

Approach to Tinnitus Patient with Glomus Tumor: A Case Report

Glomus Tümörlü Tinnitus Hastasına Yaklaşım: Bir Vaka Sunumu

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ABSTRACT

Glomus tumors are benign neoplasms that can be observed in the head and neck region. Because of their critical anatomical location, the management of patients may require consultation from multiple departments. Glomus tumors affecting the middle ear may cause various symptoms including hearing loss and tinnitus. Our aim in presenting this case report is to share our treatment method for tinnitus caused by jugular glomus tumor and to emphasize the benefit of applying an individual therapy approach, especially in patients with reduced options for getting help during the pandemic period.

Keywords: Glomus tumor, tinnitus, multiple approach

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ÖZET

Glomus tümörleri baş boyun bölgesinde görülebilen benign neoplazmlardır ve kritik anatomik yerleşimleri sebebiyle hastaların yönetimi birden çok bölümün konsültasyonunu gerektirebilir. Orta kulağı etkileyen glomus tümörleri işitme kaybı ve tinnitus gibi çeşitli semptomlara sebep olabilir. Bu olgu raporunu sunmaktaki amacımız glomus tümörü sebebiyle oluşan çınlama problemine müdahale yöntemimizi paylaşmak ve bireye özel terapi yaklaşımının özellikle pandemi döneminde yardım alma seçenekleri azalmış hastalarda uygulanmasının yararını vurgulamaktır.

Anahtar Sözcükler: glomus tümörü, tinnitus, çok yönlü yaklaşım

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INTRODUCTION

Tinnitus is a very common symptom in the community; Its incidence in the adult population has been reported to be approximately 10-15% (1). While the most common risk factor that can trigger tinnitus is noise, it can be caused by a temporary cause such as earwax or by a more complex problem in the head and neck region. It is often not possible to determine the source from which tinnitus originates (2).

Tinnitus can be broadly classified into two groups as being objective and subjective. Subjective tinnitus can only be heard by the patient, while objective tinnitus can be heard by others. The etiology of objective tinnitus can be detected more easily than subjective tinnitus. Since objective tinnitus may be caused by a change in venous and muscular activity caused by pathologies, it is possible to determine its source, but the underlying cause of subjective tinnitus is often not fully elucidated (3).

Tinnitus, a buzzing or ringing in the ear, may be pulsatile or continuous (non pulsatile). The distinction, with a detailed clinical evaluation, determines the most appropriate imaging study. Pulsatile tinnitus suggests a vascular neoplasm, vascular anomaly, or vascular malformation. Most of the neoplasms are glomus tympanicum and glomus jugulare tumors (4). Glomus jugulare tumors are typically sensitive to radiation therapy, these highly vascularized lesions arising from the chief cells of the paraganglia in the adventitia of the dome of the jugular bulb. These are mostly benign, but often locally aggressive and are associated with compression and infiltration of adjacent bone, cranial nerves, or blood vessels, despite an estimated growth rate of less than 1 mm per year (5,6). The intervention options for patients with glomus jugulare tumors include microsurgical resection, radiosurgery, vascular embolization, conventional fractionated external-beam radiotherapy, or a combination of these approaches. The purpose of treatment is to control tumor growth and prevent further neurological compromise, The choice of intervention is important as it increases the chance of controlling the tumor and minimizes the risk of complications (7).

In 80% of these patients, mostly pulsatile tinnitus is observed. Those originating from the middle ear can be seen on examination as red-colored, pulsating masses with otoscopic examination- Less frequently, hemangiomas of the middle ear and facial nerve are also causes of tinnitus. In most patients, chronic tinnitus is not completely treatable. Effective treatment may be possible against objective types such as glomus jugulare tumors, anomalous middle ear vessels, or aneurysms or vascular anomalies in and around the temporal bone. There are a number of options to reduce this complaint, and these can dramatically increase the effect on these patient's quality of life (8). Intervention approaches to tinnitus may include multidisciplinary work and a long-term treatment process. Audiological—assessment with complete audiometry is needed in all patients with chronic tinnitus. At the beginning or during of the intervention process support can be obtained from different departments such as psychiatry, neurology, etc., apart from audiology and ENT. Depending on the patient's tinnitus degree, there is no standard approach protocol in the treatment of tinnitus. In general, each center applies its own clinical approach. Counseling, masking, sound enrichment and habituation therapy are most the commonly recommended therapies in tinnitus patients. Sound therapy in accordance with the psychoacoustic tinnitus measurements of the patients is found to be beneficial for certain patient categories related to tinnitus (9), (10). Studies have described the successful results of therapies with sound generators in 6-8 months (9). Considering the patient's preferences in these patient tailored sound therapies, music that does not contain words, does not cause negative emotions or reactions in the individual, and preferably contains the tinnitus frequency of the individual should be preferred. In the presence of hearing loss, both amplification and sound therapy are recommended. With sound therapy, hearing and tinnitus measurements are repeated in the follow-ups, the measurements made at the first application are accepted as reference and compared with the control measurements to reveal whether the therapy is beneficial or not. Follow-ups may be short-term or require a process spanning several years and many consultations and interviews during this time.

