A Modified Far-lateral Approach For Resection Of Dumbbell-like Jugular Foramen Schwannomas

Xiangyu Wang¹, Wenyong Long¹, Jian Yuan¹, Qing Liu¹

¹ Department of Neurosurgery in Xiangya Hospital, Central South University, 87 Xiangya Road, Changsha 410008, Hunan, People’s Republic of China
I DO NOT have any financial or organizational relationships with commercial interests or other entities. I hereby certify that to the best of my knowledge, no aspect of my current personal or professional circumstances places me in the position of having a conflict of interest with my duties, responsibilities and exercise of independent judgement as an Officer, Member of the Board of Directors, Nominee for Office, Educational Presenter and/or a representative of AANS/NREF/NPA.
Introduction
Complete resection of dumbbell-like jugular foramen schwannomas (JFSs) with minimal cranial nerve complications remains difficult even for skilled neurosurgeons. A transcervical approach combined with an infralabyrinthine approach or a petro-occipital trans-sigmoid (POTS) approach is often utilized for removing dumbbell-shaped JFSs. Our study introduces a modified far-lateral approach (the paracondylar-lateral cervical (PCLC) approach) for removal of dumbbell-like JFSs.
Methods
Between November 2011 and November 2017, 16 consecutive patients diagnosed with dumbbell-like JFSs underwent a single-stage operation. Using the PCLC approach, dumbbell-like JFSs can be accessed from three directions: retro-sigmoid craniotomy exposes the cerebellopontine angle cistern; drilling the paracondyle bone to remove the jugular process enables access to the jugular foramen; neck dissection enables access to the poststyloid space of the infratemporal fossa. There is no need to expose or translocate the vertebral artery and cut off the styloid diaphragm. The treatment outcomes were retrospectively analyzed.
Results
Gross-total resection was achieved in 15 patients (93.8%). Adjunctive gamma knife treatment was used to manage residual tumors in one patient. Postoperatively, new-onset dysphagia occurred in six cases (6/8, 75%), while two patients experienced worsening of dysphagia (2/8, 25%). Eight patients (8/9, 88.9%) developed hoarseness. Three patients developed facial palsy (3/15, 20%). There were no cases of intracranial hematoma, re-operation, tracheotomy, or death. The mean follow-up was 26±12.8 months (range: 9 to 54 months), no tumor recurrence or progression was observed. Comparing with the pre-operated status, the improvement in hearing function (i.e., hearing loss, tinnitus) was observed in seven patients (7/9, 77.8%); dysphagia resolved in seven cases, hoarseness improved in three cases; the facial nerve function returned to normal in one patient.
Case 1
Left recurrent JFS
Pre-operation

Operation

Post-operation
Case 2
Left dumbbell-like JFS
Pre-operation

Operation

Post-operation
Case 3
Dumbbell-like JFS + $\gamma$ knife

Pre-operation

Post-operation

$\gamma$ -knife

6 months
$\gamma$ -knife

18 months
$\gamma$ -knife

57 months
$\gamma$ -knife
Discussion
Using the PCLC approach, dumbbell-like JFSs can be accessed from three directions:
(1) RS craniotomy exposes the cerebellopontine angle cistern.
(2) Drilling the paracondyle bone to remove the jugular process enables access to the jugular foramen.
(3) Neck dissection enables access to the poststyloid space of the infratemporal fossa.

In contrast to the traditional transcervical approach, the PCLC approach enables direct access to the retrostyloid region via the Henry fat gap, along with the natural space created by tumor growth. Thus, there is no need to cut off the styloid diaphragm.
Conclusion

PCLC approach provide an alternative for dumbbell-like JFSs resection, ensuring accurate bone removal while minimizing vascular exposure. Nonetheless, stereotactic radiosurgery plays an important role.