

Surgical Complications Following Removal of Cerebello-Pontine Angle (CP) Lesions

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ABSTRACT

Objective: To know about the complications requiring surgical intervention, following removal of cerebellopontine angle lesions.

Materials and Methods: We retrospectively reviewed the series of patients who underwent CP angle tumor surgery at our department between January 2010 to May 2014. The patient age and sex along with the chief complaints as well as prior surgery in the form of ventriculoperitoneal shunt or endoscopic third ventriculostomy (ETV) were recorded on a designed proforma. The derived based immediate surgical complications considered were; Cerebrospinal fluid (CSF) leak, post operative Hydrocephalus (HCP) needing a Ventriculoperitoneal (VP) shunt, post operative hematoma needing re-exploration and death.

Results: A total of fifty six (n= 56) patients were included in this study, with 24 males and 32 females. Age ranged from 3 years to 65 years with a mean age of 41 years, duration of symptoms was from 8 days to 12 years. The mean hospital stay was from 8 to 33 days. Prior surgery was performed in 12 patients (21.3%) with 7 patients having a VP shunt and 5 patients having an Endoscopic third ventriculostomy (ETV). CSF leak was encountered in (7.6%) a deterioration in facial nerve function in 3 (5.4%) patients requiring lateral tarsorrhaphy. Five patients needed immediate re-do surgery with 3 (5.4%) having a VP shunt and 2 (3.6%) patients requiring a re-exploration for post-op hematoma.

Conclusions: The immediate surgical complications of the CP angle surgery are the formation of hematoma, development of hydrocephalus while early complications requiring surgery are CSF Leak and facial nerve palsy. Almost all of them require far or less a surgical intervention for management.

Key Words: Complications, cerebellopontine angle, tumor, surgical, post operative.

INTRODUCTION

Cerebellopontine angle (CPA) is an anatomical and radiological term for the space bound anterolaterally by the posterior aspect of the petrous temporal bone and posteromedially by the cerebellum and pons¹. It contains important vascular structures and cranial nerves and also Internal auditory meatus (IAM)^{1,2}. About 6 to 10% of all intracranial tumors arise in or involve the cerebellopontine angle (CPA) and the vast majority of these (80%) are vestibular schwannomas^{2,3}. Meningiomas and epidermoids account for 10%-15% and 2-6%, respectively, and there is a small percent of an extremely heterogeneous group of tumors^{4,5}.

The most common symptom of the CP angle tumors is the hearing loss, headache, facial nerve weakness, vomiting, and gait problems⁶. Diagnostic tools for CP angle tumor are CT brain, and Magnetic Resonance Imaging of the brain with and without contrast. The primary modality of therapy has been the microsurgical resection albeit the newer techniques of the Gamma Knife (GK) surgery showing good results in the small and medium sized lesions^{7,8}. The outcome of the CP angle surgery has improved over the years and the surgical morbidity and mortality has been decreased⁹. The primary concern during the CP angle tumor surgery focuses on hearing preservation and

facial nerve^{9,10}. The most dreadful early complications requiring surgical intervention are the development of hydrocephalus and the formation of the hematoma^{11,12}. Facial nerve dysfunction of the higher grade is another complication with a potential risk of blindness¹². We had a clinical audit of our patients undergone CP angle tumor surgery in order to know about the early surgical complications following removal of the tumor during the last three and a half years.

MATERIALS AND METHODS

We retrospectively analyzed data of all patients with the CP angle tumors operated between January 2010 and May 2014. The clinical records of all the patients were retrieved along with their operative notes, and data was entered on a designed proforma which included the age, sex, date of operation, length and time of the stay in the hospital, duration of symptoms and post operative complications such as any postoperative CSF leaks, the development of hydrocephalus, the need for any VP shunt, re-exploration for any hematoma and mortality.

The patient charts were reviewed and 68 patients treated in this duration of 3 years and 4 months were selected initially. 12 patients were excluded from the study including 6 patients harboring an abscess and 3 patients having refused surgery as well as three patients referred for Gamma knife. All the data was entered and analysed on SPSS version 16.

