DOI: 10.7860/JCDR/2025/79449.21235

Case Report

Ear, Nose and Throat Section

A Case of Sinonasal Neuroendocrine Tumour: Diagnostic and Therapuetic Challenge

GUNDAPPA MAHAJAN[1], MEGHA DOIPHODE[2], MANU BABU[3], MAYUR INGALE[4], YAMINI INGALE[5]

ABSTRACT

Sinonasal malignancies are rare, accounting for only 1% of all neoplasms. These tumours typically arise from the nasal sinuses and the regions of the base of the skull. They make up approximately 3% of all neoplasms in the aerodigestive tract. Sinonasal malignancies with neuroendocrine features are particularly uncommon head and neck tumours, many of which are associated with a poor prognosis. Sinonasal malignancies exhibiting neuroendocrine features require a detailed histopathological examination for accurate differentiation. In present case report, a 46-year-old female presented with a 6-month history of progressive nasal obstruction and open-mouth breathing, along with epistaxis for the past three months and right hemifacial pain for six months. Clinical examination revealed a mass in the right nasal cavity, prompting a biopsy that showed neuroendocrine carcinoma. Patient was subjected to coblator-assisted endoscopic complete excision of the mass, which was then sent for Histopathological Examination (HPE) subjected for Haematoxylin and Eosin (H&E) stains and Immunohistochemistry (IHC) showing Neuroendocrine Tumour (NET) with positive synaptophysin, positive chromogranin: positive, PanCK and CK5/6: Negative and a Ki-67 index of 10-15%, indicating low to intermediate-grade proliferation. Tailoring assessment and treatment strategies based on the tumour's stage, grade and histopathological characteristics can significantly improve the precision of initial evaluations and enhance the effectiveness of treatments for sinonasal carcinomas with neuroendocrine features. To advance the understanding of treatment outcomes, multicentre research and collaborative efforts with standardised treatment protocols are critical. Although endoscopic resection has shown comparable results to conventional open resections, further long-term follow-up is necessary to understand the sustainability and efficacy.

Keywords: Chromogranin, Nasal obstruction, Synaptophysin

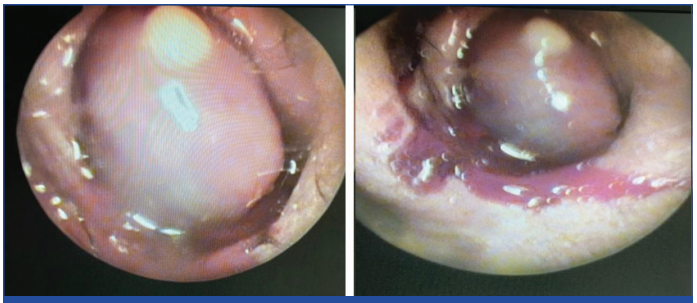
CASE REPORT

A 46-year-old female farmer presented with chief complaints of progressive right-sided nasal obstruction since six months, open-mouth breathing since four months, right-sided facial pain since six months and intermittent nasal bleeding for three months. She had no relevant past surgical history, no co-morbidities, no addictions and no known allergies.

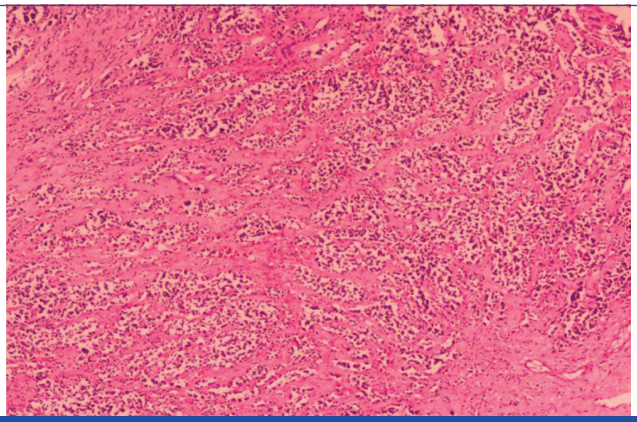
On anterior rhinoscopy, a pink, friable, gelatinous and polypoid mass, which was prone to bleeding, was found in the right nasal cavity [Table/Fig-1a]. The mass appeared soft and delicate, with a tendency to bleed easily upon probing [Table/Fig-1b]. A probe could be passed all around the mass. Posterior rhinoscopy did not show any extension of the mass into the nasopharynx. Diagnostic nasal endoscopy showed extension of the mass in the left nasal cavity. Neck examination and rest of the ear, nose and throat examination were normal. Provisional diagnosis was bilateral nasal mass with clinical features suggestive of malignancy. Differential diagnoses considered were neuroendocrine carcinoma- well-differentiated (carcinoid), moderately differentiated (atypical carcinoid), poorly differentiated (small cell carcinoma or large cell neuroendocrine carcinoma), malignant melanoma, Ewing family tumours (Ewing's sarcoma) and paraganglioma.

