TREATMENT OF PROBABLE BONE METASTASIS OF PITUITARY ADENOMA BY STEREOTACTIC RADIOTHERAPY. A CASE REPORT
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ABSTRACT

Pituitary adenomas usually arise from the anterior lobe of the pituitary gland. These tumors constitute 10% of all intracranial tumors. Pituitary adenomas are usually benign lesions and revealed by hormonal secretion or compression of surrounding structures. Pituitary adenomas metastasis to bones very rarely. According to our search of the literature, only 4 cases of benign pituitary adenoma and distant metastasis have been published to date. The time between the appearance of the disease and metastasis varies widely, ranging from several months to 20 years. Mean survival time is about 2.4 years. Survival is longer in cases with craniospinal metastasis than in cases with distant metastasis. Treatment of bones metastases is surgical resection or radiotherapy. In this case we reported a pituitary adenoma with bones metastases.

Key words: Pituitary adenoma, bone metastasis, stereotactic radiotherapy

INTRODUCTION

Pituitary adenomas usually arise from the anterior lobe of the pituitary gland. These tumors constitute 10% of all intracranial tumors, and present with functional disorders or mass effect. They are classified according to their function, and light microscopic or electron microscopic findings. Non-functional adenomas usually present with mass effect1. Metastasis of pituitary adenomas is extremely rare. According to our search of the literature, only 4 cases of benign pituitary adenoma and distant metastasis have been published to date2. Herein, we present a patient with pituitary adenoma that developed bone metastasis and a review of the relevant literature.
CASE REPORT

A 35-year-old male patient was admitted to the hospital in 2004 with complaints of headache, decreased visual acuity, and impotence. A macroadenoma was observed in the pituitary gland via cranial magnetic resonance imaging (MRI). Transsphenoidal resection was performed subsequently. Histopathological diagnosis was prolactinoma. Recurrence developed 12 months after surgery. Afterward, transsphenoidal re-resection was performed. During routine follow-up, at 6 months post-surgery a second recurrence occurred. At that time right pteroidal craniotomy was performed. 6 months later third recurrence developed. The patient then underwent left pteroidal craniotomy. Following the third and fourth surgical procedures the patient had loss of vision. A fourth recurrence was developed 4 months after the operation. External radiotherapy (54 Gy) was administered to the hypophyseal compartment. During the follow-up period, a low back pain that spread to the left hip and knee, and paralysis of the left lower extremities occurred. Lumbar MRI showed contrast enhancement of metastatic lesions that were 6.5×9×11 mm at the L4-L5 intervertebral disc level and 31×12×13.5 mm at the L5-S1 intervertebral disc level. Additionally, contrast enhancement due to a 35×50-mm mass was noted at the clivus level with cervical MRI, which was considered as metastasis. Surgery was not considered an option for the patient’s spinal metastasis. Radiological diagnosis was clear and the clinical status of the patient was poor, so that biopsy of the metastatic lesions was not indicated. He was referred to our clinical for stereotactic radiotherapy. Stereotactic radiotherapy (total dose: 21 Gy) was administered to the spinal metastasis localized at L4-L5-S1 using a cyberknife device, with an isodose of 79 % and in 3 fractions (Figure 1). One month after stereotactic radiotherapy (total dose 20 Gy) was administered to the metastatic mass in the clivus, with an isodose of 72% and in 5 fractions (Figure 2). The patient's complaints regressed partially. The follow-up MRI of the metastatic lesions was appraised as minimal regression.

DISCUSSION

Systemic metastases of pituitary adenomas are very rare. Some theories concerning the mechanism of metastasis of hypophyseal tumors have been suggested. According to one theory, metastases may exhibit completely malign histologic characteristics, and nuclear pleomorphism, numerous mitotic figures, and vascular invasion are seen. Generally, these are metastases other than those to the central nervous system. According to another postulation, they are initially benign and can then become malignant. Although they are histologically benign, they can still metastasize to the central nervous system. Based on these theories, there is no correlation between histological characteristics and metastasis in pituitary adenomas.
Figure 1. The spinal mass localized at L4-L5-S1.

Figure 2. The mass localized at the clivus.
Sometimes, a non-invasive pituitary adenoma may exhibit cellular pleomorphism and significant mitotic activity. The occurrence of metastasis in such cases cannot be predicted. Metastases may form after frequent local recurrence, surgical interventions such as craniotomies, and radiotherapy. The time between the appearance of the disease and metastasis varies widely, ranging from several months to 20 years. Mean survival time is about 2.4 years. Survival is longer in cases with craniospinal metastasis than in cases with distant metastasis.

Malign pituitary adenoma, hypophyseal carcinoma, and invasive adenoma can also be used to describe aggressive pituitary tumors. However, although they are histologically benign, these tumors are referred as hypophyseal carcinoma if metastasis occurs. Nuclear pleomorphism, cellular atypia, hyperchromasia, high mitotic activity, high levels of Ki67, and high levels of positive p53 immunoreactivity indicate the development of carcinoma. Treatment of pituitary adenomas is quite difficult if metastasis occurs. Chemotherapy and radiotherapy are not always effective. Bromocriptine may be used as a hormone secretion-reducing therapy for prolactinomas. Surgery or stereotactic radiotherapy may be used to treat metastases.

Generally, treatment of bone metastases of pituitary adenomas is palliative. Surgery is the first choice of treatment for symptomatic bone metastases. When surgery is not possible, stereotactic radiotherapy or radiosurgery are the remaining choices of the treatment. The presented case exhibited completely benign histology. The patient had recurrence 7 years after the initial diagnosis. The metastases in the lumbar spine and clivus regions were considered inoperable. Stereotactic radiotherapy was administered for these lesions.

COMPETING INTERESTS

The authors declare that they have no competing interests.

REFERENCES