Cylindrical Spinal Meningioma. A Case Report

Christian Raftopoulos, M.D., Danielle Balériaux, M.D., Jacqueline Flament-Durand, M.D., Florence Delecluse, M.D., and Jacques Brotchi, M.D., Ph.D.

Departments of Neurosurgery, Neuroradiology, Neurology, and Neuropathology, Hôpital Erasme, Université Libre de Bruxelles, Belgium

A case of cylindrical spinal meningioma is reported. This most unusual morphology suggested a preoperative diagnosis of either lymphoma, metastatic epidural tumor, or meningioma. At operation, the tumor was found to be hard and extremely adherent to the cord, so its anterior part had to be left in place. Transient paraplegia was observed postoperatively, but the patient recovered normal stance and gait within 6 months. Three years after the operation, magnetic resonance imaging demonstrated a very slow progression of the remaining tumor with an estimated increase of 5%. The differential diagnosis of this lesion by magnetic resonance, its clinical postoperative evolution, and the surgical strategy are discussed.

KEY WORDS: Meningioma; Paraplegia; Spinal cord tumor

The frequency of meningioma in all primary spinal tumors ranges from 20 to 35% [2,5]. This lesion is characterized as a thoracic lesion occurring in middle-aged women (thoracic localization frequency: 82.7%; mean age: 56 years; female frequency: 82.1%) [6]. There is a clear sex difference in tumor location, with 82% of meningiomas in females situated at thoracic level compared with 47% of those in males. To our knowledge, no image of a meningioma entirely surrounding the cord has been reported before.

Case Report

A 68-year-old woman presented complaining of leg weakness. She first suffered from right sciatica lasting 72 hours 5 months previously. One month later she reported a painful fall followed by progressive weakness in the lower limbs. On admission, she could stand only with the assistance of two people.

Clinical examination revealed a severe proximal, symmetrical paraparesis (muscular strength only greater than gravity). Leg reflexes were hyperactive with bilateral Babinski and spasticity in the right leg. Sensory examination revealed a partial sensory level at T-11 in keeping with thoracic medullary compression.

An emergency spinal magnetic resonance (MR) study was carried out. Sagittal, coronal, and axial spin echo T1-weighted images were performed without and with intravenous contrast injection (gadolinium DOTA). An intraspinal extramedullary tumor was clearly shown at the thoracic level extending from T-5 to T-7 (Figure 1 A and B). The lesion entirely surrounded the cord and compressed it and, after contrast injection, enhanced homogeneously (Figure 1 B). No other lesion was demonstrated. Considering the tumor's shape, the differential diagnosis at this time included lymphoma, metastatic epidural tumor, and meningioma. Meningioma seemed less likely because of the lesion's peculiar shape.

After opening the dura, the surgical procedure consisted of a subtotal removal of a sheathlike tumor, hard and very adherent to the spinal cord. These features complicated surgery and only piecemeal removal of the posterior and lateral parts was possible. Because of the tumor's adherence, the anterior portion was not removed by a transpedicular approach. At the end the dura was closed watertight.

Histological examination demonstrated numerous psammomatous bodies separated by loose connective tissue and small foci of meningiothelioma cells (Figure 2).

Postoperatively the patient presented with a complete paraplegia with areflexia and total sensory loss for 3 days. There was sustained improvement with recovery of gait 1 week later. Six months postoperatively, the motor status and sensation had returned to normal. An MR was carried out 3 years after surgery and showed a progression of the residual tumor of only 5% with the patient clinically stable.
Discussion

The case demonstrated two special features: (1) a meningioma en plaque completely surrounding the medulla (cylindrical shape) and (2) a patient with complete neurologic recovery after 3 days of postoperative paraplegia.

To the best of our knowledge, images of a spinal meningioma completely surrounding the cord have never been reported. Onofrio reported in 1978 [4] only one case of spinal meningioma en plaque in 979 primary spinal tumors. Stechison et al [7] reported two cases of spinal meningioma en plaque, one hemicircumferential at the same level (T-5 to T-7) and another "completely encasing" the conus medullaris. The latter was only a preoperative observation, without computed tomography or MR images [7]. In our case, the exceptional morphology disclosed by MR accounts for the particular preoperative differential diagnosis. Indeed, the more likely diagnosis suggested was either lymphoma, metastatic epidural tumor, or meningioma. Infectious epididymitis was ruled out because of the absence of any associated bone lesions. However, the existence of small hypodensities in spin echo T1-weighted images could have been interpreted as small calcifications, suggesting the diagnosis of meningioma more clearly.

From a surgical point of view, three facts must be outlined. First, the removal of either a calcified tumor or an anteriorly located one is clearly associated with more frequent postoperative neurologic deterioration. Malik et al [3] consider tumors with an anterior location to be associated with greater impairment of motor function and higher incidence of postoperative urinary disturbances. These authors reported two cases with a worsened postoperative clinical state in a series of seven patients with anterior spinal meningioma [3]. The second fact to be emphasized is that benign spinal meningiomas often pursue an indolent course. Of five cases with subtotal removal, no regrowth was observed during a follow-up study ranging from 2 to 17 years [5]. The same observation is reported by Levy et al [2]: of seven cases, only two had recurrence, one after 13 years and the other after 16 years. The conclusions from these studies, the presence of severe tumor adhesion to the cord, and the poor neurologic state of our elderly patient convinced us that resection of the anterior part of the tumor could not be attempted through a transpedicular approach. The third fact to consider is whether it is necessary to leave the dura open to minimize the effects of any postoperative compressive arachnoiditis [4,7]. At operation the surgeon (CR) preferred to close the dura, considering the fact that a clear cause of arachnoiditis is contact between blood elements and the subarachnoid spaces. In our case the MR study performed 3 years postoperatively with contrast injection did not demonstrate arachnoiditis.

Postoperatively, however, we were worried by the immediate development of a prolonged complete paraplegia. In the series of Levy et al [2], six patients worsened immediately after surgery. Three of these cases with calcified meningiomas adherent to the cord developed complete paraplegia postoperatively without any recovery. Our patient, however, started improving 3 days later and achieved complete recovery. By 3 months postoperation she was leading a normal independent life. A control MR study performed 3 years after surgery demonstrated only a 5% increase in the size of the remaining meningioma. According to a study published by Kurtske [1] about spinal cord injury, only one in six...
paraplegics with complete sensory loss will show any neurologic recovery. Even if Kurtske's population includes only patients with severe spinal cord trauma, this series, and that of Levy et al [2], suggest a very low rate of complete recovery when postoperative paraplegia is observed.

From this case, it can be concluded that spinal meningioma can, exceptionally, mimic lymphoma or metastatic epidural tumor, and that postoperative paraplegia, not rare in such a case, may be temporary, possibly because no attempt was made to remove the anterior part of the tumor at the time of surgery.

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References