

# Ventral foramen magnum meningioma surgery

Purely ventral foramen magnum meningiomas are challenging tumors to treat given their location, and proximity and relationship to vital neurovascular structures.

Ventrally located tumors have been considered to require other complex approaches to ensure surgical corridor such as the postero-lateral approach, called the far-lateral approach or the antero-lateral approach, also named the extreme-lateral approach <sup>1)</sup>,

Transoral approach has also been used for ventral FMMs. Conventional posterior suboccipital approach has also been used for anterior FMMs.

Far lateral approach, also called posterolateral approach or lateral suboccipital approach, is commonly used to resect ventral FMMs.

Condyle drilling varies from one third to one half of the condyle, in far lateral and extreme lateral approaches.

Transcondylar approaches provide a significant greater area of exposure than the retrosigmoid approach.

Extent of removal of occipital condyle can be individualized according to the case. In some of the FMMs, removal of condyle might not be necessary.

Large ventral FMMs without spinal extension can be easily approached by conventional retrosigmoid suboccipital craniectomy without requiring partial condylectomy as the size of the tumor provides great surgical corridor for tumor removal.

Since Goel et al. <sup>2)</sup> introduced the posterior approach for FM meningiomas, there have been only a few reports of the posterior approach in ventral FM meningiomas <sup>3) 4) 5)</sup>.

The far lateral and extreme lateral approaches are difficult and unfamiliar to many surgeons. Lateral bony exposure also may pose risk to the vertebral artery and low cranial nerve injury. The occipital condyle drilling may sometimes be necessary in the far lateral approach. Therefore, conventional posterior approach without lateral bony extension may be good to address these problems.

Ventral **foramen magnum (FM) meningiomas** can be removed gross totally using a posterior approach without far lateral approach. The arachnoid membrane can then be exploited as an anatomical barrier. However, this approach should be taken with a thorough understanding of its anatomical limitation <sup>6)</sup>.

## Transmastoid Trautman's Triangle Combined Low Retrosigmoid Approach

Di et al. simulated a transmastoid Trautman's triangle combined low retrosigmoid approach using five adult cadaveric heads to explore the associated anatomy in a step-by-step fashion, taking pictures of

key positions as appropriate. We then employed this approach in a single overweight patient with a short neck who was suffering from large ventral FMMs and cerebellar tonsillar herniation. Results Through cadaver studies, we were able to confirm that this transmastoid Trautman's triangle combined with low retrosigmoid approach achieves satisfactory cranial nerve and vasculature visualization while also offering a wide view of the whole of the ventrolateral medulla oblongata. We, additionally, have successfully employed this approach to treat a single patient suffering from large ventral FMMs with cerebellar tonsillar herniation. Conclusion This transmastoid Trautman's triangle combined low retrosigmoid approach may represent a complement to treatment strategies for ventral and ventrolateral FMMs, particularly in patients with the potential for limited surgical positioning due to their being overweight, having a short neck and suffering from cerebellar tonsillar herniation <sup>7)</sup>

1)

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2)

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3)

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5)

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6)

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7)

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