ORIGINAL ARTICLE

# Surgical Outcome of Cerebellopontine (CP) Angle Tumors

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## *ABSTRACT*

***Objective:*** *The purpose of this study is to evaluate the clinical characteristics and surgical outcome of CP angle tumors.*

***Material and Methods:*** *This is a retrospective study of 10 cases admitted in the Department of Neurosurgery, Shaikh Zayed Hospital, Rahim Yar Khan during the last 8 years. The predominating symptoms here related to the seventh and eighth cranial nerves and headache.*

***Results:*** *Study included 10 cases of CPA Tumour clinical presentation was hearing loss, tinnitus, abnormal balance, headache, facial numbness and buccal numbness, ataxia and trigeminal neuralgia. We had 10 patients, came with above clinical presentations. All cases were operated through retromastoid sub-occipital craniectomy. VP shunt was inserted in 1 case. Histopathology report was four patients vestibular schwanoma three tentorial meningioma, two epidermoid cyst and one patient had choroid plexuses papilloma.*

***Complications:*** *One patient developed meningitis due to cerebrospinal Fluid leakage at operative site. Lumber drain was placed to control leakage and infection was controlled by aggressive treatment. There was no mortality in our study. One patient developed recurrence of epidermoid cyst at the same site after seven and half years. None of the patients developed further cranial nerve deficit as compare to preoperative deficit. The maximum period of follow-up of one patient was seven and half year.*

***Conclusion:*** *It is concluded from this study that the retrosigmoid corridor is the safe surgical approach for CPA tumors. In case of CP angle epidermoid, there was no recurrence symptoms on the immediate follow-up. At operation, the root entry zone of TN should be examined for evidence of additional vascular compression.*

***Key Words:*** *CP Angle, Schwanoma, Acoustic Neuroma.*

***Abbreviations:*** *CPA: Cerebellopontine Angle.*

## INTRODUCTION

CP angle tumors are 5 to 10% of intracranial tumors and most of them are benign. Over 85% being vestibular schwanoma, vascular formation and hemangiomas. The most frequent non-acoustic CPA tumors are meningioma, epidermoid. Primary malignancies or metastatic lesions accounts for less than 2% of neoplasms in the CPA.

Revolutionary advances in surgical techniques and neuro-radiologic imaging and approaches have made these lesions uniformly treatable with low rates of morbidity and mortality. Surgery is the most definite way for complete tumor removal. This site has vital structures in the posterior fossa, require careful treatment plan to avoid unnecessary morbidity and mortality.

Presenting symptoms of CPA tumors include; hearing lose 95%, tinnitus 80%, Vertigo 50 – 75%. Headache 25%, diplopia 10%. Symptoms can vary according to size and location of the lesions. Surgical resection is considered for any patient in good medical condition with minimal risk to local neurological structures.

Diagnostic procedure evolved from Angiography CT Scan and MRI. 5 to 10% intracranial tumors are CP angle tumors. Most of tumors are benign, 85% being vestibular schwanoma (acoustic tumors) meningio-

mas epidermoids, facial or lower cranial nerve schwanomas.

## MATERIAL AND METHODS

This study represents a retrospective review of patients treated with CPA tumors presenting with hearing loss, tinnitus, abnormal balance, headache, facial numbness and buccal numbness, ataxia and trigeminal neuralgia. We had 10 patients, came with above clinical presentations.

Data were collected from surgical and neuroradiological records. The mean follow-up duration was 2.5 years. A postoperative outcome assessment was evaluated as good, deficit and death at the time of discharge.

### Neuroradiological Aspects

All of the patients were preoperatively evaluated with MRI which provide images with high Spatial resolution and good contrast between sold structures and CSF.

## RESULTS

### Sex Incidence

**Table 1:** *Sex Incidence*

| Sex | No. | Percentage |
|---|---|---|
| Male | 3 | 30% |
| Female | 7 | 70% |
| Total | 10 | 100% |

The details to 10 patients given in table 1, out of 10 cases, 7 (70%) were females and 3 (30%) were male patients.

### Age Incidence

The age was between 17 – 60 years.