In this study, we aimed to present our treatment method for tinnitus caused by glomus jugulare tumor and to emphasize the benefit of applying an individual therapy approach, especially in patients with reduced options for getting help during the pandemic period.

CASE REPORT

A sixty-six years old female patient was referred to our ENT department with the complaints of hoarseness and dysphagia resulting after the surgical procedure (laparoscopic nissen fundoplication) performed for reflux treatment in another medical center about 10 months ago. In medical history, she also complained hearing loss in the right ear. Physical examination revealed right sided vocal cord paralysis, and hypoglossal nerve paralysis. In addition, pulsatile mass was observed in the right ear during otoscopic examination. The cranial MRI requested for the patient revealed a 2x2x3.5 cm glomus tumor filling the right jugular foramen. The patient was decided to be treated with radiation therapy and she was given radiotherapy (RT) in three sequences in the radiation oncology department.

Subsequently, she was referred to our hearing and speech center about 10 months ago from the ENT clinic.—She applied with tinnitus complaint —which occurred after the RT treatment for glomus jugulare tumor in right ear. After obtaining detailed information about the patient's current status through psychosomatic questionnaires and patient information form about tinnitus, clinical measurements of hearing and tinnitus were performed. The tinnitus complaint of our patient had been continuing pulsatile, localized to the right, for about 3 months, and the tinnitus severity was determined as being Grade 4 according to the tinnitus disability scale score determined at the first admission. According to the visual analog scale numbered from “0” to “10”, tinnitus severity, duration and perception of discomfort level were scored as “10” by the patient. He had a cognitive (23) score just below the normalization value according to the mini mental test score. At the time of admission, quality of life scores were obtained to be followings: Physical function 40%, physical role limitation 25%, emotional role limitation 66.7%, energy 20%, emotional health 48%, social function 0%, pain 10%, and general health 40%. The measurement results of hearing (Figure 1-4) and tinnitus (Figure 5-7) of our patient, who were recommended to be followed up in 2-3 months within 1 year, are given. Although the duration of the control appointments was extended at the request of the patient in order not to increase the risk of disease during the Covid-19 pandemic period, pure tone and speech audiometry and psychoacoustic measurements related to tinnitus were repeated 4 times within 1 year. All measurements were performed in the same test cabinet and by the same-researcher.

