Single-Institution Review of Bone Sarcoma Survival

Kristi Lynn Nakagawa[1] and Sean P. Kelly[1,2]

[1]The Queen's Medical Center; [2]University of Hawaii Cancer Center

Introduction

- Sarcomas are rare cancers that arise in connective tissues such as bone, muscle, fat blood vessels, nerves and cartilage. They account for 1% of all adult, and 21% of childhood cancers[1].
- National 5-year relative survival[2,3]
  - Soft tissue sarcoma: 66%
  - Bone sarcoma: 68%
- Preliminary data suggest Hawaii-based bone sarcoma patients have significantly worse survival rates (Kelly et al., unpublished).
- The potential effects of Hawaii's unique population demographics on sarcoma survival rates have not been well-studied.

Objective

To analyze outcomes of The Queen's Medical Center (QMC) sarcoma patients for potential discrepancies compared to national trends.

Methods

Study Population (n=591)
- QMC patients
- Confirmed malignant sarcoma diagnosis
- Diagnosis January 2000 to June 2024
- Complete Survival and Last Contact Data

↓

Sort by Histology using ICD-O-3 Morphology Codes (n=46 groups)

↓

Group by Broader Diagnosis (n=21 groups)

↓

Bone (n=87) vs Soft Tissue (n=504) — Subclassify — 2000-2009 (n=194) vs 2010-2019 (n=255)

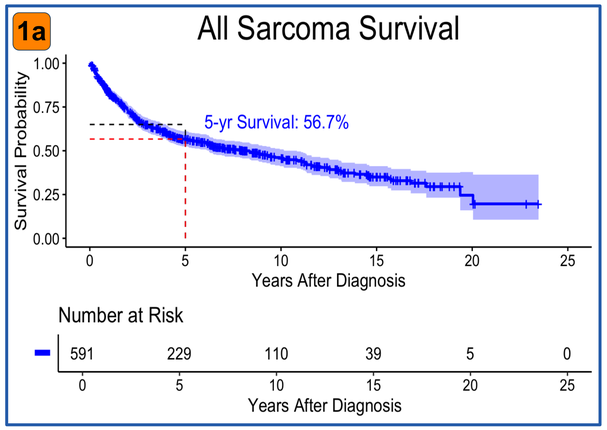
↓

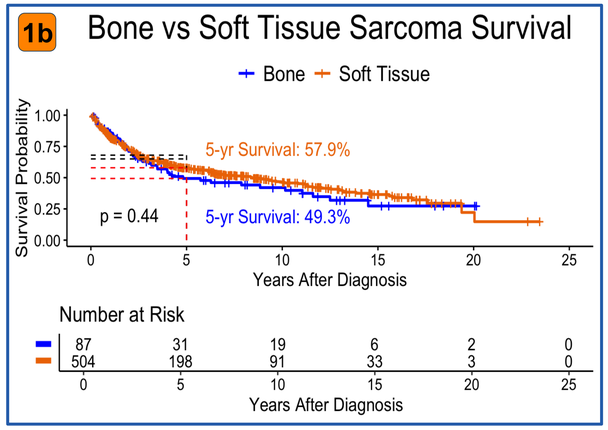
Kaplan-Meier Survival Analysis *Performed in R*

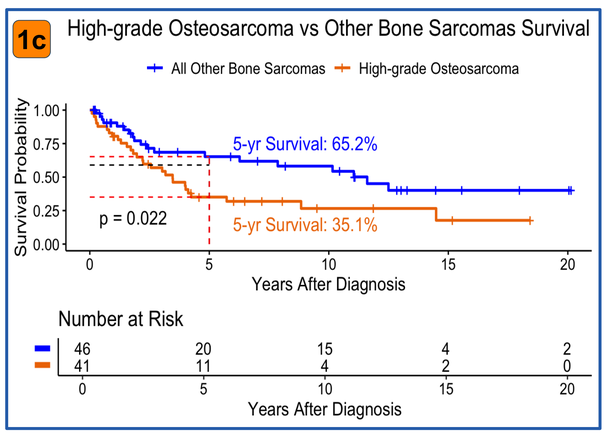
Results

Table 1. Patient Characteristics by Sarcoma Type (Bone vs. Soft Tissue)

