

RACIAL DISPARITIES BY HISTOLOGY FOR SARCOMAS OF SOFT-TISSUE AND BONE

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Background

Chromosomal translocations and somatic mutations are known to be predisposing elements for the development of many sarcomas of soft-tissue and bone, yet patient survival has been shown to also depend on a number of demographic and treatment factors. Race has previously been shown to impact medical care and cancer outcomes; whether this is predominantly attributable to genetic or external factors is not yet known in sarcomas.

Purpose

The purpose of this study was to examine the impact of patient race on survival for soft-tissue and bone sarcomas, and to compare possible disparities across diverse tumor histologies.

Methods

Design: Retrospective Study, NCDB Study

We retrospectively reviewed 123,244 patients with diagnoses of sarcoma of the soft-tissue or bone in the National Cancer Database (NCDB) from 2004 through 2015. After inclusion and exclusion criteria were met, 62,260 patients remained. The study population included 51,720 (86%) patients who identified as Caucasian, 6,722 (11%) as African-American, and 1,818 (3%) as Asian. Kaplan-Meier analysis and log-rank tests were used to compare survival between races. Multivariate analysis by proportional hazards regression was used to assess patient, tumor and treatment variables as independent predictors of survival. To more clearly distinguish the influence of race on survival across the various sarcoma types, an interaction of Race*Histology was also included in the model.

Results

Figure 1: Kaplan-Meier 5-year survival rates were 65% for Asian and 59% for African-American, compared with 63% for Caucasian (log-rank p-values for overall survival compared to White race were p=0.0590 and p<0.0001, respectively).

