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CLINICAL STUDY - PATIENT STUDY

Gamma knife radiosurgery for metastatic brain tumors from thyroid cancer

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Abstract *Objective* We report our experience using gamma knife radiosurgery (GKR) for brain metastasis from thyroid cancer, which is extremely rare. *Methods* Between 1995 and 2007, 9 patients with 26 metastatic brain tumor(s) from thyroid cancer underwent GKR. The mean patient age was 58 years (range: 10–78). Seven patients had metastases from papillary thyroid cancer, and two from medullary thyroid cancer. Five patients had solitary tumors, and four patients had multiple metastases. Three patients who had multiple metastases also underwent whole brain radiation therapy (WBRT). The mean tumor volume was 2.4 cc (range: 0.03–14.0). A median margin dose of 18.0 Gy (range: 12–20) was delivered to the tumor margin. *Results* Tumor control was obtained in 25 out of 26 tumors (96%). The median progression-free period after GKR was 12 months (range: 4–53). The overall median survival after GKR was 33 months (range: 5–54). There were no procedure-related complications and six patients are still living 5–54 months after GKR. *Conclusions* Radiosurgery is an effective and minimally invasive strategy for management of brain metastases form thyroid cancer.

Keywords Cerebral metastasis · Gamma knife radiosurgery · Medullary thyroid cancer · Papillary thyroid cancer · Radiation therapy · Stereotactic radiosurgery · Thyroid cancer

Abbreviations

GKR	Gamma knife radiosurgery
MRI	Magnetic resonance imaging
SPGR	Spoiled-Gradient Recalled Acquisition in Steady State
SRS	Stereotactic radiosurgery
WBRT	Whole brain radiation therapy

Introduction

Stereotactic radiosurgery (SRS) for cerebral metastases is associated with high local control rates [1–11]. Even cerebral metastases considered resistant to whole brain radiation therapy can be successfully treated with SRS [2, 12, 13]. The response rate may differ depending on the tumor histology [9, 14]. Although thyroid cancer is a relatively common malignancy that may metastasize within the body, brain metastases from thyroid cancer are extremely rare [15]. The reported incidence is approximately 1% of all cases of thyroid carcinoma [15–18]. There are only rare reports on the management of cerebral metastases from thyroid cancer [15, 17, 19]. The role of SRS has not been defined for this pathology and only scattered cases have been reported [20–22].

We retrospectively studied the outcomes of gamma knife radiosurgery (GKR) for patients with cerebral

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