

# CEREBELLOPONTINE ANGLE TUMORS: A CLINICAL STUDY IN A TERTIARY CARE HOSPITAL

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## ABSTRACT

**Background:** Cerebellopontine angle (CPA) tumors accounts for 5- 10% of all intracranial neoplasms, and are mostly benign with vestibular schwannoma being commonest. Clinical features depend on size and location of tumor.

**Objective:** To determine the frequency and clinical features of patients with cerebellopontine angle tumors.

**Methodology:** This descriptive cross sectional study was conducted at Neurosurgery Department of Pakistan Institute of Medical Sciences, Islamabad from January 2009 to December 2011. Sample size was 45 and sampling technique was consecutive non probability sampling. Inclusion criteria was all patients of any age or gender presenting with cerebellopontine angle tumor. Exclusion criteria was patients with recurrent CPA tumor and tumor other than CPA. Clinical features, imaging characteristics and resectability was taken into account. Data entered in Proforma and subjected to statistical analysis using SPSS 20.0.

**Results:** Total patients were studied with mean age of 39 + 2.54 years. 19(42.2%) were male and 26(57.7%) were female. Regarding the subtypes, 36(80%) were vestibular schwannomas, 5(11%) meningiomas and 4(8.8%) were epidermoid tumors. Commonest presenting feature was sensorineural hearing loss in 37(82.2%), headache in 34(75.5%), cerebellar signs in 32(71%), tinnitus in 22(48.8%), facial nerve dysfunction in 33(73.3%) and papilledema in 25(55.5%) cases. Most CPA tumors in size were giant (>40 mm) in 26(57.7%) cases. Total resection was done in 30(66.6%) cases. Commonest complication was CSF leak observed in 7(15.5%), meningitis in 4(8.8%) and lower cranial nerve palsy in 5(11%) patients.

**Conclusion:** Cerebellopontine angle tumors are most commonly seen in fourth to sixth decade of life with hearing loss, headache and ataxia being commonest features and vascular schwannoma commonest subtype.

**Key Words:** Cerebellopontine angle, Resectability, Papilledema, Cerebrospinal Fluid, Meningitis.

## INTRODUCTION

Cerebellopontine angle (CPA) is a triangular space bounded by the temporal bone anterolaterally, pons medially, cerebellar hemisphere anteriorly, tentorium cerebella superiorly and lower cranial nerve inferiorly<sup>1</sup>. Cerebellopontine angle (CPA) tumors are the most common neoplasms and account for 5-10% of all intracranial tumors<sup>2,3</sup>. Most CP angle tumors are benign, however the complex anatomy and important neurovascular structure in this space makes the management of these tumor a challenge to neurosurgeons<sup>4</sup>.

Vestibular schwannoma are the most common tumor of cerebellopontine angle (CPA), representing more than 90% of all such tumors. Other tumors of this area include meningioma (3-10%) and epidermoid (2-4%). Schwannoma of other cranial nerves, paraganglioma,

chordomas, arachnoid cyst and metastasis are rare<sup>5,6</sup>.

Clinical presentation of CPA usually depends upon size and location of tumor. These tumors are slow growing over a period of years and when increase in size causes compression on surrounding structure resulting in hearing loss (95%), tinnitus (80%), vertigo/unsteadiness (50-75%), headache (25%) and facial hypesthesia (35-50%)<sup>7,8</sup>. Magnetic resonance imaging (MRI) with gadolinium enhancement is the investigation of choice when available and can pick the small intracanalicular tumor less than 4mm<sup>9</sup>.

The management of CPA tumors falls in to three main categories: conservative management, radiotherapy and microsurgical removal. Conservative management in general has a role to play for small tumors, tumor involvement in only hearing ear, advanced age and poor general health<sup>10</sup>. Stereotactic (gamma knife or LINAC) radiosurgery is becoming a popular method for management of small to medium size tumors in some centers<sup>11</sup>. Microsurgical removal of such tumor was the standard form of therapy and include translabyrinthine approach, retrosigmoid approach and middle fossa approach. All surgical approaches were associated with complications. Despite advancement in microsurgical techniques and intraoperative monitoring the mortality rate has been reported between 0.5-3 percent<sup>12-15</sup>.

The current study was conducted to determine

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the frequency and clinical feature of patients presented with CPA tumors.

## MATERIAL AND METHODS

This descriptive cross sectional study was conducted at Neurosurgery Department Pakistan Institute of Medical Sciences Islamabad from January 2009 to December 2011. Sample size was 53 and sampling technique was consecutive non probability sampling. Approval was obtained from hospital ethical committee. Inclusion criteria were all patient having primary cerebellopontine angle (CPA) tumors. Exclusion criteria was patient having recurrent CPA tumor, vascular pathology and tumor other than CPA.

Patients were reviewed for age, gender, clinical presentation, imaging characteristic and resectability. Age wise patients were distributed in to 4 age groups i.e., 0-20years, 21-40years, 40-60 years and 61-70years All patients were operated via retrosigmoid suboccipital craniectomy using standard microsurgical technique<sup>16</sup>. All the data was collected and analyzed by descriptive statistics using software SPSS version 20.0 and represented in the form of tables.