Sample Characteristic	Total (n=591)	Bone (n=87)	Soft Tissue (n=504)
Age at Diagnosis (Years), mean ± SD	57.05 ± 19.38	42.21 ± 22.93	59.62 ± 17.49
Sex Female Male	 264 327	 41 46	 223 281
Average Follow-Up (Years)	5.26	5.23	5.27
Surgery of Primary Site, N (%) Yes No	 477 (80.7) 114 (19.3)	 64 (73.6) 23 (26.4)	 413 (81.9) 91 (18.1)







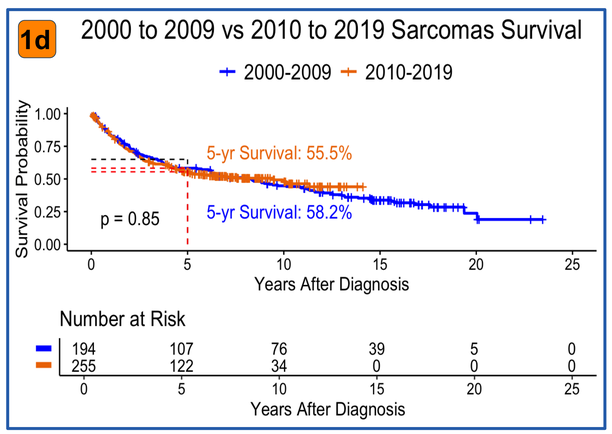


Figure 1. Kaplan-Meier survival curves showing survival probability after diagnosis. Stepwise drops represent deaths, tick marks indicate censored patients (alive at end of study follow-up) and dashed lines denote calculated 5-year relative survival (black for national data, red for study population data). Panels show (a) all sarcoma patients within study population, (b) bone versus soft tissue sarcoma grouped patients ($p>0.05$), (c) high-grade osteosarcoma versus all other bone sarcoma type patients ($p<0.05$), and (d) all sarcoma patients diagnosed from 2000-2009 versus 2010-2019 ($p>0.05$).

Conclusions

- Overall sarcoma 5-year survival appears lower than the national data (Figure 1a).
- No significant difference in 5-year relative survival between bone versus soft tissue sarcomas, though both appear lower than national data (Figure 1b).
- **5-year survival rate of high-grade osteosarcoma (35.1%) is significantly lower than that of all other bone sarcoma types (65.2%) and national osteosarcoma data[4] (59%) ($p<0.05$) (Figure 1c).**
- No significant difference in 5-year survival between all sarcomas diagnosed in 2000 to 2009 versus 2010 to 2019, though both appear lower than national data (Figure 1d).

Future Directions

Hawaii's unique geographic, ethnic and cultural contexts may require targeted interventions to improve sarcoma survival. A chart review will aim to identify modifiable risk factors contributing to the lower survival of high-grade osteosarcoma patients and may uncover additional environmental or exposure-related contributors.

References

[1] Burningham, Zachary, et al. "The Epidemiology of Sarcoma." *Clinical Sarcoma Research*, vol. 2, no. 1, 2012, p. 14, https://doi.org/10.1186/2045-3329-2-14.
[2] "Cancer of Soft Tissue Including Heart - Cancer Stat Facts." *SEER*, 2018, seer.cancer.gov/statfacts/html/soft.html.
[3] National Cancer Institute. "Bone and Joint Cancer - Cancer Stat Facts." *SEER*, 2018, seer.cancer.gov/statfacts/html/bones.html.
[4] American Cancer Society. "Survival Rates for Osteosarcoma." *Www.cancer.org*, www.cancer.org/cancer/types/osteosarcoma/detection-diagnosis-staging/survival-rates.html.

Acknowledgements

Thank you to Dr. Sean Kelly for generously sharing his time and expertise throughout this project. His patient mentorship fostered a welcoming and productive learning environment. Additionally, thank you to Lori Tsue and the QMC Office of Research and Development for supporting the 2025 Queen's Summer Research Internship.

Scan for PDF