ORIGINAL ARTICLE

Surgical Management Of Glomus Tympanicum –Our Experience

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ABSTRACT

Glomus tympanicum, a typeof paraganglioma is a highly vascular benigntumor of the middle ear. We are presenting a series of 5 such cases operated in a tertiary care centre from 2015 to 2017. These cases were operated with an operating microscope and without embolisation. The outcome of the procedure was followed up over a minimum period of 6 months and maximum being 2 years. The absence of complications and recurrence over the period of follow-up justify the use of operating microscope for type 3 and type 4 (Glasscock –Jackson classification) tumors and use of embolisation not an absolute necessity if cotton ball dissection is used and tumor is not directly handled.

INTRODUCTION

Glomus tympanicum is a tumorprimarily arising from the chiefcells of neural crest origin called paraganglions[(1)]in the tympanic segment of the IXth cranial nerve (Jacobson's nerve) or from the branch of Xth cranial nerve in the middle ear (Arnolds nerve).These tumors arise from non chromaffin paraganglions and hence rarely have any endocrine activity.Paragangliomas have an incidence of 1in every 1.3 million people[(2)]and 3% of these are head and neck tumors[(3,4)].Glomus tympanicum is the second most common paraganglioma of the head and neck region after carotid body tumors[(5,6,7)] Glomus tumors in general do not exhibit malignant transformation but it is reported in 4% cases[(8)]. They grow by taking the path of least resistance making the air cells of the temporal bone suitable for unrestricted growth. It is classified on the basis of its extent by Fisch classification or the commonly used Glasscock-Jackson classification system.[(9,10,11,15)]

Table 1: The Glasscock-Jackson's Glomus Tympanicum Classification.

TYPE	DESCRIPTION
I	Small mass which is limited to the promontory of the middle ear
II	Tumor which is completely filling the middle ear cleft
III	Tumor which is within the middle ear and mastoid extension
IV	Tumor which is within the middle ear and mastoid with extension into the external auditory canal

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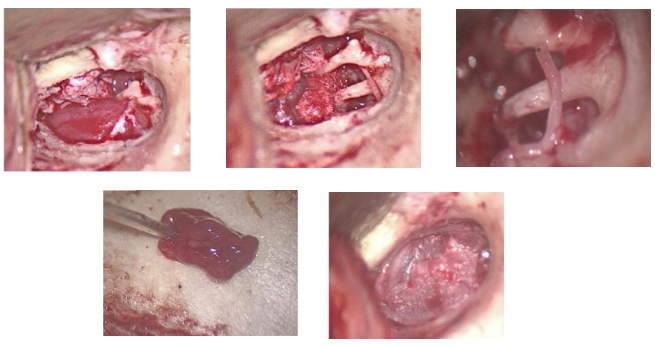
Surgical excision of the disease with preservation of function secondary to satisfactory clearance of disease is the modality of treatment

MATERIALS AND METHODS

We have studied in retrospect 5 cases diagnosed and operated in a tertiary care centre from 2015 to 2017. Out of the five cases operated, four were females and only one was male and patients ranged from 43 years of age to 64 years of age. Three of the operated cases were Glasscock-Jackson type 2, one was type 3 and one was type 4. All patients were operated under GA with ET intubation. Post aural incision was taken and Trans canal tympanotomy done after adequate canalplasty. On the basis of the findings at this stage further decision on mastoidectomy was taken intraoperative. Complete visualization of tumor was thus achieved before starting excision of the tumor for convenient instrumentation. After elevation of the annulus attempt at visualization and preservation of ossicular chain is done and we were successful in doing so in 3 out of these 5 cases. In tumors extending from the meso tympanum to the epitympanum and mastoid cavity, removal of the incus was necessary for further visualization of tumor all sharp instruments were used with utmost caution from this step onwards and maximum dissection was done with cotton balls dipped in 1:1000 adrenaline solution used to gently dissect off the tumor from underlying tissue. Tumor excision is started from its lowest extent in the hypotympanum and proceeded up into the mesotympanum to identify the feeder vessels and carefully cauterize the vessels if possible. In the type 4 tumor mastoidectomy was done as tumor was filling the external auditory canal and it was not possible to mobilize the tumor without further removal of the external auditory canal wall leading to a canal wall down mastoidectomy . In this particular scenario tumor was initially reduced using cautery before final cotton ball dissection. After complete removal of the tumor and haemostasis , appropriate reconstructive procedure was done wherever necessary .Patients were kept admitted for observation and intravenous antibiotics for 5 days and followed up on7thday for suture removal and then on 14th day and one month later .



