

Should Gamma Knife be Offered as a Primary Treatment for a Resectable Glomus Jugulare Tumor?

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ABSTRACT

Attempted total resections is the preferred treatment option in the management of glomus jugulare tumors in most subjects. In the elderly patients, it may be advisable to leave a tiny residue over the involved cranial nerve to preserve function. In a medically unfit and anesthesiologically high-risk subject observation with serial MRI scans is the preferred line of management. If in such a patient there occurs brainstem compression, it is prudent to only operate the intracranial part to relieve the compression explaining the very high-risk in this group. Radiotherapy is not to be offered as a primary treatment for glomus jugulare tumors.

Keywords: Glomus jugulare, Gamma knife.

CASE REPORT

In the year 2000, a 25-year-old male subject presented with a history of progressively increasing hearing deficit with episodes of bleeding from the left ear, of approximately three years duration on presentation. A polyp was seen in the left external auditory canal and a polypectomy was performed by the treating surgeon. The histopathology was reported as paraganglioma. Around the 8th day following polypectomy, the subject started developing facial paresis on the affected side. High-resolution CT scan and also MRI scan were performed after the polypectomy which are shown in Figures 1A to D. The lesion was established as glomus jugulare C3 type (Fisch classification).

Instead of surgery (no contraindication to surgery), gamma knife was offered to the subject in early 2001. Serial MRI scans were performed every year for three subsequent years, which showed tumor control with mild regression. The scans are shown in Figures 2 to 4. The subject was assumed to be treated. However, the subject redeveloped left ear bleeding in year 2006, after which scans were repeated as shown in Figures 5A and B.

The subject underwent embolization followed by partial tumor excision in May 2006. Scans repeated in July 2006 showed significant residual tumor with tumor along the petrous and cavernous course of internal carotid artery left *in situ*. The subject also developed lower cranial nerve palsies on the affected side. The postoperative scans are shown in Figures 6A and B.

Subject was subsequently advised by the treating surgeon to take another course of gamma knife radiation which he

did in early 2007. Scans were repeated post-gamma knife radiation, which are shown in Figures 7A and B.

Subject approached our center for opinion at this point of treatment. He desired complete recovery of facial and lower cranial nerve functions on the affected side. Since we did not offer a favorable prognosis of the same, he deferred any treatment till 2009. Scans repeated in 2009 show progression of the tumor with extensive erosion and involvement of the previously normal side (right) (Fig. 8).



Fig. 1A: Bone window image of the base skull. A mildly enhancing lesion is seen occupying the jugular bulb. Fluid is seen in the left mastoid air cells (September 2000)

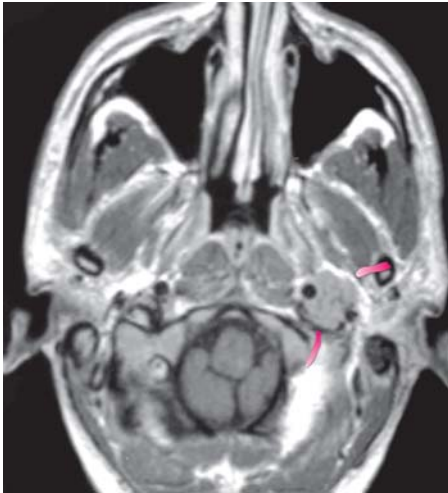


Fig. 1B: CE axial T1-weighted image showing a mildly enhancing mass lesion anterior to the arch of atlas lateral to the left ICA and partially encasing it (September 2000)

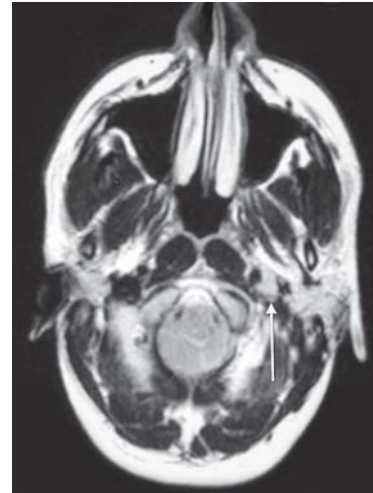


Fig. 2: Axial T2-weighted image after gamma knife treatment. The lesion has decreased in size (April 2001-post gamma)

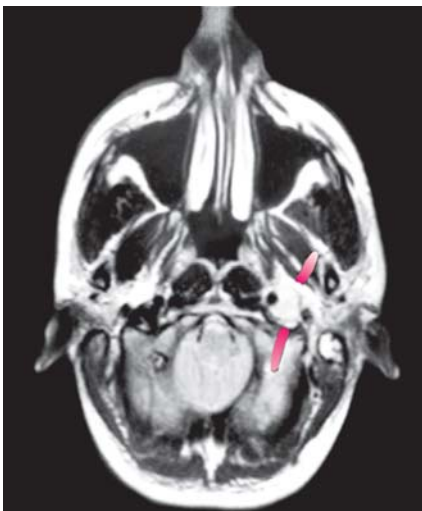


Fig. 1C: Axial T2-weighted image. The lesion is hyperintense (September 2000)



Fig. 3: Axial CE T1-weighted image one year after gamma knife surgery showing further regression of the lesion (March 2002)



Fig. 1D: 3D reconstruction of CECT scan. The lesion is depicted in red color (September 2000)



Fig. 4: Axial T2-weighted image two years after gamma knife surgery (March 2003)

