

Gamma knife radiosurgery for cavernous sinus metastasis from hypopharyngeal carcinoma

Ming Chen¹, Honggang Duan², Lin Xu³, Ting Chen⁴

ABSTRACT

Cavernous sinus metastasis of hypopharyngeal carcinoma is rare. We present a 57-year old Chinese man who was diagnosed as a case with hypopharyngeal carcinoma (T₃N_{2b}M₀). He received the radical surgery and radiotherapy. After six months, it was found that the metastasis of hypopharyngeal carcinoma appeared in the right cavernous sinus. The patient was treated with Gamma knife radiosurgery. However, 10 months later, the clinical sign and mass reappeared, then Gamma knife radiosurgery was used again at the double dose. After 17 months, the tumor had extended into the right temporal bone and showed metastasis in the abdomen and lung without the metastasis in the neck or the recurrence in the hypopharynx. The patient survived 29 months. Gamma knife radiosurgery may be effective in the treatment of patients with cavernous sinus metastasis.

KEY WORDS: Hypopharyngeal, Squamous cell carcinoma, Cavernous sinus, Metastasis, Gamma knife radiosurgery.

Pak J Med Sci April - June 2012 Vol. 28 No. 3 525-527

How to cite this article:

Chen M, Duan HG, Xu L, Chen T. Gamma knife radiosurgery for cavernous sinus metastasis from hypopharyngeal carcinoma. Pak J Med Sci 2012;28(3):525-527

INTRODUCTION

So far, a few cases of Cavernous sinus metastasis (CSM) have been reported usually, the cases with CSM can be diagnosed by clinical presentation combined with computed tomography(CT) or magnetic resonance imaging (MRI), but not by biopsy.¹ However, Lin et al² reported that CT guided fine-needle aspiration was useful to the

diagnosis of masses involving the cavernous sinus. Because of the existence of concomitant primary tumor and poor prognosis, the surgical treatment is not suitable for CSM. Radiotherapy, including gamma knife radiosurgery, and chemotherapy are prescribed as a palliative therapy to improve local control and the life-quality of patients. We searched the Pubmed, and found only one case has been reported.³ Moreover, the gamma knife radiosurgery was not used for this case. In present investigation, it is reported that a case with CSM from hypopharyngeal carcinoma was treated by gamma knife radiosurgery.

CASE REPORT

A 57-year-old Chinese man with a mass in the right neck was admitted to the Second Affiliated Hospital, School of Medicine, Zhejiang University in March 2008. Physical examination showed a fixed node of 2.5 x 3.5 cm in the right carotid triangle. Under a hard laryngoscope, we found an exogenous lesion occupying the entire right piriform fossa with the right fixed vocal fold. CT scan of the head and neck showed a mass in the right pyriform fossa and some positive nodes at II and III levels in the right

1. Ming Chen, MD, Attending, Assistant Professor,
 2. Honggang Duan, MD, Fellow, Department of Otolaryngology, Affiliated Eye and Ear, Nose and Throat Hospital, Shanghai Medical College, Fudan University, Shanghai, 200031, China.
 3. Lin Xu, MD, Fellow,
 4. Ting Chen, MD, Attending, Gamma Knife Center, Hospital No. 455 of the PLA, Shanghai, 200052, China.
- 1,3: Department of Otolaryngology, Second Affiliated Hospital of Medical School, Zhejiang University, Hangzhou 310009, Zhejiang Province, China.

Correspondence:

Lin Xu, MD,
E-mail: xulinent@163.com

- * Received for Publication: November 2, 2011
- * Revision Received: November 5, 2011
- * Revision Accepted: March 14, 2012

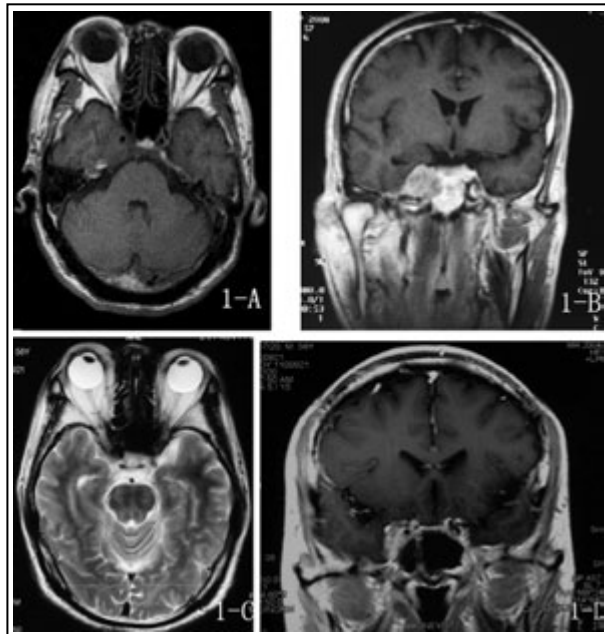


Figure-1: MRI of the lesion after the initial gamma knife radio surgery.

