Neurophysiotherapy Following Cerebellopontine Angle Tumour Excision: A Case Report.

Abstract:

The most common type of tumour in the posterior cerebral fossa is a cerebellopontine angle tumour. They cause facial muscle weakness, significant motor impairments, and sensory impairments. Postural control, balance, and coordination have been enhanced by a particular physiotherapy intervention in conjunction with dual-task training, Frenkle's exercises, strength endurance, and facial exercises. A twelve-week focused physiotherapy intervention after post-CP angle tumour excision is reviewed in this care report.

Key words: CP angle tumour, physiotherapy, Dual task training.

Abbreviations: CP- Cerebellopontine.

INTRODUCTION:

Cerebellopontine angle tumours are slow-growing lesions at the junction of the cerebellum, brainstem, and internal auditory canal, most commonly arising from the vestibulocochlear nerve (1). Clinical manifestations of CP angle tumours vary according to their location and can be typically asymptomatic or neurologically destructive.The anterior inferior cerebellar artery and the cranial nerves V, VI, VII, and VIII arise from the CPA cistern. The CP angle tumours present symptoms such as vertigo, headaches, hearing loss, tinnitus, dizziness,aberrant gait, and facial muscle weakness(2). Early diagnosis is CP angle is critical, usually asymptomatic in nature. Magnetic Resonance Imaging (MRI) is the most common approach for identifying CP angle tumours because it has higher specificity for diagnosing both asymptomatic and symptomatic conditions (3). Surgical excision is the Gold Standard management for CP angle tumours, which can be done via the retrosigmoid approach.(4). Brainstem tumours have a higher risk of seizures, facial muscle paralysis, and postoperative raised ICP and CSF Leakage might be seen. Postoperative outcome of CP angle tumour excision entirely depends on the patient's condition. Whereas patients with good preoperative status have good postoperative outcomes in 80-90% of patients (5). Motor recovery following the excision of the CP angle tumour is unique, depending on patient deficits. This case report highlights the impairment of a patient with a CP angle tumour excision in the acute phase and its effects on specific physiotherapy intervention strategies, such as dual-task training on balance, coordination exercises, and facial muscle exercises to bring about better motor recovery and functional outcomes.

CASE DESCRIPTION:

A 45-year-old male presented with complaints of abrupt-onset headache, right-sided facial muscle weakness, and difficulty walking for three days; the symptoms had deteriorated over time. In August 2026, he consulted a neurosurgeon, and all of his necessary investigations were completed. He was diagnosed with a CP angle tumour. After confirming pre-operative fitness and gaining informed consent, intraoperative neuromonitoring was carried out under general anaesthesia. After the surgery, the patient was monitored and treated with intravenous (IV) fluids, IV antibiotics, IV antacids, and other supportive medications. Overall, the patient's hospitalisation was uneventful.

Following the surgery, the patient developed neurological deficits in the right upper and lower extremities and right-sided facial muscle weakness. He was referred for physiotherapy management.

CLINICAL INVESTIGATIONS:

Multiplanar, multisequence MRI of the brain was performed, including T1W, T2W, FLAIR, DWI, ADC and SWI sequences. Post-contrast T1-weighted images were obtained. An extra-axial, well-defined, lobulated

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soft tissue intensity lesion is noted in the left cerebellopontine angle cistern.The lesion appears hypointense on T1-weighted images and heterogeneously hyperintense on T2-weighted and FLAIR images. The lesion demonstrates avid, heterogeneous post-contrast enhancement. The lesion extends towards the left internal auditory canal (IAC), with widening of the porus acusticus. Mild mass effect is noted on the adjacent left middle cerebellar peduncle and cerebellar hemisphere. Mild indentation of the left lateral aspect of the pons is noted.

CLINICAL FINDINGS

During observation, the patient was lying with an adducted and internally rotated right shoulder, extended elbow, and neutral wrist and hand position. In a supine position, he adducted and externally rotated his right hip, extended his knee, and plantarflexed his ankle.The Numeric Pain Rating Scale (NPRS) indicates a pain level of 6 during assessment. The patient's muscle consistency was firm based on palpation, and a higher mental function evaluation revealed alertness, comprehension, orientation to time and place, in addition to good attention and memory. Motor examination showed diminished tendon jerks with near-normal muscle tone and muscle strength of 3+/5 in manual muscle testing. Patient was able to do isolated assisted movement patterns with gross coordination in the upperand lower limbs. Sitting balance was fair in feedforward and feed backward mode, and standing balance was poor.Outcome measures like the Scale for the Assessment and Rating of Ataxia (SARA), Berg Balance Scale (BBS) and BarthelIndex were evaluated pre- and post -intervention as shown in Tables 2 and 3

INTERVENTION:

The patient received intervention 5 days a week, where the below-mentioned protocol was provided for a session of approximately 1.5 hours.

