see Anterior petrosectomy.

In 1985, Takeshi Kawase from the Department of Neurosurgery, Keio University School of Medicine, Tokyo, and Ashikaga Red Cross Hospital, Ashikaga, Japan \(^1\) published an anterior petrosal approach to expose the posterior cranial fossa and to minimize retraction of the temporal lobe for upper petroclival

Anterior subtemporal and transpetrous apex approaches let us some exposure of deep region, however they require an unacceptable temporal lobe retraction and provide an extremely narrow surgical corridor in cases of large tumors mainly located in the infratentorial space \(^2\) \(^3\).

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 \(^4\).

Several neurosurgeons still have difficulty with removing tumors through an anterior petrosal approach, because a complete understanding of the Kawase pyramid has not been achieved. Jung et
al. hypothesized that if anterior petrosectomy is performed with a three-dimensional understanding of the Kawase pyramid, it would have a positive effect on the extent of tumor resection.

They performed a retrospective study of patients who underwent surgical treatment for meningioma through an anterior petrosal approach. Patients were divided into total resection and subtotal resection groups, and statistical differences between the two groups were analyzed. To identify factors predictive of complete tumor removal, univariable and multivariable logistic regression analyses were performed.

The width and height of the drilled internal acoustic canal (IAC) of the total resection group were significantly longer than those of the subtotal resection group ($p=0.001, p=0.033$). The operative angle of the total resection group was significantly larger than that of the subtotal resection group ($p<0.001$). Regression analyses showed only drilled IAC width to be predictive of complete tumor removal, increasing the likelihood thereof by 2.778-fold with an increase in drilled IAC width by 1 mm ($p=0.023$).

Insufficient petrosectomy during an anterior petrosal approach adversely affects the extent of tumor resection. Furthering a three-dimensional understanding of the Kawase pyramid could help complete tumor resection and better outcomes without causing damage to the surrounding organs \(^5\).

see Anterior transpetrosal transtentorial approach.

### Indications

see Anterior transpetrosal approach indications.

### Case series

A study of Shibao et al., included 126 patients treated via the ATPA. The bridging vein (BV) and the tentorial sinus (TenS) located in the operative fields were analyzed. Furthermore, in the preoperative evaluation, the cross-sectional shapes of the intradural vein and the interdural sinus were analyzed by curved planar reconstruction (CPR), and the flattening rate was calculated. Flattening rate = \( (a-b)/a = 1-b/a \) (a: long radius, b: short radius).

Seventeen BVs and 18 TenS were identified. The bridging site was divided into two groups: tentorial and middle fossa. The middle fossa group was divided into three subgroups: cavernous sinus, middle fossa dural sinus, and middle fossa dural adherence. Five isolated TenS were sacrificed and no venous complications were observed. The mean flattening rate was 0.13 in the intradural vein and 0.51 in the interdural sinus, respectively ($P = 0.0003$).

They showed classification of the BV, and preservation of the BV and TenS during the ATPA. Furthermore, they found that the interdural sinus was significantly flatter than the intradural veins. Measuring the flattening rate by CPR may be useful to identify BVs preoperatively \(^6\).

### References


