



## **Impact of Balance Training and Co-ordination Exercises in Post-Operative Left Cerebellopontine Angle Tumor: A Case Report**

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### **Authors' contributions**

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

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**Case Study**

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## **ABSTRACT**

**Introduction:** Acoustic neuromas are most common tumors of CP angle, accounting more than 90% of all such tumors. Meningioma, primary cholesteratoma and facial nerve schwannoma are the different type of tumors. Acoustic neuroma is a benign tumor situated in CP angle which has a fibrous growth and originates from the division of vestibulochochlear nerve.

**Aim:** Impact of Balance Training and Co-ordination Exercises in Post-Operative Left Cerebellopontine Angle Tumor

**Case Presentation:** A 40 year old male with right hand dominance was referred to physiotherapy department. On examination he presented mild impairment in balance and co-ordination, assisted walking.

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**Discussion:** This case report is an important to the published literature on rehabilitation of a patient with CPA tumor, as it presents the sequential management in the patients post CPA tumor.

**Conclusion:** Acoustic neuroma is most common CPA tumor. Management of CPA tumor is important to improve quality of life. As per the reference articles and the exercises planned can progressively improve balance and co-ordination of patients.

*Keywords: CP angle tumor; sensorineural hearing loss; tinnitus; physiotherapy; case report.*

## 1. INTRODUCTION

The cerebellopontine (CP) angle is formed anterolateral by the posterior aspect of the petrous temporal bone, posteromedial by the cerebellum and pons [1]. Various types of CP angle tumors include epidermoids, meningiomas, metastases, acoustic neuroma and neurinomas of the jugular foramen [2]. The bulk of these tumors (about 80%) are acoustic neurinomas [2].

A benign tumor of eighth cranial nerve is known as an acoustic neuroma (AN) (VIII). Vestibular schwannoma, or more precisely vestibulocochlear schwannoma, is a benign tumor of the inner ear [3]. Physicians are conscious of the fact that lesions of the cerebello-pontine angle, particularly in acoustic neuromas, can cause a rapid loss of hearing [4]. Hearing loss caused by a CPA mass is thought to be caused by one or more of the following theories: 1. Pressure on the 8th nerve; 2. Inner ear vascular compromise; 3. Biochemical changes [4]. Tinnitus is termed as an auditory perception of sound though it is absent or the surrounding is quiet [5,6]. Thus, this may lead to hearing loss [5,7]. It is a rather common condition, with prevalence ranging from 7 to 20% [8]. Acoustic neuroma should be suspected if you have unilateral hearing loss and tinnitus [9].

## 2. PATIENT INFORMATION

A 40-year-old right-handed man, presented with complaint of weakness of left upper and lower extremity for 2-3 months; difficulty in swallowing; reduced hearing since October 2018 (since 3 yrs) from left ear, unable to hear whispers gradually progressive in nature; left ear ringing sensation since 3 yrs low pitched, on and off in nature; giddiness since 3 yrs on and off in nature, lasting for 10 minutes, not associated with positional changes. Patient had initially visited local practitioners and was managed conservatively then visited a private hospital and was advised surgical management. Patient was admitted to AVBRH on 28 September 2021. On 10<sup>th</sup> October

2021 patient underwent under app under a temporary transorrhaphy of left eye performed under local anesthesia in supine position. Patient had a history of alcohol intake since 17 yrs, last intake 7 months ago and khara chewing since 15 yrs. No family history.

## 3. CLINICAL FINDINGS

The patient was examined after taking the consent. Patient was conscious, oriented to time, place, and person, was cooperative and could follow commands. On examination he presented mild impairment in balance and co-ordination, and walked with support. Motor examination showed normal muscle tone, intact sensations, and normal ROM. His score on MMSE was 26.

His deep tendon reflexes were exaggerated.

**Table 1. Therapeutic interventions of cranial nerves**

| Cranial nerves          | Findings   |
|-------------------------|--|
| Optic nerve             | Loss of vision on left side  |
| Facial nerve            | No facial expressions on left side<br>No frowning because of clips attached to left eye<br>Mouth deviation to right side |
| Vestibulocochlear nerve | Hearing loss on left side  |

## 4. THERAPEUTIC INTERVENTIONS

The physiotherapy interventions focused on cerebellar impairments and a limitation of activity [10]

The most frequently used physiotherapy interventions are Proprioceptive Neuromuscular facilitation exercises, Frenkel's exercises, the equilibrium exercises for balance and exercises for improving static and dynamic balance in standing [10].

Conservative physiotherapy exercise programme 3 days each week over a period of four weeks [10].

Physical therapy exercises started with individual leg movements in the sitting position, progressed to static and dynamic standing balancing activity, as well as assisted walking with minimal support [11-13].

All the above mentioned exercises are done with task oriented exercises for 35-45 minutes along with ergonomic exercises [14].

## 5. FOLLOW-UP AND OUTCOMES

There was a improvement in the Berg balance scale score, DGI Score, and the WHO-QOL post-rehabilitation.

## 6. RESULTS

Early rehabilitation for patients with operated case of CP angle tumor proves beneficial in improving balance and co-ordination. He is under regular follow-up and rehabilitation in our department.

## 7. DISCUSSION

CPA tumours accounts for 5-10% of all intracranial tumours. The majority of CPA tumours are benign, with vestibular schwannomas accounting for over 80% of all tumours [15]. After diagnosing of CP angle tumour early treatment should be started as delayed treatment can result in poor outcome [16]. In the study researchers found that there were slightly more male dominance and a mean age of 56 years [17]. Early rehabilitation in CPA tumours includes balance and coordination training. This review showed some evidence that physiotherapy can help persons with cerebellar impairment improve their gait, and activity limitations. Many researchers have shown that central vestibular disorders prove improvement in balance [10]. In this patient we gave balance exercises, gait training, and Frenkle's exercises which proved to be beneficial.

## 8. CONCLUSION

Acoustic neuroma is most common CPA tumor. Management of CPA tumor is important to improve quality of life. As per reference articles and the exercises planned can progressively

improve balance and co-ordination of patient. Physiotherapy plays important role in managing balance training in CPA tumor patients.

## CONSENT

A proper informed consent was taken from the patient prior.

## ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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