The Role of Postoperative Radiotherapy after Resection of a Single Brain Metastasis: Combined Analysis of 643 Patients

BACKGROUND AND PURPOSE: The extent of treatment in patients with single brain metastasis is a controversial topic. Especially the issue of whole-brain radiotherapy (WBRT) after local treatment of the lesion is largely unresolved. Therefore, the authors performed a pooled analysis of all available clinical data, based on a comprehensive literature search and on prospectively defined inclusion criteria and endpoints (in particular local brain control at the original site and development of new brain metastases). MATERIAL AND METHODS: Overall, 643 patients from ten publications met the inclusion criteria. 106 patients were treated with surgery alone, 66 with surgery plus local radiotherapy, and the others with surgery plus WBRT (Table 1). RESULTS: Both types of additional radiotherapy significantly improved local control at the original site (relative risk of local failure < 0.5). WBRT also reduced new lesions significantly (relative risk 0.6). Within the available range of doses, no significant dose-response relationship was observed (Figure 1). Even after WBRT, new lesions remained the predominant type of brain failure. One of the underlying causes might be continuous reseeding of cells from active extracranial sites. Toxicity and quality of life were not well described in the publications. CONCLUSION: The present data favor moderate-dose WBRT, but the pros and cons of each option should be discussed with each
patient. Higher radiation doses or local boost treatment are not supported by these data, but might be considered under certain circumstances, e. g., after incomplete resection.