

Anterior clinoid region meningioma case series

Despite the advances in the microsurgical technique and anatomical understanding of the anterior and middle skull base, anterior clinoidal meningiomas are still challenging lesions to resect completely and safely due to their intimate relationship with vital neurovascular structures. We report predictive factors for tumor recurrence and postoperative complications based on surgical outcome of patients with anterior clinoidal meningiomas treated at our institution. Fifty-nine consecutive patients with anterior clinoidal meningioma who were surgically treated between March, 1993, and July, 2015, were reviewed retrospectively. For microsurgical tumor removal, orbitocranial or orbitozygomatic (78.0%), extended pterional (15.3%) and subfrontal approach (6.8%) were performed. The median follow-up duration was 54.1 months. Gross total resection (GTR, Simpson's grade I or II) was achieved in 38 patients (64.4%). The overall recurrence rate (new lesion in GTR cases and re-growth in non-GTR cases) was 18.6%. GTR (Hazard ratio [HR] 0.014, 95% confidence interval [CI] 0.001-0.256; $P = .004$), absence of internal feeder (HR 0.058, 95% CI 0.004-0.759; $P = .030$) and benign pathology (WHO grade I, HR 0.056, 95% CI 0.005-0.674; $P = .023$) were independent prognostic factors for recurrence-free. Fourteen patients (23.7%) developed permanent complications. The most common complication was cranial nerve injury ($n = 6$; 10.2%), followed by postoperative hemorrhage/infarction, hydrocephalus and infection. Larger size (≥ 40 mm) was significant as an independent predictive factor for permanent complication (HR 0.139, 95% CI 0.030-0.653; $P = .012$). Old age (≥ 60 years, $P = .056$) and peritumoral edema (thickness ≥ 5 mm, $P = .303$) did not reach statistical significance in multivariate analysis. In surgical resection of anterior clinoidal meningiomas, various clinicoradiological factors were related with resection degree, complication, and progression rate. Although our results showed acceptable resection degree and morbidity, mortality, and recurrence rate, compared to the results of past, anterior clinoidal meningioma remain as neurosurgical challenges because of their close contact to critical vascular and neural structures ¹.

2016

The medical records of 36 consecutive patients underwent surgery from 1995 to 2015 with clinoidal meningiomas were retrospectively reviewed. Using selected clinical features and tumor characteristics, a grading scale was devised and utilized to assess a degree of tumor resectability. The factors included: preoperative visual status (no visual loss=0, visual loss=1), tumor volume: small ($<13.5\text{cm}^3=1$), moderate ($13.5\text{-}30\text{cm}^3=2$), and large ($>30\text{cm}^3=3$), relationship with the internal carotid artery (no displacement=0, displacement=1, encasement=2, stenosis=3 and bilateral involvement=4) tumor extension into the cavernous sinus (yes=1, no=0) and invasion into the optic canal (yes=1, no=0), (defined as tumor beyond the falciform ligament). A grading system was designed using the total scores (10) in this classification and separating patients into two groups: group 1 with scores of 5 or less, group 2 with scores more than 5.

The patients mean age at the time of intervention was 61 years. The tumor involved the cavernous sinus in 38.9% of patients and invaded the optic canal in 36% of cases. The patient presented with visual impairment in 89% of cases. Vision improved in 28% and remained stable in 63% of cases. The mean volume of a tumor was 16.99cm^3 . The most common approach involved pterional with or without anterior clinoidectomy. After stratification, group 1 consisting of 22 patients and in group 2, 14 patients. Gross total resection (Simpson Grade I or II) was achieved in 75% of surgeries and

subtotal and partial resections were achieved in 25% of cases. Group 1 patients had higher gross total resection rate than group 2 ($p=0.009$). Only optic canal involvement was significantly associated with the extent of resectability in a univariate analysis ($p=0.03$). Four patients developed tumor recurrence with median recurrence duration of 89 months (53-204 months). Three patients underwent GKRS and one patient underwent repeat surgery at the time of recurrence.

A grading system can be employed in patients who present with clinoidal meningiomas and serve as an aid in planning an appropriate treatment strategy and establishing the prognosis. Radical resection can be planned in patients with favorable tumor criteria (groups 1) while a less aggressive surgical approach followed by stereotactic radiosurgery may be better suited for patients with less favorable tumor characteristics (group 2) ²⁾.

2015

Patients having undergone resection of a clinoid region meningioma between 2001 and 2011 were identified. Included in further analysis were those patients in whom a clinoidectomy was performed with subsequent pathologically confirmed presence or absence of tumor in the clinoid process on decalcified specimens. Two neuroradiologists, blinded to pathology results, independently reviewed available preoperative imaging and stated whether or not they anticipated the clinoid to be involved by tumor. Interobserver agreement and the ability to accurately predict tumor involvement of the clinoid were then analyzed.

Sixty-two patients were included in the final analysis. Interobserver agreement was 100%. Sensitivity and specificity of preoperative imaging to predict tumor involvement was 89% and 52%, respectively, with positive and negative likelihood ratios of 1.85 and 0.20. Positive and negative predictive values were 73% and 76%, respectively.

Preoperative imaging of clinoid region meningiomas can accurately predict the presence or absence of tumor involvement of the clinoid in only approximately 75% of cases. In light of the fact that a quarter of patients with radiographically negative clinoids will have tumor present on pathological analysis, Copeland et al. recommend a clinoidectomy for all anterior clinoid region meningiomas ³⁾.

29 patients with anterior clinoid meningiomas who underwent surgical resection between 1991 and 2007. The median length of follow-up was 7.5 years (range: 2.0 to 18.6 years). Similar to others, gross total resection was seldom safely achievable in these patients. Despite this, only 1/20 of patients undergoing subtotal resection without immediate postoperative radiosurgery experienced tumor progression. The optic canal was unroofed in 18/29 patients in this series, while in 11/29 patients it was not. Notably, all five patients experiencing visual improvement underwent optic canal unroofing, while three of four patients experiencing visual worsening did not.

These data provide some evidence suggesting that unroofing the optic canal in anterior clinoid meningiomas might improve visual outcomes in these patients ⁴⁾.

1)

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