

# CASE REPORT

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## AMBIGUITY IN DIAGNOSING ESTHESIONEUROBLASTOMA – A CASE REPORT

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**ABSTRACT:** Esthesioneuroblastomas (ENBs) are undifferentiated tumours of neuroectodermal origin derived from the olfactory epithelium. Inconsistent histologic presentations can lead to the controversy regarding the exact histologic origin of ENBs, and this ambiguity can confound clinical and prognostic decisions. These tumours often display varying biologic activity ranging from indolent growth, with patient survival exceeding 20 years, to a highly aggressive neoplasm capable of rapid widespread metastasis, with survival limited to a few months. Due to the rare and complex nature of ENB, multiple opinions exist regarding the etiology, optimal staging system and treatment modalities. We have come across a case of Esthesioneuroblastoma, presenting as recurrent nasal mass with bleeding in a 50 yr old male. Histological presentation was unusual but the diagnosis was confirmed by Immunohistochemistry.

**INTRODUCTION:** Esthesioneuroblastoma (ENB), also known as olfactory neuroblastoma, is a rare neoplasm originating from olfactory neuroepithelium in the superior portion of the nasal cavity. The tumour cells are mitotically active. The olfactory epithelium contains three cell types, which can be histologically identified in the tumor: basal cells, olfactory neurosensory cells, and supporting sustentacular cells. The basal cells are the stem cell compartment, continuously replacing the neurosensory cells throughout adult life; both physiologically and as a response to injury.<sup>1</sup> ENBs contain variable arrangements of their small cells. Additionally, there exists a variable presence (or absence) of true rosettes and neurofibrillary material.<sup>2</sup>

**CASE REPORT:** A 50 yr old male presented with nasal mass and loss of sensation of smell. The mass was curetted and sent for histopathology examination.

### HISTOPATHOLOGICAL EXAMINATION

**GROSS APPEARANCE:** The specimen consisted of multiple grey brown tissue fragments. Entire tissue was processed.

**MICROSCOPY:** The sections studied showed few irregular nests and sheets of small round cells separated by thin intervening stroma. The cells showed small round nuclei with coarse to fine chromatin and scanty cytoplasm with mild nuclear pleomorphism. The fibrillary background was prominent. Neurofibrillary tangles were seen [fig.1]. There were no Homer Wright or Flexner- type rosettes. There were prominent tiny blood vessels in the background. Chromogranin and synaptophysin with S-100protein was positive [fig2] at the periphery of the nests. Immunohistochemistry showed strong positivity for neurone specific enolase [fig.3]

**DISCUSSION:** Esthesioneuroblastoma (ENB) is an uncommon malignant neuroectodermal nasal tumour that arises from the olfactory mucosa in the superior nasal cavity .It comprises about 2% of

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all sinonasal tract tumours with an incidence of approximately 0.4 per million populations.<sup>3</sup> This aggressive tumour exhibits a variety of potential behaviours, at times invading locally into the paranasal cavities, oropharynx, anterior skull base, and frontal cerebral lobes and in other cases metastasizing to the cervical lymph nodes, lungs, or distant CNS. Although this tumour may occur in patients of any age, the literature points to a bimodal distribution, with peaks in the 2nd and 3rd decades and the 6th and 7th decades of life.<sup>4</sup> The Kadish staging system is applied to these tumours.<sup>5</sup>

- Stage A: disease confined to the nasal cavity
- Stage B: disease confined to the nasal cavity and paranasal sinuses
- Stage C: local or distant spread beyond the nasal cavity or sinuses

The differential diagnosis of ENB includes the group of small round blue cell malignant neoplasms that can occur in the sinonasal tract, i.e. sinonasal undifferentiated carcinoma, extra nodal NK/T cell lymphoma- nasal type, rhabdomyosarcoma, Ewing/PNET, mucosal malignant melanoma and neuroendocrine carcinomas (NEC).

The catecholamines have been demonstrated in olfactory neuroblastoma by fluorescent techniques after formaldehyde vapour or glyoxylic acid treatment.<sup>6</sup> Whereas the enzyme dopamine  $\beta$ -hydroxylase and the hormone ACTH have been detected by biochemical and immunocytochemical methods.<sup>7</sup> Other substances detected immunohistochemically in the tumour include synaptophysin, chromogranin, neuron-specific enolase and neurofilaments. Takanori Hirose et al have mentioned in their study that the longer survival rates are related significantly to a higher incidence of S-100 protein-positive cells.<sup>8</sup>

Olfactory neuroblastoma shows complex karyotypic changes. An array-based comparative genomic hybridization study showed that gene copy gains are more common than losses, with the most changes being gains at 7q, 9p, 20p/q, and Xp/q, and losses at 2q, 6q, 22q, and Xp/q.<sup>9</sup>

**CONCLUSION:** Diagnosis of esthesioneuroblastoma is usually difficult on conventional light microscopy and almost always requires immunohistochemical staining for definitive diagnosis. This is particularly true in poorly differentiated forms that tend to resemble sinonasal undifferentiated carcinoma (SNUC) and other small, round blue cell tumours, such as melanoma, lymphoma, neuroendocrine carcinoma, and rhabdomyosarcoma. Common features of ENB on light microscopy include small, round-to-oval cells with coarsely granular chromatin, multiple small nucleoli, prominent nuclear membranes, and scant cytoplasm with pseudo rosette or occasional Homer-Wright rosettes separated by fibrous septa. Calcification and necrosis are sometimes seen, and mitotic figures are rare. In our case we did not find pseudo rosettes or sheets of small round cells. Only characteristic feature was neurofibrillary tangles with a few small round cells. The Immunohistochemistry was of great help in arriving at a proper conclusion.

A number of immunohistochemical stains are used to differentiate ENB from other tumours with similar histological features on light microscopy. Typically, chromogranin, synaptophysin, S-100 protein, and neuron-specific enolase are positive with ENB. Due to the rare and complex nature of ENB, multiple opinions exist regarding the etiology, optimal staging system, and treatment modalities.

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## ACKNOWLEDGEMENT:

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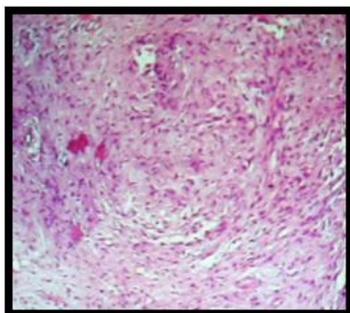


Figure 1: (10x) Small round cells with Neurofibrillary stroma in the background.

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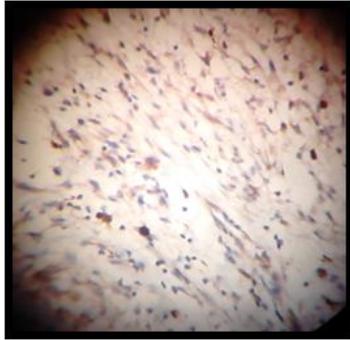


Figure 2: (10x) S-100 Protein positive



Figure 3: (10x) Neurone specific enolase positive.

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