

Introduction

Stereotactic radiosurgery (SRS) can enhance immune activation and improve disease control through the abscopal effect. Effective anti-tumor immunity relies on a competent immune system. Patients with cancer receiving chemotherapy are often immunosuppressed, which may impact the efficacy of SRS. Here we investigate the relationship between systemic lymphopenia and response to SRS in patients with brain-metastatic lung cancer.

Methods

We reviewed 125 cases of lung cancer brain metastases treated with SRS between January 2014 and May 2017. Complete blood counts from the time of SRS were reviewed, and lymphopenia was defined as an absolute lymphocyte count (ALC) < 1000/uL. The Kaplan-Meier method and cox proportional-hazards model were used to evaluate risks of progression or death.

Results

The median age was 65 years (range 43-86), with 54% female patients. 56 patients (45%) underwent prior surgical resection. The median duration of follow-up was 11.7 months. Lymphopenia was present in 60 patients (48%). In univariate analysis, the median PFS and OS were significantly shorter in lymphopenic patients (PFS: 3.7 vs 9.4 months, $p<0.0001$; OS: 6.4 vs 28.0 months, $p<0.0001$). When accounting for age, gender, smoking history, ECOG score, surgery, and tumor histology in a multivariate model, lymphopenia remained significantly predictive of worse PFS (HR=3.9, [95% CI, 2.4-6.3], $p<0.001$) and OS (HR=4.5, [95% CI, 2.4-8.3], $p<0.001$). Patients who received immunotherapy within 3 months of SRS demonstrated significantly shorter PFS and OS if

Conclusions

Brain-metastatic lung cancer patients with lymphopenia treated with SRS had significantly worse PFS and OS. The effect of lymphopenia was even more pronounced in patients receiving immunotherapy. These data demonstrate the significant impact of deficient immunity on disease control and survival. Lymphopenic patients may benefit from interventions to improve immune function prior to SRS for brain metastases.

Learning Objectives

By the conclusion of this session, participants should be able to: 1) Understand the importance of brain metastasis on patient morbidity and mortality in lung cancer, 2) Describe the relationship between lymphopenia and survival in brain-metastatic lung cancer patients, and 3) Understand the importance of immune system regulation with regards to disease control.

