

# Epithelioid Hemangioendothelioma of Cavernous Sinus

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Indian J Neurosurg 2017;6:206–209.

## Abstract

Epithelioid hemangioendothelioma is an uncommon vascular neoplasm. It is rare in the intracranial location. Its occurrence in the region of cavernous sinus is reported only once. Here, we report a case of 49-year-old man who presented with a headache, pain in the right eye, diplopia, and ptosis due to third and sixth cranial nerve involvement. Imaging showed an enhancing lesion in the region of cavernous sinus on the right side. Pterional craniotomy, combined extradural and intradural approach, and subtotal excision of the tumor was done. Histopathology and immunohistochemistry were suggestive of epithelioid hemangioendothelioma which is a rare tumor in this location. We report this case because of its rarity and uncommon location.

## Keywords

- ▶ epithelioid
- ▶ hemangio-endothelioma
- ▶ cavernous sinus

## Background and Importance

Epithelioid hemangioendothelioma was coined by Enzinger and Weiss in 1880 to define an intermediate group of vascular neoplasm.<sup>1</sup> The tumor is composed of epithelioid or histiocytoid endothelial cells. It commonly occurs in lungs, liver, bone, and presents as a soft tissue mass. Intracranial occurrences are very rare and cavernous sinus is an unusual site. To the best of our knowledge, we found only one reported case in literature of its occurrence in cavernous sinus.<sup>2</sup>

## Clinical Presentation

We report a case of a 49-year-old man who was referred to the neurosurgery outpatient department with complaints of headache, diplopia, ptosis, pain in the right eye, and numbness of right side of the face for 1 week.

Clinical examination revealed normal vital signs and higher mental functions. Central nervous system examination showed complete third nerve palsy right eye, impaired lateral gaze on right side (sixth nerve palsy), impaired corneal reflex, anesthesia over the right side of face corresponding to V1, V2, divisions of the trigeminal nerve. No long tract signs or neurocutaneous markers.

Computed tomography and magnetic resonance imaging suggested possibilities of meningioma/lymphoma in the region of the cavernous sinus (▶ **Figs. 1 and 2**).

A right frontotemporal craniotomy was done and combined extradural and intradural approach to the lesion was adopted. Sphenoid ridge was drilled, superior orbital fissure widened, extradural resection of the anterior clinoid process was done, and cavernous sinus was opened. A vascular lesion involving the anterolateral and posterior quadrant of the cavernous sinus, extending to superior orbital fissure was identified and subtotal excision of the lesion was done in piecemeal.

On follow-up, eye movements recovered completely after 3 months. Microscopy of the lesion showed a neoplasm composed of thin-walled spaces lined by epithelioid type of endothelial cells (▶ **Figs. 3 and 4**). Immunohistochemistry was done to confirm vascular nature, as CD31 (▶ **Fig. 5**), and CD34 (▶ **Fig. 6**) were positive. Epithelial membrane antigen (EMA, ▶ **Fig. 7**) was negative disproving meningeal origin.<sup>1</sup> With the clinical, histopathological, and immunohistological evidence, a diagnosis of epithelioid hemangioendothelioma in right cavernous sinus causing Tolosa–Hunt syndrome was made.

received  
April 9, 2015

accepted  
September 17, 2016  
published online  
May 9, 2017

DOI <https://doi.org/10.1055/s-0036-1596042>.  
ISSN 2277-954X.

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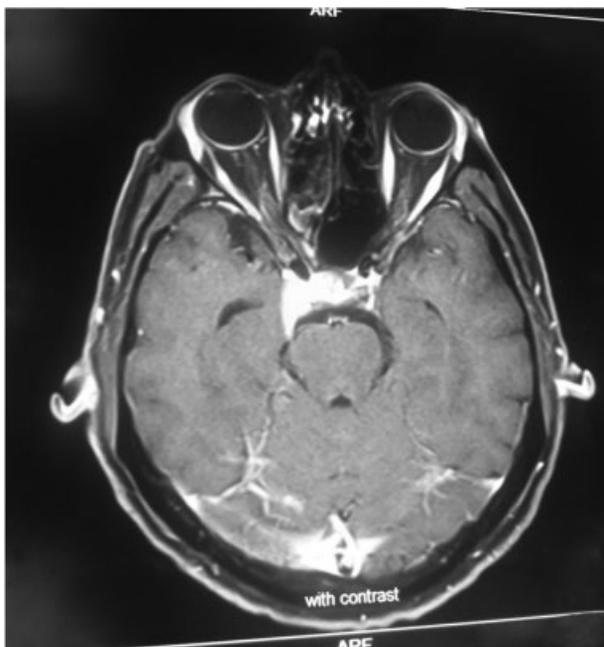




