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Case Report

Brain metastasis from a thoracic myxofibrosarcoma: A case report and literature review

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ABSTRACT

Background: Myxofibrosarcoma (MFS) is a type of sarcoma that mainly affects elderly people; it represents only 5% of all sarcomas and shows no line of differentiation. Intracranial MFS is a rare condition. At present, limited data exist regarding brain metastasis from MFS. This article reports a case of MFS and reviews the literature regarding MFS metastasis.

Case Description: We report a case of brain metastasis from chest wall MFS. The patient was diagnosed with an anterior thoracic MFS and underwent surgery and radiotherapy. One year later, he noticed a tumor on his left shoulder, and more than 1 year thereafter, bilateral lung metastasis was observed. Twelve months after lung metastasis, he presented to the emergency department and underwent contrast-enhanced magnetic resonance imaging, which demonstrated a left frontal tumor suggestive of brain metastasis. Since the main hypothesis was a sarcoma metastasis at the location close to the left motor area, and the patient had a good Karnofsky performance scale, the patient underwent neuronavigation-guided surgery. After surgery, the patient developed Grade III hemiparesis and aphasia. Brain tumor histopathology confirmed a malignant neoplasm with osteosarcomatous differentiation and metastasis from MFS.

Conclusion: We report a rare case of MFS metastasis. To the best of our knowledge, this is the eighth case of intracerebral metastasis from MFS.

Keywords: Brain metastasis, Case report, Myxofibrosarcoma, Sarcoma, Thoracic myxofibrosarcoma

INTRODUCTION

Brain metastases are common events in cancer patients, occurring in approximately 10–30% of patients, and are among the most serious complications due to the negative neurological repercussions that directly impact patient quality of life.[12,13]

Except for leukemia and lymphoma, metastasis to the brain is rare.[17] Myxofibrosarcoma (MFS) is a type of sarcoma that mainly affects the elderly, representing only 5% of all sarcomas.[17,18] At present, limited data are available regarding brain metastasis from MFS, particularly in the lungs, primarily in the chest wall. In our literature review, only seven secondary cases of intracerebral MFS were found, none from the lung site. We report a rare case of chest wall MFS with brain

metastasis. This article reviews and discusses the literature on the prognosis involved in the present case.

CASE PRESENTATION

A 75-year-old man was diagnosed with anterior thoracic MFS and underwent surgery and radiotherapy. One year later, he noticed a tumor in his left shoulder. The patient was treated with neoadjuvant chemotherapy (ifosfamide + doxorubicin) followed by surgical resection and radiotherapy. One year after the shoulder metastasis diagnosis, bilateral lung metastasis was observed, and chemotherapy treatment (docetaxel + gemcitabine) was started. One year after lung metastasis, the patient presented to the emergency department with sudden onset weakness on the right side and a speech disorder. Neurological examination revealed Grade 4 hemiparesis and aphasia. He underwent brain computed tomography (CT), which revealed a hypodense left frontal lesion. He was prescribed dexamethasone and contrast-enhanced magnetic resonance imaging was performed, which revealed a left frontal tumor suggestive of brain metastasis [Figure 1]**.** Since the main hypothesis was a sarcoma metastasis close to the left motor area, and the patient had good clinical status (Karnofsky performance scale score of 80), surgical resection was proposed. The patient underwent neuronavigation-guided surgery. A postoperative CT scan showed a hematoma at the surgical site, and reoperation was performed to drain the hematoma [Figure 2]. After surgery, he developed Grade III hemiparesis, and the aphasia persisted. Brain tumor histopathology confirmed a malignant neoplasm with osteosarcomatous differentiation and metastasis from MFS [Figure 3]. The patient developed postoperative pleural effusion and recurrence of pulmonary metastasis was diagnosed. Surgical treatment and chemotherapy were attempted, but the patient died 3 months after the neurological surgery.

DISCUSSION

MFS, formerly called malignant fibrous histiocytoma (MFH), is a soft-tissue neoplasm belonging to the sarcoma group, characterized by a diffuse infiltrative tissue pattern that can occur in any part of the body.[15] It corresponds to a tumor that originates from the mesenchyme, is aggressive, and constitutes one-third of all soft-tissue sarcomas (STSs) in adults.[9]

MFSs have a high recurrence rate, ranging from 16% to 57%.[18] The head and neck were the areas with the most local recurrence, with an overall risk of metastases between 20% and 25%.[2] In the literature, of the seven cases of secondary intracerebral MFS diagnosis that has been published, there is no chest wall site. For our patient, we elected to perform a surgical approach with neuronavigation-guided surgery of the brain lesion from the chest wall.

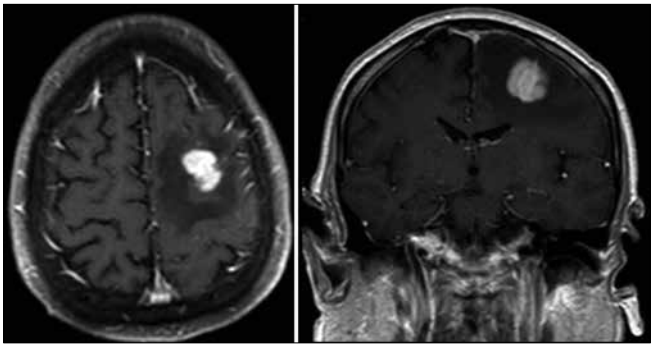

Figure 1: Coronal and axial planes of brain magnetic resonance reveal hypodense left frontal lesion tumor, suggestive of brain metastasis.

