An Unusual Presentation of Esthesioneuroblastoma in a Young Pregnant Female

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Established Facts

- It is marked by aggressive presentation.
- It spreads to orbit.

Novel Insights

- Primarily ocular sign with blindness in one eye at presentation.
- The tumor may present without nasal symptom.

Keywords

Esthesioneuroblastoma · Olfactory neuroblastoma · Neuroepithelium · Neuroectodermal tumor

Abstract

Background: Esthesioneuroblastoma is a rare neuroepithelial tumor arising from the olfactory epithelium in the cribriform plate or nasal cavity. It accounts for 1–5% of cases of malignant neoplasms of the nasal cavity. **Methods:** A 20-year-old pregnant female presented with painful loss of vision in both eyes, on imaging diagnosed as meningioma. There was a progressive increase in pain along with diminution of vision to the extent of complete loss of vision in the right eye.

Results: In view of increasing proptosis with progressive

complete loss of vision in the left eye also, she consulted the neurosurgery department at a tertiary care hospital where a follow-up of contrast-enhanced computerised tomography was made. Histopathology of fluid obtained after craniotomy showed esthesioneuroblastoma. In view of intracranial space-occupying lesion applying pressure on the optic nerve, intravenous methylprednisolone (1 g, IV stat X 3 days) was given. She underwent extensive radiotherapy but died within 3 months of diagnosis. **Conclusion:** This case highlights the progressive and fatal course of olfactory neuroblastoma. As it can present with the complex symptoms related to ocular and nasal sites, timely referral of patients presenting with visual symptoms along with nasal involvement (frequent epistaxis) to otorhinolaryngologists is very important.

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Introduction

Esthesioneuroblastoma (ENB, olfactory neuroblastoma) is an uncommon neuroepithelial tumor that originates from the olfactory sensory epithelium in the upper nasal fossa at the level of the cribriform plate. It was described first by Berger et al. in 1924 [1, 2]. It frequently invades the cranial base, cranial vault, and orbit. It has a histological pattern similar to that of sympathetic ganglia, retina, and adrenal medulla [3, 4]. It differs from most of neuroectodermal tumors that occur in childhood by having a peak distribution between 11–20 years and 51–60 years of age [2, 3]. We report a rare presentation of ENB in a pregnant female presenting with complete unilateral loss of vision in one eye and ultimately leading to death within 3 months of diagnosis.

Case Presentation

A 20-year-old pregnant female presented to the outpatient department with complaints of painful diminution of vision in the right eye followed by complete loss of vision in the right eye within 2 days. The pain increased with ocular movements. There was no history of trauma, coloured halos, redness, photophobia, or floaters and no history of drug intake or any systemic diseases.

On ocular examination, visual acuity in OD was absent perception of light and in OS 6/12 with accurate projection of rays. On anterior segment examination, there was mild proptosis, RAPD grade I in OD. On posterior segment examination, there was mild disc hyperemia, and the rest of the fundus examination was within normal limits. There was no restriction of ocular movements in the right eye. In the left eye, anterior and posterior segment examination was within normal limits. On general physical examination, she was primigravida with 38 weeks' period of gestation. Her obstetric examination and hematological examination were within normal limits. A provisional diagnosis of retrobulbar neuritis was

Fig. 1. a, b Computed tomography scan (axial and coronal section) of the orbit showing a heterogeneously enhancing basifrontal space-occupying cystic component epicentered around olfactory fossa extending to anterior and middle cranial fossa. The mass is causing erosion of right medial and superior wall of right orbit. The mass is also seen to be extending into right orbit with displacement of medial rectus and encasement of right optic nerve. **c** Mi-

crograph of the section from nasal cavity shows tumor cells in sheets with occasional rosettes. Cells are monomorphic with high nuclear cytoplasmic ratio, hyperchromatic nuclei with moderate to scant cytoplasm. **d** Immunohistochemistry shows cytoplasmic NSE positivity whereas synaptophysin, cytokeratin, GFAP, desmin are negative.

Table 1. Clinical presentation, pathology, imaging, and treatment outcomes of patients with esthesioneuroblastoma

