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Case Report

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A Case of Intracranial Melanoma Metastasis Presenting with Arteriovenous Shunting

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Abstract

Melanoma metastases to the brain are highly vascular lesions and have a high predilection to haemorrhage. Due to their degree of vascularity, these lesions sometimes demonstrate arteriovenous shunting. They may even mimic separate entities such as arteriovenous malformations (AVM). We present one such case; a 32-year-old male who was transferred to our unit with acute left sided hemiparesis and slurred speech. Imaging demonstrated a large intracerebral haemorrhage (ICH) with arteriovenous shunting and presumed underlying AVM. This was initially managed conservatively, however progressive neurological decline over subsequent days necessitated surgical intervention and the hematoma was evacuated. An arterialised vein and nidus of abnormal vessels were identified intra-operatively and disconnected from feeding MCA vessels. There were no macroscopic appearances suggestive of a melanoma. The final diagnosis of metastatic melanoma was only made on histopathological analysis of the resected specimen. This case highlights the importance of sending all ICH samples for histopathological analysis regardless of appearances on imaging.

Introduction

Malignant Melanoma commonly metastasises to the brain and is highly vascular [1]. Metastatic intracranial deposits mimicking vascular pathologies such as an arteriovenous malformation (AVM) have been reported in literature but are rare [2-4]. We report a case of an intracranial melanoma metastasis presenting with arteriovenous shunting mimicking an AVM, highlighting the importance of sending all intracerebral haemorrhage (ICH) specimens for histopathological confirmation.

Case Report

A 32-year-old male presented to us with acute hemiparesis and slurred speech. Examination revealed an alert patient, with MRC grade 0/5 power in his left upper limb and 4/5 in his left lower limb.

Computed tomography (CT) demonstrated a large right fronto-parietal intraparenchymal haematoma (Figure 1). CT angiogram demonstrated a compact nidus underlying the haematoma (Figure 2). Digital subtraction angiography (DSA) demonstrated a feeding artery from the posterior right M3 branch and venous drainage from the anterior and lateral aspects of the nidus into the superior sagittal sinus (Figure 3A). No intranidal aneurysm was identified.

Given the peri-rolandic position of the haematoma the patient was initially managed conservatively, however progressive neurological decline necessitated haematoma evacuation. An arterialised vein and nidus of abnormal vessels were identified intra-operatively and disconnected from feeding MCA vessels. The haematoma was sent for formal histopathology.

Histopathology demonstrated metastatic melanoma. A repeat DSA was performed to exclude dual pathology; tumour and vascular malformation, and this demonstrated no residual abnormal vasculature (Figure 3B).

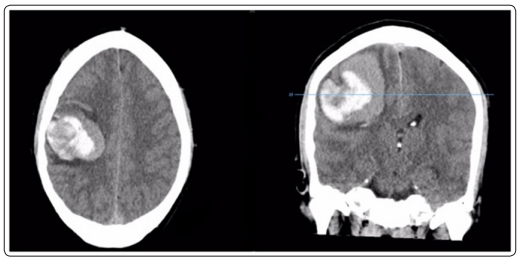

Figure 1: Large right fronto-parietal intraparenchymal haematoma with surrounding vasogenic oedema

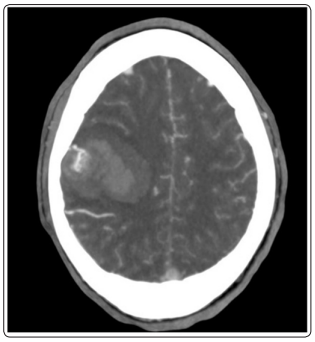

Figure 2: CTA demonstrating a peripheral compact nidus underlying the haematoma measuring 15x8x14mm

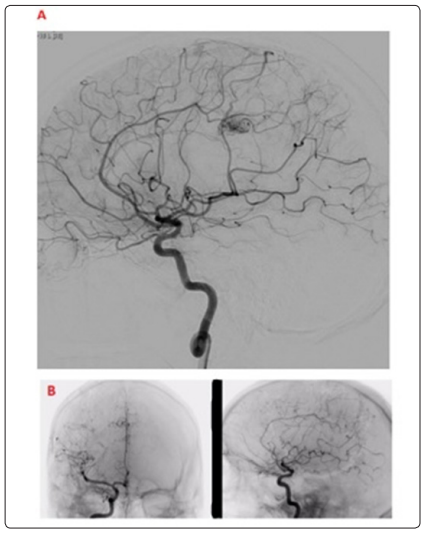

Figure 3: A Pre-operative cerebral DSA demonstrating a vascular malformation with a feeding artery from the posterior right M3 branch. Venous drainage is from the anterior and lateral aspect of the nidus into the superior sagittal sinus. **B:** Post -operative cerebral DSA demonstrating complete resection of the lesion.

Subsequent staging CT revealed metastases to the lungs and liver. Upon discharge, the patient recovered to full power in his left lower limb and grade 3/5 in his left upper limb.

Discussion

Malignant melanoma is the fourth most common cause of intracranial metastasis and one of the most common intracranial tumours to haemorrhage [1,5,6]. Haemorrhage may leave doubt as to the underlying aetiology given the high attenuation of blood on CT which can mask contrast enhancement [7]. Indeed, in a retrospective study involving 50 cases of spontaneous ICH caused by cerebral tumours, there was no radiological suspicion of neoplasm in half the cases [8].

Our patient had a CTA and DSA demonstrating arteriovenous shunting and an abnormal tangle of blood vessels. This combination was very suggestive of an underlying AVM.

Histopathology revealed metastatic melanoma and ruled out suspected AVM. It was a haemorrhagic and moderately-cellular lesion with large, thick-walled blood vessels separated by sheets of epithelioid cells. There was interspersed focal necrosis and scattered brown pigment. In contrast, the classic histopathology of an AVM would show a disorganized array of blood vessels of different calibre separated by gliotic brain tissue.

An MRI may have been useful in this case but was not performed because a vascular cause for the haemorrhage was thought to have been identified on CTA and confirmed by DSA.

The predilection of melanomas to haemorrhage is postulated to be due to rapid neovascularisation and angiogenesis. Angiogenic stimulation is a key step in both tumour and vascular malformation development [9]. In melanomas, angiogenesis is stimulated by elevated levels of vascular endothelial growth factor (VEGF) and decreased levels of anti-angiogenesis compounds [10]. This feature is shared by other highly vascular intracranial metastases including renal cell carcinoma [2]. There are reported cases of metastatic choriocarcinoma and renal cell carcinoma mimicking AVMs [2,3]. We postulate that rapid angiogenesis in these tumours result in development of abnormal vasculature including arteriovenous shunting giving them the deceptive appearance of completely separate pathologies including AVMs.

This case highlights the importance of sending all ICH specimens for histopathological examination. Conventional imaging may not be sensitive enough to exclude the presence of underlying highly vascular tumours.

Conclusion

Metastatic melanoma is a highly vascular tumour that is a common cause of ICH. Diagnostic uncertainty of an underlying lesion in cases of haemorrhage may be compounded by the fact that current imaging techniques may cause highly vascular tumours such as metastatic melanoma to appear like primary vascular pathologies. This case highlights the importance of histopathological confirmation of all resected specimens.

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