All routine preoperative blood investigations were normal. A biopsy of the mass was taken under local anaesthesia, which showed round to oval cells arranged in trabeculae and nests, with minimal cytoplasm, hyperchromatic nuclei with moulding and mitosis, suggestive of neuroendocrine carcinoma [Table/Fig-2].

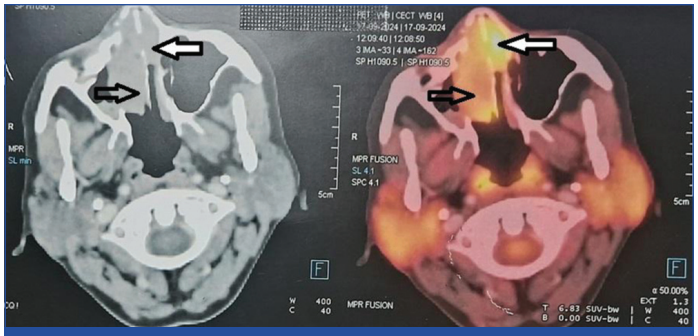
Post-biopsy, the patient was subjected to Positron Emission Tomography-Computed Tomography (PET-CT) scan, which showed moderate-grade tracer uptake in ill-defined right ethmoidal soft-tissue thickening extending to left side of nasal cavity, with irregularity of the nasal septum measuring approximately 4.7×2.5×2.5 cm Anteroposterior, Transverse and Craniocaudal (AP×TR×CC) [Table/Fig-3]. Low-grade metabolically active right maxillary sinus thickening appeared inflammatory. There was also



[Table/Fig-1]: a) Diagnostic nasal endoscopy showing pink, friable, gelatinous and polypoid mass with tendency to bleed upon probing; b) The mass appeared soft and delicate. (Images from left to right)



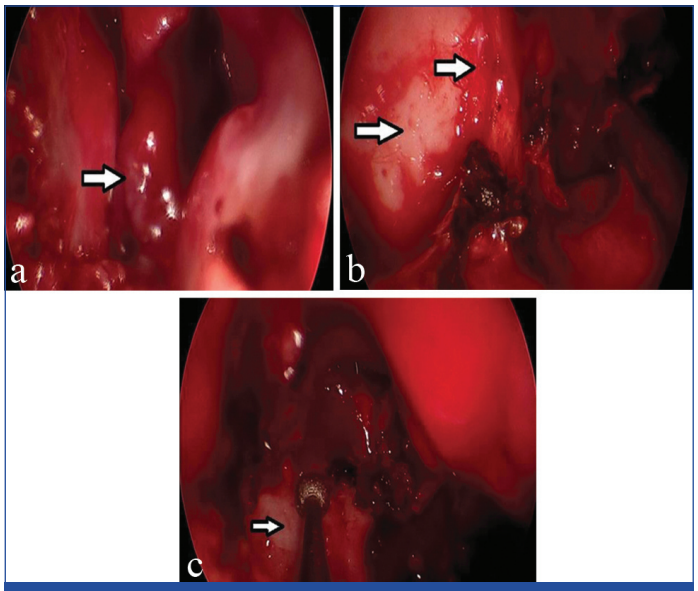
[Table/Fig-2]: A showing oval cells arranged in trabeculae and nests with minimal cytoplasm, hyperchromatic nuclei suggestive of neuroendocrine carcinoma (H&E 10X).



