The role of racial and ethnic differences on time to treatment following biopsy in orthopaedic oncology

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INTRODUCTION:

Sarcomas are rate, aggressive malignancies of bone and soft tissue requiring timely multidisciplinary management to optimize outcomes. Delays in treatment can lead to tumor progression, increased risk of metastasis, and worse overall survival. Although racial and ethnic disparities in time to treatment have been well established in other oncology subspecialties and in elective orthopedic procedures, such disparities remain underexplored in orthopedic oncology. Sarcoma care often necessitates coordination among multiple specialties, and delays after diagnosis may disproportionately impact historically underserved populations. Given these considerations, we sought to evaluate whether disparities in time to treatment exist among racial and ethnic groups with bone sarcomas, soft tissue sarcomas, and skeletal metastatic disease using a large, multi-institutional database.

METHODS:

A retrospective cohort study was performed using the TriNetX Research Network, a database encompassing electronic health records from over 117 million patients across the United States. Adults with new diagnoses of bone sarcoma, soft tissue sarcoma, or metastatic bone disease following biopsy were identified. Time from biopsy to treatment initiation – defined as chemotherapy, radiation therapy, or surgical resection – was calculated. Patients were stratified by ethnicity (Hispanic vs. Non-Hispanic) and race (White, Black, Asian, Other). Mann-Whitney U tests were used to compare treatment timing between groups. Race-based comparisons were assessed descriptively due to small absolute differences.

RESULTS:

Among 26,698 patients, 5,557 had bone sarcoma, 5,204 had soft tissue sarcoma, and 14,937 had metastatic bone disease. Significant ethnic disparities in time to surgical resection were observed from primary sarcomas. Hispanic patients with bone sarcoma had a median delay of 27 days to surgery compared to 11 days for Non-Hispanic patients ($p<0.0001$); for soft tissue sarcoma, the delay was 25 vs. 11 days ($p=0.0212$). These delays exceeded two weeks and suggested potential barriers to timely surgical care.

For chemotherapy, Hispanic patients with bone sarcoma had slightly shorter time to initiation (6 vs. 8 days, $p<0.0001$), though the absolute difference was small. No significant ethnic differences were found in time to radiation therapy.

In metastatic bone disease, treatment initiation was generally rapid, and although Hispanic patients had marginally shorter times to chemotherapy (7 vs. 8 days, $p=0.0176$) and radiation (5 vs. 6 days, $p=0.0125$), these differences were not clinically meaningful.

Race based comparisons across White, Black, Asian, and Other groups showed no substantial differences in treatment timing.

DISCUSSION AND CONCLUSION:

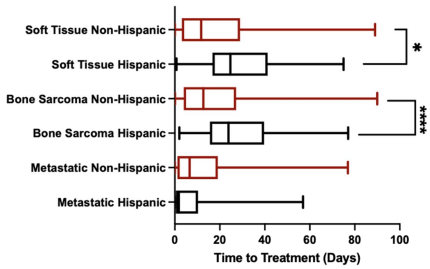
Hispanic patients with bone and soft tissue sarcomas face significantly prolonged time to definitive surgical management, suggesting the presence of ethnic disparities in access to timely care within orthopedic oncology. These delays may be driven by structural barriers such as referral inefficiencies, provider availability, and institutional limitations. Conversely, patients with metastatic bone disease did not experience similar disparities, possibly due to differing care pathways characterized by more urgent, standard interventions. The absence of race-based disparities in this study does not preclude the presence of systemic inequities but highlight the need for further research incorporating social determinants of health, insurance status, and tumor-specific variables. Addressing delays in sarcoma care is critical for equitable oncology outcomes and should be a priority in improving multidisciplinary care delivery.

Table 1: Median Time to Treatment by Ethnicity Across Sarcoma and Metastatic Diagnostic Groups

Diagnostic Group	Treatment Type	Hispanic (n)	Non-Hispanic (n)	Median (Hispanic)	Median (Non-Hispanic)	p-value
Metastatic	Chemo	739	9462	7	8	0.0176
	Radiation	388	5511	5	6	0.0125
	Resection	17	189	2	6	0.0956
Bone Sarcoma	Chemo	330	2759	6	8	<0.0001
	Radiation	84	498	8	8	0.9481
	Resection	56	167	27	11	**<0.0001**
Soft Tissue	Chemo	161	1112	9	7	0.0764
	Radiation	40	498	5	8	0.1071
	Resection	14	167	25	11	**0.0212**

Median days from diagnosis to chemotherapy, radiation, or surgical resection are shown for Hispanic and non-Hispanic patients with metastatic cancer, bone sarcoma, and soft tissue sarcoma. P-values reflect results from Mann-Whitney U tests comparing time to treatment between ethnic groups.

Figure 1: Median Time to Resection Stratified by Ethnicity Across Diagnostic Groups



*Median time (in days) from biopsy to resection is shown for Hispanic and Non-Hispanic patients with metastatic bone disease, bone sarcoma, and soft tissue sarcoma. Box plots display interquartile ranges and medians. Asterisks indicate statistically significant differences between groups (*p<0.05, ****p<0.0001; Mann-Whitney U test).*