Tentorial meningioma case series

2018

From January 2011 to December 2016, a cohort of 28 patients with medial tentorial meningiomas were treated by microneurosurgery at the First Affiliated Hospital of Chongqing Medical University. Patients who treated intraoperatively with dynamic retraction surgery from January 2014 to December 2016 were assigned into dynamic retraction group, and those with fixed retractors intraoperatively from January 2011 to December 2013 were assigned into retractor group. The surgical approaches tailored in our patients were based on predominant direction of tumor extension. The extent of tumor resection was scored according to the Simpson's classification scale. Comparisons of tumor size, operation time, hospitalization time, retraction-related injury, tumor Simpson resection grade and Karnofsky Performance Scale (KPS) score six months after surgery were also made between two groups.

A total of 12 patients (retractor group) were treated with the use of self-retaining brain retractors intraoperatively and dynamic retraction surgical procedure was performed intraoperatively in 16 patients(dynamic retraction group). The difference between two groups with regard to sex, age, tumor size, operation time and tumor Simpson resection grade was not statistically significant(all P>0.05). The mean duration of hospital time was shorter in the dynamic retraction group than that in the retractor group(18.3 d \pm 1.8 d vs 20.2 d \pm 1.3 d, P=0.004). The dynamic retraction group had lower incidence of retraction-related injury compared with the retractor group(1/16 vs 6/12), P=0.022]. The dynamic retraction group had better neurological recovery rate with KPS >80 evaluated six months after surgery compared with the retractor group(14/16 vs 5/12, P=0.017).

Dynamic retraction microneurosurgery for the treatment of medial tentorial meningiomas is feasible, which can obviate or reduce the amount of brain retraction needed, and may be of help in lowering the risk of postoperative neurological deficits and complications and leading to reduced hospitalization cost and improved surgical outcomes ¹⁾.

2017

In 27 consecutive patients who underwent tumor resection through the Poppen approach for tentorial meningioma or pineal region meningiomas, the following morphologic parameters were assessed on a preoperative MRI: 1) tentorial angle; 2) tentorial length; 3) the shortest distance from the confluence of sinus to the tumor. All these parameters, together with tumor size, texture, and resection extent, were correlated with occipital lobe damage by using the ANOVA test, chi-square test, or Fisher's exact test.

The mean value was $55.3\pm5.6^{\circ}$ (range $45-66^{\circ}$) for the tentorial angle, which was significantly associated with the occipital lobe damage grades (p=0.008), but this was not the case for the tentorial length (p=0.802) and the shortest distance from the confluence of sinus to the tumor (p=0.695). Interestingly, age was also strongly associated with occipital lobe damage risk (p=0.020). The patients in the subgroup with no occipital damage (Grade 4) were the youngest (aged 47.3 years), compared with other grades, with age of 58.0 years for Grade 1, 54.3 years for Grade 2, and 58.6 years for Grade 3. These two parameters were also significant after multivariate analysis. No correlation was observed between either tumor nature or the extent of resection and damage grades. The risk of occipital lobe damage increases in the presence of a steep tentorial angle during the Poppen approach for tentorial or pineal area tumors. Awareness of such anatomical features preoperatively is important for minimizing operative complications².

2015

Between 2008 and 2012, five patients with symptomatic tentorial meningiomas (median diameter, 5.2 cm; range, 4.0-5.7 cm) near the middle third of the medial tentorial edge with supratentorial extension underwent TZ-AITG, consisting of zygomatic osteotomy, low-positioned craniotomy, and resection of the inferior temporal gyrus around 4 cm from the tip.

Tumors were completely resected in all patients. Postoperatively, none had a newly developed neurological morbidity, and none died. Of three patients with preoperative hemianopia, two showed improvement and one remained stationary. One patient with preoperative hemiparesis recovered completely. All patients returned to their normal activities during the follow-up period. Surgical morbidities included epidural hematoma and chronic subdural hematoma in one patient each, with both requiring evacuation.

TZ-AITG may be a good alternative to the subtemporal approach for large tentorial meningiomas near the middle third of the medial tentorial edge. TZ-AITG provides access to the lesions and visualization of the middle fossa, facilitating early feeder control while minimizing brain retraction, thus reducing potential injury to the vein of Labbé. TZ-AITG is also safe and feasible in minimizing neurological compromise ³⁾.

The data of clinical symptom, imaging examination, surgical approaches as well as the influence factors of gross total resection (GTR) of 43 TMs cases were analyzed retrospectively.

Imaging examinations of computer tomography (CT) and magnetic resonance image (MRI) were performed in all 43 cases. The angiographies such as computer tomography angiography (CTA), digital subtraction angiography (DSA), magnetic resonance angiography (MRA) and magnetic resonance venography (MRV) were obtained in part of these cases. The TMs can be classified into 2 types as superior/inferior to the tentorium, and subtypes as medial/lateral, anterior/middle/posterior according its location and the origination of the tumor. Six different surgical approaches were utilized in the study mainly depending on the tumor location and the surgeon's preference. CT scan was performed in all patients 6h after the operation. Follow-up MRI with contrast was also obtained 3 months later. Simpson's grade of excision was applied. GTR was defined as Simpson grade I and II, and was acquired in 34 cases, in which Simpson grade I resection was accomplished in 15 cases, and subtotal resection (STR) was defined as more than 90% of the tumor volume was removed and was acquired in 7 cases; histopathology revealed 34 benign (grade I), 8 atypical (grade II), and 1 malignant (grade III) cases.

Elaborate imaging examination, microsurgical skills as well as the choices of approaches and management of the sinus involved are the main prognostic factors of the TMs ⁴.

