Convexity meningioma case series

2023

performed a systematic investigation in 210 patients with supratentorial CM considering all relevant clinical and radiological factors, with a follow-up time of 19.5 years.

Results: Among 812 patients with intracranial meningiomas treated in our department (2003-2020), 28.2 % of intracranial meningiomas were located over the supratentorial convexity, and the patients had a median age of 62 years (95 % CI:59-64). The median follow-up was 30.4 months (95 % CI:21.6-37.1). Tumor-related symptoms were observed in 88.1 % of patients. The most common preoperative symptom was headache (28.1 %), followed by seizure (19.5 %). Symptomatic patients had significantly higher tumor volumes than asymptomatic patients ($p = 0.0003$; 24.5 cm3 and 6.98 cm3, respectively). Complete tumor resection was achieved in 92.9 % of patients. The most common postoperative complication was bleeding (7.1 %) in the approach area. Of all bleedings, only three were intracerebral hemorrhages and did not require surgical intervention. The second most common complication was postoperative seizure (4.7 %). The multiple logistic regression analyses showed that tumor volume (OR:1.007; 95 % CI:1.001-1.013; $p = 0.02$) and brain infiltration by the tumor (OR:1.961; 95 % CI:1.028-3.741; $p = 0.04$) had a significant impact on postoperative complications. The postoperative and final KPS scores significantly improved ($p < 0.001$). The tumor recurrence rate was 6.2 %, with a median time of 38 months. No surgery-related deaths occurred.

A large tumor volume and brain infiltration by the tumor were significant factors for postoperative complications. The clinical conditions significantly improved postoperatively and further during the follow-up period [1)].

A study included a total of 117 patients: 80 with eloquent area tumor and 37 with non- eloquent area tumor. Statistically significant differences were detected between the groups in preoperative KPS (93 ± 10 in eloquent vs. 97 ± 6 in non-eloquent; $p = .008$) and in large-caliber vein involvement (76.3% in cases vs. 16.2% in controls; $p < .001$). Postoperatively, patients with eloquent area tumors showed initial deterioration in neurological status followed by recovery; final outcomes were comparable to that of patients with non-eloquent area tumors. However, patients with eloquent area meningiomas had higher propensity to suffer from seizures postoperatively. Postoperative complications and long-term outcomes were not significantly different between the two groups.

Patients with eloquent areas convexity meningiomas do not appear to have higher surgical risk. Neurological status is more likely to worsen immediately after surgery but long-term recovery is satisfactory. Seizure control after surgery appears to be poorer in patients with perirolandic meningioma [2)].

A retrospective review of medical records was conducted for patients who underwent surgical resection of their convexity meningioma. World Health Organization Classification of Tumors of the Central Nervous System 2007 was used for histopathological diagnosis. Preoperative radiologic parameters were analyzed, each parameter was scored 0 or 1. Signal intensity on diffusion weighted

MRI (DWI) (hyperintensity=1), heterogeneity on T1 weighted gadolinium enhanced MRI (heterogeneity=1), disruption of arachnoid at brain-tumor interface=1 and peritumoral edema (PTE) on T2-weighted MRI (presence of PTE=1) and tumor shape (irregular shape=1). Multivariate logistic regression analyses were conducted to determine association of radiological parameters to histopathological grading. Kaplan-Meier and Cox regression models were used to determine the association of scoring system to overall survival and progression free survival (PFS). Reliability of the classification was tested using Kappa co-efficient analysis.

Hyperintensity on DWI, disruption of arachnoid at brain-tumor interface, PTE, heterogenicitiy on T1-weighted enhanced MRI and irregular tumor shape were independent predictors of non-grade I meningioma. Mean follow-up period was 94.6 months (range, 12-117 months). Median survival and PFS in groups-I, II and III was 114.1±1.2 and 115.7± 0.8, 88± 3.3 and 58.5±3.9, 43.2± 5.1 and 18.2±1.7 months respectively. In cox regression analysis model, age (P<0.0001, OR-1.039, CI-1.017-0.062), WHO non-grade-I meningioma (P=0.017, OR-3.014, CI-1.217-7.465), radiological classification groups II (P=0.002, OR-6.194, CI-1.956-19.610) and III (P<0.0001, OR-21.658, CI-5.701-82.273) were independent predictors of unfavorable survival outcomes.

Preoperative radiological classification can be used as a supplement to the histopathological grading. Group-I meningiomas demonstrate benign radiological, histopathological and clinical features; group-III demonstrates aggressive features. Group-II meningiomas demonstrate intermediate features; the need for more aggressive follow-up and/or treatment should be further investigated [3].

Four women and two men (mean age 51.4 years±12.8) underwent reconstruction of bone flap defects after meningioma resection. Mean duration of intraoperative reconstruction of the partial bone flap defects was 19 minutes±4 (range 14-24 minutes). Implant sizes ranged from 17-35 cm2 (mean size 22 cm2±8). Radiologic and clinical follow-up examinations revealed excellent implant alignment and favorable cosmesis (visual analogue scale for cosmesis [VASC]=97±5) in all patients.

