Case Report

A 22-year-old male presented with a history of sudden onset right-sided weakness and diplopia associated with headache and vomiting 2 months prior to admission. Clinical examination revealed Medical Research Council grade IV/V power on right side and left abducens palsy. Plain computed tomographic (CT) scan of brain showed a hyperdense well-defined lesion in left half of pons. MRI Brain revealed a hyperintense lesion in T1-weighted and T2-weighted sequences with a well-defined hypointense rim [Figure 1].

Preoperative tractography was done to track the corticospinal tracts in relation to the lesion and were found to be displaced posteromedially in left half of pons [Figure 2]. Based on the tractography and more ventral location of cavernoma, anterior petrosal approach was planned.

Patient was placed supine with head turned to right side. Lumbar drain was placed to drain cerebrospinal fluid. Left temporozygomatic craniotomy was performed. Extradural anterior petrosectomy was carried out before dural incision. Tentorium was cut posterior to trochlear nerve. After incising the tentorium, anterolateral surface of brainstem was seen but without any xanthochromia. Hence, cavernoma was localized with navigation. Small horizontal incision was taken in anterolateral portion of pons and complete excision of cavernoma was done. Intraoperative brainstem auditory evoked response (BAER) and facial nerve monitoring did not show any disturbance.

Postoperative imaging showed complete excision of the lesion with preservation of the corticospinal tracts [Figure 3].
Postoperative hearing and face was normal. The patient improved symptomatically with complete resolution of diplopia and weakness over 2 months.

Discussion

Brainstem cavernoma follows a more aggressive clinical course due to its eloquent location. Symptomatic lesions reaching up to the pial or ependymal surface are treated surgically. While Tarnaris et al. proposed that conservative management for BC have a better long-term outcome, majority of the authors believe that surgical excision of accessible symptomatic BC will have a better long-term outcome. Multiple approaches have been proposed and utilized for BC – the most common being supracerebellar infratentorial, occipital transtentorial and retrosigmoid.

Petrosal approaches have been infrequently used for BC. Spetzler et al. popularized the use of petrosal approaches for BC. These approaches provide a better ventral exposure than any other approach. Until now, petrosal approach has been reported in 65 cases of BC and anterior petrosal approach was utilized in only 17. In these 17 cases fourteen had the standard Kawase approach whereas other three were operated though an intradural anterior petrosectomy.

In the present case, the anterior petrosal approach was used based on the location of the cavernoma in the anterolateral part of the pons, the relationship of the pyramidal tracts posterior to the cavernoma and our experience with the anteropetrosal approach for other lesions.

Modalities like frameless stereotaxy, BAER, SSEP, intra-operative cranial nerve mapping and neuronavigation can be used to localize the lesion as well as critical neurovascular structures and reduce the morbidity. Preoperative relationship and status of corticospinal tracts in relation to brainstem cavernoma helps in predicting postoperative motor outcome. In the present, case preoperative DTI was used to localize the corticospinal tracts and helped in planning the surgical approach.

The anterior petrosal approach provides a surgical corridor-superiorly till the oculomotor nerves, inferiorly till the mid-clivus, laterally till the internal acoustic meatus, and medially, till the contralateral abducens nerve. Once pons is reached, the cavernoma is approached via the peritrigeminal area, which lies between the pyramidal tracts and the trigeminal nerve, with the anterolateral surface of pons as the base, and the apex being the mesencephalic and sensory nuclei of trigeminal nerve. The safe entry zones for brainstem are through lateral mesencephalic sulcus, the peritrigeminal area, and the inferior olivary nucleus.

The advantages of anterior petrosal approach in the present case are lesser retraction and damage to the cerebellum and temporal lobe, reduced injury to VII-XI nerves and decreased risk to the temporal venous channels. The approach provides a dry surgical field and the reduced risk of cerebrospinal fluid leak owing to the extradural drilling.

In the present case, we did not come across any complications. Various potential complications/disadvantages associated with this approach are—traction injury to temporal lobe, injury to vein of Labbe, traction injury to GSPN (Greater Superficial petrosal nerve), risk of injury to cochlea, semicircular canals and petrous internal carotid artery. However the incidence of these complications is very low. A case report of delayed
facial palsy (facial palsy developing more than 72 h after surgery) has been reported after anterior petrosal approach.[20]

**References**