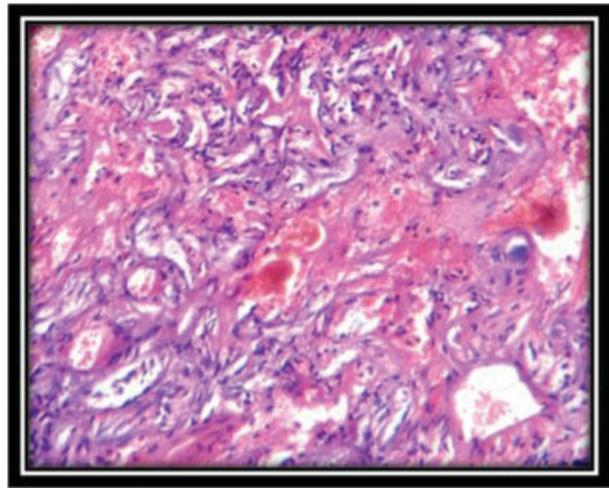
**Fig. 1** CT scan showing iso- to hyperdense lesion in the right cavernous sinus extending medially to sella. CT, computed tomography.

**Discussion**

Epithelioid hemangioendothelioma commonly occurs in lungs, liver, bone and presents as a soft tissue mass<sup>3</sup> The vascular tumors of central nervous system (CNS) commonly include hemangioma, hemangioendothelioma, hemangiopericytoma,



**Fig. 2** Contrast MRI showing fairly well-defined lesion in the right cavernous sinus region, which is extending to sella with intense contrast enhancement. MRI, magnetic resonance imaging.

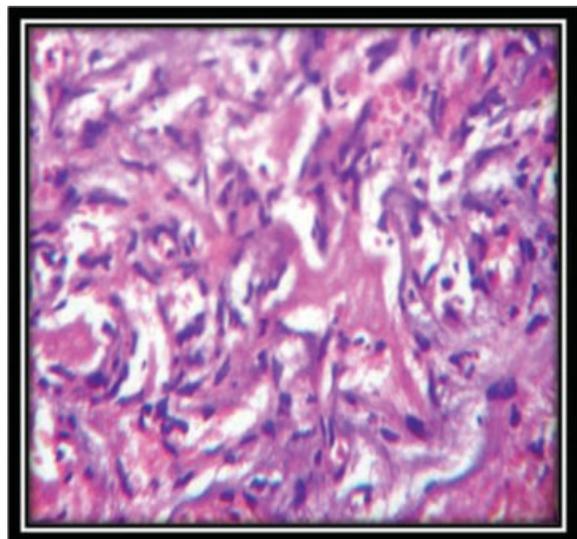


**Fig. 3** Vascular spaces lined by endothelial cells (x40).

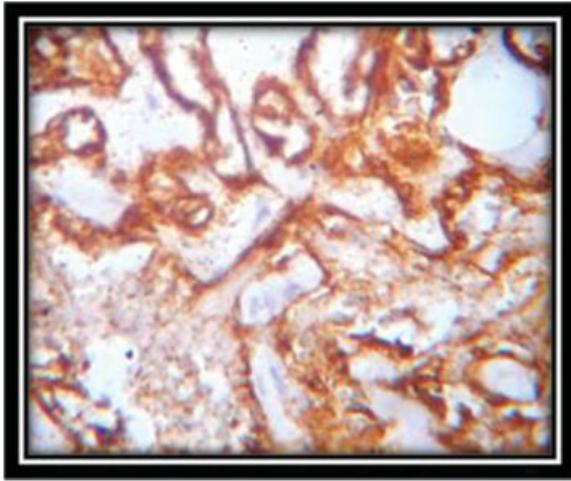
and angiosarcomas.<sup>4</sup> Weiss and Enzinger described four variants of hemangioendothelioma, including epithelioid, spindle cell, endovascular papillary angioendothelioma, and kaposiform.<sup>2,3</sup> Only the epithelioid variant has been described to occur in the brain and surrounding structures. Typically, they have an epithelioid appearance and an angiocentric location.<sup>5</sup>

Epithelioid hemangioendothelioma is an intermediate grade vascular neoplasm. It commonly occurs in lungs, liver, bone and presents as a soft tissue mass. Intracranial occurrences are very rare. Phookan et al,<sup>2</sup> has reported a case of intracranial hemangioendothelioma in the cavernous sinus.

