Spinal meningioma case series

Clinical data of 44 cases who underwent surgery for spinal meningiomas between 2010 and 2020 have been reviewed retrospectively. Demographics, preoperative and postoperative clinical states, pathologic type, location of the meningioma relative to the spinal cord, resection amount of the tumor according to Simpson's grading scale, postoperative complications, recurrence rate, and correlation between preoperative and intraoperative data and recurrence were analyzed.

The tumor was located in the thoracic spine in 31 cases, in the cervical spine in 12 cases, and in the lumbar spine in one case. Dural attachment of tumor was ventral to the spinal cord in 15 cases, lateral to the spinal cord in 15 cases, and posterior to the spinal cord in 14 cases. All cases underwent microsurgical Simpson grade 2 resection. Two cases were recurrent and reoperated. Recurrences were observed in cases younger than 18 years old, in cervical spines and in cases with long dural tails.

Simpson Grading System 2 resection is safe and effective in spinal meningiomas. Patients younger than 18 year old, and those with cervical location and long dural tail may be under risk of Spinal meningioma recurrence after Simpson grade 2 resection [1].

2022

A total of 40 spinal meningioma cases with the median age of 63 years (36-81 years) were enrolled in this study. The median postoperative follow-up period of all 40 cases was 96 months (34-193 months). About 82.5% of cases were located in the thoracic spine, while 16.5% of cases were located in the cervical spine. Of the symptomatic cases, 87.5% of cases follow with satisfactory outcomes and 12.5% of cases follow with unexpected outcomes. The local spinal meningioma recurrence rate was 2.5% (1 of 40 cases). No postoperative cerebrospinal fluid leak occurred in the 40 spinal meningioma cases.

A long-term postoperative follow-up indicated that this modified spinal dura preservation technique caused good neurologic improvement with rare recurrence. Therefore the recommend this improved technique (Inner Dura Layer-An Improved Preservation Technique of Spinal Dura) may be an alternative surgical option for total resection of spinal meningiomas with a favorable prognosis [2].

2018

Onken et al., report on their surgical experience that involves two institutions in which 207 patients underwent surgery for spinal meningiomas (sMNGs) . Special focus was placed on patients with sMNGs localized anterior to the denticulate ligament (aMNGs) that were treated via a unilateral posterior approach (ULPA).

Between 2005 and 2017, 207 patients underwent resection of sMNGs at one of two institutions. The following characteristics were assessed: tumor size and localization, surgical approach, duration of surgery, grade of resection, peri- and postoperative complication rates, and neurological outcome. Data were compared between the subgroups of patients according to the lesion's relationship to the denticulate ligament and to surgical approach.

The authors identified 48 patients with aMNGs, 86 patients with lateral MNGs, and 76 patients with posterior MNGs (pMNGs). Overall, 66.6% of aMNGs and 64% of pMNGs were reached via a ULPA. aMNGs that were approached via a ULPA showed reduced duration of surgery (131 vs 224 minutes, $p < 0.0001$) and had surgical complication rates and neurological outcomes comparable to those of lesions that were approached via a bilateral approach. No significant differences in complication rate, outcomes, and extent of resection were seen between aMNGs and pMNGs.

The duration of surgery, extent of resection, and outcomes are comparable between aMNGs and pMNGs when removed via a ULPA. Thus, ULPA represents a safe route to achieve a gross-total resection, even in cases of aMNG [3].

2017

Twelve patients, who received surgical treatment for ventral spinal meningioma via a posterior approach, were included. There were three male and nine female patients, with an average age of 66.3 years (47-88 years). The average observation period was 55.4 months (22-132 months). In these cases, we analyzed the spinal level of tumor position, histopathological type (subtype), the grade of tumor resection (Simpson grade), pre- and post-operative walking state (Nurick grade), perioperative neurological complications, and the recurrence.

Spinal meningioma occurred in the cervical spinal cord in three cases, with a further nine cases in the thoracic spinal cord. Histopathologically, all 12 tumors were assessed as World Health Organization grade 1 meningioma (eight cases of meningothelial type and four cases of psammomatous type). The level of tumor resection was Simpson grade I resection for two cases and Simpson grade II resection for the remaining ten cases. The average of Nurick grade improved from 3.3 preoperatively to 1.3 postoperatively. In all cases, they identified no neurological complications. One incident of tumor recurrence was identified 11 years after an operation involving a Simpson grade II resection

Posterior approaches provide adequate exposure to safely remove ventrally located meningioma. Posterior exposures with lateral bone resection, denticulate ligament division, provide also adequate exposure for safe removal [4].

2016

Davies et al undertook a retrospective analysis of 31 patients pre- and postoperative MRIs, preoperative functional status and their outcomes at follow-up. The following metrics were analysed; percentage cord area at maximum compression, percentage tumour occupancy and percentage cord occupancy. These were then compared with outcome as measured by the Nurick scale.

Of the 31 patients, 27 (87%) had thoracic meningiomas, 3 (10%) cervical and 1 (3%) cervicothoracic. The meningiomas were pathologically classified as grade 1 (29) or grade 2 (2) according to the WHO classification. The average remaining cord cross-sectional area was 61% of the estimated original value. The average tumour occupancy of the canal was 72%. The average cord occupancy of the spinal canal at maximum compression was 20%. No correlation between cord cross-section area and Nurick Scale was seen. On the postoperative scan, the average cord area had increased to 84%. No correlation was seen between this value and outcome.

They found that cross-section area measurements on MRI scans have no obvious relationship with function before or after surgery. This is a base for future research into the mechanism of cord recovery and other compressive cord conditions [5].

2008

A study was undertaken to analyze the functional outcome of surgically treated spinal meningiomas and to determine factors for surgical morbidity. Between January 1990 and December 2006 a total of 131 patients underwent surgical resection of a spinal menigioma. There were 114 (87%) female and 17 (13%) male patients. Age ranged from 17 to 88 years (mean 69 years). The mean follow-up period was 61 months (range 1-116 months) including a complete neurological examination and postoperative MRI studies. The pre- and postoperative neurological state was graded according to the Frankel Grade Scale. Surgery was performed under standard microsurgical conditions with intraoperative neurophysiological monitoring. In 73% the lesion was located in the thoracic region, in 16% in the cervical region, in 5% at the cervico-thoracic junction, in 4.5% at the thoraco-lumbar junction and in 1.5% in the lumbar region. Surgical resection was complete in 127 patients (97%) and incomplete in 4 patients (3%). At the last follow-up the neurological state was improved or unchanged in 126 patients (96.2%) and worse in 4 patients (3%). Permanent operative morbidity and mortality rates were 3 and 0.8%, respectively. Extensive tumour calcification proved to be a significant factor for surgical morbidity ($P < 0.0001$). Radical resection of spinal meningiomas can be performed with good functional results. Extensive tumor calcification, especially in elderly patients proved to harbor an increased risk for surgical morbidity [6].

1)
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