RESULTS

In our study there were 24 males and 32 females with a male to female ratio of 1:1.3. The age range was from 3 years to 65 years with a mean age of 41 years. The chief complaints were headache in 29, decrease hearing in 34, decrease vision in 16, vomiting in 12, loss of consciousness in 8, fits in 4, gait problems in 4 and hydrocephalus was observed in 12 patients. Most of the patients were having two complaints at the same time and they were more disturbed by the new onset complaint rather than the old one. The mean duration of symptoms was from 8 days to 12 years, the shortest duration was observed in a patient who has got a cystic lesion while the longest duration was observed in a patient with a CP angle schwannoma which had a very indolent course. From the charts and ward rounds documentation it was noted that most of the patients had a prior CT done which was almost always followed by an Magnetic Resonance Image (MRI)

scan. The documented reports revealed that the size of the lesion was in the range of 3-7 cm, and it showed that either the symptoms were trivial or the people were very stoic or otherwise; lack of facilities, poverty and fiscal issues.

Prior surgeries were performed in 12 patients for hydrocephalus in the form of VP shunt in seven patients and Endoscopic third ventriculostomy was performed in 5 patients since the introduction of the procedure in the department since May 2010. The mean duration between a prior shunt or ETV and definitive surgery was 21 days with a range of 18-53 days, the duration was comparatively longer in patient having a VP shunt compared to an ETV. Surgical approach was almost exclusively the retromastoid sub-occipital. Per-operatively the tumours were mostly solid and non suckable and micro dissection was performed under the microscope. Radiologically and peroperatively the features suggestive of schwannoma (based/extension into internal acoustic meatus (IAM), no dural attachment) were 32(57%), meningioma (dural attachment, no extension into the IAM) was found in 16 (27%) and 3(5.4%) patients were having epidermoid; 2 (3.6%) were also having dermoid lesion, one patient was having arachnoid cyst (1.8%) Trigeminal neuroma was found in 2 (3.6%) patients.

The duration of stay in the hospital was from 8 days to 33 days with a mean of 14 days. The stay was prolonged due to preoperative workup, and duration was quite similar in post operative patients without any complications in which case patients were discharged on the 4th postoperative day. During the early post operative period re-do surgery, which was performed on five patients included VP shunt in 3 (5.4%) patients and re-do craniotomy for two patients (3.6%) due to hematoma. One patient in the latter group had a GCS of 3 and was retrieved by in time intervention with safe discharge home. The early complications were the CSF leak and facial nerve palsy which required surgical intervention in the subsequent 2-3 weeks. CSF leak was encountered in 4 patients (7.4%); of which one patient had a fistula repaired.

Facial nerve function was disturbed/ deteriorated in 3(5.4%) and it was impaired already in two patients with a **House and Breckman** grade III, which deteriorated further to grade IV and V post operatively. He was referred to ophthalmology for lateral tarsorrhaphy initial stages and follow up could not be retrieved for any neuroraphy procedure. Death in our series was encountered in 3 (5.4%) patients, one

patient was having a hematoma and two patients had an indolent course post operatively.

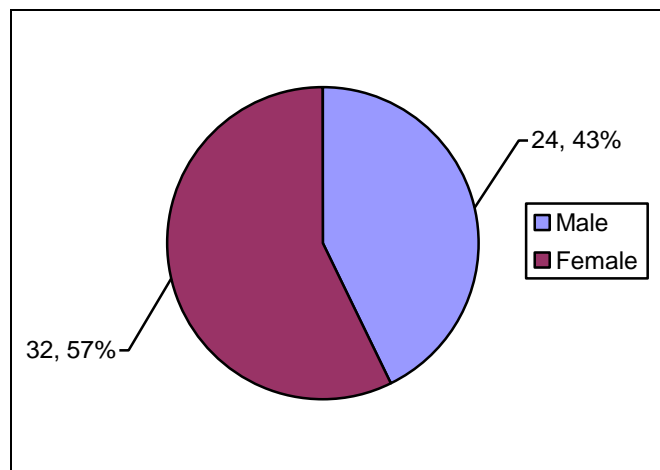


Fig. 1:

DISCUSSION

Surgery is the treatment of choice for symptomatic large CPA tumors and in patient having inaccessibility to the gamma knife. The results of surgery are rewarding with preservation of the hearing and facial nerve function depending upon the preoperative status and the size of the tumor^{9,10}. The cerebellopontine angle is a very delicate and sensitive area; as by a famous saying by Dandy: "If any neurologic surgeon were asked to name the most difficult tumor to extirpate, his answer would doubtless be the acoustic tumor."¹⁴ hence impunity to complications is beyond the reach of even the most specialized and advance set ups although minimized to a significant level over time. We reviewed our results and had an audit of the immediate complications requiring surgical intervention following removal of a CP angle lesion.

The male to female ratio in our series was 3:4. This has been reported to be as high as 2-3:1 in larger series^{1,3,13}. The females are more commonly affected by the tumors than males. The age range in our series was from 3 to 65 years. The mean age was 41 years. The CP angle tumor is more common in the 5th and the sixth decade^{13,15}.

The duration symptoms ranged 8 days to 12 years. The minimal symptoms were with a cystic tumor which gave rise to symptoms suddenly while the mean duration was 3.6 years. Prior surgery was performed in the form of ETV and shunt in 12(21.4%). Hydrocephalus is reported to be present in upto 30%¹⁶

of patients with a posterior fossa lesion. Our criteria for CSF diversion prior to definitive surgery has been that we used diversionary procedures in those who had an overt hydrocephalus, or otherwise were received in a bad neurological condition due to altered CSF dynamics. ETV is the first choice for all patients with obstructive hydrocephalus, and shunt has been used in case of communicating hydrocephalus. Since in CP angle lesions, majority of the patients has communicating hydrocephalus, we used Shunt in these cases.

Posterior fossa surgery is jeopardized by edema and hematoma formation;¹⁵ edema results in the obstruction to CSF flow causing acute hydrocephalus with alteration in the conscious level and subsequent herniation syndromes if not timely intervened¹⁵. The resulting hydrocephalus in our series with subsequent shunt placement was 3.4% and it has been reported after posterior fossa surgery from 1.9 to 2.3%^{11,12} in larger tumors. The subsequent hematoma formation is dangerous and results in the rapid deterioration of patient due to paucity of space in posterior fossa and direct pressure transmission to the brainstem. Even performing a CT scan is debatable in this case¹⁵, which was not done in one patient. Hematoma formation with subsequent evacuation was present in 2 (3.6%). The reported incidence of hematoma with subsequent re-exploration is reported in the range of 1.5-1.9%^{11,12,14} in larger series. The formation was immediate, and the patients were re-explored within 12 hours of extubation.

CSF leaks after posterior fossa surgery is most of the time a harbinger of altered CSF dynamics and the most of the CSF leaks stops (23-80%)¹⁵ with subsequent conservative trials. CSF fistula was encountered in 7.4% of our patients and one patient (1.8%) had undergone through duroplasty for the problem. The rate of CSF fistula after CP angle surgery are reported 5.2-9.2%^{11,12}. The subsequent intervention in the form of repair ranged from 0.6% to 2.8%^{11,12,14}. Some series showed that the leak was high for small and larger tumor while low for medium sized tumor¹².

Facial nerve preservation after the posterior fossa surgery (HB grade 1-3) is reported from 76-96% depending upon the pathologic stage of the lesion. In our series 7.4% of patients required lateral tectoraphy. The function of the facial nerve improves over time and the most of the patients have acceptable outcome at subsequent follow up⁹.

CONCLUSIONS

Immediate surgical complications of the CP angle surgery are the formation of hematoma, development of hydrocephalus while early complications requiring surgery are CSF Leak and facial nerve palsy. Almost all of them requires far or less need a surgical intervention for management.

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