Patient-specific reconstruction of partial bone flap defects after convexity meningioma resection using the presented intraoperative PMMA cast method resulted in excellent bony alignment and a favorable cosmetic outcome. Relatively low costs and minimized operation time for adjustment and insertion of the cranioplasty implant justify use of this method in small bony defects as well [4].

All patients at least 16 years old who underwent primary craniotomies for convexity meningiomas at Oslo University-affiliated hospitals (Rikshospitalet and Ullevål University Hospitals) in the period between January 1, 1990, and January 27, 2011, were included. Overall survival and retreatment-free survival rates were correlated with patient- and surgery-specific factors.

Three hundred ninety-one consecutive patients were included in the study. The median patient age was 60.1 years (range 19-92 years). The female-to-male ratio was 2.1:1. The WHO grades were Grade I in 353 (90.3%), Grade II in 22 (5.6%), and Grade III in 16 (4.1%). The follow-up rate was 100%. Median follow-up time was 7.1 years (range 0.0-20.9 years) and total observation time was 3147 patient-years. The 1-, 5-, and 10-year overall survival rates were 96%, 89%, and 78%, respectively. Age, sex, WHO grade, and Simpson grade were significantly associated with overall survival. The 1-, 5-, and 10-year retreatment-free survival rates were 99%, 94%, and 90%, respectively. Simpson resection grade and WHO grade were significantly associated with retreatment-free survival. The hazard ratios for retreatment after combined Simpson resection Grades II+III and IV+V were 4.9- and

13.2-times higher than after Simpson Grade I resection, respectively.

Simpson Grade I resection should continue to be the goal for convexity meningiomas [5].

Between 1997 and 2007, 141 consecutive patients (median age 48 years, range 18-95 years) underwent resection of a supratentorial convexity meningioma. The most common signs or symptoms at presentation were headache (48%), seizures (34%), and weakness (21%). The mean tumor volume was 146.3 cm3 (range 1-512 cm3). There were no intraoperative complications or deaths. Medical or neurosurgical morbidity was noted in the postoperative course of 14 patients, equating to a 10% overall complication rate. Postoperative surgical complications included hematoma requiring evacuation, CSF leakage, and operative site infection. Medical complications included pulmonary embolus and deep vein thrombosis requiring treatment. A Simpson Grade 0 or 1 resection was achieved in 122 patients (87%). One hundred six tumors (75%) were WHO Grade I, whereas 35 (25%) were WHO Grade II. The median clinical follow-up was 2.9 years (range 1-10 years), and the median radiographic follow-up was 3.7 years (range 1-10 years). Six patients (4%) had radiographic evidence of tumor recurrence, with 3 (2%) undergoing repeat resection.

With the conservative recommendations for surgery for asymptomatic meningiomas and the advent of radiosurgery during the past 10 years, microsurgically treated convexity meningiomas are now typically large in size. Nevertheless, the patient's clinical course following microsurgical removal of these lesions is expected to be uncomplicated. The authors' findings provide a defined risk profile associated with the resection of supratentorial convexity meningiomas in the modern neurosurgical era [6].

Morokoff et al., retrospectively reviewed 163 cases of convexity meningiomas operated on in our institution by the senior author (PMB) between 1986 and 2005. The median follow-up time was 2.3 years (range, 1-13 yr).

Convexity tumors represented 22% of all meningiomas operated on. There was a female:male ratio of 2.7:1. Median age was 57 years (range, 20-89 yr). Image-guided surgery was used on all cases in the last 5 years. The 30-day mortality rate was 0%. The incidence of new neurological deficits was 1.7%, and the overall complication rate was 9.4%. The pathology of the tumors was benign in 144 (88.3%), atypical in 16 (9.8%), and anaplastic/malignant in 3 (1.8%). In six of the cases designated “benign,” there were borderline atypical features. The 5-year recurrence rate for benign meningiomas was 1.8%, atypical meningiomas 27.2%, and anaplastic meningiomas 50%. The two cases of benign tumor recurrences involved tumors with borderline atypia and high MIB-1 indices. The borderline atypical cases had a 5-year recurrence-free survival rate of only 55.9%, more closely approximating that of tumors designated “atypical.”

Convexity meningiomas can be safely removed using modern image-guided minimally invasive surgical techniques with a very low operative mortality. Benign convexity meningiomas having a Simpson Grade I complete excision have a very low recurrence rate. The recurrence rates of atypical and malignant tumors are significantly higher, and borderline atypical tumors should be considered to behave more like atypical rather than benign lesions. Longer-term follow-up data are needed to more accurately determine the recurrence rates of benign meningiomas [7].

References

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