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LETTER TO THE EDITOR (BY INVITATION) - PITUITARIES

Reply to letter "Pituitary tumors and oculomotor cistern"

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Dear Editor,

We thank Prof. Atul Goel for his important comment [4] on our article [7]. We agree that the membrane surrounding the tumor could be the stretched thinned out dural layer of the oculomotor triangle. Our intraoperative observation was that the oculomotor cistern extension (OMCE) tumor was growing and protruding from the oculomotor triangle. These structures have a thin continuous capsule, and the brownish tumor was seen through this capsule. In contrast, the dura of the cavernous sinus opposite to the ligament is thick and white. Such changes in color, thickness, and shape might have hindered our better understanding [7]. On the other hand, in our case 1, the oculomotor nerve, as confirmed by electrical stimulation, was seen within this capsule. This nerve can be considered as the intradural portion of the oculomotor nerve. In our case 2, the oculomotor nerve was confirmed within the cistern and was easily separated from the tumor capsule. These findings can be understood by considering that the tumor capsules were formed by the thinned out dural layer of the oculomotor triangle [2–4]. Findings of OMCE tumor surrounded by the oculomotor triangle dural layer were not described in detail in the recent two reports [5, 6]. However, clear understanding of these findings may be important on the craniotomy side of the combined approach to this part of the tumor.

Removal of OMCE tumor with a thinned out dural layer (Goel grade 3) is theoretically possible through only transnasal surgery [2–4]. However, there are several limitations. Caution should be exercised in the approach to the oculomotor triangle as the thinned out oculomotor nerve may appear suddenly during deep excision along the tumor development trajectory. In addition, large OMCE protrusions and severe shape constriction by the ligament may make removal difficult only through the transnasal approach without special arrangements [1, 6].

The combined approach is sometimes considered for multilobulated adenoma and giant adenoma. If the OMCE portion is entirely covered by a thin dural layer (Goel grade 3), this layer has relatively strong continuity, so that the OMCE tumor can be displaced to the transnasal side by pushing with dissectors. The "push and suction technique" would be very reasonable to use as described by us, and several other authors [7]. By pushing the tumor from above, the ligament window can be easily confirmed on the nasal side. In addition, using the push and suction technique for OMCE part as in our two cases, the continuity of the dural layer is maintained, and the nasal side and the intracranial portion are separated, so surgical invasiveness is not so strong. If the tumor is hard or too large, the dural layer could be dissected from the craniotomy side under electrooculographic monitoring.

The surgical strategy for adenoma with OMCE extension may include some variations, including the transsellar approach, various extended approaches, combined approach, transcranial approach, and recent transoculomotor triangle approach [1]. Goel's grading system is essential and useful for this type of multilobulated adenoma [2–4]. Characterization of OMCE should be extended to consider factors such as the shape, size, pathology, and neurological symptoms, as well as the dural layer continuity (Goel's grading system).

This article is part of the Topical Collection on *Pituitaries*

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