

## Leptomeningeal metastases of an astrocytoma of the conus medullaris : a case report

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### Abstract

We describe a case of spinal leptomeningeal metastases of an astrocytoma of the conus medullaris that presented with quadriplegia. The patient was a 50-year-old woman with a previously treated astrocytoma of the conus medullaris and a spinal cord metastasis at the Th12-L1 level. Four years after the initial treatment, the patient developed weakness of the upper extremities with a decreased muscular tonus. Magnetic resonance imaging of the cervical spine showed an intradural extramedullary metastatic tumor deposit at the C3-C6 level. Spinal leptomeningeal metastases need to be suspected in patients with a history of intramedullary astrocytoma.

**Key words :** Astrocytoma ; metastasis ; conus medullaris ; spinal leptomeninges.

### Introduction

Intramedullary tumors are relatively infrequent. Spinal cord astrocytomas are rare neoplasms that can change the structural integrity of the spinal cord. This alteration can be assessed by use of diffusion tensor imaging methods (1). The diagnostic value of plain X-ray of the spine and computed tomography (CT) is limited in cases of intramedullary tumors. Magnetic resonance imaging (MRI) should be performed as soon as possible and as the first technique whenever an intrinsic spinal cord lesion is clinically suspected. Research has shown that MRI is the method of choice in diagnostic of spinal cord tumors (2). Basic MRI features allow the differentiation of specific types of intramedullary tumors : astrocytoma, ependymoma and hemangioblastoma (3-6). MRI provides accurate localization of intramedullary, intradural extramedullary, and extradural tumors. Proper diagnosis by histopathologic and immunochemical staining with clinical and radiological follow-up is important for the management of this sometimes very aggressive tumor (7, 8).

Here, we report a case of a grade III astrocytoma of the conus medullaris with multiple metastases :

spinal cord at the Th12-L1 level, spinal leptomeningeal metastasis at the C3-C6 level, and central nervous system.

### Case report

At the age of 44, the patient underwent surgical treatment for an astrocytoma of the conus medullaris. Histopathological analysis confirmed the diagnosis of a grade III astrocytoma. A year and a half after the surgery the patient developed a normotensive hydrocephalus, for which a ventriculo-peritoneal shunt was placed. Two years after the first surgery, the patient developed a paraplegia. A recurrence of the medullary astrocytoma at the Th12-L1 level was diagnosed, and the patient was treated with radiotherapy in 27 fractions of 1.8 Gy up to 54 Gy. Despite this treatment, paraplegia of the lower extremities and incontinence remained. Four years after the surgery and two years after the radiotherapy, paresis of the upper extremities occurred with weakening of myotatic reflexes and muscular tonus. A MRI of the brain and cervical medulla spinalis was done, using a Shimadzu EPIOS 0.5T magnet. MRI of the brain revealed a punctiform lesion visible as a hypointensive signal on T1-weighted images and hyperintensive signal on T2-weighted images, paramedially on the right side, in the pyramid area and next to the corpus amygdala, above the tuber cerebelli. The lesions were opacified at the edges after administration of contrast, which was all consistent with a metastasis. A series of sagittal and transversal MRI sections through the area of the cervical spinal canal showed the visible vertebral bodies to be normally sized, shaped and structured. The visible cervical medulla was intumescent distally from the 3rd cervical vertebra, with subtotal obliteration of both the anterior and the posterior subarachnoid spaces. The medulla was of inhomogeneous signal intensity, showing irregular spindle-shaped marginal signal hypointensities on T1-weighted images, whereas on T2-weighted images there was heterogeneously hyperintensive signal of serpiginous appearance, from the



FIG. 1. — MRI of cervical spinal leptomeningeal metastases of an astrocytoma of the conus medullaris.

4th to the lower edge of the 6th cervical vertebra. More cranially, pronounced syrinx formation was visible. Following administration of contrast, there was a crescent-shaped more marginal opacification, dispersing further caudally towards the upper thoracic spine. The findings indicated leptomeningeal metastases (Fig. 1).

It was decided not to treat the patient surgically, but with radiotherapy of 50 Gy in 25 fractions. The neurological deficit remained unchanged, i.e. the patient still suffered from paresis of the upper limbs, together with the previously developed paraplegia.

### Discussion

Spinal astrocytoma is an uncommon entity and its metastases are extremely rare. Astrocytoma of the conus medullaris is a highly aggressive tumor. Factors associated with its dissemination include histological malignancy, proximity of the tumor to the cerebrospinal fluid (CSF) pathways, and surgical manipulation. Hydrocephalus with infiltration of the basal cisterns also appears to be a consistent feature in these patients (9, 10). In this article we report of a spinal astrocytoma diagnosed by MRI and confirmed by histopathological examination. Astrocytomas of the conus medullaris, as well as its intramedullary metastases, are extremely rare, whereas brain metastases of this tumor occur somewhat more often. Only individual cases of astrocytoma of the spinal cord have been described (11, 15). Increased intracranial pressure is rarely seen in cases of spinal cord tumors, and occurs even more

rarely in spinal cord astrocytomas (16, 17). Our patient had a primary tumor location in the conus medullaris and developed increased intracranial pressure, for which she was treated with a ventriculo-peritoneal shunt. This was followed by the occurrence of metastases at the Th12-L1 level, which resulted in paraplegia. Because of paresis of the upper extremities, further diagnostic was performed: MRI of the brain and the cervical spine. Spinal leptomeningeal metastases need to be suspected in patients with a history of astrocytoma of the conus medullaris and intramedullary tumor metastases. In our patient, MRI of the cervical spine demonstrated an intradural extramedullary metastatic tumor deposit at the level of C3-C6. Tumors metastasizing to the leptomeninges or the intramedullary spine are quite rare and the prognosis is relatively poor. Leptomeningeal metastasis and dissemination have been diagnosed by MRI (18, 19). In our case, astrocytoma grade III was diagnosed by MRI and confirmed by histopathological examination. Therefore, no further histopathological analysis of the intramedullary tumor metastases was done. Radiotherapy provided only a temporary relief from pain with little improvement in neurological deficit but no survival advantage. Hejazi and Hasler recommend an early radical surgery of the intramedullary spinal cord tumors to be performed whenever the patient's neurological status is still good (20). We hold that subtotal resection combined with irradiation is the optimal treatment of this kind of metastatic tumors. Other authors recommend the same principles of treatment of the astrocytoma – radical surgery and irradiation (3, 4, 15, 21-24).

An astrocytoma of the medulla spinalis requires regular neurological and neuroradiological follow up, to detect possible metastases and to allow an early appropriate medical treatment.

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