1-A, B: MRI, corona and axial view (before the initial gamma knife radio surgery), a right metasellar lesion of 2.2*2.2 cm in diameter, accompanied with destruction of the right sphenoid bone, and encased the right carotid artery and cavernous sinus.

1-C, D: MRI, coronal and axial view (at 3 months after gamma knife radio surgery), the right metasellar lesion of 2.0*1.0 cm in diameter encased right carotid artery and cavernous sinus. Compared with the figure of the initial gamma knife radiosurgery, the metasellar lesion decreased apparently.

neck without extending into carotid arteries. Biopsy revealed a poorly differentiated squamous cell carcinoma (SCC). The diagnosis indicated that the patient suffered from a hypopharyngeal carcinoma (T3N2bM0). Radical dissection of the right neck and excision of the total larynx, right pyriform fossa and part of the right thyroid gland were performed. In a month after the surgery, the patient received radiotherapy to the hypopharynx and neck (levels 1, 2, 3, 4) with a dose of 7000 cGy in 35 fractions over seven weeks.

Three months later, the patient presented with progressive right ophthalmalgia. No tumor or lymphatic nodes were found in the pharynx and nasopharynx or in the cervical region. CT scan showed no positive changes in the orbit and cavernous sinus. After 6 months, MRI revealed a mass in the right cavernous sinus (Figure 1-A, B) due to the metastasis of hypopharyngeal carcinoma. The patient was treated with gamma knife radiosurgery at the dose of 3200cGy for central part and the dose

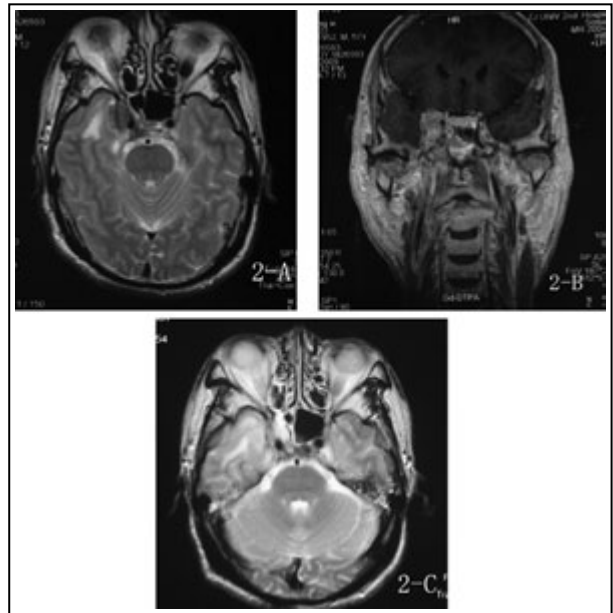


Figure-2: MRI of the lesion by the second gamma knife therapy.

2-A, B: MRI, corona and axial view (before the second gamma knife radiosurgery), the right metasellar lesion of 2.7*1.8cm in diameter encroached the carotid artery and cavernous sinus.

2-C: MRI, axial view (at 3 months after the second gamma knife radiosurgery), compared with the figure of the second gamma knife therapy, the metasellar lesion decreased apparently, and accompanied with the right temporal lobe brain edema.

of 1600cGy for surrounding part. In 3 months after the treatment, ophthalmalgia, abduction disorder and blepharoptosis were improved and the mass in the right cavernous sinus dwindled as was shown by MRI (Figure-1-C, D). Ten months later,

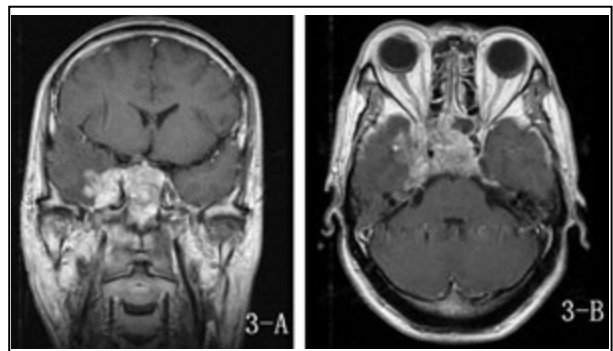


Figure-3: Four month after the second gamma knife therapy.

3-A, B: MRI, coronal and axial view (contrast-enhanced T1-weighted image), in 7 months after the second gamma knife radiosurgery, the right metasellar lesion increased apparently, destructed the clivus, sphenoid bone, and encased the right carotid artery.

these signs including the mass reappeared (Figure-2-A, B). The patient was treated with the therapy again at the double dose. In three months after the treatment, symptom improved again, and the mass in the right cavernous sinus dwindled once more (Figure-2-C). After 17 months, the patient complained of right headache, and MRI revealed that the tumor had extended into the right temporal bone (Figure-3). X-ray and PET showed metastases of hypopharyngeal squamous cell carcinoma to the abdomen and lungs, but the tumor was not found in the neck or hypopharynx. The patient died after 29 months post surgically.