### Clinical Feature

The clinical manifestations were hearing loss, tinnitus, abnormal balance, headache, facial numbness and buccal numbness, ataxia and trigeminal neuralgia. We had 10 patients, came with above clinical presentations.

Six patients had radiological findings on right CP angel and four had on left side.

### Surgical Procedure

The 10 patients were treated surgically, sub-occipital retrosigmoid approach was used in all patients and one patient required ventricular peritoneal shunt to control raised intracranial pressure before definitive surgery.

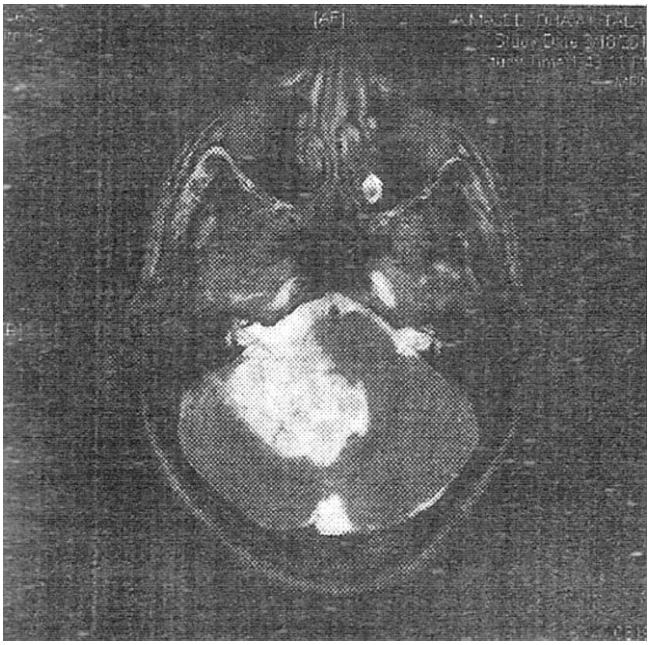


**Fig. 1:**

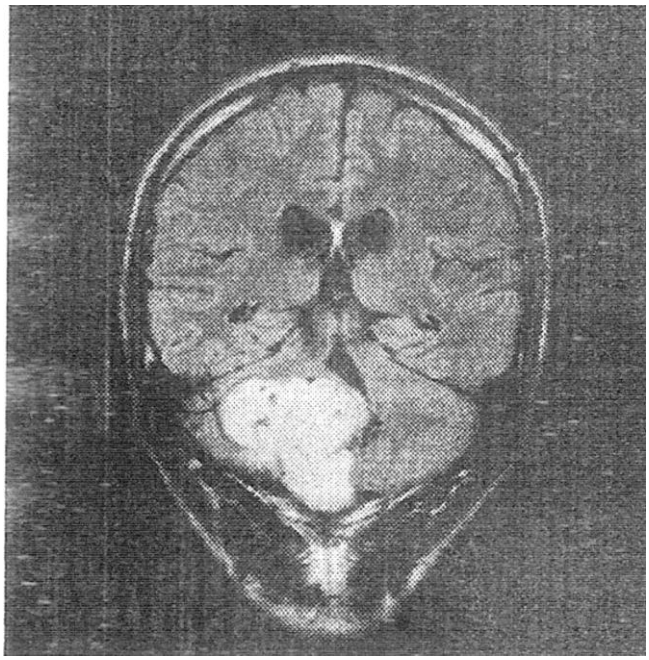


**Fig. 2:**

## Histopathology

Operative findings in all 10 patients including 4 patients vestibular schwanoma, three tentorial meningioma, two epidermoid cyst and one patient had choroid plexuses papilloma (Table 3).

**Table 3:** *Histopathology.*

| Type | Number | Percentage |
|---|---|---|
| Acoustic Schwanoma | 4 | 40% |
| Tentorial Meningioma | 3 | 30% |
| Epidermoid | 2 | 20% |
| Choroid Plexuses | 1 | 10% |
| Papilloma | 10 | 100% |

Neuronavigation system was used in all the cases and CUSA was used to remove the tumors without causing damaging to important neurovascular structures. In two cases of epidermoids cyst complete removal of tumor was not possible, site of origin was not possible to determine due to its invasive nature.

