Anterior transpetrosal approach for pontine cavernous malformation

A 73-year-old man with a history of 3 episodes of intracranial hemorrhage associated with a pontine cavernous malformation located in the right ventral pons.

The cavernous malformation was removed via the supratrigeminal zone of the brainstem using an anterior transpetrosal approach (ATPA).

This approach requires epidural subtemporal procedures to expose the petrous apex adequately. The petrous apex must be totally resected and the dura of the temporal lobe and posterior fossa is then cut to ligate the superior petrosal sinus and tentorium. In this procedure, the most important things are to preserve the internal carotid artery C2 segment and greater superficial petrosal nerve (GSPN). To identify the GSPN, facial nerve integrity monitor (Medtronic Inc, Dublin, Ireland) is very useful. In the extradural bone removal, Sonopet Ultrasonic Aspirator (Stryker Ltd, Portage, Michigan) is a very excellent surgical tool for avoiding the injury of the internal carotid artery. As demonstrated by Daniel D. Cavalcanti, ATPA is particularly useful for accessing lesions located in the upper ventral pons via the supratrigeminal zone because it provides a wide and shallow surgical field above the trigeminal nerve without requiring retraction of the cerebellum [1)].

A 58-year-old male patient presented with headache and unsteady gait. Magnetic resonance imaging revealed hemorrhage from a pontine cavernous angioma. The patient experienced stepwise aggravation of symptoms due to repeated hemorrhages. We decided to surgically remove the pontine cavernous angioma through an anterior transpetrosal approach, since the angioma and hematoma were located near the ventrolateral surface of the pons. The brain stem was incised at a site caudal to the trigeminal nerve and the hematoma and angioma were totally removed. No additional neurological deficits were observed following surgery. Brain stem cavernous angiomas are usually removed via a trans-fourth ventricle or lateral suboccipital approach. However, these approaches may not be appropriate if the angioma is located ventrally to the pons. We propose that the anterior transpetrosal approach is the method of choice for ventrally located pontine cavernous angioma [2)].

1)
Yokoyama K, Kawanishi M, Sugie A, Yamada M, Tanaka H, Ito Y, Yamshita M. Microsurgical Resection of a Ventral Pontine Cavernoma via Supratrigeminal Zone by Anterior Transpetrosal Approach: 2-Dimensional Operative Video. Oper Neurosurg (Hagerstown). 2018 Jul 19. doi: 10.1093/ons/opy177. [Epub ahead of print] PubMed PMID: 30032310.

2)
Saito N, Sasaki T, Chikui E, Yuyama R, Kirino T. Anterior transpetrosal approach for pontine cavernous angioma–case report. Neurol Med Chir (Tokyo). 2002 Jun;42(6):272-4. PubMed PMID: 12116535.