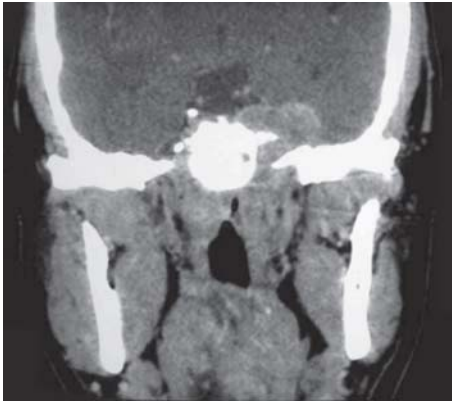


Fig. 5A: Coronal CECT of base skull, five years after surgery. A large enhancing mass is seen in the left juxtasellar region causing bone destruction and extending into the infratemporal fossa. A similar but smaller mass lesion is also seen in the right juxtasellar region extending into the infratemporal region (May 2006)



Fig. 5B: Bone windows posterior to the section above, showing bone destruction in the mastoid bone (May 2006)



Fig. 6A: Axial T1-weighted image at the skull base. An isointense mass is seen involving the left petrous bone, adjoining clivus and apex of right petrous bone. A small exophytic component extends intracranially. Packing material is seen in the left mastoid bone (July 2006-post surgery)

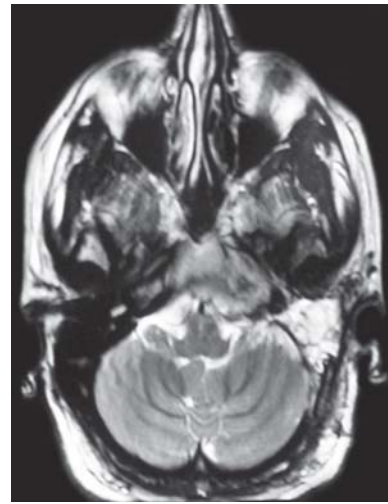


Fig. 6B: Axial T2-weighted image at the skull base. The lesion is mildly hyperintense and involves the left petrous bone and adjoining clivus (July 2006-post surgery)

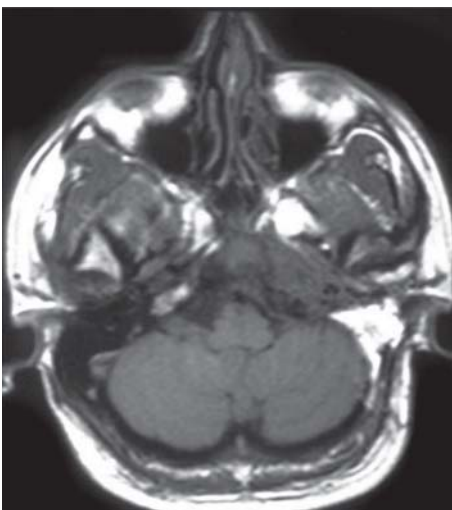


Fig. 7A: Axial T1-weighted image at the skull base showing some regression of the lesion (March 2007)

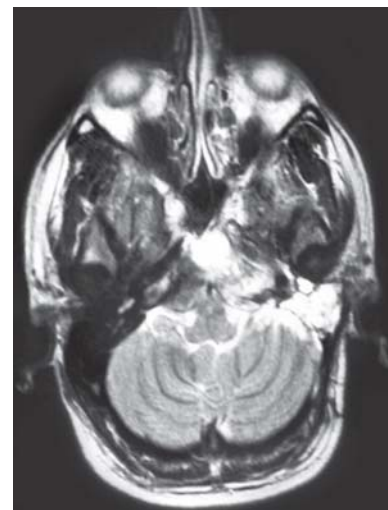


Fig. 7B: Axial T2-weighted image at the skull base (March 2007)

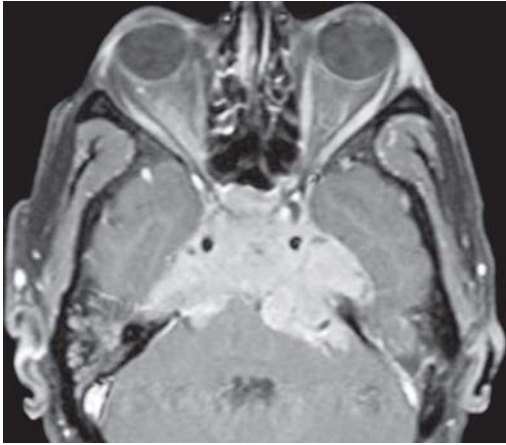


Fig. 8: Axial CE T1-weighted image at the skull base. The lesion has increased in size and extends into the cavernous sinuses, bilaterally and into the posterior cranial fossa. The ICAs are encased (*March 2009*)

DISCUSSION

Age, overall health, status of lower cranial nerves are important considerations in management of glomus lesions. Surgery is the primary modality of treatment of glomus jugulare tumors. In most instances, total resection should be the goal with rehabilitation of the lower cranial nerve

weakness where necessary. However, in older age group subjects, a tiny bit of tumor could be left over the cranial nerve if deemed necessary to preserve function of the cranial nerve where poor compensation of function is expected. In residual tumors, again, resection should be attempted wherever possible.¹ Gamma knife as a primary modality may control tumor in the short-term but makes subsequent surgery extremely difficult with the resultant morbidity. Gamma knife is used as an adjunctive to surgery^{2,3} where residual tumor would be left behind. However, in our view this should only be considered for residual in the region of the cavernous sinus or in a subject of very poor health where surgery is not feasible and control of the tumor is desired.

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