Sphenoid wing meningioma case series

see also Medial sphenoid wing meningioma case series.

2022

A retrospective study was conducted for surgery performed between 2008 and 2021, including 36 patients presenting with SWMCSI. The data from surgical intervention, Simpson grade of resection, tumor location, and morbimortality related to the surgery was reviewed. We examined the medical records, operative reports, radiologic examinations, and follow-up information.

Results: The group comprised 29 women and 7 men with an average age of 61 years (range, 31-87 years). The mean follow-up period was 75 months (range, 1-170 months). Simpson grade I and II resections were obtained in 80% of cases. The meningiomas were World Health Organization (WHO) grade 1 in 94% of cases, WHO grade 2 in 3%, and WHO grade 3 in 3%. The overall mortality was 5.5%. Permanent cranial nerve deficits occurred in 8% of cases, transient cranial nerve deficits in 22%, cerebrospinal fistula in 16.5%, and hemiparesis in 2.7%. The recurrence/regrowth rate was 14% during the follow-up period. The Karnofsky Performance Status 100 and 90 was 92%.

Conclusions: The surgical treatment of symptomatic SWMCSI is an effective treatment modality with low morbimortality and good long-term control of the disease. Visual impairment is the most common abnormality, affecting preoperative and postoperative quality of life of patients with SWMCSI. Training in the microsurgical laboratory is essential for safe surgical approaches in this area [1)].

2019

A prospective series of 26 cases with SWMs larger than 3 cm in one of its main diameter is presented. All patients were studied following the same clinical and imaging procedures. The surgical approach was through a pterional transzygomatic craniotomy. The surgical procedure has the following steps: 1. Extradural tumor devascularization and resection of the hyperostotic and/or infiltrated bone and then intradurally; 2. Intradural tumor debunking; 3. Microdissection of vascular branches and perforators from the capsule; 4. Identification of the optic and oculomotor nerves and internal carotid artery; 5. Tumor capsule dissection and resection; 6. Dural resection or cauterization; 7. Dural and bone reconstruction and closing. Results All lesions were completely removed. Most complications were transient. The most relevant complication was a large middle cerebral artery infarct with permanent hemiplegia despite a decompressive craniotomy. Conclusion Large SWMs can be considered as a single pathology regarding the surgical approach and intraoperative microsurgical procedure strategies. The pterional transzygomatic approach allows an extradural devascularization of the tumor and an extensive bone resection that facilitates the intradural stage of tumor resection. The proposed approach allows a wide and radical resection of the duramater and bone that increases the Simpson grade. However, surgery does not control other biological or molecular prognostic factors involved in tumor recurrence [2)]

2017

A retrospective review of 75 patients surgically treated for SWM from 2009 to 2015 was undertaken to determine the degree of circumferential vascular encasement (0°-360°) as assessed by preoperative magnetic resonance imaging (MRI). A novel grading system describing “maximum” and “total” arterial encasement scores was created. Postoperative MRIs were reviewed for total ischemia volume measured on sequential diffusion-weighted images.

Of the 75 patients, 89.3% had some degree of vascular involvement with a median maximum encasement score of 3.0 (2.0-3.0) in the internal carotid artery (ICA), M1, M2, and A1 segments; 76% of patients had some degree of ischemia with median infarct volume of 3.75 cm 3 (0.81-9.3 cm 3). Univariate analysis determined risk factors associated with larger infarction volume, which were encasement of the supraclinoid ICA (P < .001), M1 segment (P < .001), A1 segment (P = .015), and diabetes (P = .019). As the maximum encasement score increased from 1 to 5 in each of the significant arterial segments, so did mean and median infarction volume (P < .001). Risk for devastating ischemic injury >62 cm 3 was found when the ICA, M1, and A1 vessels all had ≥360° involvement (P = .001). Residual tumor was associated with smaller infarct volumes (P = .022). As infarction volume increased, so did modified Rankin Score at discharge (P = .025).

Subtotal resection should be considered in SWM with significant vascular encasement of proximal arteries to limit postoperative ischemic complications [3)].

2015

The clinical materials of 53 patients with sphenoid wing meningiomas treated microsurgically between January 2008 and January 2012 were analyzed retrospectively. Follow-up period ranged from 6 to 62 months (median, 34 months). Clinical outcomes including postoperative quality of life and recurrence rate were evaluated. Univariate and multivariate statistical analysis were performed among factors that might influence postoperative quality of life.

