Stereotactic Radiosurgery for Recurrent Pleomorphic Adenoma Invading the Skull Base

—Case Report—

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Abstract

A 38-year-old man presented with a recurrent pleomorphic adenoma in the parapharyngeal space invading the skull base 19 years after the first operation for a parotid gland tumor. Stereotactic radiotherapy was performed to control the tumor growth using a marginal dose of 8 Gy and maximum dose of 18 Gy with care taken to minimize the dose to nearby structures. The symptoms were reduced within a few months. Magnetic resonance imaging over 5 years showed that the tumor was controlled with no regrowth. Stereotactic radiotherapy is a therapeutic option for the treatment of pleomorphic adenomas.

Key words: pleomorphic adenoma, stereotactic radiosurgery, skull base

Introduction

Pleomorphic adenomas are generally slow-growing, well-circumscribed benign tumors arising from the salivary or lacrimal glands. Usually, complete excision is curative. However, recurrence is common due to incomplete resection or scattering of tumor cells during surgery. Recurrent tumors are often located or extend into the parapharyngeal space. Bone destruction is not uncommon, but intracranial extension is rare, unless the tumor has undergone malignant transformation or originated in the middle ear and mastoid. The therapeutic strategies remain controversial. Radiotherapy may be beneficial for tumor control, but involves the risks of side effects including brain radiation necrosis or late malignant transformation.

We treated a patient with recurrent pleomorphic adenoma invading through the parapharyngeal space into the skull base, manifesting as palsy of the lower cranial nerves, which was controlled for 5 years by stereotactic radiosurgery.

Case Report

A 38-year-old man was admitted to our department in May 1997. He had undergone a first operation for a left parotid gland tumor when he was 19 years old. Histological examination confirmed the diagnosis of pleomorphic adenoma. Six years later, he underwent a second operation for local recurrence of the tumor. Then, 10 years later, a third operation was performed for multiple recurrences, including the parapharyngeal space, resulting in partial resection (Fig. 1). After this operation, he developed sensory disturbance in the left trigeminal nerve area and left facial nerve palsy, but these symptoms gradually improved. Histological examination of the resected tumors at the second and third operations showed no malignant transformation (Fig. 2). Three years later, he gradually exhibited hoarseness, and regrowth of the residual tumor was detected.

On admission, neurological examination revealed slight sensory disturbance in the left trigeminal nerve area, slight left peripheral-type facial nerve palsy, and hoarseness due to left glossohypopharyngeal and vagal nerve palsy. Magnetic resonance (MR) imaging revealed a well-circumscribed mass arising from the left parapharyngeal space as hypointense on T1-weighted images and mixed intensity on T2-weighted images, with strong homogeneous enhancement by gadolinium-diethylenetriaminepentaacetic acid. The mass extended through the left jugular foramen to the cerebellopontine angle region,
compressing the left acoustic nerve (Fig. 3). Cerebral angiography demonstrated compression of the extracranial left carotid artery, but no visualization of the left transverse-sigmoid sinus or jugular vein.

The patient underwent single fraction stereotactic radiosurgery (X-knife) with a marginal dose of 8 Gy and maximum dose of 18 Gy (Fig. 4). The isocenter covered the lateral anterosuperior portion and a smaller collimator was used to expose the left cranial nerves and carotid artery to the minimum dose possible (facial and acoustic nerve 7 Gy, carotid artery 6 Gy, brain stem 2–4 Gy).

Several months after the treatment, his hoarseness was diminished. Follow-up MR imaging over 5 years showed that the volume of the tumor in the lateral portion had decreased to 25% and the tumor in the medial portion had no regrowth (Fig. 5).

Discussion

Postoperative radiotherapy may prevent recurrence of pleomorphic adenoma. Only radiotherapy was chosen as the treatment for some recurrent tumors.\cite{1,2,5} Relatively high doses of radiation were applied, ranging from 50 to 70 Gy.\cite{1-3,5} However, damage to neighboring structures including cerebral or osteonecrosis was observed.\cite{1,3,5} In our case, the observation period is not yet long enough to be conclusive, but low-dose restricted stereotactic radiosurgery apparently achieved control of the tumor growth. The tumor in the portion covered by the isocenter markedly decreased in size and the tumor near the brain stem, which was exposed to less than 10 Gy, showed no regrowth.

High doses of conventional radiotherapy have always been applied for benign tumors such as pleomorphic adenomas. However, clinicians must weigh the risk of recurrence against the complications of cerebral damage and late malignant transformation.\cite{3} The risk of complication may be increased after conventional radiotherapy if invasion of the skull base is present. Stereotactic radiosurgery has not been applied to pleomorphic adenoma previously. This method is also hard to perform, especially if the tumor has extensively invaded the skull base. Therefore, stereotactic radiosurgery should be immediately considered for the treatment of pleomorphic adenoma as soon as invasion of the skull base is detected.

References

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