

# Diagnosis of Acoustic Neuroma through Telemedicine

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## Abstract

A 65-year-old male individual presented to an electronic urban primary health center with complaints of impaired hearing in the left ear, loss of sensations on the left side of the face, loss of sensation of taste of the left side of the tongue, and tingling and numbness of the left side of the face for 2 months. He had a history of diabetes for 8 years and hypertension for 5 years and on regular medication. The patient was completely evaluated by the medical officer and referred to a general medicine doctor for teleconsultation. The general medicine specialist had clinical evaluation, and after detailed discussion with the medical officer, he was referred to a neurosurgeon for further evaluation and management to Guntur Medical College. He had evaluated the client and recommended magnetic resonance imaging scans, and imaging revealed an extra-axial cerebellopontine angle solid mass lesion of size 3 cm × 2 cm with cystic component, arising from the left internal auditory canal causing mass effect on the middle cerebellar peduncle, suggestive of left acoustic neuroma without mass effect. He had specialized radiation therapy of 30 fractions of 25 gray in 5 cycles from July 20 to August 5, 2019, currently on regular medication for diabetes and hypertension and Vitamin B<sub>12</sub> supplements, and follow-up scheduled in July 2020.

**Keywords:** Acoustic neuroma, telemedicine, vestibular schwannoma

## INTRODUCTION

Acoustic neuroma is also called a vestibular schwannoma. It is a benign intracranial tumor and develops from myelin-forming cells of the vestibule cochlear nerve gradually over the years with 1–2 mm growth rate per year.<sup>[1]</sup> Usually, manifestations range from asymptomatic to symptoms such as gradual or sudden unilateral hearing loss associated with tinnitus, facial numbness, and vertigo.

This case was identified and diagnosed through teleconsultation at Mukhyamantri Arogya Kendram (MAK) (a digital health enabled primary health center) at Salipeta Electronic Urban Primary Health Center (e-UPHC) in Guntur district. He was referred to a general medicine consultant through virtual consultation and then referred to Government General Hospital (GGH), Guntur, for further management.

## CASE REPORT

A 65-year-old male patient visited the MAK center at Salipeta, Tenali town of Guntur district of Andhra Pradesh on July 16, 2019. His demographic details were collected, and an electronic medical record was generated with a universal health-care identifier. He complained of impaired hearing in the left ear,

loss of sensations of the left side of the face (left maxillary area along with superficial one-third of the mandibular area), and loss of sensation of taste of the left side of the tongue for 2 months, and all the symptoms started simultaneously 2 months ago. He had a history of disturbed sleep with mild tingling and numbness of the left side of the face with intermittent episodes of mild headache which relieved after taking rest or sleeping for 2 months for which he did not consult any doctor as the symptoms were mild and were relieved on some rest. He was known diabetic for 8 years and had a history of hypertension for 5 years on regular medication, metformin hydrochloride 500 mg twice per day for diabetes mellitus type 2, and amlodipine 5 mg once per day for hypertension. Both his sugar levels and blood pressure were within normal limits.

Vitals examination revealed a height of 176 cm, weight of 84.5 kg, and temperature of 97° F, pulse rate of 84 beats per min, regular with a normal rhythm, respiratory rate of 16 cycles

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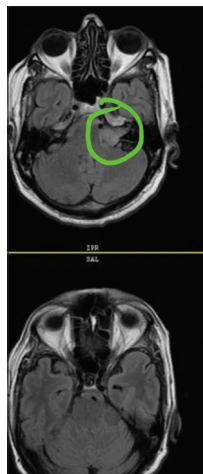
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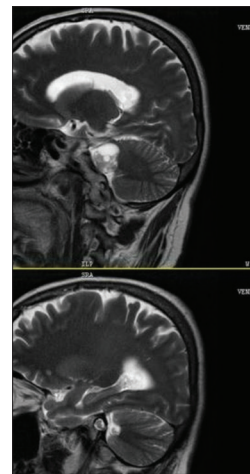


**Figure 1:** Magnetic resonance imaging of the head, transverse section

per min, and blood pressure of 125/80 mmHg. General examination findings show no clubbing, no cyanosis, no pallor, no icterus, no lymphadenopathy, and no pedal edema. Cardiovascular system examination revealed apex beat is in the left 5<sup>th</sup> intercostal space in the midclavicular line with no heaves and thrills, normal heart sounds s1 and s2, no murmurs, or other adventitious sounds. Respiratory system examination reveals trachea to be central, normal vesicular breath sounds, no crackles, and rhonchi. Abdominal examination revealed no tenderness, no guarding, no rigidity, no palpable mass, and no organomegaly, and auscultation reveals normal bowel sounds.

Central nervous system and musculoskeletal system examination reveals that there is sensory loss of the fifth cranial nerve on the left side of the face, the corneal reflex was normal, and eighth cranial nerve examination reveals sensorineural hearing loss in the left ear. No abnormality was detected in motor and sensory system examination, and all deep tendon reflexes were normal and elicited a normal plantar reflex. Coordination and gait were normal, and Romberg's test was negative.

