

Epidemiology and Survival of Balloon Cell Melanoma by Sex: A Surveillance, Epidemiology and End Results Database Analysis

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ABSTRACT

Balloon Cell Melanoma (BCM) is a rare presentation of malignant melanoma characterized by large, foamy melanocytes without pigmentation. BCM has been reported in a handful of case reports; however, the epidemiology and clinical behavior of BCM has not been fully characterized. Specifically, demographic features of BCM in the United States including sex, race, and socioeconomic distribution and survival rates, based on these factors, is unclear. Thus, further characterization of BCM demographic differences and survival behavior is of critical importance. Here we report national data on BCM epidemiology and survival by sex using the National Cancer Institute's Surveillance, Epidemiology and End Results (SEERs) Program from 2000 to 2018.

Keywords: Balloon Cell Melanoma; Skin cancer; Surveillance Epidemiology and End Results Program (SEERs); Epidemiology; Gender disparities; Survival analysis

DESCRIPTION

Balloon Cell Melanoma (BCM) is a rare presentation of malignant melanoma with large, foamy depigmented melanocytes [1]. BCM has been reported in several case reports, but its epidemiology has not been characterized based on national data. We analyzed data from the National Cancer Institute's Surveillance, Epidemiology, and End Results (SEERs) Program for epidemiology and survival of BCM by sex in the United States between 2000-2018.

Methods

Data for BCM were collected from the SEER-18 (2000-2018) database. Demographic and treatment information of BCMs was collected using the rate session tool. Incidence rates are per 100,000 and age-adjusted to the 2000 US Std Population (19 age groups-Census P25-1130) standard. SEER*Stat software was utilized to generate confidence intervals. Confidence intervals (Tiwari mod) are 95% for rates. ICD-10-CM codes were used to identify primary tumor location. In SEER*Stat, we used the survival session function to calculate age-standardized relative survival *via* the Kaplan-Meier method. In Stata/SE v15.1, we

used traditional chi-squared or Fisher exact tests to compare demographic characteristics, tumor qualities, treatments, and survival rates between sexes; p-values are reported in Table 1.

Results

In the SEER-18 dataset, BCM is more common in men, with an incidence of 0.0093 (95% CI 0.0072-0.0118) per 100,000 compared to 0.0048 (95% CI 0.0034-0.0065) per 100,000 in women (Table 1). Primary tumor location differed by sex, with skin of the lower limb and hip being the most common site in women (29.3%), while skin of the trunk was the most common site in men (39.7%). No other sociodemographic survival rates or tumor characteristics differed significantly by sex. The yearly incidence of BCM was 0.0067 cases per 100,000 people per year, and the relative survival at one, three, and five years was 98.73%, 98.73%, and 94.11%, respectively. Most cases of BCM occurred in non-Hispanic whites (94.5%) and were located on the skin of the trunk (34.9%), followed by upper limb/shoulder (23.90%), then lower limb/hip (13.80%). The highest rate of BCM was observed in 5-year age group 50-54 (12.8%), with the second highest rate in 70-74-year-olds (11.9%). In terms of staging, BCMs were most commonly localized at presentation.

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Ten percent of patients died due to their BCM diagnosis, and 86.2% reported that this was their first malignancy. Most patients diagnosed with BCM had household incomes in excess of \$75,000 per year (33%). With regard to treatment, 92.7% had site-specific surgery performed and 22.9% received a sentinel lymph node biopsy.

	Total	Male	Female	p-value
Total number of cases	109	68	41	
Incidence	0.0067 (0.0055-0.0081)	0.0093 (0.0072-0.0118)	0.0048 (0.0034-0.0065)	
Location				
C20.9-Rectum, NOS	1 (0.90%)	1 (1.50%)	0 (0.00%)	0.013
C44.3-Skin other/unspec parts of face	10 (9.20%)	7 (10.30%)	3 (7.30%)	
C44.4-Skin of scalp and neck	13 (11.90%)	11 (16.20%)	2 (4.90%)	
C44.5-Skin of trunk	38 (34.90%)	27 (39.70%)	11 (26.80%)	
C44.6-Skin of upper limb and shoulder	26 (23.90%)	16 (23.50%)	10 (24.40%)	
C44.7-Skin of lower limb and hip	15 (13.80%)	3 (4.40%)	12 (29.30%)	
C44.9-Skin, NOS	2 (1.80%)	0 (0.00%)	2 (4.90%)	
C69.0-Conjunctiva	2 (1.80%)	1 (1.50%)	1 (2.40%)	
C69.3-Choroid	2 (1.80%)	2 (2.90%)	0 (0.00%)	

Table 1: The incidence and demographics of balloon cell melanoma among all individuals and by sex.

DISCUSSION

Our results are consistent with a recent systematic review of BCM case reports published between 1970 and 2020 [2]. Similar to our findings, the mean age at presentation was 57.81 years

(n=75, SD=16.52). Of 16 cases reporting race, 81% were Caucasian and 19% were Japanese. Correspondingly, in our study, 94.5% were White, 2.8% were Asian or Pacific Islander, and no cases were reported in Blacks or American Indian/Alaska Natives. In contrast to our finding that BCM had a significantly higher incidence in men, of the 75 BCM cases reporting patient sex, 49% were males and 51% were females [2]. However, other studies have reported a significantly higher overall prevalence of melanoma in men compared to women [3,4]. The three most frequent tumor locations were the same as in our study; however, the order of prevalence was different. Lesions were most frequently found in the lower extremities (n=63, 35%), followed by upper extremities (19%), and then trunk (16%) [2]. This difference may be explained by the fact that this review included a disproportionately high number of female cases, and lower extremity was the most common presentation in females. No prior studies have evaluated the survival or treatment of BCM. Our findings indicate that the rates of site-specific surgery and one, three, and five year survival of BCM is similar to the most common melanoma subtype, superficial spreading melanoma, which has a five-year survival rate of 95.30% [3,4]. In the SEER-18 dataset, men have higher rates of BCM than women, and primary tumor location differed significantly by sex, with skin of the lower limb and hip being the most common presentation in women and skin of the upper limb and shoulder most common in men. Future studies are needed to determine the underlying cause of these differences.

CONCLUSION

In this manuscript we are the first, to our knowledge, to evaluate the epidemiology and survival of BCM by sex in the United States. We found that in the SEER-18 dataset, BCM is more common in men, than in women. Additionally, we found that differences between the sexes exist for BCM in terms of primary tumor location with skin of the lower limb and hip most commonly affected in women while skin of the trunk was the most common effected site in men. All other demographic, treatment, and survival characteristics of BCM did not differ significantly between men and women. This study may shape BCM screening guidelines and inform patient education/awareness of BCM.

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