## Complications

One patient developed meningitis due to cerebrospinal Fluid leakage at operative site. Lumber drain was placed to control leakage and infection was controlled by aggressive treatment. There was no mortality in our study. One patient developed recurrence of epidermoid cyst at the same site after seven and half years. None of the patients developed further cranial nerve deficit as compare to preoperative deficit. The maximum period of follow-up of one patient was seven and half year.

## DISCUSSION

We present a heterogeneous series of ten patients who underwent surgery for CP angel through a retrosigmoid approach with facial nerve preservation in all cases (House Brackmann grade I or II) who presented with Tinnitis, abnormal gait and loss of coordination, with hearing loss (30%) confirmed form audiology clinic. One patient had buccal numbness and two facial numbness. Two patients (20%) presented with trigeminal neuralgia.

**Cushing** first described the syndrome of the cerebellopontine syndrome as progression of symptoms (i) auditory and vestibular changes (ii) Headache (iii) ataxia (iv) involvement of adjacent cranial nerves (v) Hydrocephalus (vi) dysarthria and (vii) Cerebellar and

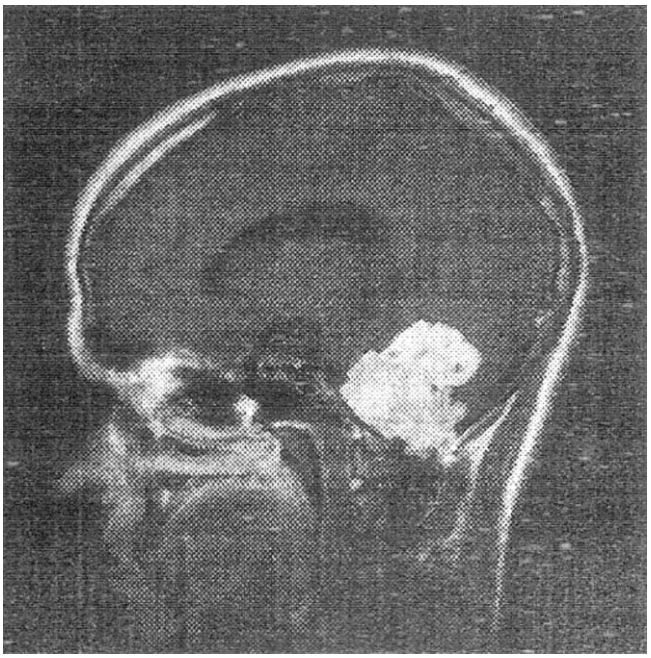
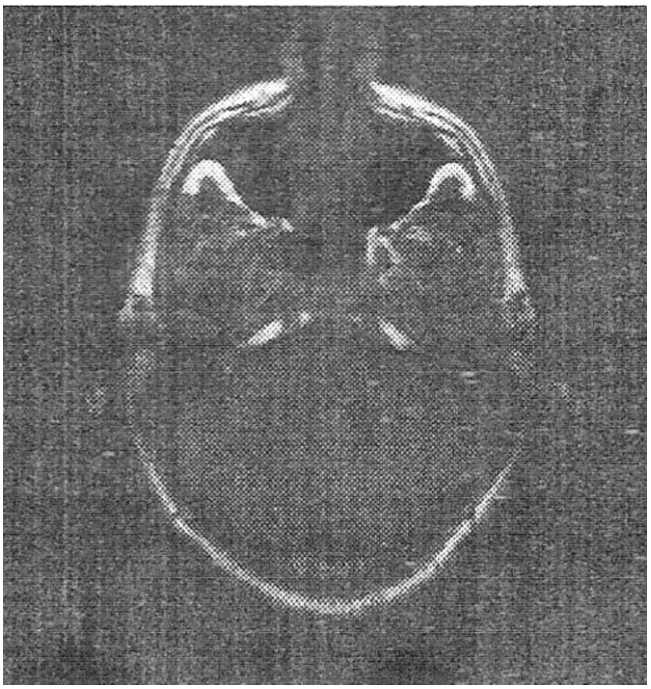