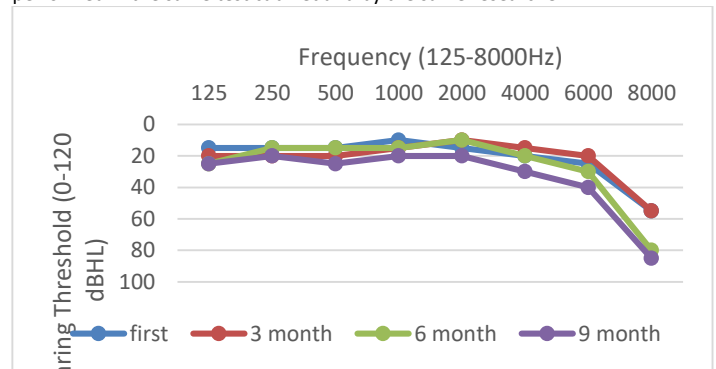


Figure 1. Change in Left Ear Pure Tone Thresholds

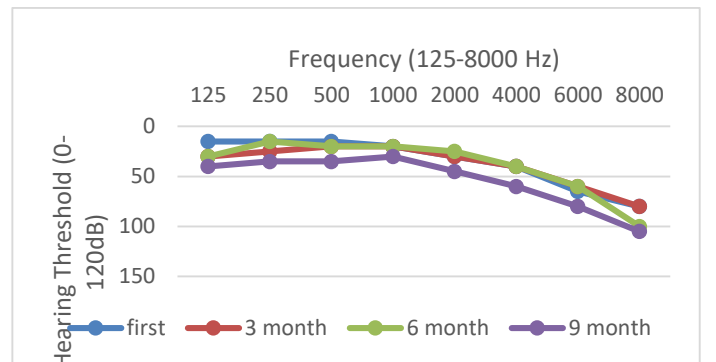


Figure 2. Change in Right Ear Pure Tone Thresholds

According to the hearing measurement findings in Figures 1 and 2, it is seen that the hearing thresholds worsen more significantly after the 6th month. While the hearing on the left was within normal limits at the first measurement, it was observed that it changed slightly sensorineurally in the last audiometry test at the 9th month.

On the right side where the tumor was localized, it was determined that the hearing loss was mildly sensorinoral at the beginning, but increased to a moderate degree according to the most recent test. The drug doses used by the patient did not change during the hearing follow-up period. However, the drug doses were updated according to the hearing measurement scores at the 9th month.



Figure 3. Change in Speech Recognition Score(SRT)

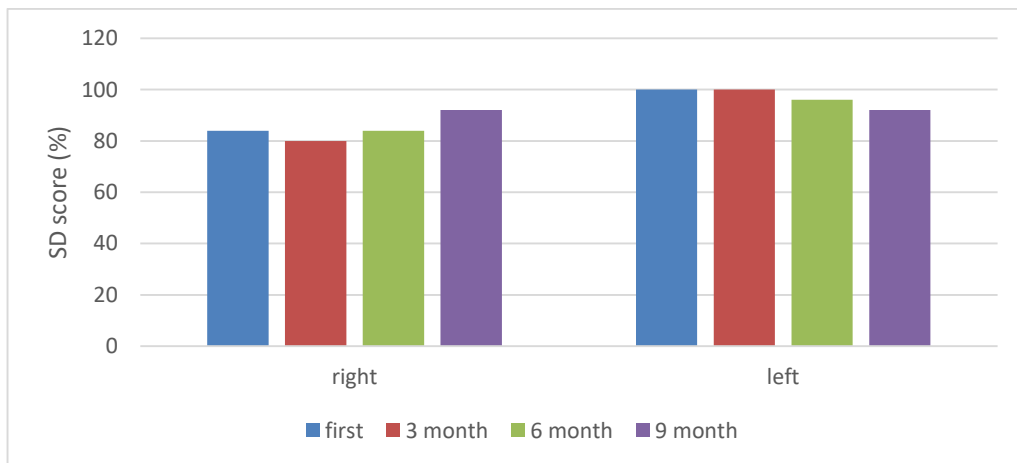


Figure 4. Change in Speech Discrimination(SD) Score

It was observed that in the right ear where tinnitus was localized, speech discrimination increased in relation to the experience of using the device, and slightly decreased in the unused ear over time. All of control measurements, speech audiometry results were obtained in accordance with pure tone thresholds and her findings on hearing are similar to the literature.

The change in psychoacoustic measurement data investigated related to tinnitus. While the characteristic feature of tinnitus was initially described as pulsatile, it was found to be continuous in the 3rd month of treatment and its character did not change in subsequent appointments. Location and frequency did not change during the follow-ups of the patient; It has been understood that tinnitus is matched at a center frequency of 6 kHz. After the first evaluation, our patient, whose tinnitus grade was determined to be 3rd degree, was given sound therapy together with the 1st level tinnitus information service.

The recorded sound used in voice therapy was created with the help of Adobe Audition 3.0 program. With the help of this program, a narrow band sound was produced in accordance with the tinnitus frequency determined by psychoacoustic measurement. This produced sound was combined with music given by the patient. The narrowband noise value is set as the upper frequency cut-off reference point and filtered with the Multi-track Editor in Adobe Audition 3.0 software. The audio file is 16-bit resolution and has been prepared to be a 2-hour recording by choosing a stereo channel at a sampling rate of 44.100 Hz. The square mean power root value of the music and tape noise is equalized with the "Amplify -Fade process" command; The music was combined as a stereo channel with 70% of the music and 30% of the narrowband noise, making it suitable for therapy. Our patient was instructed to listen to this individualized music at a moderate level for 2 hours every day for at least 8 months. Measurement scores related to tinnitus are presented in the graphs in Figure 5-7.

