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# Whole brain radiotherapy with a conformational external beam radiation boost for lung cancer patients with 1-3 brain metastasis: a multi institutional study.

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**BACKGROUND:** To determine the outcome of patients with brain metastasis (BM) from lung cancer treated with an external beam radiotherapy boost (RTB) after whole brain radiotherapy (WBRT). **METHODS:** A total of 53 BM patients with lung cancer were treated sequentially with WBRT and RTB between 1996 and 2008 according to our institutional protocol. Mean age was 58.8 years. The median KPS was 90. Median recursive partitioning analysis (RPA) and graded prognostic assessment (GPA) grouping were 2 and 2.5, respectively. Surgery was performed on 38 (71%) patients. The median number of BM was 1 (range, 1-3). Median WBRT and RTB combined dose was 39 Gy (range, 37.5-54). Median follow-up was 12.0 months. **RESULTS:** During the period of follow-up, 37 (70%) patients died. The median overall survival (OS) was 14.5 months. Only 13 patients failed in the brain. The majority of patients (n = 29) failed distantly. The 1-year OS, -local control, extracranial failure rates were 61.2%, 75.2% and 60.8%, respectively. On univariate analysis, improved OS was found to be significantly associated with total dose ( $\leq$  or  $>$  39 Gy vs.  $>$  39 Gy;  $p < 0.01$ ), age  $<$  65 ( $p < 0.01$ ), absence of extracranial metastasis ( $p < 0.01$ ), GPA  $>$  or = 2.5 ( $p = 0.01$ ), KPS  $>$  or = 90 ( $p = 0.01$ ), and RPA  $<$  2 ( $p = 0.04$ ). On multivariate analysis, total dose ( $p < 0.01$ ) and the absence of extracranial metastasis ( $p = 0.03$ ) retained statistical significance. **CONCLUSIONS:** The majority of lung cancer patients treated with WBRT and RTB progressed extracranially. There might be a subgroup of younger patients with good performance status and no extracranial disease who may benefit from dose escalation after WBRT to the metastatic site.

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