

# Cavernous sinus melanoma: A rare tumor

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## Abstract

Primary melanoma of the cavernous sinus is very rare with only few cases reported in the literature. We present the cross-sectional imaging findings of this rare tumor. The differential diagnosis for cavernous sinus mass lesion is wide as it contains vital neurovascular structures that may be affected by vascular, neoplastic, infective, and infiltrative lesions arising in the cavernous sinus proper or via extension from adjacent intra and/or extracranial regions. Radiologic imaging can narrow the differential diagnosis, however, imaging cannot definitely reach single diagnosis if they present in atypical form with hemorrhage and cystic degeneration. This case report illustrates that primary cavernous sinus melanoma may present as a atypical tumor with diagnostic dilemma.

**Key words:** Cavernous sinus; differential diagnosis; melanoma

## Introduction

Primary melanoma of the cavernous sinus is very rare, and neuroimaging findings have been described in a few reports.<sup>[1-3]</sup> We describe the case of a 36-year-old female who presented with left cavernous sinus mass lesion with imaging characteristic of melanin-containing tumor. The differential diagnosis of cavernous mass lesion is reviewed followed by a discussion of particular characteristics of melanin pigment on cross-sectional imaging.

## Case History

A 36-year-old female presented with headache since 3 years, reduced sensation over left half of the face, difficulty in chewing from left side of the mouth, and diplopia for the last six months. No other comorbidities were present. On examination, vitals were normal. Left lateral rectus palsy, mild ptosis, left temporalis, and masseter muscle wasting with reduced sensation over V1, V2, V3 by 50%, corneal reflex absent, and grade 2 facial palsy was noted. Basal laboratory studies were normal.

An unenhanced computed tomography (CT) scan of the brain showed a hyperdense mass in and adjacent to the left cavernous sinus and petrous bone [Figure 1]. Neither calcification within the lesion nor hyperostosis of the adjacent bony structures noted. On magnetic resonance imaging (MRI), the mass appears to be predominantly hypointense on T2-weighted axial MRI [Figure 2A], predominantly hyperintense on T1-weighted coronal image [Figure 2B], with no significant enhancement on post-contrast T1-weighted axial images [Figure 2C] and mild blooming in centre due to hemorrhage [Figure 2D] as well as some cystic degeneration.

Left frontotemporal craniotomy and biopsy of the lesion revealed extra-axial black-colored mass in the left cavernous sinus region between V2 and V3 division of the 5<sup>th</sup> cranial nerve. It was firm but friable in consistency and there was xanthochromic fluid within a cyst in the tumor. The histopathology examination revealed melanocytic neoplasm with high activity. The diagnosis was melanoma.

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10.4103/0971-3026.202970

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**Cite this article as:** Garge S, Mani S, Inbaraj A, Rajshekhar V, Mohapatra P. Cavernous sinus melanoma: A rare tumor. Indian J Radiol Imaging 2017;27:43-5.



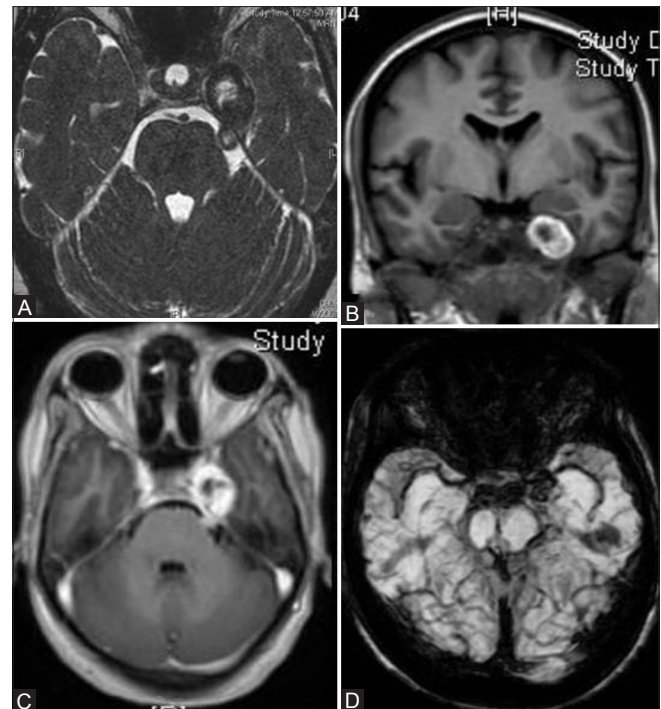
**Figure 1:** Unenhanced axial computed tomography scan shows a heterogeneous hyperdense mass in and adjacent to cavernous sinus and petrous bone which appear oval with elongation into the Meckel's cave. No calcification was seen in the lesion

The patient underwent CT-guided stereotactic radiosurgery using 16 Gy radiation. Post-procedure period was uneventful. Telephonic follow-up after 1 month showed significant symptomatic improvement without any new symptoms.