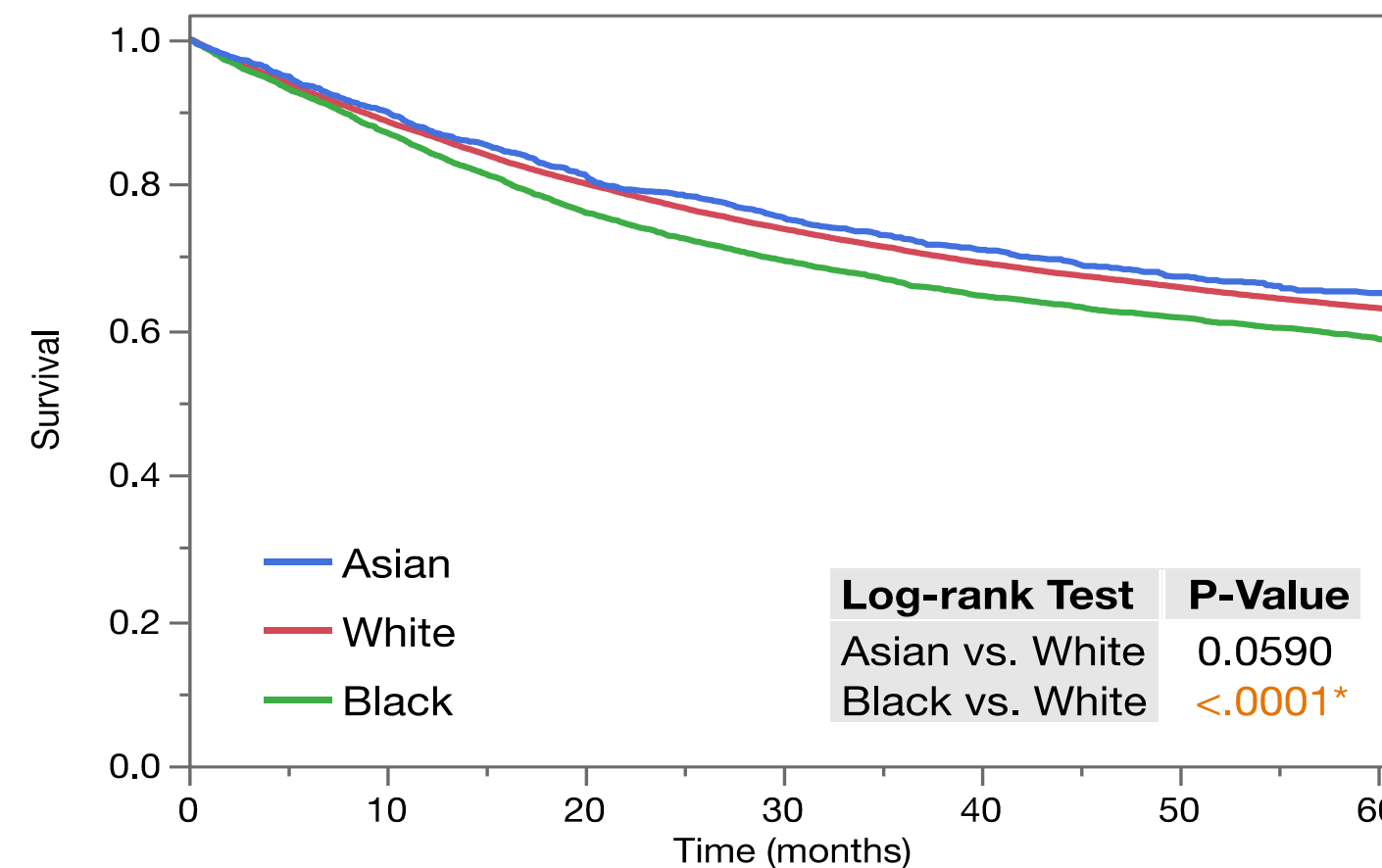


Figure 2: Patient, demographic, tumor, and treatment variables were included in a proportional hazards analysis to assess for influence on overall survival. In addition to controlling for the confounding effects of other variables on survival, an interaction term (Race*Histology) was included to specifically determine the effect of race on survival within different tumor types.

Patient Demographic Variables	HR (95% CI)	P-Value
Age above median	1.82 (1.77-1.88)	<0.001 ***
Female sex	0.91 (0.89-0.94)	<0.001 ***
Race (Black vs. White)	1.14 (1.04-1.25)	0.006 **
Fibrosarcoma	1.01 (0.90-1.13)	0.902
Liposarcoma	1.03 (0.91-1.17)	0.616
Leiomyosarcoma	1.13 (1.02-1.24)	0.021 *
Rhabdomyosarcoma	0.81 (0.70-0.95)	0.008 **
Synovial Sarcoma	1.21 (1.03-1.42)	0.024 *
Osteosarcoma	0.98 (0.88-1.09)	0.700
Chondrosarcoma	0.88 (0.73-1.06)	0.177
Ewing Sarcoma	1.41 (1.09-1.82)	0.008 **
Comorbidity Score (vs. 0)	1.29 (1.24-1.34)	<0.001 ***
≥2	1.87 (1.76-1.99)	<0.001 ***
Income below median	1.07 (1.04-1.10)	<0.001 ***
Insurance (vs. Private)	1.32 (1.23-1.41)	<0.001 ***
Govt.	1.41 (1.37-1.46)	<0.001 ***
Academic facility type	0.85 (0.82-0.89)	<0.001 ***
Tumor and Treatment Variables		
Tumor size >5 cm	1.74 (1.67-1.81)	<0.001 ***
Grade (vs. Low)	1.79 (1.67-1.92)	<0.001 ***
Intermed.	2.96 (2.79-3.15)	<0.001 ***
High	2.82 (2.71-2.92)	<0.001 ***
Metastases	0.43 (0.41-0.44)	<0.001 ***
Surgery	1.44 (1.39-1.50)	<0.001 ***
Positive Margins (vs. Negative)		

Results cont'd

Five-year survival rates were 65% for Asian patient and 59% for African-American, compared with 63% for Caucasian (log-rank p-values for overall survival compared to White race were p=0.0590 and p<0.0001, respectively). Compared to Caucasian patients, African-American patients were less likely to have private insurance (48% vs. 55%, p<0.001) or above-median income (37% vs. 62%, p<0.0001). African-American patients also had an increased average time between diagnosis and any treatment (25 vs. 20 days, p<0.0001), surgery (44 vs. 37 days, p<0.0001), and chemotherapy (48 vs. 45 days, p=0.0027). There was no significant difference in average time between diagnosis and radiation therapy (88 vs. 86 days, p=0.274). There was no significant difference in time between diagnosis and radiation (88 vs. 86 days, p=0.274). In a multivariate analysis including various patient, demographic, and tumor variables, African-American race was associated with significantly worse survival compared to White race for 4 of 8 histologic groups: Ewing sarcoma (HR 1.41 [1.09-1.82], p=0.008), synovial sarcoma (HR 1.21 [1.03-1.42], p=0.024), leiomyosarcoma (HR 1.13 [1.02-1.24], p=0.021), and “STS, Other” which included spindle, giant cell, small cell, epithelioid, and undifferentiated sarcomas (HR 1.14 [1.04-1.25], p=0.006). Black race was associated with improved survival in rhabdomyosarcoma (HR 0.81 [0.7-0.95], p=0.008). Asian patients did not demonstrate significant survival differences across histologies compared to Caucasian patients, other than for fibrosarcoma (HR 0.72 [0.57-0.92], p=0.008).

Conclusion

Race was associated with variations in survival for both soft-tissue and bone sarcomas in a multivariate analysis that included other tumor or demographic characteristics known to independently influence survival, such as income and insurance. African-American patients experience poorer survival relative to Caucasian patients with Ewing sarcoma, synovial sarcoma, leiomyosarcoma, and some other soft-tissue sarcomas, but improved survival for rhabdomyosarcoma. While some of these tumors are largely driven by canonical translocation events (EWS-FLI1 in Ewing, SSX-SYT in synovial sarcoma), other soft tissue sarcomas are influenced by a number of sporadic genetic mutations. Further research is needed to expose whether racial disparities in sarcoma outcomes are dependent or independent of the underlying genetic drivers for various sarcoma sub-types.