The mean age of patients was 49 years. Mean tumor size was 3.9cm. Total tumor resection was achieved in 38 cases (71.7%), subtotal in 10 cases (18.9%) and partial resection in 5 cases (9.4%). Within the follow-up period, ten patients (18.9%) had recurrence and three patients (5.7%) died. In univariate analysis, we found the postoperative Karnofshky Performance Score (KPS) improvement was determined by various factors, including extent of tumor resection, peritumoral edema, tumor blood supply, size, adhesion, encasement and preoperative KPS. However, multivariate analysis showed that complete resection, rich blood supply, adhesion to adjacent structure, encasement of neurovascular were independent predictive factors for worse postoperative KPS.

With the improved requirement of postoperative quality of life in patients, intentional incomplete resection should be considered as an acceptable treatment option. Multivariate analysis confirmed that incomplete resection, poor blood supply, lack of adhesion or encasement of adjacent structure were independent predictive factors for favorable postoperative quality of life. An individual treatment strategy could help improved quality of life [4)].

2013

A total of 56 patients underwent microsurgical resection for sphenoid wing meningioma. The rates of optic canal invasion (medial 50% vs middle 5% vs lateral 0%; p<0.0001, chi-square test), supraclinoid internal carotid artery encasement (medial 32% vs middle 5% vs lateral 0%; p<0.01, chi-square test), and middle cerebral artery encasement (medial 45% vs middle 24% vs lateral 0%; p<0.01, chi-square test) were all highest with medial-third tumors. New or worsened neurological deficits occurred in 10 (19%) of 56 patients. Of all the imaging characteristics studied, only location of the tumor along the medial third of the sphenoid wing significantly predicted an increased rate of new or worsened neurological deficit (OR 2.7, p<0.05) [5].

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53 patients (33 female and 20 male, mean age of 47.5 years) with large and giant medial sphenoid wing meningiomas were treated surgically between April 2004 to March 2012, with their clinical features analyzed, management experience collected, and treatment results investigated retrospectively.

In this study, gross total resection (Simpson I and II) was applied in 44 patients (83%). Fifty-three patients had accepted the routine computed tomography scan and magnetic resonance imaging scan as postoperative neuroradiological evaluation. Their performance showed surgical complications of vascular lesions and helped us evaluate patients' conditions, respectively. Meanwhile, the drugs resisting cerebral angiospasm, such as Nimodipine, were infused in every postoperative patient through vein as routine. As a result, 11 patients (21%) were found to have secondary injury of cranial nerves II, III, and IV, and nine patients got recovered during the long-term observing follow-up period. Temporary surgical complications of vascular lesions occurred after surgery, such as cerebral angiospasm, ischemia, and edema; 24 patients (45%) appeared to have infarction and dyskinesia of limbs. Overall, visual ability was improved in 41 patients (77%). No patient died during the process.

Microsurgical treatment may be the most effective method for the large and giant medial sphenoid wing meningiomas. The surgical strategy should focus on survival and postoperative living quality [6].

2010

A retrospective review of the records of 19 patients who underwent sphenoid wing meningioma resection via a lateral transzygomatic approach between 1997 and 2007 was performed. A confirmatory cadaver dissection was performed to illustrate the anatomic nature of the technique. To achieve maximal exposure and minimal brain retraction, a lateral transzygomatic approach with osteotomies of the entire zygoma, which remains pedicled on the masseter muscle, was used.

Nineteen patients with sphenoid wing meningioma underwent resection via a lateral transzygomatic approach. Complete resection of the meningioma was achieved in 17 cases. Morbidity consisted of temporary frontal nerve weakness (57.9%), mild to moderate temporalis atrophy (36.8%), and diplopia (15.8%). There were no cases of wound infection, bone malunion, or resorption. A mean follow-up period of 33.1 months (range, 2-71 months) revealed no recurrences after surgery as demonstrated by computed tomography or magnetic resonance imaging.

The lateral transzygomatic approach to the sphenoid wing can be performed safely with minimal

morbidity and facilitates complete resection of the tumor. Complete removal at an early stage is the best prognostic factor in treating sphenoid wing meningioma. This approach belongs in the armamentarium of surgeons who are involved in the resection of skull base neoplasms [7].

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73 patients who were surgically treated for meningiomas involving the sphenoid wing, where a pterional approach was performed between April 2001 and February 2006. 51 women and 22 men with a mean age of 59.4 years were operated on. The follow-up period ranged from 3-75 months (mean 29.8 months). Patients were divided into the following groups based on the site of the tumor: group 1: outer part of the sphenoid ridge (lateral, n=16); group 2: middle part of the sphenoid ridge (intermediate, n=5); group 3: inner part of the sphenoid ridge (medial, n=22); and group 4: spheno-orbital meningioma (n=30).