## RESULTS

Total 45 patients with cerebellopontine angle tumors were assessed in this study. Mean age was  $39 \pm 2.54$  years. 19(42.2%) were male while 26(57.7%) were female. In our study there is slight predominance of female with female to male ratio was 1.2:1

Out of 45 cases of cerebellopontine angle tumors 36(80%) were vestibular schwannoma, meningioma constituted for 5(11%) and epidermoid in 4(8.8%) of patients. The most common presenting complaint was sensineural hearing loss in 37(82.2%), followed by headache in 34(75.5%) of cases. Cerebellar sign was observed in 32(71.1%) of patients, tinnitus in 22(48.8%) of patients, fascial nerve dysfunction in 33(73.3%) and papilledema was observed in 25(55.5%) of cases. As shown in table. No.

Magnetic resonance imaging (MRI) with contrast done in all patients. Size of tumor were graded in to medium (10-25mm), large (26-40mm) and giant(>40mm). In our study most of CPA tumors were giant 26(57.7%). 16(35.5%) were large in size while only 3(6.6%) were medium in size.

**Table 1: Gender Distribution**

Gender	Frequency	Percentage
Male	19	42.2%
Female	26	57.7%
Total	45	100%

**Table 2: Tumor distribution according to age.**

Age	Vestibular schwannoma	Meningioma	Epidermoid	Frequency	Percentage
0-20years	3	0	0	3	6%
21-40 years	12	0	1	13	28.8%
41-60years	16	3	2	21	46.6%
61-70years	5	2	1	8	17.7%
Total	36	5	4	45	100%

**Table 3: Distribution according to clinical presentation**

Clinical presentation	Vestibular schwannoma	Meningioma	Epidermoid	Total no of patients	Percentage
Sensineural hearing loss	32	3	2	37	82.2%
Cerebellar sign	26	5	1	32	71.1%
Headache	29	4	1	34	75.5%
Tinnitus	17	3	2	22	48.8%
Papilledema	22	3	0	25	55.5%
Fascial hypoesthesia	28	3	2	33	73.3%

Total resection of tumor was possible in 30(66.6%) Cases of vestibular schwannoma and 3(60%) In meningioma, epidermoid 2(50%) of patient total removal was achieved. Complete adherence of tumor to brain stem and facial nerve was the reason for subtotal removal in remaining cases. The most common complication was cerebrospinal fluid leak in 7(15.5%)of patient followed by meningitis 4(8.8%), rebleed occurred in 2(4.4%) of patient while lower cranial nerve palsy observed in 5(11%)of patients. All the complications were managed conservatively. In our study the mortality rate was (11%).

## DISCUSSION

Cerebellopontine angle (CPA) tumors are the most common neoplasm in the posterior fossa accounting 5-10% of all intracranial tumors. Most CPA tumors are benign, with over 85% being vestibular schwannoma. The first successful removal of CPA tumor was done by Sir Charles Balance in 1894. Later Harvey Cushing in 1917 describe CPA syndrome and pioneered subtotal resection through bilaterale suboccipital craniectomy and reduces the mortality from 50 to 11%<sup>17</sup>. With the advent of era of advance imaging technique operating microscope, modern anaesthesia the goal of vestibular schwannoma surgery shifted from complete excision to preservation of facial and cochlear nerve function<sup>18</sup>.

In our study the most common CPA tumor was vestibular schwannoma 36(80%), followed by meningioma 5(11%) and epidermoid in 4(8%). Almost similar results were obtained by different studies both national and international<sup>19,20</sup>.

CPA tumors also have wide diversity in clinical presentations. A study done by Raja G et al<sup>19</sup> in India recruited 50 patients and Voss NF et al<sup>21</sup> studied 41 cases concluded that the most common presenting symptoms were sensineural hearing loss, headache, and gait ataxia. Other features like tinnitus, facial hypoesthesia, cerebellar signs, papilledema and focal deficit were present in different frequencies in various studies. Almost similar results were obtained in our study.

In our study total resection of tumor was possible in 30(66.6%) cases of vestibular schwannoma and 3(60%) of meningioma, and in epidermoid 2(50%) of patients total removal was achieved. In 10(22.2%) subtotal removal was done due to adherence of tumor with brain stem and facial nerve. Jain VK et al<sup>22</sup> reported complete tumor excision in 70% and in remaining subtotal removal was done which correlates with our study. In our study the most common complication was cerebrospinal fluid leak in 7(15.5%)of patient followed by meningitis 4(8.8%), rebleed occurred in 2(4.4%) of patient. Almost similar results were obtained by Samii M et al<sup>5</sup> and Ebersold MI et al<sup>23</sup>.

There were several limitations in our study. Firstly, the sample size was small. Secondly the patients should

have been followed in order to know which treatment modality they received. Thirdly, only Pakistan Institute of Medical Sciences was the study place, extension of the study to other hospital of same locality could have given us better impression about the frequency of this condition in that particular area..

## CONCLUSION

Cerebellopontineangle tumors shows high incidence in fourth to sixth decade of life with common symptoms being hearing loss, headache, and ataxia. Most of the tumor presented very late with large to giant size having no useful hearing. Vestibular schwannoma is the most common CPA tumor followed by meningioma, epidermoid and arachnoid cyst.

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