An International Multi-Institutional Analysis of Outcomes following SBRT for Extracranial Metastases from Sarcoma Primaries

🏆 Member-In-Training Research Achievement Award Winner 🏆

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Objectives: Though there is growing evidence in support of local ablative therapies for patients with metastatic disease, there is limited data on outcomes for patients with extracranial metastases from sarcoma primaries treated with stereotactic body radiation therapy (SBRT). We aimed to characterize local control (LC) and overall survival (OS) following SBRT for extracranial sarcoma metastases utilizing an international multi-institutional SBRT registry.

Methods: The RSS Patient Registry was queried for patients with metastases from sarcoma primaries treated with SBRT. Kaplan-Meier analysis was utilized to assess potential prognostic patient, treatment, and tumor characteristics with respect to LC and OS on univariate analyses. A Cox proportional hazards multivariate model was utilized to further assess independent variables initially identified.

Results: A total of 149 patients with 128 lesions with information on LC were identified. The most common histologies were leiomyosarcoma (44), sarcoma NOS (30), carcinosarcoma (10), and liposarcoma (8). The most common sites of metastatic disease treated were the lung (82), non-spinal bone (15), and spine (10). The median tumor size was 15.0cc (range: 0.22-1007.2cc). Median patient age was 59 (range: 16-90) and median KPS was 90% (range: 40-100%). The median prescription dose was 50 Gy (range: 16-60 Gy), the median number of fractions was 5 (range: 1-5), and the median biologically effective dose (BED4) was 175 Gy4 (range: 56.3 Gy4 – 360 Gy4). One- and 2-year OS rates were 73.6% (95% CI: 65.1-80.3%) and 44.0% (95% CI: 35.5-53.0%), respectively. On UVA, age≥75 (75.6% vs. 65.0%; p=0.003), KPS< 90% (84.0% vs. 48.8%; p=0.008), and lung vs. non-lung metastases (78.3% vs. 68.5%; p=0.007) were correlated with 1-year OS. On Cox MVA, advanced age, poor KPS, and non-lung metastases were all associated with inferior OS (p< 0.01) with patients with 0-2 of these risk factors having 2-year OS of 72.2%, 39.2%, and 11.0%, respectively. One- and 2-year LC rates were 85.3% (95% CI: 77.7-90.9%) and 78.2% (95% CI: 67.9-85.6%), respectively. On UVA, non-lung metastases (73.1% vs. 92.4%; p=0.003) and BED4< 175 Gy (64.2% vs. 95.4%; p< 0.0001) were associated with inferior 1-year LC. On Cox

MVA, only BED4< 175 Gy was associated with inferior LC (hazard ratio (HR) = 3.33; p=0.01). Ten of 128 treated lesions had associated treatment-related toxicities with all being Grade 1-2.

Conclusion(s): Age, KPS, and presence of lung vs. non-lung metastases were prognostic of OS and should be considered in patient selection for SBRT for asymptomatic metastases from sarcoma primaries. Dose escalation when feasible with BED4 ≥175 Gy is recommended given durable LC achieved without significant toxicity.