RESULTS

Our patients range from the age of 55 years to 64 years with the following presenting complaints

Table 2: Chief complaints of our patients.

Chief complaints	Number of patients	Percentage of patients % (total no of patients is 5)
Tinnitus(pulsatile)	5	100
Hearing loss	3	60
Aural fullness	4	80
Dizziness	3	60
Earache	1	20
Discharge or bleeding	3	60

Thus pulsatile tinnitus was the most frequent presenting complaint and ear ache was infrequent. The mean duration between the onset of symptoms and the patient presenting to us was three years with a range as wide asone month to 15 years. On examination, a highly vascular mass behind the normal tympanic membrane was seen in 4 of the 5 patients , but not all of these patients exhibited a positive Brown's sign, which is blanching of the mass on increasing pressure in the external auditory canal with a seigles speculum . 3 of these were located in thehypotympanum demonstrated the "sun rise" appearance, while rest of them involved the full mesotympanum. 2 of the patients had a pulsatile polypoidal mass in external auditory canal. None of the patients displayed symptoms or signs suggestive of neurosecretory tumor or lower cranial nerve involvement.

The intra operative blood loss was approximately estimated to 75 ml on an average calculated after considering the suction container reading and the gauge pieces used. The pre and post operative hearing of our patients was compared and an average hearing improvement of 18.6 dB was achieved considering the air bone gap closure pre and post surgery. This result is due to the fact that all our patients had a certain degree of conductive hearing loss only, even though sensorineural hearing loss may be encountered in patients with glomus tympanicum.

Table 3: pre and post surgery hearing comparison

Sr no of patient	Pre operative mean air bone gap	Post operative mean air bone gap	Air bone gap closure
1	44	18	26
2	25	14	11
3	28	14	14
4	32	20	12
5	48	18	30

DISCUSSION

Glomus tympanicum is a slow growing tumor and thepatients are usually diagnosed late when the tumor is advanced .The presentation depends on its type and extent but majority of patients with the tumor complain of pulsatile tinnitus and sometimes of hearingloss and earache. Some patients present with bleeding fromthe ear. microscopy revealsa highly vascular mass behind a normaltympanic membrane or in outer auditory canal. Browns sign might not be always seen[12]. high jugular bulb and aberrant carotid artery arecrucial anatomical differentials. So, myringotomy and biopsyare to be avoided. The pure tone audiometry usually revealsconductive and occasionally mixed or sensorineural hearing loss which depends onthe stage of the tumor.

The confirmatory diagnosis of glomus tumor is primarily radiological. Imagingplays an important role in determining the type of glomus , if its jugulare or tympanicum and its stage. The HRCT of temporal bone is the modality of choice. HRCT temporal bone is useful for determining theextent of lesion as well as possibility of facial nerve, jugular bulb and carotid artery involvement. MRI with gadolinium contrast DTPA maybe valuable when inclusion of jugular bulb and carotid arteryis doubtful and to rule out multicentricity[13]. Angiography is rarely required for confirmed glomustympanicum unless embolization is to be performed. Every patient withthis tumor need not get catecholaminesscreening unless patient exhibits symptoms similar topheochromocytoma or has family history ofneurosecretory tumors[12].

A glomus tumor classification is needed for surgical planningand providing standards for reporting surgical outcome. Oldringand Fisch[14]proposed a classification but it did not considertympanicum and jugulare lesion separately. We referred tothe more popular Glasscock-Jackson classification that retains thetympanic and jugulare subclasses.

Use of meticulous dissection without direct contact of the sharp instruments with the tumor was achieved using cotton balls to transmit the force leading to dissection and avoiding puncture of the tumor and blood loss. Complete exposure and visualization of the whole tumor coupled with the use of microscope gives a better field for operating. The use of both hands is an additional advantage with the use of an operating microscope.

CONCLUSION

We would thus conclude that even though glomus tympanicum is a highly vascular tumor a meticulous approach to the surgical process will lead to minimum blood loss and complete excision of the tumor with minimum post operative morbidity. The key to this is adequate exposure by canalplasty and staying away from the important structures like facial nerve, internal carotid artery, jugular bulb and sparing the dura to avoid CSF leaks. After adequate exposure removal of tumor without direct instrumentation using a cotton ball ensures gentle handling and drilling the surface of the underlying bone ensures complete clearance of the tumor. Reconstruction of the ossicularchain may be required in some cases and this will lead to satisfactory post operative hearing outcome.

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