

Use of Intraoperative Radiotherapy for Primary Soft Tissue Sarcomas in the extremities: *Analysis of Disease Outcomes and Toxicity*

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Abstract

Objective: Radiotherapy has an important role in management of soft-tissue sarcomas. The goal of our study was to describe the risk and predictors of disease and treatment-related outcomes among patients who received intraoperative radiation therapy (IORT) for primary soft tissue sarcoma in the extremities.

Methods: From an IRB approved prospectively collected database of patients treated with IORT, all patients with extremity and limb girdle soft tissue sarcomas treated between 1989 and 2012 were retrieved. In addition to patient and tumor data, the database included treatment data, follow-up status and toxicities. All toxicities were scored with respect to their likely etiology/etiologies. A secondary chart review was performed of these patients to evaluate further surgical and pathologic factors such as tumor size, grade, location, margin status, chemotherapy and radiotherapy features. Risk and predictors of outcomes were examined using the Kaplan-Meier method and the Cox proportional hazards regression models.

Results: A cohort of 194 patients with localized primary soft tissue sarcomas were identified. With a median follow-up of 8.63 years, 6 patients had local recurrence, and 38 patients developed distant metastases, corresponding to a 5-year recurrence and metastasis free survival of 96% and 80%, respectively. Disease-free and overall patient survival at 5 years was 77% and 73%, respectively. There was no variable which is effect on recurrence free survival except size; 4 out of 6 recurrence patients had less than 5 cm tumor size. Bigger than 5 cm tumor size (HR: 5.9, 95% CI: 1.42, 24.53) and less than R0 margin (HR: 2.41, 95% CI: 1.24, 4.72) significantly correlated with risk of distant metastasis. Overall survival were significantly lower among patients with tumors >5 cm (HR: 2.38, 95%CI: 1.26, 4.51), high-grade tumors (HR: 2.41, 95% CI: 1.24, 4.69) and age (for each year HR: 1.03, 95% CI: 1.02, 1.05). Tumor size and age were independent predictors of overall survival in multivariate analysis. IORT-related toxicity was observed in 6 patients (4 of them grade 2 or 3), and external beam radiation therapy (EBRT)-related toxicity was observed in 33 patients (13 of them are grade 2 or 3).

Conclusions: Treatment of primary soft tissue sarcomas with IORT is associated with excellent local control, limb preservation and patient survival. Tumor size is important prognostic factors.

Key words: Extremity, intraoperative radiation, radiotherapy, sarcoma