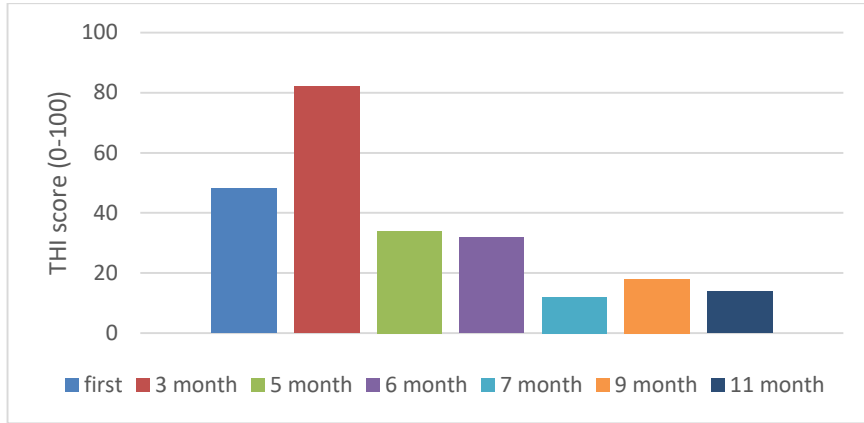


Figure 5. Change in Tinnitus Disability Scale (THI) Scores

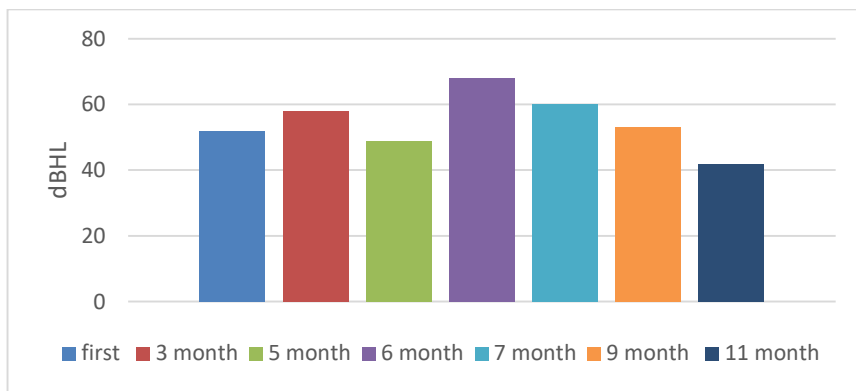


Figure 6. Change in Tinnitus Loudness Level

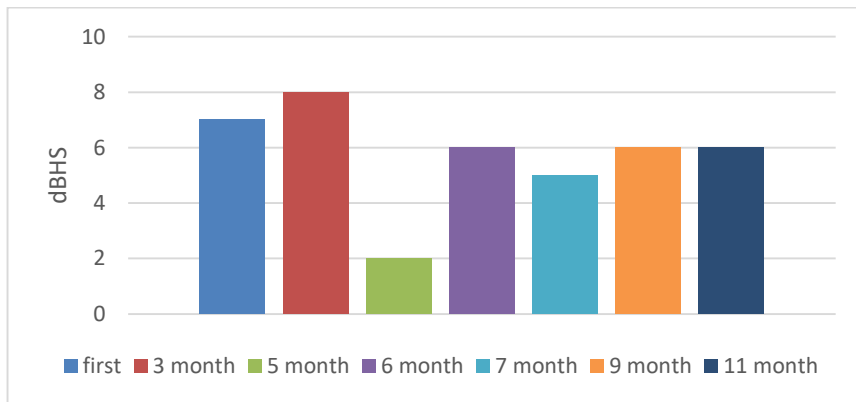


Figure 7. Change in Minimal Masking Level (MMS)

Although the tinnitus loudness level of our patient at the 6th month increased in line with the change in hearing threshold, no increase was observed in the THI score. MMS was obtained at higher values in the device-free period. While the device can mask tinnitus at lower intensity levels in the early period of use, MMS was obtained at a level of approximately 5dB in the later period, in line with the literature on tinnitus. No change in MMS level was observed in tinnitus measurements in the last two controls. However, it was determined that the THI score decreased and the tinnitus grade regressed to the 1st degree. Our patient, who first described tinnitus severity, duration, and degree of discomfort as the highest score (10/10/10), respectively, in terms of VAS scores, rated these values as 2/5/2, respectively, at his last follow-up appointment. The patient's current status scores in terms of the SF-36 scale, physical function was determined as 45%, physical role limitation 75%, emotional role limitation 0%, energy 40%, emotional health 48%, social function 87.5%, pain 32.5%, and general health 5%.