[Table/Fig-3]: PET-CT which showed moderate grade tracer uptake in ill-defined right ethmoidal soft-tissue thickening extending to left nasal cavity (white filled arrow) with irregularity of the nasal septum measuring approximately 4.7×2.5×2.5 cm (AP×TR×CC).

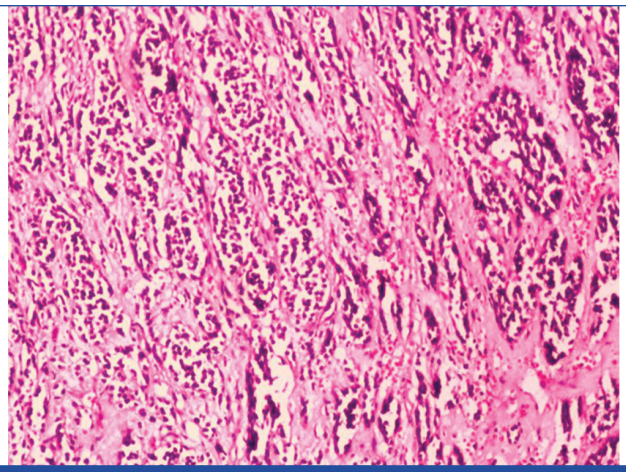
low-grade, sub-centimetre-sized metabolically active right level II node appeared inflammatory. No other significant abnormality or metabolically active relevant disease is seen elsewhere in the body.

Patient was posted for coblator-assisted endoscopic excision of the mass under general anaesthesia, with due consent from patient and her relatives. Coblator-assisted excision was done to reduce the intraoperative bleeding and to avoid recurrence [Table/Fig-4a-c].

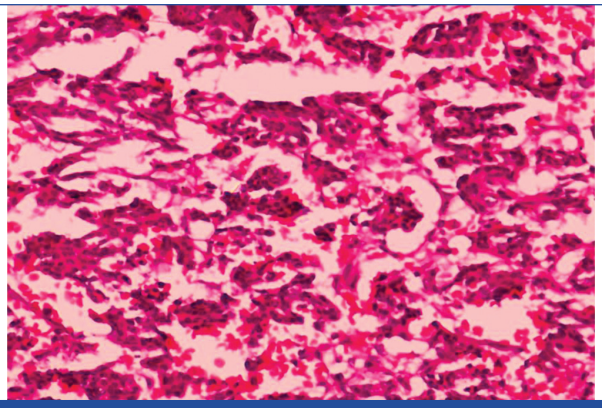


[Table/Fig-4]: a) Intraoperative picture of tumour being delivered; b) Post-tumour excision view of posterior wall of maxillary sinus and pterygoid plate; c) Mucosa clearance with diamond burr from posterior wall of maxillary sinus and pterygoid plate.

Excised mass was sent for HPE [Table/Fig-5a,b], which showed all features of neuroendocrine carcinoma: round to oval cells arranged in trabeculae and nests, with minimal cytoplasm, hyperchromatic nuclei with molding and mitosis, same as that of biopsy.

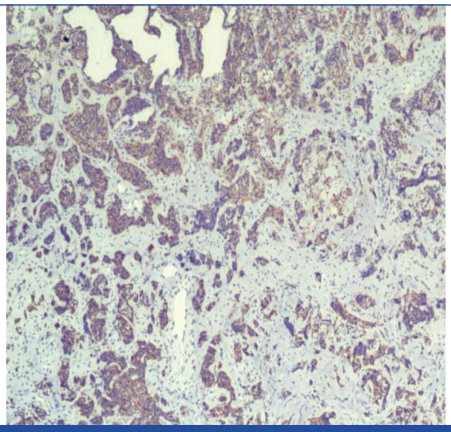


[Table/Fig-5a]: Multiple tissue bits consisting of tumour which is arranged in trabeculae and nests of small cells. Surrounding tissue showing mucus glands with normal nasal tissue and areas of haemorrhage (H&E, 100x).

