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Clinical Factors Associated with Mortality Within Three Months After Radiosurgery of Small, Asymptomatic Brain Metastases from Non-small Cell Lung Cancer

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Introduction

Routine brain MRI surveillance frequently diagnoses small, asymptomatic brain metastases from non-small cell lung cancer (NSCLC) that are effectively treated with stereotactic radiosurgery (SRS). A subset of patients, however, may die prior to the onset of symptoms. We identify clinical features that distinguish neurologically-asymptomatic NSCLC brain metastases patients that die prior to routine 3-month follow-up after SRS.

Methods

Retrospective chart review from 2007-2017 identified 18 patients with neurologically-asymptomatic NSCLC brain metastases who died <3-months after SRS. Twenty-eight additional patients, meeting criteria, surviving >6-months after SRS were identified. Clinical factors were examined to determine characteristics correlating with survival using cox proportional hazards and nominal logistic regression models. Logistic regression models using significant factors were trained with 5-fold cross-validation and compared to the graded performance score (GPA) and score index of radiosurgery (SIR) using the AUC from receiver operant characteristic curves.

Results

The median survival following SRS was 1.4 and 9.2 months for the <3-months and >6-months groups, respectively. Age, number of brain metastases, and Karnofsky performance status (KPS) were associated with overall survival while gender and interval between primary cancer and first brain metastasis diagnoses were associated with <3-month and >6-month survival, respectively. Models using GPA and SIR performed poorly compared to preliminary metrics generated in this study for prognosis of both <3-month and >6-month survival.

Conclusions

Physicians require data to provide high-value, cost-conscious health care. Clinical metrics can screen patients with asymptomatic NSCLC brain metastases likely to die prior to the standard screening interval, and observation could be considered.

Learning Objectives

By the conclusion of this session, participants should be able to: 1) Describe the importance of more versatile clinical metrics in guiding physicians and care teams in patient-centered care 2) Discuss, in small groups, the shortcomings of current metrics with respect to asymptomatic NSCLC brain metastases, 3) Identify effective prognostic clinical features and metrics for asymptomatic NSCLC brain metastasis patients.

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