0	22
Grade				
1	602	31	10	645
2	843	68	15	928
3	369	57	15	442
Anaplastic	13	5	0	18
Unknown	358	24	14	394
Race/ethnicity				
African American	203	17	8	228
White	1859	154	44	2065
Native American	16	3	0	19
Asian or Pacific Islander	81	3	2	89
Unknown	26	0	0	26
No. dead of disease	296	60	16	373

Abbreviations: EBRT = external beam radiation therapy; SEER = Surveillance, Epidemiology, and End Results.
* Eight patients received brachytherapy with or without EBRT and/or surgery; therefore these totals include some of those patients.