DISCUSSION

Glomus tumors, are slow-growing, mostly benign paragangliomas-seen on the carotid arteries, the middle ear or the area below the middle ear. Glomus tumors are usually benign; however, they can cause significant damage to surrounding tissues as they grow (8, 11).Temporal glomus tumors are five times more common in women than in men. Although the age of onset of symptoms varies between 17 and 80 years, complaints are mostly reported between 50 and 60 years of age (12).The clinical picture presented by these tumors varies according to the source of the growth. The symptoms that occur when originating from the middle ear are otological. Likewise, the first symptoms are auditory when the tumor originates from the bulbus jugulare. Sometimes complaints at presentation such as hoarseness and dysphagia due to vagus nerve involvement may result from tumor enlargement in the jugular foramen (11,12).

The treatment of glomus jugulare tumors is controversial. External beam radiation therapy has been found to inhibit growth of glomus tumors and reduce patient symptoms with acceptable complication rates,^{(13) (14)}. Some cases require no treatment. Often, glomus jugulare tumors are diagnosed within the sixth or seventh decade of life and can be followed by imaging only and may not need treatment (15). Our patient referred to audiology department from ENT clinic with complaints of hearing loss and tinnitus after 3 doses of radiotherapy without surgery. Hearing and tinnitus measurements were made in the Audiology department. In general, pulsatile tinnitus is commonly described in the presence of jugular glomus tumor. It was determined by the control measurements that the tinnitus, which was determined as pulsatile in the first control of our patient, was perceived as a continuous sound in the second control after the our treatment. It was determined that the tinnitus grade, which was determined as 4th grade in the control measurements of our patient, regressed to the 1st grade at the last control appointment. Similarly, VAS scores showed a marked improvement from the highest score grade. Although the scale scores related to tinnitus have decreased significantly, this positive effect is not equally reflected in the quality of life scores. According to the final scale scores, although there was a significant improvement in energy, physical function, pain and especially physical role limitation and social function, it was observed that the overall quality of life score decreased. No change was observed in the emotional health score; However, emotional role limitation score was obtained as the lowest score (%0) and this also affected the general health score(%5). It was determined that there was no progression in tumor size in our patient's MRIs taken for control. Our patient, whose radiological follow-up will continue, has ongoing hearing loss and tinnitus complaints as well as swallowing and voice disorders. Although tinnitus complaints decreased significantly (according to THI and VAS scales) and some improvement was determined in terms of quality of life sub-scores, no improvement was observed in the overall quality of life score. It is reasonable to think that one of the reasons for this situation is systemic diseases in the patient, as well as problems that impair the quality of life such as dysphagia and dysphonia. In addition, although it is understood that the patient does not show an increased sensitivity to the pandemic according to the short form of the Coronavirus Anxiety Scale(CAS), it is reported that she prefers to live in isolation from people in this period due to systematic diseases such as asthma and high blood pressure, which pose a high risk for the Covid-19 pandemic.

The negative effects of the epidemic on the quality of life for the individuals are known. The benefit of treatment in the patients who are in the follow-up group, who do not need urgent intervention in the epidemic, but are in the vulnerable group due to their chronic disease, not being able to reach the treatment and help at a sufficient level, being more careful about entering social environments, etc. is overshadowed by the presence of confounding factors. These factors are likely to worsen overall quality of life scores. Our patient continues to be followed up with tinnitus and hearing status, as well as swallowing and voice disorder, and the long-term results of his treatment and its reflections on quality of life will be shared. Tinnitus therapy had a positive effect on the patient's quality of life sub-scores; however, it has not been successful in increasing the overall quality of life score. Among the reasons for this situation, there are reasons such as the fact that the patient's swallowing and hoarseness problem still continues, and that the patient's living alone, as the patient's statement, forces herself more as the pandemic process gets longer.

CONCLUSION

The application of tinnitus therapy in the home environment and at the most appropriate time during the day for the patient can meet the needs of getting help for tinnitus and reduce their distress to a certain extent. Presenting the multidisciplinary approach we apply in the presence of glomus tumor and sharing our results may be meaningful especially for these patients who have reduced options for getting help during the pandemic period. Long-term results from the patient's post-pandemic controls are important in order to evaluate the benefit of continued treatment independent of the effect of the pandemic period.

Conflict of interest

No conflict of interest was declared by the authors.

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