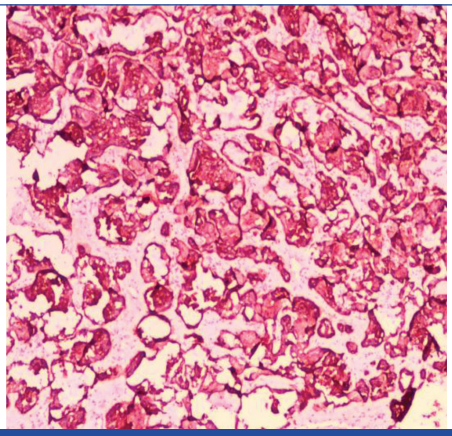


[Table/Fig-5b]: Haematoxylin and eosin-stained sections showing round to oval cells with minimal cytoplasm hyperchromatic nuclei with molding are seen, mitosis present (400x).

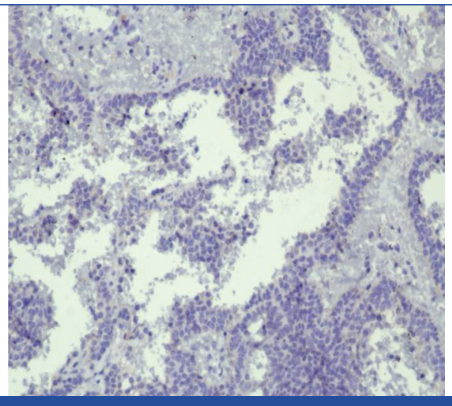
But to a surprise on immunohistochemistry Ki-67 index was less than 30%, which indicates it is NET not neuroendocrine carcinoma. Other IHC markers were as follows: synaptophysin: positive; chromogranin: positive; PanCK and CK5/6: negative; and Ki-67 index: 10-15%, indicating low to intermediate-grade proliferation [Table/Fig-6a-e].



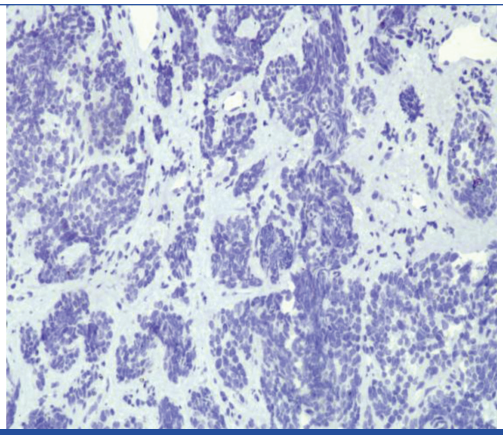
[Table/Fig-6a]: Synaptophysin positive.



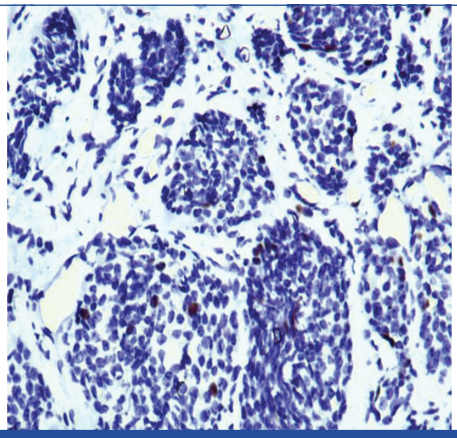
[Table/Fig-6b]: Chromogranin positive.



[Table/Fig-6c]: PanCK: Negative.



[Table/Fig-6d]: CK5/6: Negative.



[Table/Fig-6e]: Ki-67 Index (10-15%).

Immunohistochemistry

Patient has completed her radiation therapy of External Beam Radiation Therapy (EBRT) of two fractions per day, five days a week, total of 60 Gy. She is on regular follow-up and has no evidence of recurrence.