**Fig. 3:**



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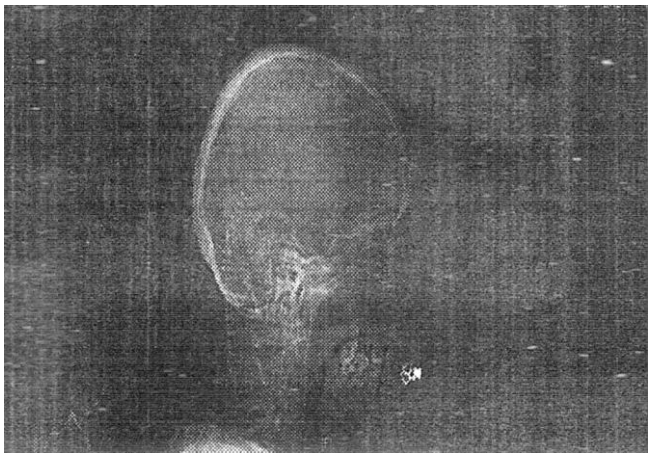

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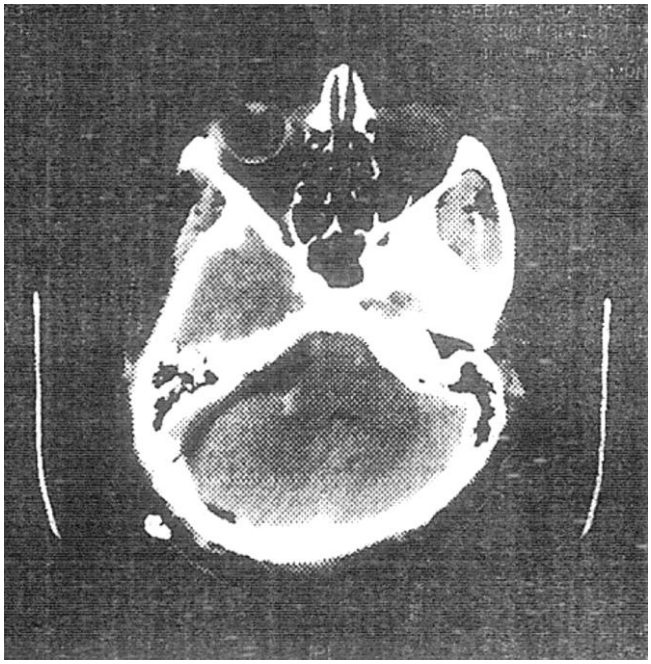

**Fig. 6:**

brain stem crisis.

As in other major series, we found a preponderance of women, and frequent cochlear or vestibular dysfunction. In our cases, preoperative hearing was associated with tumors located inferior to Internal Anatomy Meatus (IAM) or involving the IAM. However the relationship between tumor origin site and cranial nerve displacement is not always predictable. In our group of tumor, facial and vestibulocochlear nerves were displaced upwards in 80% of cases but anterior displacement was observed in 20% of cases.

The mean duration of symptoms declined over the period of study because of faster access to MRI examination. In case of large meningioma, there is a fairly universal consensus if it exerts mass effect on the brain stem and in particular young patient without co-morbidity consider for surgical treatment. In small, asympto-

