

ABSTRACT FINAL ID: 2404;

TITLE:

High Dose Rate Brachytherapy Boost in the Treatment of Extremity Soft-Tissue Sarcomas

AUTHORS (ALL): Streeter, Oscar Edward¹; Chung, Eric ¹; Chawla, Sant ⁴; Jozsef, Gabor ¹; Astrahan, Melvin A.¹; Groshen, Susan ³; Menendez, Lawrence ².

INSTITUTIONS (ALL): 1. Radiation Oncology, Keck School of Medicine, University of Southern California, Los Angeles, CA, USA.

2. Orthopaedics, Keck School of Medicine, University of Southern California, Los Angeles, CA, USA.

3. Preventive Medicine, Keck School of Medicine, University of Southern California, Los Angeles, CA, USA.

4. Medicine, Keck School of Medicine, University of Southern California, Los Angeles, CA, USA.

ABSTRACT BODY:

Purpose/Objective: Retrospective review of our experience with high dose rate brachytherapy (HDR-BT) as a radiation boost following limb-sparing resection for extremity soft tissue sarcomas with a median follow-up of five years. We examined toxicity, local recurrence, metastatic disease development, and survival.

Materials/Methods: Twelve patients were treated between April 1994 and September 1995 for extremity sarcomas. There were nine men and three women ranging in age from 31 to 73 years old (median 60 years). All were considered candidates for limb-sparing surgery prior to the start of any therapy. Six had malignant fibrous histiocytoma (50%), two had liposarcoma (17%), and one patient each had a leiomyosarcoma, synovial sarcoma, malignant schwannoma or spindle cell sarcoma (33%). Ten patients had high-grade tumors and two patients had low-grade tumors on initial biopsy. The sites of tumor origin were 8 in the lower extremity, 1 in the buttock, and 2 in the upper extremity; 1 patient had a lesion in both the upper and lower extremities.

The treatment consisted of interstitial high dose rate brachytherapy (HDR-BT) following neoadjuvant chemotherapy in 8 of the 12 patients. Ten received external beam radiation therapy (EBRT), post operative radiation in one. The eight patients who received chemotherapy received either Ifosfamide/Mesna with or without Adriamycin, or MAID for 3 to 4 cycles. One patient also received Cisplatin. Preoperative external beam radiation doses ranged from 4000 cGy to 5940 cGy, and were given in daily fractions of 180 cGy to 200 cGy. At the time of en bloc resection of the sarcoma, interstitial catheters were sutured into the surgical bed for remote afterloading HDR-BT delivery. The HDR-BT was administered using a HDR remote afterloading machine. Doses ranging from 1300 to 3000 cGy were delivered to the surgical tumor bed at a depth of 5 to 7.5 mm from the center of the Ir¹⁹² high dose rate source.

Results: Eleven of the twelve patients experienced treatment-related toxicities. The toxicities were delayed wound healing in one, four required grafts or flaps, two experienced neurologic impairment, and four patients had chemotherapy-related neutropenia. With a median follow-up of 63 months, four patients have recurred. One patient developed a local recurrence at 37 months; two patients developed distant metastases (at 5 and 12 months) and one patient recurred with both local and distant disease at 24 months. The two patients with the very early metastases have died. The estimated five-year probability of surviving for the entire group was 0.83 \pm 0.17 (s.e.). The five-year probability of recurring was 0.33 \pm 0.14 (s.e.). Of the ten patients with high-grade sarcoma, seven received adjuvant chemotherapy and of these, two patients subsequently developed distant metastases. There were three patients with high-grade sarcoma who did not receive adjuvant chemotherapy, and one developed distant metastases.

Conclusions: HDR-IBT appears to assist in local control of high-risk soft tissue sarcomas of the extremity following neoadjuvant therapy and en bloc resection with manageable toxicity. The local failure rate of 20% in high-grade lesions is comparable to the 19% local failure rate reported by Pister et al from Memorial Sloan-Kettering Cancer Center¹. Neoadjuvant chemotherapy may contribute to local control as well as in overall survival².

References:

1. Pisters PWT, Harrison LB, Leung DHY, et al. Long term results of a prospective randomized trial of adjuvant brachytherapy in soft tissue sarcoma. *J Clin Oncol* 14:859-868, 1996
2. DeLaney TF, Spiro IJ, Suit HD, Gebhardt MC, Hornicek FJ, et al. Neoadjuvant chemotherapy and radiotherapy for large extremity soft tissue sarcoma. *Int. J. Radiation Oncology Biol. Phys.*, 56(4):1117-27, 2003

(No Table Selected)