EDUCATION: The patient and caregiver were educated regarding CP Angle Tumour. The patient and caregiver were also educated on the importance of physiotherapy and its impact on physical function and independence. Education of the caregiver regarding proper handling and ambulation was carried out to prevent secondary complications. The patient and caregiver were also educated about secondary complications and home managementto prevent secondary complications.

PHYSIOTHERAPY INTERVENTION:

General strengthening exercises, Frenkel exercises, balance training, dual-task training, and facial exercises were done before exercises and facial massages were done. Followed by facial exercises. **Table 1.** Exercises were progressively made more complex as the patient's abilities improved, with continuous verbal cues to maximise performance. Postural stability was significantly improved in sitting and standing and in ambulation.

RESULTS:

The pre- and post-intervention scores of the assessment and the rating of the outcome measures by SARA Scale **Table 2**, facial muscle weakness by House-Brackmann Scale, balance by Berg Balance Scale, & Functional Independence Measured by Barthel Index showed significant improvement **Table3**

DISCUSSION:

Cerebellopontine angle tumours are the most common tumours requiring immediate surgical intervention, followed by physiotherapy management. These lesions can affect normal brain function, resulting in a variety of neurological symptoms such as motor deficiencies, sensory abnormalities, and problems with coordination and facial muscles(6)(7). Our patient presented to our rehabilitation centre for rehabilitation in the post-operative state with impairment of coordination, balance and facial muscle deficits. The therapy strategies were incorporated into tailored programs that combine balance and dual-task training. Dual-task training on a stable surface improved balance and motor control, which was appreciated in our patient, and findings showed improved balance and postural stability (8). Improvements in coordinated movements are

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possibly linked to Frenkel's workouts and reaching in functional positions that had enhanced the spatial and temporal components of movement, which showed that Frenkel Exercises reduced ataxia and improved the quality of movement(9). Our patient's prognosis after CP angle ablation with a 12-week intervention showed a significant change in the SARA and Berg balance scales, moving the individual from severe to moderate dependence as measured by the Barthel index.

CONCLUSION:

We determine that implementing targeted physiotherapy methods, such as dual-task training and Frenkel exercises, alongside general strength and endurance workouts, enhances motor control, postural stability, balance, and coordination, leading to improved functional performance. The favourable results observed in this patient motivate the planning and integration of interventions that utilise specific techniques to achieve greater functional recovery.

CONFLICTS OF INTEREST: No conflict of interest

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Table 1: PHYSIOTHERAPY INTERVENTION

	TASK TO BE PERFORMED
Strengthening Exercises	• **Isotonic strengthening exercises with minimal to moderate manual resistance for upper extremity and lower extremity muscles**
Coordination Exercises	• **Frenkel's Exercises for UL and LL, reaching in functional positions**
Dual Task Training	• **Standing on different stable surfaces and performing functional-oriented tasks**
Balance Exercises	• **Feedforward and feedback exercises in sitting and standing positions**
Gait Training	• **Weight-bearing exercises** • **Stair climbing** • **Side stepping** • **Obstacle walking** • **Walking on uneven surface** • **Tandem walking**
Facial Exercises	• **Gentle facial massage** • **Facial muscle strengthening exercise** • **Facial muscle Taping**

Table 2

	PRE-TREATMENT	POST-TREATMENT
SARA TOTAL SCORE	**26/40**	**9/40**
Gait	**6/8**	**2/8**
Stance	**5/6**	**2/6**
Sitting	**3/4**	**1/4**
Speech Disturbance	**Normal**	**Normal**
Finger Chase	**3/4**	**1/4**
Nose -Finger Test	**3/4**	**1/4**
Fast Alternating Hand Movements	**3/4**	**1/4**
Heel -Shin	**3/4**	**1/4**

Table 3: House-Brackmann Scale, Berg Balance Scale& Barthel Index.

	PRE-TREATMENT	POST-TREATMENT
HOUSE BRACKMANNSCALE	**5**	**2**
BERG BALANCE SCALE	**15/56**	**45/56**
BARTHEL INDEX	**45/100**	**80/100**

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