He was completely evaluated by the medical officer at e-UPHC and was referred to a general medicine doctor for teleconsultation. The general medicine specialist had taken the case history and, after detailed discussion with the medical officer, had referred to a neurosurgeon at GGH, Guntur, for magnetic resonance imaging (MRI) brain scan and was asked to come back for review. The neurosurgeon evaluated and prescribed MRI brain. It was carried out on July 17, 2019, and revealed an extra-axial cerebellopontine angle solid mass lesion of size 3 cm × 2 cm with cystic component, arising from the left internal auditory canal causing mass effect on the middle cerebellar peduncle, suggestive of left acoustic neuroma without mass (left vestibular schwannoma of size 3 cm × 2 cm with mild cerebral atrophy) [Figures 1 and 2]. The neurosurgeon referred the patient to the oncology department of omega hospitals, Hyderabad, for further management. He was clinically evaluated by a team of surgical oncologist and radiation oncologist, and the treatment plan was specialized



**Figure 2:** Magnetic resonance imaging of the head, sagittal section

radiation therapy up to 30 fractions in 6 weeks after explaining the risks and benefits of therapy.<sup>[1]</sup> He underwent computed tomography (CT) simulations and then radiation therapy of 25 gray in 5 cycles to left acoustic neuroma with stereotactic radiosurgery (SRS). The patient got admitted on June 20, 2019; CT simulations were conducted on June 24, 2019; treatment was carried from June 27, 2019, to August 5, 2019; and the radiation therapy sessions were uneventful.

Follow-up evaluation post-SRS revealed, he was hemodynamically stable, and there is no progression in the hearing impairment. Follow-up MRI scan in the month of January 2020 reveals no change in the size of the tumor, but the severity of the symptoms has considerably decreased. Follow-up and repeat scan is advised again 6 months later in the month of July 2020 to decide on further course of the management.

## DISCUSSION

The earliest symptoms of acoustic neuromas include ipsilateral sensorineural hearing loss/deafness<sup>[2]</sup> (i.e., impairment or loss of hearing on the same side in relation to the side of occurrence of schwannoma), disturbed sense of balance and altered gait,<sup>[1]</sup> vertigo with associated nausea and vomiting, and pressure in the ear, all of which can be attributed to the disruption of normal vestibulocochlear nerve function.<sup>[3]</sup> The afferent root of the trigeminal nerve,<sup>[4]</sup> which links the gasserian ganglion and the pons, may be a site for schwannomas, with the tumor growing in the cerebellopontine angle.<sup>[5]</sup> The majority of the tumors growing in this region are comprised of vestibular schwannomas.<sup>[6]</sup>

He was diagnosed with acoustic/vestibular schwannoma left cerebellopontine angle.<sup>[7]</sup> On further elicitation, he revealed a history of hearing impairment and tinnitus left ear with headache and disturbed sleep. The inner ear is composed of the cochlea, internal basilar membrane and cochlear nerve. Inner ear helps with sensorineural hearing ability of an individual. The pinna, ear canal, and tympanic membrane which constitute the external ear transmit the sounds to the

middle ear, and they do not have any role in conduction or sensorineural hearing ability.

He had received radiation therapy of 5 cycles, and follow-up revealed no progression in hearing impairment, with relief from headache. Sleep pattern has become regular, except random sleep disturbances. The tingling and numbness over the left side of his face have decreased considerably. The major variation of symptoms and presentation observed in this case is loss of sensation of taste of the left half of the tongue for 2 months, atypical presentation of acoustic neuroma. There is no further progression of hearing loss and loss of sensation over the left side of the face has subsided. The patient complaints of mild tingling and numbness sensation over the left side of the face. Sensation of taste of the left half of the tongue has also improved considerably now. Currently, sleep pattern is regular but with occasional sleep disturbances intermittently.

Acoustic neuroma is a benign tumor,<sup>[8]</sup> and these tumors develop from the vestibular nerve associated with balance.<sup>[9,10]</sup> Usually, symptoms of acoustic neuroma vary from person to person.<sup>[11]</sup> The common symptoms are hearing loss in either ear, tinnitus, loss of sensation of one side of the face, and dizziness or unsteadiness.<sup>[12]</sup> In this peculiar case, e-UPHC and telemedicine have proven to be the cheapest, as well as the fastest, way to bridge the rural–urban health divide by bringing the specialized health care to the patient in the remotest corner. There is a significant cost saving in the system since the patient avoided expenses toward travel, stay, and for treatment at the hospitals in the cities. Early diagnosis and treatment of this patient will significantly improve the health outcome.

Telemedicine has helped to save lives in crowded communities and urban socioeconomically backward outposts. The benefits of telemedicine extend beyond cost and convenience.

Telemedicine helps in reducing mortality rates and complications as the transmission of health records and data is immediate. Medical specialists located in urban areas can serve patients in rural regions using telemedicine technologies. Instead of driving to a medical practice, patients can get immediate access to the specialist from anywhere through the concept of telemedicine. That way, telemedicine serves to significantly increase patient satisfaction.<sup>[13,14]</sup>

## CONCLUSION

In a bid to provide equal access to quality care to all, the Government of India and the Board of Governors of the Medical Council of India have laid out telemedicine practice guidelines enabling registered medical practitioners to provide health care using telemedicine.<sup>[14]</sup> This case report clearly emphasizes the role of digital health and telemedicine at primary health-care level in early identification of acoustic neuroma, timely referral to higher centers for further management, and the response to the treatment plan. Telemedicine is perhaps the greatest

innovation to emerge in the context of the paradigm shift from sustained yield health care of a hospital to managing it as ecosystems for multiple cost-effective, patient-friendly, and personalized health-care benefits.<sup>[13]</sup> Little did we know that the prophecy “telemedicine is the future of healthcare” would become true and would impact so many lives. The e-UPHC program of telemedicine, in this case, is a leading example of delivery of specialty health and facilitation of early diagnosis, treatment, and prevention of complications of acoustic neuroma, digitally.

## Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his consent for his images and other clinical information to be reported in the journal. The patient understands that his name and initials will not be published and due efforts will be made to conceal identity, but anonymity cannot be guaranteed.

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Nil.

## Conflicts of interest

There are no conflicts of interest.

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