## Discussion

Primary malignant melanoma of the central nervous system comprises approximately 0.1% of the brain tumors.<sup>[4]</sup> Primary malignant melanoma in the vicinity of the sellar turcica is even rare, with only few reports in the literature.<sup>[1-3]</sup> The explanation for the histogenesis of primary melanoma in the vicinity of cavernous sinus is that these tumors could arise from melanocytes in the leptomeninges.<sup>[5]</sup>

The differential diagnosis for cavernous sinus mass lesion is wide because it contains vital neurovascular structures that may be affected by vascular, neoplastic, infective, and infiltrative lesions arising in the cavernous sinus proper or via extension from the adjacent intra and/or extracranial regions. The clinician needs to know the type of cavernous sinus lesion, its relationship, and its extension so that



**Figure 2 (A-D):** Magnetic resonance images of the brain. (A) Axial T2-weighted MRI shows an extracranial mass which is appearing predominantly hypointense with central areas of hyperintensity due to cystic degeneration and haemorrhage. (B) Coronal T1-weighted MRI shows the mass to be predominantly hyperintense with central areas of hypointensity. (C) Axial T1-weighted post contrast MRI shows the mass to be predominantly hyperintense without any appreciable enhancement. (D) Axial susceptibility weighted image (SWI) shows mild blooming in centre suggestive of hemorrhage

appropriate treatment can be started.<sup>[1]</sup> Radiologic imaging can narrow the differential diagnosis, however, imaging cannot definitely reach single diagnosis if mass lesions present in the atypical form with hemorrhage and cystic degeneration.

Primary meningeal melanocytic tumors include a spectrum of meningeal tumors, benign end of which is represented by melanocytoma whereas the malignant end is represented by primary or secondary meningeal melanomas.<sup>[6]</sup> The more aggressive meningeal melanoma have the propensity to metastasize, however, in our case, no distant spread or other primary foci of melanoma was identified.

An unenhanced CT scan in melanoma shows a hyperdense lesion, as seen in our case. The initial differential diagnosis was meningioma, cavernous carotid aneurysm, or hypercellular tumor. MRI and angiography exclude aneurysm and meningioma because the lesion was appearing hyperintense on T1 and hypointense on T2-weighted images with no direct communication with carotid artery. There was medial displacement and narrowing of the cavernous carotid artery, suggesting an intradural lesion. The MR findings narrowed the differential

diagnosis to melanomatous neoplasm, cavernous angioma, or dermoid/white epidermoid tumor.

The typical MR findings in intracranial melanoma include shortening of T1 and T2 with characteristic hyperintensity to brain parenchyma on T1-weighted images and hypointensity on T2-weighted images, presumably due to the paramagnetic effects of melanin, as in our case. Cavernous angiomas appear hyperdense on CT scan and appear T1 isointense and T2 hyperintense on MRI with strong progressive post-contrast enhancement and variable hemosiderin deposits.

Lipid-like material can also produce the same MR signals as melanin, however, they may be distinguishable on CT by attenuation. Another useful diagnostic tool for the detection of intracranial melanoma could be the demonstration of an increased uptake of  $^{123}\text{I}$ -iodoamphetamine in single-photon emission computed tomography (SPECT).<sup>[7,8]</sup>

Biopsy confirmed the melanoma in our case. Once the diagnosis of melanoma is established, the exclusion of a primary melanoma in other organs proves to be the most important issue by thorough clinical examination, paying attention to the dermatologic, ophthalmologic, and sinonasal areas; in our case, a thorough clinical examination was done to exclude any other organs having melanoma or metastasis. The melanoma may be primary or metastatic and the primary form may arise from the skin or other sites such as the uvea, meningeal, sinonasal mucosa, prostate, urethra, etc., Metastatic melanoma occurs when melanoma cells of any kind (cutaneous, mucosal, or ocular) have spread through the lymph nodes to distant sites in the body. The liver, lungs, bones, and brain are most often affected by these metastasis. The treatment modalities include surgical excision, stereotactic radiosurgery, and/or boron neutron capture therapy.<sup>[5]</sup>

## Conclusion

In conclusion, primary melanoma of the cavernous sinus is a very rare tumor and can have atypical characteristic if associated with hemorrhage and cystic degeneration. The differential diagnosis for cavernous sinus lesion is wide; however, a meticulous radiological approach can narrow the differential diagnosis so that an appropriate treatment can be initiated.

## Financial support and sponsorship

Nil.

## Conflicts of interest

There are no conflicts of interest.

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