Author, year	Age, gender	Presenting sign	Laterality	Imaging	Histopathological markers	Treatment	Prognosis
Rakes et al., 1985 [9]	64, F	Right eye proptosis, nasal discharge	Unilateral	Mass at the apex of orbit contiguous with ethmoid sinus	Histopathologically positive (details not given)	Surgery and radiotherapy	Died after 11 months of diagnosis
Lee and Tang, 2000 [8]	52, M	Left-sided ptosis, left third nerve palsy, left nasal bleeding	Unilateral	4-cm mass in left sphenoid sinus extending into prepontine cistern, sellar area, cavernous sinus, and dorsum sellae	Synaptophysin positive	Surgery	Alive after 18 months of follow-up
Villalba et al., 2008 [7]	85, F	Eyelid edema	Unilateral	Intranasal solid mass spreading to anterior cranial fossa	Histopathologically positive (details not given)	Palliative treatment	Died within 2 months of diagnosis
	32, F	Left lower eyelid haematoma, right sixth and bilateral fourth nerve paralysis, rhinorrhoea	Bilateral	Aggressive tumour affecting ethmoid sinus, maxillary sinus, and anterior portion of skull base	Histopathologically positive (details not given)	Chemotherapy	Alive after 9 months of diagnosis
Aggarwal et al., 2011 [1]	17, M	Right eye proptosis, bilateral neck metastasis	Unilateral	Heterogeneous soft tissue mass involving right nasal sinus, anterior and posterior ethmoids, erosion of cribriform plate	Not mentioned	Radiotherapy	Alive after 2 months of treatment
Lopez et al., 2013 [6]	73, F	Chemosis and diplopia	Unilateral	Heterogeneous tissue mass with invasion of left maxillary sinus with extension to left orbit, inferior eyelid, and anterior left ethmoidal sinus	NSE, synaptophysin, and chromogranin positive	Surgery, radiation	Not mentioned

made. On computerised tomography scan of the brain and orbit, a provisional diagnosis of meningioma was made. In view of intracranial space-occupying lesion applying pressure on the optic nerve, intravenous methylprednisolone (1 g, IV stat X 3 days) was given and she was discharged without any improvement in her visual acuity. Thereafter, she was referred to the neurosurgery department. After 2 weeks, she gave birth to a healthy baby boy by vaginal route and consulted the neurosurgery department.

In view of increasing proptosis with progressive complete loss of vision in the left eye also, she consulted the neurosurgery department at a tertiary care hospital there a follow-up of contrast-enhanced computerised tomography (Fig. 1a, b) scan of the brain revealed a heterogeneously enhancing right basifrontal space-occupying lesion with extension to the orbit and erosion of the meatal

wall. She underwent right orbitoparietal craniotomy and subtotal tumor excision and a repeat craniotomy within a week. Histopathology of the tumor mass revealed ENB (Kadish grade C) (Fig. 1c, d) and she was planned for radiotherapy in the form of supportive care. She underwent three cycles of external beam radiotherapy but died after the third cycle due to multiple organ failure.

Discussion

The most common manifestations of ENB are epistaxis and nasal obstruction due to frequent nasal and sinus involvement. The other symptoms may vary between

headache, lacrimation, anosmia, and visual disturbance due to proptosis and optic neuropathy. Contrary to this, the index case presented with visual symptoms with no nasal symptoms. ENB is known to occur with equal frequency in females and males. The tumor has a tendency of rapid progression submucosally in all directions with the involvement of the nasal sinus and nasal cavity.

There are numerous classifications for staging ENB, but the most commonly followed is the one by Kadish et al. [2] since 1976 with 3 stages (A, B, C), but recently, Morita et al. [4] added stage D to it with metastases in the cervical lymph nodes [2, 3]. Histopathological diagnosis is important to differentiate this tumor from other lesions such as lymphoma, meningioma, undifferentiated carcinoma, extramedullary plasmacytoma, or embryonal rhabdomyosarcoma [6]. Histopathologically, ENB is characterized by the presence of neuroepithelial cells arranged in a classic pseudorosette and rosette pattern, fibrillar intracellular background, and marked microvasculature.

The current treatment approach of surgery (en bloc tumour excision) and radiotherapy together or surgery followed by radiotherapy has good prognosis but is associated with poor outcome in the presence of female gender, age over 50 years, and distant metastasis [3, 4]. It has a very aggressive and fatal course, a 5-year survival rate of approximately 45–50% has been reported by Dulguerov et al. [5], and it has a metastatic predilection for cervical lymph nodes and lungs.

There are many cases in the literature of ENB presenting with visual symptoms, but most of them had manifestations in the form of primary nasal symptoms along with

associated visual symptoms (Table 1), except the one reported by Lopez et al. [6] presenting with exclusive orbital manifestation and Aggarwal et al. [1] presenting with proptosis and no nasal symptoms at presentation, but in both cases, the patients were stable after treatment. The index case also presented with orbital manifestation in the form of mild proptosis and unilateral visual loss progressing to blindness and death within 3 months of diagnosis in spite of treatment.

Conclusion

This case highlights the progressive and fatal course of olfactory neuroblastoma as they can present with the complex symptoms related to ocular and nasal sites. Imaging and histopathology can aid in the timely diagnosis of this malignancy. It is necessary for ophthalmologists to remain aware of this disease as they play a very important role in the management of this entity by timely referral of patients presenting with visual symptoms along with nasal involvement (frequent epistaxis) to otorhinolaryngologists.

Statement of Ethics

Informed consent was taken from the patient's relative.

Disclosure Statement

There is no conflict of interest between the authors.

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