The majority of patients presented with visual impairment (55%), followed by generalized headaches (36%) and visual field defects (33%). Total microscopic tumor resection was achieved in 35 patients (47.9%). Visual acuity improved in 58% of the patients, with 23% returning to normal vision. Preexisting cranial nerve deficits remained unchanged in the majority of patients (79%) and improved in 18%. Temporary new cranial nerve deficits occurred in 6 cases, and 1 patient (1%) developed permanent third nerve palsy. The mortality rate was 3% (2 patients) and the rate of permanent nonvisual morbidity was 7% (5 patients). 12 patients (16%) received postoperative radiotherapy. In 6 of 7 patients who were observed for at least 1 year after radiotherapy, stable tumor volume was noted at the follow-up review (mean 30.2 months, range 16-50 months), which provides a tumor growth control rate of 86%. The overall recurrence rate was 15% (11 of 73 patients).

The result of this study affirms the safety of microsurgical treatment strategies, so that sufficient tumor control can be achieved with minimal morbidity and satisfying functional results in most cases.

2009

A retrospective study was made on clinical manifestations, neuroradiological features, and operative techniques in 37 patients undergoing transcranio-orbital approach from Sep. 1998 to Apr. 2009. Patients ages: 16 years to 67 years, 45.5 years in average; sex: 15 males, 22 females. Chief complaints were progressive proptosis and visual acuity deficits. All patients were operated on using a fronto-temporal approach with orbital decompression. The extent of tumor resection and postoperative complications were investigated.

Simpson grade II resection was achieved in 9 patients, Simpson grade III in 22 patients and Simpson grade IV in 6 patients. Pathological examination showed 27 (73%) patients were meningothelial meningiomas. After surgery, proptosis improved in all patients, visual acuity improved in 18 patients (69%). Temporary ophthalmoplegia was found in 8 patients, Cerebrospinal fluid fistula was found in 1 patient. Duration of follow up was from 3 months to 9 years, tumor recurred in 7 patients, and 5 patients underwent second surgery, including two trans-nasal endoscopic surgeries to resect sphenoid sinus-involved tumor. There were no operation-related deaths or other significant complications.

Sphenoid wing meningioma en plaque, mainly meningothelial meningiomas, are more likely to produce adjacent hyperostosis and have characteristic radiological appearances. All the hyperostosis

bone of the great wing of sphenoid bone should be removed to prevent recurrence. Extensive tumor removal with bony decompression at the orbital apex can produce satisfactory cosmetic and functional outcome. Close co-operation between the neurosurgeons and the ophthalmologists is important [8].

2007

Bikmaz et al. reviewed the records of 67 patients with sphenoid wing meningiomas who underwent surgery at the University of Arkansas for Medical Sciences between 1994 and 2004. In all 67 cases, the surgery was performed by the senior author. Seventeen of the patients had the distinguishing characteristics of hyperostotic sphenoid wing meningiomas-extensive bone invasion, en plaque dural involvement, and a minimal intracranial mass with minimal orbital involvement. In all patients, hyperostosis was determined on the basis of preoperative neuroimaging. Histopathological evaluation of bone specimens was performed in 14 cases. Estrogen and progesterone receptor expression and Ki 67 labeling were evaluated in all specimens. Chromosome analysis was performed in all tumors resected since 2001 (seven cases). Particular attention was paid to removing all involved bone and dura mater.

Total removal was achieved in 14 cases (82.3%), with only one recurrence (7.1%) over a mean follow-up period of 36 months (range 5-72 months). Radical resection was followed by cranioorbital reconstruction to prevent enophthalmos and to obtain good cosmetic results. No deaths or serious complications occurred in association with surgery. Proptosis was corrected in all cases and visual acuity improved in seven (70%) of 10 cases. Revision of the orbital reconstruction was required because of postoperative enophthalmos (two cases) or restricted postoperative ocular movement (one case).

Sphenoid wing meningiomas frequently invade bone, although such invasion does not represent malignancy. These lesions are generally histologically benign. Total removal with a prospect for cure and visual preservation should be the goal of treatment. This requires extensive drilling of the invaded bone and extensive excision of the involved dura. When the optic canal is involved, it should be decompressed. Extensive bone resection should be followed by cranioorbital reconstruction for good cosmesis and to prevent enophthalmos [9].

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