Supratrigeminal zone

Thirteen safe entry zones have been reported and validated for approaching brainstem lesions, including the anterior mesencephalic zone, lateral mesencephalic sulcus, intercollicular region, peritrigeminal zone, supratrigeminal zone, lateral pontine zone, supracollicularzone, infracollicularzone, median sulcus of the fourth ventricle, anterolateral and posterior median sulci of the medulla, olivary zone, and lateral medullary zone. A discussion of the approaches, anatomy, and limitations of these entry zones is included.

A detailed understanding of the anatomy, area of exposure, and safe entry zones for each major approach allows for improved surgical planning and dissemination of the techniques required to successfully resect intrinsic brainstem lesions [1].

A 73-year-old man with a history of 3 episodes of intracranial hemorrhage associated with a cavernous hemangioma located in the right ventral pons. The hemangioma was removed via the supratrigeminal zone of the brainstem using an anterior transpetrosal approach (ATPA). ATPA was first described in 1985 for upper petroclival lesions by Kawase.

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 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. We received written informed consent from the patient for this publication [2].

1)
Cavalcanti DD, Preul MC, Kalani MY, Spetzler RF. Microsurgical anatomy of safe entry zones to the brainstem. J Neurosurg. 2016 May;124(5):1359-76. doi: 10.3171/2015.4.JNS141945. Epub 2015 Oct 9. PubMed PMID: 26452114.
2)
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.