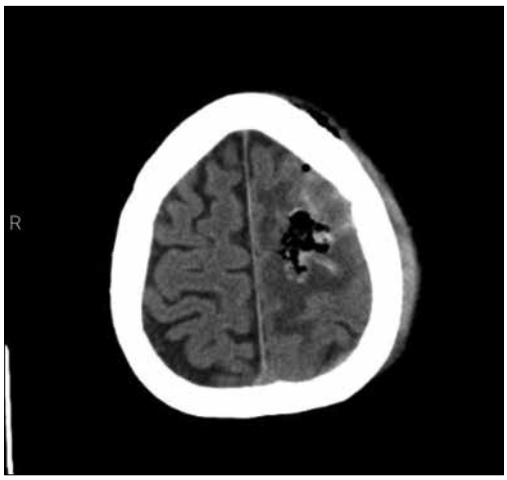

Figure 2: Axial plane of postoperative computed tomography scan.

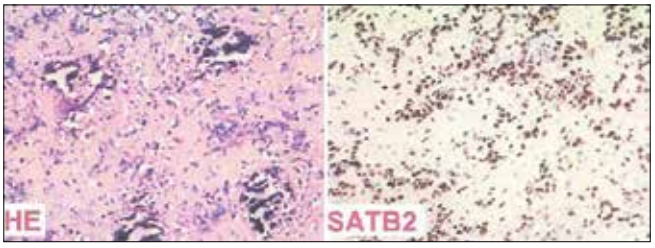

Figure 3: Histopathology images HE stain shows spindle and pleomorphic cells, which are observed in myxofibrosarcoma tumors. Immunohistochemical marker SATB2, which is sensitive and specific for bone and soft-tissue tumors, was positive.

Intracranial MFS is rare and some reports have described cases without extracranial sites.[3,6,14,16] Sarrami *et al.* reported a case of MFS with infiltration of the pons, cerebellum, and basal surface of the left temporal lobe without any visible masses.[16] A 55-year-old man presented with MFS presenting as an acute cerebral hemorrhage, with subsequent development of lung metastases.[14] Thirty-nine previously reported cases were related to location/origin

Table 1: Data from literature review of brain metastasis from myxofibrosarcoma.

Study	Number of patients	Primary site	Age and gender	Interval between diagnosis and brain metastasis	Outcome
Kamath *et al*., 1994	1	Right pulmonary mass	56, M	Primary lesion diagnosed at the time of diagnosis of metastasis	Died 1 month after laryngectomy
Kim *et al*., 1997	1	Left heart mass	18, F	2 years later	Died 50 months after initial diagnosis
Kawaguchi *et al*., 2012	1	Femoral chondrosarcoma	72, F	2 years later	Died 3 months after initial diagnosis
Wernhart *et al*., 2013	1	Dorsolateral thoracic wall	73, M	7 and a half months later	Died 9 and a half months after initial diagnosis
Badaloni *et al*., 2017	1	Left heart mass	41, M	Primary lesion diagnosed at the time of diagnosis of metastasis	Died 1 month after surgery and 17 days after onset of neurological symptoms
Chan *et al*., 2020	1	Left posterior thigh	67, M	9.9 months	Died 13.4 months after initial diagnosis
Zhang *et al*., 2021	1	Left occipital scalp	20, F	6 months	Tumor relapsed 6 months after resection

in the brain, treatment, and follow-up, which showed a consensus regarding the diagnosis and treatment of the primary tumor.[6] Brain metastasis was associated with a higher risk when multiple metastases to bone, liver, and lung were reported by a population-based cohort study with 0.26% of the cases with brain metastasis of the 8.433 patients with STS.[6] Other risk factors for brain metastasis in STS were being female and American Indian/Alaska Native.[6]

To the best of our knowledge, only seven cases of brain metastasis as a consequence of MFS have been reported, and this is the first case of metastasis from the chest wall.[3,4,10-12,17,18] The study, number of patients, primary site, age, sex, and outcome of these studies are summarized in Table 1.

In this case, several prognostic factors were identified. The previous data showed that factors believed to negatively influence survival are advanced patient age, greater tumor size at resection, positive surgical resection margins, higher tumor grading, greater tumor necrosis, higher mitotic rate, low degree of myxoid areas, and intracerebral manifestations.[7]

The clinical manifestations of intracranial MFH vary and are largely dependent on the location of the tumor.[16]

The prognosis tends to be poor and survival is generally short.[1] Our literature review showed a poor prognosis <1 year after the initial diagnosis. Lung metastasis appears to be a high-risk factor for brain metastasis.[6] This is consistent with our case, which did not respond to chemotherapy and the patient died 3 months after the diagnosis of brain metastasis.

Although we showed a single case study with a rare primary site of metastasis, wide resection of MFS appears to be associated with a lower recurrence rate.[5,8]

CONCLUSION

According to the literature regarding metastasis in the frontal lobe, specifically in the motor area due to MFS, this is a very rare case. This is the eighth case reporting intracerebral metastases from MFS and the first report from a lung site. Furthermore, more studies may aid in elucidating the prognostic parameters of this malignant condition, which may improve the quality of life of patients.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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