Primary osteosarcoma of the short bones: a Surveillance, Epidemiology, and End Results Program (SEER) retrospective study

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Introduction

Background

Osteosarcoma (OS) is the most common primary solid malignancy of bone and accounts for 2% of all childhood cancers. OS is most often found in the long bones of the extremities, including the femur (42%), tibia (19%), and humerus (10%). The demographic, clinical, and treatment characteristics of OS arising in these locations are well established. For OS of the short bones of the extremity, however, these characteristics are not well understood.

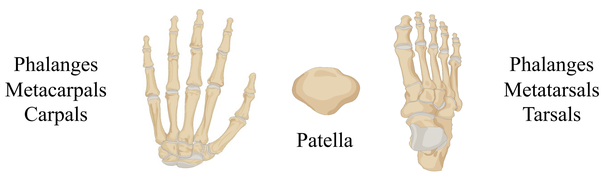

Figure 1. Short Bones of the Extremity

Objective

To describe the incidence, disease-specific survival, and treatment patterns in patients with osteosarcoma of the short bones of the extremity.

Methods

National Cancer Institute Surveillance, Epidemiology, and End Results (SEER) Program

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SEER 21 (2000-2022) registry N = 16,057,866

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Cases of osteosarcoma N = 10,163

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Cases of primary osteosarcoma of the short bones of the extremity N = 236

Results

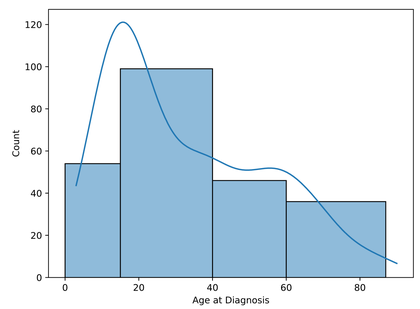

Figure 2. Distribution of Ages at Diagnosis for short bones OS.

Table 1. Demographic, Clinical, and Treatment Characteristics for short bone OS.

Total Patients (N=236)	Number (%)
Age (N=236)	
0-14	54 (22.9)
15-39	99 (41.9)
40-59	46 (19.5)
60 +	37 (15.7)
Sex (N=236)	
Female	102 (43.2)
Male	134 (56.8)
Race (N=234)	
White	167 (71.4)
Black	38 (16.2)
Other	29 (12.4)
Ethnicity (N=236)	
Hispanic or Latino	73 (30.9)
Not Hispanic or Latino	163 (69.1)
Location (N=236)	
Short Bones of the Upper Extremity	74 (31.4)
Short Bones of the Lower Extremity	162 (68.6)
Grade (N=132)	
High + Intermediate	118 (89.4)
Low	14 (10.6)
Disease Spread (N=185)	
Localized	149 (80.5)
Regional	5 (2.7)
Distant	31 (16.8)
Tumor Size (N=64)	
≤ 8 cm	41 (64.1)
> 8 cm	23 (35.9)
Chemotherapy (N=236)	
Yes	138 (58.5)
No/Unknown	98 (41.5)
Radiation (N=236)	
Yes	8 (3.4)
No/Unknown	228 (96.6)
Surgery Type (N=204)	
Limb Salvage Surgery (LSS)	105
Amputation	63
No Surgery	36