2014

Thirty-nine patients with meningiomas of the tentorium underwent stereotactic radiosurgery (SRS) using various Gamma Knife technologies between 1988 and 2010. The most common presenting symptoms were headache, dizziness or disequilibrium, and ataxia.

The median tumor volume was 4.6 cm3 (range 0.5-36.6 cm3) and the median radiation dose to the tumor margin was 14 Gy (range 8.9-18 Gy). The median follow-up period was 41 months (range 6-183 months). At the last imaging follow-up, tumor volumes decreased in 22 patients (57 %), remained stable in 13 patients (33 %), and increased in 4 patients (10 %). The progression free survival after SRS was 97 % at 1 year, and 92 % at 5 years. At the last clinical follow-up, 35 patients (90 %) showed no change in symptoms, 1 patient (2 %) showed improvement of their neurologic symptom, and 3 patients (8 %) demonstrated worsening symptoms. The rate of symptom worsening after SRS was 5 % at 1 year, and 10 % at 5 years. Asymptomatic peritumoral edema after SRS occurred in 2 patients (5 %). Symptomatic adverse radiation effect developed in 2 patients (5 %). SRS for tentorial meningiomas provided long-term effective tumor control and a low risk of radiation related complications ⁵⁾.

2010

A retrospective analysis on 21 consecutive patients (female/male ratio 17/4) with meningiomas originating from the TF, who underwent surgery between 1992 and 2005 in our clinic, was performed. The follow-up period ranged from 6 to 93 months. The cases were classified according to tumor extension in three different types: type I, TF meningiomas with compression of the brain stem; type II, with extension into the anterior portion of middle fossa; and type III, a combination of type I and II. Depending on tumor location, surgical approaches consisted of pterional (nine cases), subtemporal (nine cases), or combined subtemporal-pterional craniotomies (three cases). We defined transient and persistent operative complications in relation to Simpson grade and TF classification.

Tumor size ranged from 1 to 6 cm in diameter, with a median at 2.5 cm. The presenting symptoms of the patients were anisocoria (six cases), diplopia (six cases), ptosis (five cases), hemianopia (four cases), and ataxia (two cases). Extent of tumor resection was Simpson grade II in 19 patients, grade III in one patient, and grade IV in one patient. There was no operative mortality (first 30 days after surgery). The rate of postoperative transient new neurological deficits was found at 9.5%, the rate of permanent at 33%. The neurological deficits at admission recovered in two patients.

In the majority of patients with TF meningiomas, total resection can be achieved through a pterional, subtemporal, or combined approaches but at a substantial toll in terms of permanent morbidity. Radiotherapy after volume reductive surgery in TFM type II and III and decompression of eloquent anatomical structures with low tolerance of radiation should be considered ⁶⁾.

From 1998 to 2005, 30 patients (22 female and 8 male) with tentorial meningiomas were operated. Thirteen patients had tumor restricted to the infratentorial space; 12, to the supratentorial space; and in 5 cases, the tumor involved both compartments. Follow-up ranged from 1 to 8 years. A total of 35 surgical procedures were performed in 30 patients, where 26 procedures were performed through a single approach (2, ITSC; 10, RS; 5, SOIH; 5, ST; and 4, TT); and 9, through combined approaches (7, ITSC/ SOIH; and 2, RS/ST).

Simpson I resection was achieved in 17 patients. Tumors involving both compartments, involving the petrous sinus, and attached to the torcula limited complete resection. Twenty-two out of 30 patients

were able to return to their regular life with no or minimal neurological sequelae. Most frequent complications in our series were shunt dependence, CSF fistulae, diffuse brain injury and visual field defects. Overall, our series revealed 3% mortality and 23% morbidity.

Tentorial meningiomas are associated with significant morbidity related to the nervous and vascular structures surrounding the tumor. Partial tumor removal may be necessary in some cases ⁷⁾.

1999

Kaki et al. report the experience and long-term results of twenty patients with tentorial meningiomas who underwent surgical removal between 1987 and 1996. Computed tomography, angiography and magnetic resonance imaging were used as diagnostic tools for planning the surgical procedure. The tumor site was posterolateral in 6 cases (30%), posteromedial in 4 cases (20%), in the tentorium itself in 4 cases (20%), anterolateral in 3 cases (15%), at the apex of tentorial incisura in 2 cases (10%) and at the free border of the tentorial notch in 1 case (5%). Neuroradiologically, 70% of the meningiomas ranged from 1 to 3 cm. Lateral and medial tumors with solely or mainly supratentorial development were approached from above. The approach from below was selected for meningiomas with subtentorial involvement only. In meningiomas with both supra and subtentorial growth, a supratentorial bone flap was combined with a suboccipital craniectomy using a retromastoid incision. Radical surgical removal (Simpson's grade I and II) was achieved in 80% of the cases. There was no mortality. The follow-up averaged 4 years and revealed that 65% of patients were able to return to their premorbid activity. Complications were mainly postoperative brain oedema, functional deficits, seizures and psychological disorders. Recurrence rate amounted at 6.25% in the group where the tumors were totally removed (16 cases). From this retrospective study, the statistically significant prediction of a good outcome was: duration of symptoms from onset to the operation inferior or equal to 1 year (p < 0.01), good preoperative neurological conditions (Karnofsky scale from 80 to 100) (p < 0.01) 0.05) and tumor size inferior or equal to 3 cm (p < 0.002)⁸⁾.

1967

Olivecrona series included 21 tentorial meningiomas representing 2.5% of all of their intracranial meningiomas. He found in his series 52% of these lesions above the tentorium and 48% below. The transverse sinus was invaded in 52%. In a such way the first attempt to classify the tentorial meningioma was made by him ⁹.

1938

In the Cushing and Eisenhard's series of 295 intracranal meningiomas, 11 tumors (3.7%) were attached to the tentorium 10 .

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