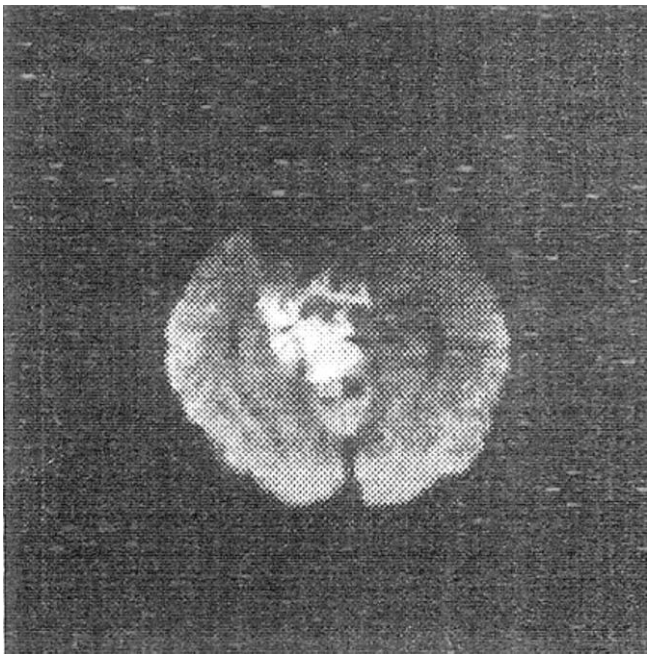

**Fig. 7:**

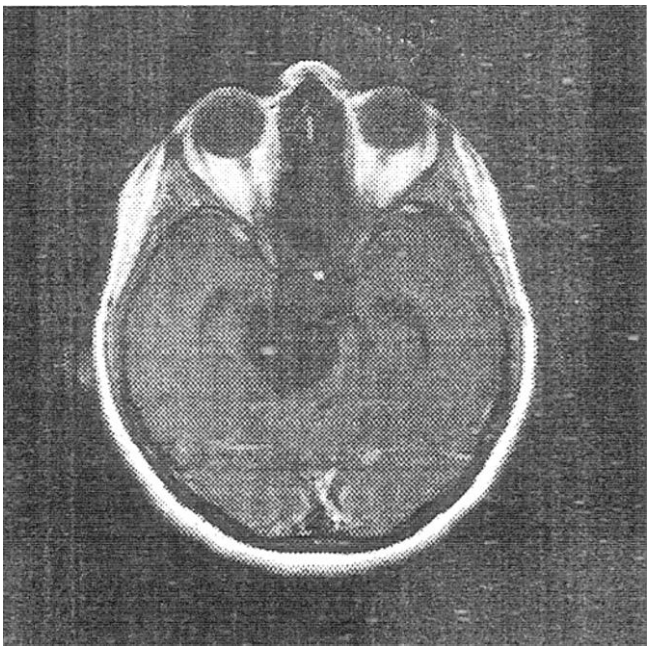

**Fig. 8:**

matic meningiomas, regular clinical and radiological monitoring of patients is required. The proposal of surgical or radiosurgical treatment in case of tumor progression might be accepted.

The diversity of surgical approaches described in the literature reflects the difficulty of CPA surgery and choice of approach is based on clinical and radiological aspect specific to each patient. The retrosigmoid approach is the most frequently used by other authors as well as by our team and allows extrapetrosal approach to the CPA that avoids destroying or opening the labyrinth. The intervention must be conducted under facial monitoring to improve the rate of facial nerve preservation. The tumor is removed, starting with the coagulation and holding of arachnoid layer in one hand which can safe the outer vascular structures from damage.[6]

In case of meningioma, located close to jugular formen, there is increased risk of perioperative vegetative disorders and postoperative swallowing disturbances.

In case of epidermoids at CPA, its incidence is approximately 5%. Incidence of trigeminal Neuralgia in CPA epidermoids has been reported as 0.2 to 5.5% in the literature. Symptoms and signs are caused by displacement of adjacent neurovascular structure.[8,13]

MRI is the diagnostic modality of choice for detection of epidermoid. We agree that the ideal goal in surgery for epidermoid is the total removal but not at the expense of neurological deficits. If the capsule is firmly adherent to the critical neurovascular structures, we leave the adherent portion in place to minimize the risk. Although capsule remnant probably will result in recurrence and in our cases, there is recurrence of one case of epidermoid after seven and half year.[9]

In literature overall estimated recurrence rate of epidermoid in long term follow-up vary from 0 to 30%.[10] Some authors combine a retrolabyrinthine approach with retrosigmoid, arguing that this might reduce the need to retract the cerebellar parenchyma.[3,17] In all other cases, generous drainage of the CSF at the beginning of the intervention by opening the cistern magna usually avoids cerebellar retraction and often allows the operation to be performed without use of retractor or minimal was of secretions.

In our series additional treatment such as radiotherapy or radiosurgery was not required.

## CONCLUSION

It is concluded that:

1. The retrosigmoid corridor is the safe surgical approach for CPA tumors.
2. In case of CP angle epidermoid, there was no recurrence symptoms on the immediate follow-up. At operation, the root entry zone of TN should be examined for evidence of additional vascular compression.

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