Epidemiology And Survival Factors For Sarcoma Patients In Minority Populations: A SEER Retrospective Study

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INTRODUCTION: In the United States, race and socioeconomic status are known predictors of worse oncological outcomes, specifically in sarcomas. This has contributed to the overall health disparities that result from lack of access to healthcare. To better understand the effect of race, and its subtext of socioeconomic status, on oncological outcomes, we utilized the Surveillance, Epidemiology, and End Results (SEER) database for this study. This is data that is generalizable to the U.S. population as it is the largest population-based sarcoma registry. The purpose of this project was to determine how race factors as an independent risk factor for survival outcomes in patients with soft tissue sarcoma (STS) of the extremities and to evaluate if significant differences exist in medical treatment provided to minority groups on initial detection.

METHODS: A retrospective review of soft tissue and bone sarcoma cases in the extremities was performed using the latest version of the SEER database, released in April 2021, to assess cases from January 2000 to December 2017 for a minimum 5-year survival rate. Kaposi sarcoma was excluded. Patients were classified by demographics and relevant disease characteristics were extracted. <br bcx0""=""> <br bcx0""="">Statistical analysis was performed using the statistical software SPSS (version 28). Categorical variables including race/ethnicity (Native American/Alaskan Native [NA/AN], Asian/Pacific Islander [A/PI], Hispanic, Black, and White), treatment variables, and disease characteristics were compared using Pearson's Chi-Square test and Cramer V. Kaplan-Meier curves were used to determine survival rates (SR) with log-rank tests to determine significance. Cox regression analysis was used to determine hazard ratios (HRs) that compared the risk of death between variables.

RESULTS:

There were 28,521 patients with soft tissue and bone sarcoma in the extremities that met the inclusion criteria. The median age was 52.58 years with a standard deviation of 23.045. The cohort was 45.1% female and 54.9% male. Most of the cohort (65%) was White, with 0.6% NA/AN, 6.5% A/PI, and 11.3% Black. 8.7% of patients were found to have metastasis at the time of diagnosis.

Races that had an increased risk of death when compared to White included: NA/AN (HR 1.36, 95% Confidence Interval [CI], 1.049-1.761, p=0.020) and Black individuals (HR 1.17, 95% CI 1.091-1.256, p<0.001) (Table 1).

NA/AN individuals had the lowest SR (5-year SR=70.9%, 95% CI=63.8%-78.0% with an overall SR=58.4%, 95% CI=49.0%-67.8%), followed by Black (5-year SR=72.9%, 95% CI=71.3%-74.5% with an overall SR=65.4%, 95% CI=63.2%-67.6%), Hispanic (5-year SR=75.7%, 95% CI=74.3%-77.2% with an overall SR=58.4%, 95% CI=49.0%-67.8%), A/PI (5-year SR=77.2%, 95% CI=75.2%-79.2% with overall SR=68.4%, 95% CI=65.4%-71.3%) and White (5-year SR=76.8%, 95% CI=76.2%-77.4% with overall SR=69.1%, 95% CI=68.1%-70.1%). These differences in SR were significant between races (p<0.001) (Figure 1).

The rate of individuals with metastasis at diagnosis for each race was: 10.62%-NA/AN, 10.61%-A/PI, 13.07%-Hispanic, 12.77%-Black, and 9.02%-White individuals. There were significant differences in the rate of patients with metastasis at diagnosis between Hispanic vs White (p<0.001) and Black vs White (p<0.001).

The rate of surgical excision performed for each race was: 87.31%- Hispanic, 87.79% -NA/AN, 89.23%- A/PI, 86.35% -Black, and 88.73%- White individuals. There were also significant differences in rates of surgical excision for Hispanic vs White (p<0.001), and White vs Black (p<0.001). Risk of death associated with adjuvant and neoadjuvant treatment varied between races. NA/AN (p=0.060), Black (p<0.001), White (p<0.001), and Hispanic (p<0.001) had increased risk of death associated with receiving radiation. Chemotherapy was associated with increased risk of death for NA/AN (p<0.001), A/PI (p<0.001), Hispanic (p<0.001), Black (p<0.001), and White (p<0.001) (Table 1).

DISCUSSION AND CONCLUSION:

When comparing races, this data represents the most recent and generalizable analysis of epidemiology and survival outcomes for sarcoma patients. Race is determined to be an independent risk factor for death in NA/AN and Black patients. Early access to health resources may contribute to the lower rate of metastasis on disease detection for White patients when compared to Black and Hispanic patients.

Decreased rates of surgical excision could be associated with poor follow-up and lack of health resources. Increased risk of death associated with adjuvant therapies is likely due to the severity of disease due to delay in health resources access, and further studies are needed to determine how outcomes associated with different treatment courses are impacted by both race and progression of disease.

More effort on health access and follow up care for minority groups such as NA/ANs is necessary due to the lower rate of treatment received and survival rates. Although it is well known that minority groups likely have worse outcomes, it's important to know recent changes in oncological outcomes to observe whether treatment modalities and access to resources for minority groups change, and hopefully improve, over time.

Figure 1: 5-Year and Overall Survival Rate with Grouped Race

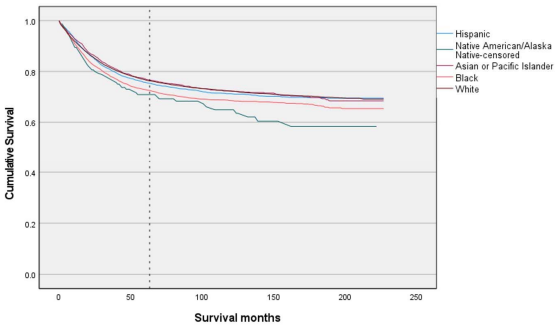

Figure 1 caption: Overall survival rate compared between races with the 5-year mark labeled by the dotted line on the graph.

Table 1: Factors Associated with Overall Survival and Hazard Ratios

Factor		Hazard Ratio	95% CI		P-value
			Lower CI	Upper CI	
Race*	NA/AN	1.36	1.049	1.761	0.020
	A/PI	0.990	0.900	1.030	0.837
	Hispanic	1.03	0.965	1.1	0.369
	Black	1.17	1.091	1.256	<0.001
Male Sex	NA/AN	1.95	1.266	1.611	<0.001
	A/PI	1.048	0.872	1.26	0.0616
	Hispanic	1.428	1.266	1.611	<0.001
	Black	1.232	1.082	1.403	0.002
	White	1.192	1.124	1.264	<0.001
Age	NA/AN	1.006	0.994	1.017	0.006
	A/PI	1.004	1.000	1.008	1.004
	Hispanic	1.004	1.001	1.006	0.006
	Black	1.012	1.009	1.015	<0.001
	White	1.015	1.014	1.017	<0.001
Radiation	NA/AN	1.654	0.980	2.792	0.060
	A/PI	1.031	0.855	1.242	0.752
	Hispanic	1.355	1.199	1.530	<0.001
	Black	1.504	1.317	1.717	<0.001
	White	1.596	1.506	1.691	<0.001
Chemotherapy	NA/AN	3.056	1.820	5.133	<0.001
	A/PI	2.446	2.037	2.938	<0.001
	Hispanic	2.856	2.530	3.223	<0.001
	Black	2.479	2.179	2.820	<0.001
	White	2.485	2.344	2.635	<0.001

*Races were compared to white patients