**Clivus meningioma**

Petroclival meningiomas are lesions arising from the upper two thirds of the clivus with dural attachment centered on the petroclival junction. They are seated medial to the internal auditory meatus and posterior to the gasserian ganglion. This differentiates them from clival meningiomas that arise close to the midline of the clivus.

Clivus meningioma is either petroclival meningioma or foramen magnum meningioma.

Removal of clivus meningiomas is extremely difficult, because of their abundant vascularity and tight adhesion to many cranial nerves which are usually found running over the tumor.

The basilar artery is displaced posteriorly or entangled by the tumor, and at times one or both vertebral arteries may be involved.

Usually the midbrain, pons and medulla are indented by the tumor, so that separation of the tumor capsule from these structures is most hazardous, if possible at all.

**Case series**

**2017**

Between 1984 and 2015, 22 patients diagnosed with an intracranial chordoma were treated at the Karolinska University Hospital, Stockholm, Sweden. Sixteen of 22 were treated with Gamma Knife radiosurgery (GKRS) for tumour residual or progression during the disease course. Seven of 22 received adjuvant fractionated radiotherapy and 5 of these also received proton beam radiotherapy. RESULTS: Fifteen of 22 (68%) patients were alive at follow-up after a median of 80 months (range 22-370 months) from the time of diagnosis. Six were considered disease free after >10-year follow-up. The median tumour volume at the time of GKRS was 4.7 cm³, range 0.8-24.3 cm³. Median prescription dose was 16 Gy, range 12-20 Gy to the 40-50% isodose curve. Five patients received a second treatment with GKRS while one received three treatments. After GKRS patients were followed with serial imaging for a median of 34 months (range 6-180 months). Four of 16 patients treated with GKRS were in need of a salvage microsurgical procedure compared to 5/7 treated with conventional or proton therapy. CONCLUSION: After surgery, 7/22 patients received conventional and/or photon therapy, while 15/22 were treated with GKRS for tumour residual or followed with serial imaging with GKRS as needed upon tumour progression. With this multidisciplinary management, 5- and 10-year survivals of 82% and 50% were achieved, respectively.

**1993**

Seven cases of clivus meningioma were operated on. The tumors sized from 5 to 8 cm in diameter. They were classified into 3 types: petroclival (5 cases), clival (1), sphenopetroclival (1). Common symptoms were cranial nerve deficits of fifth, sixth, seventh, eighth and cerebral disturbance of gait. CT was accurate in determining tumor location and size. Vascular displacement and tumor stain were seen of vertebral angiogram. Blood supply to the tumor was derived primarily from branches of the internal, external carotid arteries and vertebral arteries. Temporo-transtentorial approach, combined temporo-transtentorialsboccipita approach were used to remove the tumor. Total, Subtotal, and large partial resection of tumors was done in three, two and two cases respectively. Intraoperative technical difficulties were discussed. The mortality of the operation was 14.2%.
1981

Total removal of clivus meningiomas and the operative results.


