Gamma Knife surgery for metastatic brain tumors from renal cell carcinoma.

Clinical Articles

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OBJECT. The authors evaluated the results of Gamma Knife surgery (GKS) for the treatment of metastatic brain tumors from renal cell carcinoma (RCC).

METHODS. The authors conducted a retrospective review of the clinical characteristics and treatment outcomes in 69 patients with metastatic brain tumors from RCC who underwent GKS at the authors’ institution. Fifty-one patients were men, and 18 were women. The mean patient age was 64.2 years (range 45–85 years). The 69 patients underwent a total of 104 GKS procedures for treatment of 314 tumors. Eighteen patients received repeated GKS. Follow-up magnetic resonance (MR) imaging was used at a mean of 7.1 months after GKS to evaluate the change in 132 tumors after treatment. The mean prescription dose at the tumor margin was 21.8 Gy. The tumor growth control rate was 82.6%. Tumor volume and the delivered peripheral dose were significantly correlated with tumor growth control on univariate and multivariate analyses. Sixty (45.5%) of the 132 tumors assessed with MR imaging were associated with apparent peritumoral edema at the time of GKS. After treatment, peritumoral edema disappeared in 27 tumors, decreased in 13, was unchanged in 16, and progressed in four. Newly developed peritumoral edema after GKS was rare. The delivered peripheral dose was significantly correlated with control of peritumoral edema. The overall median survival time after GKS was 9.5 months. In this study, 34 patients died of systemic disease and 10 died of progressive brain metastases. Multivariate analysis showed that the number of lesions at the first GKS, the Karnofsky Performance Scale score at the first GKS, the recursive partitioning analysis classification, and the interval from diagnosis of RCC to brain metastasis were significantly correlated with survival time.

CONCLUSIONS. Gamma Knife surgery is effective for metastatic brain tumors from RCC. The disappearance rate of tumors is relatively low, but growth control is high. The delivered dose to the tumor margin is significantly correlated with the control of peritumoral edema. Gamma Knife surgery should be used as the initial treatment modality, if possible, even in patients with multiple metastases. Repeated GKS is recommended for newly developed brain metastases because of the low sensitivity of RCC to conventional radiation therapy.

KEYWORDS: cerebral metastasis, renal cell carcinoma, radiosurgery, Gamma Knife surgery