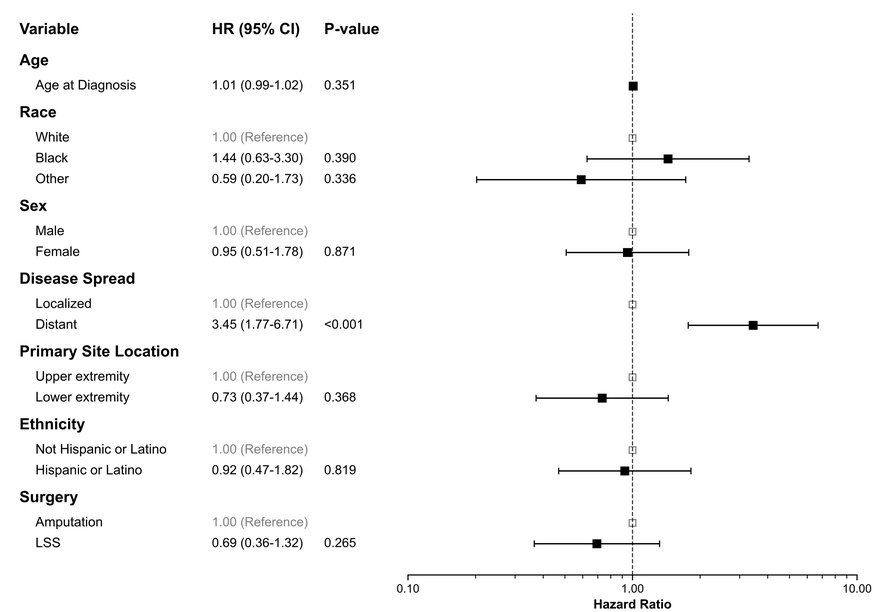

Figure 3. Cox proportional hazard model for multivariate regression analysis on disease-specific survival (DSS).

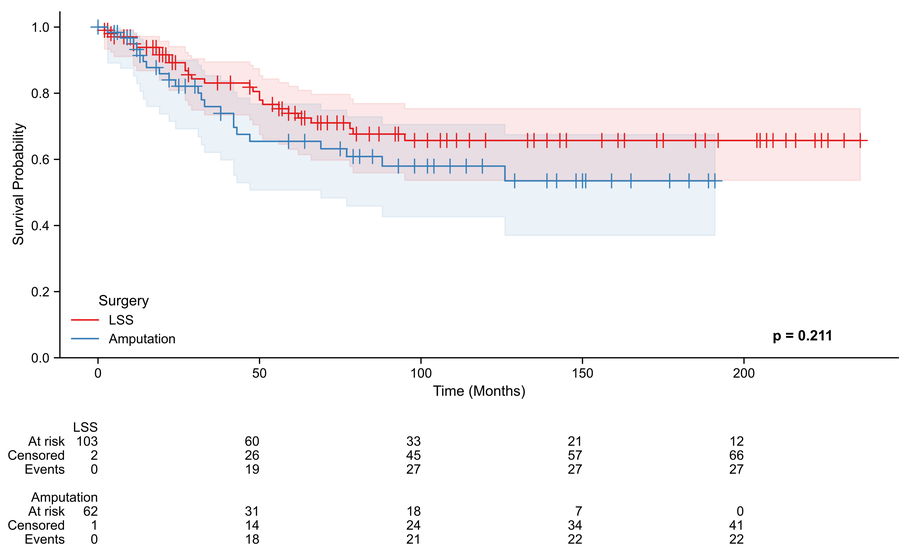

Figure 4. Kaplan-Meier analysis of disease-specific survival between SBOS patients that received limb salvage surgery (LSS) vs. amputation.

Discussion and Conclusions

Incidence

- Primary OS of the short bones of the extremity accounted for 2.3% of OS cases in SEER 21 registry.
- The majority of cases were male (134/236, 57%) and aged 15-39 (99/236, 42%).
- Most tumors were high or intermediate grade (118/132, 89%) and less than 8 cm in size (41/64, 64%).
- The rate of metastasis on presentation for primary OS of the short bones of the extremity (16.8%) was similar to the rate of metastasis for all cases of extremity OS in SEER (18.7%).

Disease-specific survival

- Both metastatic disease and high/intermediate-grade were associated with a significant decrease in DSS compared to localized and low-grade disease.
- No difference in DSS was observed between LSS and Amputation treatment groups.

Treatment patterns

- Treatment predominantly included surgery (168/204, 82%). The most common surgery type was limb salvage (105/168, 63.5%), followed by amputation (63/168, 37.5%).
- 138 patients (58.5%) were treated with chemotherapy.
- Radiotherapy was rarely used in this cohort (8/236, 3.4%).

Limitations

- Data was limited for several variables, including tumor size, tumor grade, and disease spread.
- "No" and "Unknown" were grouped together in the SEER registry, so these data likely underestimate the number of patients treated with either modality.
- Selection bias and a limited sample size may affect these results.

Acknowledgements

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