In the case report by Phookan et al,<sup>2</sup> the patient presented with features of Tolosa–Hunt syndrome and the neuroimaging diagnosis was a meningioma, as in our case. A complete excision by orbitozygomatic approach was possible in the case by Phookan et al but in our case only



**Fig. 4** Endothelial cells are plump epithelioid type (x100).



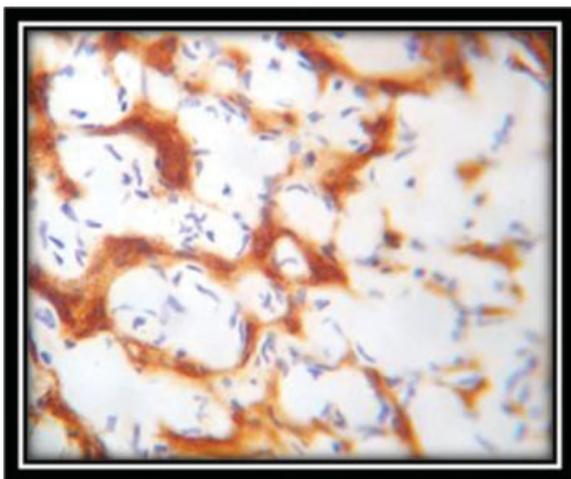
**Fig. 5** CD31 Positive.

subtotal excision of the tumor was possible due to the inaccessibility during surgery and high vascularity.

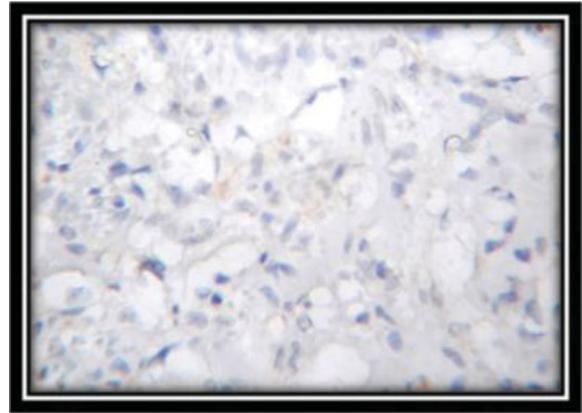
Epithelioid hemangioendothelioma is composed of epithelioid or histiocytoid endothelial cells. Immunohistochemical study helps in confirming the diagnosis by demonstrating CD31, CD34 antigens, von Willebrand factor or Fli-1 in endothelial cells.<sup>6,7</sup> These tumors are found extremely rarely in CNS especially in the cavernous sinus.<sup>2</sup>

The closest radiological and histological differential is meningioma,<sup>2,4</sup> which can be distinguished by positive staining of EMA and the presence of meningothelial cells. The other differential diagnosis of cavernous sinus lesions include metastases which can have easily recognizable anaplasia and pleomorphism.<sup>3</sup> Hemangiomas lack epithelioid and spindle cell component, and have more well-formed vessels compared with epithelioid hemangioendotheliomas.

Metastases are rare in primary intracranial lesions while in the case of noncentral nervous system epithelioid hemangioendotheliomas, Weiss et al reported 31% developed metastases, 13% local recurrences, and 13% died of the tumor.<sup>3</sup> This tumor also has the potential to turn



**Fig. 6** CD34 Positive.



**Fig. 7** Epithelial membrane antigen negative.

malignant.<sup>3</sup> In our patient, imaging studies did not show any other mass lesions.

The experience with intracranial hemangioendothelioma is limited to make a prediction of the biological behavior of these tumors with certainty.<sup>2</sup> The origin of epithelioid hemangioendothelioma is uncertain but they clearly represent a clonal growth rather than a reactive process.<sup>8</sup> A recent report found translocation t(1;3)(p36.3;q25) in two cases of epithelioid hemangioendotheliomas. The involvement of PAX 7 in the pathogenesis of epithelioid hemangioendothelioma is recognized.<sup>8,9</sup>

A combination of gross total excision without adjuvant therapy and close follow-up seems to be reasonable option.<sup>2</sup> A standard pterional approach provides adequate exposure of the lesion in the region of cavernous sinus.<sup>2</sup> The addition of orbitozygomatic osteotomy<sup>10</sup> along with the dissection of Sylvian fissure allows a true lateral approach and provides exposure of superior cavernous sinus as well.<sup>2</sup> Radiation therapy was attempted to control the growth of incompletely excised tumors.<sup>11,12</sup> Treatment with  $\alpha$  interferons became a modality of treatment for control of growth of the tumors.<sup>13,14</sup>

## Conclusion

On follow-up, till the date of reporting the case, our patient is doing well. We attempt to report a case of this rare tumor in an unusual site, namely, the cavernous sinus. To the best of our knowledge, we found only one reported case in the literature of its occurrence in the cavernous sinus, hence this case being reported.

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