Case Report

Metastatic melanoma of unknown origin mimicking neurofibromatosis

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A B S T R A C T
We present an unusual case of metastatic melanoma in a young patient with imaging appearance resembling neurofibromatosis. A 36-year-old-man with a history of cervical radiculopathy presented with cauda equina syndrome. An MRI was performed for further evaluation demonstrating multiple intradural, extramedullary enhancing lesions in the thoracic and lumbar spine, as well as extra-axial enhancing lesions with involvement of the lateral ventricles and posterior fossa. Bilateral pulmonary masses were found on chest CT. Lung lesions were biopsied and positive for metastatic melanoma. Melanoma is the third most common primary neoplasm to produce brain metastasis and should be considered on the differential as a cause of newly detected intracranial and intraspinal masses in young patients.

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Introduction

Metastatic melanoma of unknown primary (MUP) is the presence of metastatic melanoma without evidence of a primary skin lesion. At least 8% of patients who present with melanoma metastases are diagnosed with MUP. Often times melanoma metastasis to the central nervous system (CNS) presents with intracerebral lesions that are hyperintense in T1 weighted MRI due to variable content of melanin. In this case report we present the unusual MRI appearance of pathology proven melanoma metastasis, and a review of MUP with its prognostic factors.

Case report

A 36-year-old male patient with a medical history of cervical radiculopathy presented to the emergency department complaining of lower back pain, saddle anesthesia, and incontinence for 2 months. The patient’s family history was positive
for multiple cancers, but no specific information was available. Vital signs at triage were notable for increased blood pressure (170/115 mm Hg) secondary to pain. Patient was awake and alert, with no cranial nerve deficits. Paresthesia in the left ulnar distribution and tenderness to palpation of the lumbar spine were noted on exam. An MRI of the head was performed, revealing extra-axial enhancing lesions with involvement of the lateral ventricles and posterior fossa, with 1 lesion demonstrating a dural tail reminiscent of meningioma (Figs. 1 and 2). MR imaging of the spine demonstrated multiple intradural, extramedullary enhancing lesions in the thoracic and lumbar spine, suggestive of multiple schwannomas (Fig. 3). Initial tumor biomarkers of carcinoembryonic antigen (CEA), human chorionic gonadotropin (beta-hCG), alpha fetoprotein (AFP), and beta-2 microglobulin were negative. A biopsy was performed, with pathology results consistent with metastatic melanoma (Fig. 4). Upon additional review of patient's history, he denied ever having had a concerning skin lesion and a primary melanoma lesion was not found on clinical examination. The patient was referred to radiation oncology for emergent palliative cranial spinal radiation and genetic studies were sent out for possible systemic treatment options. Neurosurgery evaluation did not indicate a surgical intervention for his neurological symptoms at that time. Medical treatment was given using corticosteroids.

**Discussion**

MUP is the presence of metastatic melanoma without evidence of a primary skin lesion. The incidence of MUP is 2-3% of all diagnosed melanomas, and typically presents in the fourth to fifth decades of life [1]. 40% to 50% of patients diagnosed with stage IV metastatic melanoma have brain metastases [2]. At least 8% of patients who present with distant melanoma metastases are diagnosed with MUP [3]. Risk factors for developing CNS metastasis include presence of visceral tumor and lung metastasis, MUP, depth of tumor invasion, and male gender [4]. Good prognostic indicators include single brain lesion, good performance status, absence of neurologic symptoms, younger age, and longer disease-free interval [4]. The incidence of stage IV MUP has increased over the last thirty years, especially among patients younger than 30 years old [5]. As the incidence of MUP is on the rise, it is...
important not to discount this disease in the younger adult patient with multiple lesion imaging.

Metastatic melanoma requires a multidisciplinary approach for management with consideration of quality of life. For patients with symptomatic brain metastasis, steroids are often used to decrease cerebral swelling and to improve symptoms. Historically, stereotactic radiosurgery and whole-brain radiotherapy, with or without chemotherapy, is used to control metastases [6]. More recently, systemic treatment such as ipilimumab, an anti-CTLA-4 monoclonal antibody, and vemurafenib, an inhibitor of BRAFV600E, positive melanoma, have provided an alternative for patients [6]. Patients with brain metastases remain at risk of CNS progression even after treatment, and should have MRI imaging surveillance every 3 months [7].

Prior to biopsy, our radiologists and neurologists also considered a diagnosis of neurofibromatosis type 2 given our patient’s age, imaging appearance and reported negative personal history of cancer. The most commonly encountered enhancing intradural-extramедullary spinal lesions are schwannomas and the presence of multiple schwannomas is suggestive of neurofibromatosis type 2 [8], with the differential including meningioma. Their imaging appearance on non-contrast CT and T1 weighted MR images is similar to attenuation and signal intensity of spinal cord. Extraspinal cord compression by metastases is a far more common presentation, with up to 20% of new epidural spinal cord compression by neoplasm as the initial presentation of metastatic malignancy [9]. Melanocytic tumors are typically visualized by hyperintensity on T1 weighted and T2 weighted signal intensity loss [10] with 7% of melanoma lesions detected principally on T2 weighted sequences [11]. Brain metastases of patients containing a significant amount of melanin are more likely to demonstrate increased T1 signal intensity than those with amelanotic or lightly melanotic tumors [11]. In the presented case, the extra-axial lesions are isointense to minimally increased in signal intensity to grey matter on T1 weighted sequences which can be seen with the presence of melanin or metabolic products, isointense signal intensity on T2 weighted sequences, and avid diffuse enhancement on postcontrast images which can be seen with schwannoma or metastatic disease. Metastatic disease to the choroid plexus and extra-axial location as seen in our patient, is an uncommon location. Despite its relative rarity as a systemic neoplasm, melanoma is the third most common primary to produce brain metastasis and thus must be considered as the cause of newly detected intracranial masses in patients with no known primary [12], in either intra-axial or extra-axial location.

**Consent**

We are using entirely anonymized images from pathology slides, CT scans, and MRI. These do not contain any identifying marks and are not accompanied by text that might identify the individual concerned.

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