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Purpose

The clinical course of patients diagnosed with non-small cell lung cancer (NSCLC) with brain metastases (BM) at presentation is variable. Here we seek to identify predictors of survival in patients staged with FDG-PET/CT.

Method and Materials

We identified patients who were diagnosed with NSCLC with BM at presentation in the years 2007 or 2008 and underwent staging FDG-PET/CT. Using a gradient-based semi-automatic contouring tool, hypermetabolic lesions were contoured on each patient's PET scan. Maximum SUV, number of hypermetabolic lesions (NHL), total metabolic tumor volume (MTV), and various clinical factors were evaluated as predictors of overall survival.

Results

Twenty-five consecutive patients with NSCLC and BM at presentation were identified. Of those, 15 patients (60%) were alive 1 year after diagnosis, and 10 patients (40%) are still alive with median follow-up of 26.4 months (range: 16.2-33.9). Patients alive at 1 year were younger at diagnosis (mean 53.2 v. 63.1 years, $p=0.01$), had lower rate of extracranial metastases (7% v. 70%, $p<0.01$), and had lower MTV (41.8 v. 115.7 cc, $p=0.02$) than other patients. Gender, presence of multiple BM, maximum SUV, and NHL were not significantly related to survival at 1-year. A multivariate Cox proportional hazards model demonstrated that increasing age and presence of extracranial metastases were significantly associated with decreased survival. Of patients younger than 65 without extracranial metastases at diagnosis, 12 out of 14 (86%) were alive at 1 year.

Conclusion

A subset of patients diagnosed with non-small cell lung cancer with brain metastases can be expected to have a good prognosis. Further study is required to determine the prognostic significance of quantitative FDG-PET/CT findings.