DISCUSSION

Primary tumors of the head and neck area, including laryngeal squamous cell carcinoma⁴ and oropharyngeal squamous cell carcinoma⁵, rarely bring CSM. The risk of distant metastases is influenced by age, site of primary cancer, local and/or regional extension, grading, and locoregional control. Moreover, most distant metastases become clinically apparent in two years after diagnosis of the tumor.⁶ CSM could occur by direct extension, hematogenous spread and perineural infiltration, with symptoms of diplopia, blepharoptosis, ophthalmoplegia, dysesthesias, headache, retroorbital pain and facial pain. In some patients, Horner syndrome appeared.⁷

Lin et al² reported CT guided fine-needle aspiration could be useful in the diagnosis and management of masses which were involved in the cavernous sinus. In the present study, contrast enhanced high resolution CT represented the imaging procedure of choice for metastatic disease to the cavernous sinus. MRI is more accurate because of its capacity for detecting the primary or metastatic tumors and thrombosis in the cavernous sinus.⁸ Contrast-enhanced 3D-FIESTA (3D-fast-imaging-employing steady-state-acquisition) is powerful for the assessment of cranial nerves in and around the cavernous sinus with tumor involvement, even the trigeminal nerve with tumor involvement was easily identified in the cavernous portion.¹

General radiotherapy is frequently used for the treatment of CSM, with a clinical improvement. Gamma knife radiosurgery is recognized widely as the preferred treatment method for brain tumors, and the metastatic tumor in the cavernous sinus is highly sensitive to it. Thus the tumor shrinks markedly on MRI in 2-3 months after the therapy.⁹ After treatment with gamma knife radiosurgery, ophthalmalgia, abduction disorder and

blepharoptosis were improved in this case, and the mass of the right cavernous sinus shrunk markedly as was shown by MRI.

The median survival of three to six months is referred for patients treated with general radiotherapy in contrast to one month for untreated patients.¹⁰ The present patient died 23 months later after gamma knife radiosurgery. We consider that gamma knife radiosurgery is feasible in patients with CSM, and it may be more effective in the treatment of patients with CSM, even those with recurrent cases.

REFERENCES

- Amemiya S, Aoki S, Ohtomo K. Cranial nerve assessment in cavernous sinus tumors with contrast-enhanced 3D fast-imaging employing steady-state acquisition MR imaging. *Neuroradiology* 2009;51:467-470.
- Lin A, Foroozan R, Carrier D, Yen MT. Diagnosis of metastatic carcinoma to the cavernous sinus by computed tomography - guided fine-needle aspiration. *Am J Ophthalmol* 2004;138:864-866.
- Traserra J, Comas J, Conde C, Cuchi A, Cardesa A. Metastatic involvement of the cavernous sinus from Primary hypopharyngeal tumors. *Head Neck* 1990;12:426-429.
- Curry MP, Newlon JL, Watson DW. Cavernous sinus metastasis from laryngeal squamous cell carcinoma. *Otolaryngol Head Neck Surg* 2001;125:567-568.
- García RG, Pérez JS, Gías LN, Campo FJR, González FJD. Cavernous sinus metastasis from oropharyngeal squamous cell carcinoma. *Med Oral Patol Oral Cir Bucal* 2007;12:E166-170.
- Garavello W, Ciardo A, Spreafico R, Gaini RM. Risk Factors for Distant Metastases in Head and Neck Squamous Cell Carcinoma. *Arch Otolaryngol Head Neck Surg* 2006;132:762-766.
- Tsuda H, Ishikawa H, Asayama K, Saito T, Endo S, Mizutani T. Abducens Nerve Palsy and Horner Syndrome Due to Metastatic Tumor in the Cavernous Sinus. *Internal Medicine* 2005;44:644-646.
- Liu AL, Wang C, Sun S, Wang M, Liu P. Gamma knife radiosurgery for tumors involving the cavernous sinus. *Stereotact Funct Neurosurg* 2005;83:45-51.
- Schoëgg A, Kitz K, Reddy M, et al. Defining the role of stereotactic radiosurgery versus microsurgery in the treatment of single brain metastases. *Acta Neurochir (Wien)* 2000;142:621-626.
- De Bree R, Mehta DM, Snow GB, Quak JJ. Intracranial metastasis in patients with squamous cell carcinoma of the head and neck. *Otolaryngol Head Neck Surg* 2001;124:217-221.

Authors Contribution:

Ming Chen, MD, Attending, Assistant Professor, designed the study and prepared draft.

Honggang Duan, MD, Fellow, managed therapy and collection of data.

Lin Xu, MD, Fellow, managed therapy and drafted the manuscript.

Ting Chen, MD, managed therapy of Gamma knife radio surgery.