

# Radiotherapy Leads to Improved Overall Survival in Patients Undergoing Resection for Undifferentiated Pleomorphic Sarcoma

Sarah Collins Tepper<sup>1</sup>, Linus Lee<sup>1</sup>, Michael Peter Fice, Conor Morrow Jones, Gayathri Vijayakumar, Dian Wang<sup>1</sup>, Matthew Wesley Colman<sup>2</sup>, Steven Gitelis<sup>3</sup>, Alan T Blank<sup>1</sup>

<sup>1</sup>Rush University Medical Center, <sup>2</sup>Midwest Orthopaedics At Rush, <sup>3</sup>Rush

## INTRODUCTION:

Undifferentiated pleomorphic sarcoma (UPS) is a frequent subtype within the heterogeneous group of soft tissue sarcomas (STS). The use of radiotherapy (RT) has become an important component of a multimodal approach to treating STS. Key studies have demonstrated that the addition of RT improves rates of local control in STS, though the effect on overall survival (OS) is less clear. Furthermore, there is very limited and conflicting evidence regarding effect of RT on overall survival in UPS. The purposes of this investigation were to examine the association between RT and OS in UPS patients undergoing surgical resection and to determine independent prognostic indicators of OS in this patient population.

## METHODS:

This was a retrospective review of patients who underwent surgical treatment for primary soft tissue UPS from 1993 to 2021. Associations between RT and OS were analyzed with Kaplan-Meier curves and log-rank testing. Cox proportional hazards regression analysis was used to determine independent prognostic factors of OS.

## RESULTS:

One hundred and fourteen patients who underwent surgical resection of primary soft tissue UPS were included in the study. Ninety-six (84.2%) patients received RT perioperatively. Eighteen patients (15.8%) did not receive RT for reasons relating to tumor location, difficulty with patient follow-up, and tumor resection with amputation as the index procedure. The rate of local recurrence was 17.7% in the RT group and 11.1% in the no RT group. Use of RT was not significantly associated with a lower rate of local recurrence in our cohort ( $p=0.49$ ). Use of RT was associated with improved OS on log-rank testing (hazard ratio 0.20; 95% confidence interval 0.11-0.36;  $p<0.001$ ). On multivariate analysis, RT was an independent predictor of improved OS (hazard ratio 0.17; 95% confidence interval 0.08-0.35;  $p<0.001$ ) while metastasis at presentation (hazard ratio 6.87; 95% confidence interval 3.43-13.76;  $p<0.001$ ) and older age (hazard ratio 1.03; 95% confidence interval 1.01-1.05;  $p=0.005$ ) were predictive of decreased OS.

**DISCUSSION AND CONCLUSION:** Use of RT in combination with surgery was an independent prognostic indicator of improved overall survival in UPS patients. Older age and metastasis at presentation were associated with worse overall survival. Based on this and other available studies, treatment for UPS should involve limb-sparing resection when feasible with RT to ensure optimal survival.

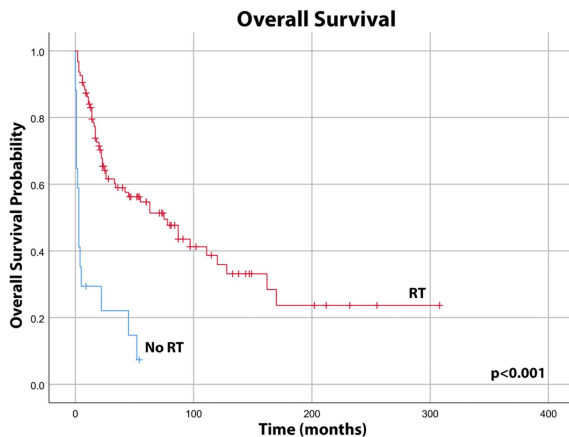


Figure 1. Kaplan-Meier curves for overall survival of patients with undifferentiated pleomorphic sarcoma stratified by radiotherapy (RT) vs no RT. Use of RT is associated with improved overall survival ( $p<0.001$ ).