DISCUSSION

This case of a 46-year-old female with a low-to-intermediate-grade sinonasal NET as determined by a Ki-67 index of 10-15%, reinforces the importance of precise histopathological characterisation in guiding clinical decisions. This patient initially presented with non specific symptoms—progressive nasal obstruction, hemifacial pain and epistaxis—which are commonly seen in benign sinonasal conditions. This underlines the challenge in early clinical suspicion, a difficulty echoed in several studies that stress the need for high clinical vigilance due to the non specific nature of initial presentations [1,2].

Histologically, NETs of the sinonasal tract are divided into Olfactory Neuroblastoma (ONB), Sinonasal Neuroendocrine Carcinoma (SNEC), Sinonasal Undifferentiated Carcinoma (SNUC) and Small Cell Carcinoma (SmCC) [3]. While many cases reported in the literature are high-grade with poor prognosis, this case was of a lower proliferative index (Ki-67 < 30%), which tends to have a more favourable prognosis [4,5]. Notably, the initial biopsy suggested a carcinoma, but further IHC refined the diagnosis to a NET, emphasising the role of advanced pathological techniques in diagnosis refinement [2].

The treatment in this case involved coblator-assisted endoscopic resection, followed by postoperative radiation therapy. Historically, open craniofacial resection combined with radiotherapy has been the gold standard for achieving local control in sinonasal malignancies [6]. However, recent literature, including studies by Soldatova L et al., and Hanna E et al., supports the oncological efficacy of endoscopic resection in selected patients, showing comparable outcomes with significantly reduced morbidity [4,7]. The use of coblation technology in this case aligns with this trend, offering precise tissue removal while minimising intraoperative bleeding and preserving surrounding structures.

The decision to proceed with adjuvant radiotherapy is supported by studies indicating improved local-regional control, especially in tumours with moderate differentiation or residual microscopic disease [5,8]. Although chemotherapy has been considered for poorly-differentiated subtypes, its utility remains limited in well-differentiated or intermediate-grade cases like current one [8].

Imaging played an important role in both preoperative assessment and staging. PET/CT using 18F-Fluorodeoxyglucose (18F-FDG) was used in present case to assess metabolic activity and to rule out distant disease. Gallium-68 (68Ga)-DOTATATE PET/CT is emerging as a superior imaging modality for low-grade NETs due to its ability to detect somatostatin receptor expression [9,10]; however it was not utilised in this case. This could be considered as a point for future enhancement in diagnostic pathways, mainly for long-term surveillance and treatment planning.

Overall, this case adds to the growing body of literature supporting endoscopic surgical management with adjuvant radiation in selected cases of sinonasal NETs. The use of coblation further demonstrates the evolving landscape of minimally invasive surgical techniques that prioritise oncological safety and functional preservation.

CONCLUSION(S)

Sinonasal NETs are rare and diagnostically challenging entities that demand a high index of clinical suspicion and a multidisciplinary approach for optimal management. This case underscores the importance of comprehensive histopathological and immunohistochemistry evaluation for accurate diagnosis, especially when initial findings suggest more aggressive variants such as neuroendocrine carcinoma. Advancements in endoscopic surgical techniques, such as coblator-assisted resection, offers effective and minimally invasive alternatives to traditional open approaches, with reduced morbidity and favourable oncologic outcomes in carefully selected patients. The successful use of endoscopic resection followed by adjuvant radiation therapy in this case supports the growing body of evidence advocating for individualised, stage- and grade-adapted treatment strategies. Long-term follow-up remains essential given the potential for recurrence. As diagnostic tools like 68Ga-DOTATATE PET/CT and particle beam radiotherapy continue to evolve, future management of sinonasal NETs may become even more precise and personalised. Continued reporting of such rare cases and collaboration through multicentre studies will be critical in developing standardised protocols and improving patient outcomes in this uncommon but aggressive disease spectrum.

REFERENCES

[1] Okebalama VC, Nwadiokwu JI, Osaze E, Ayodeji AA, Chinatu-Nwankwo OM. Poorly differentiated carcinoma with neuroendocrine features in two patients with sinonasal tumours: A report of two cases. Pan Afr Med J. 2022;42:37. Doi: 10.11604/pamj.2022.42.37.34513.
[2] Bell D, Hanna EY, Weber RS, DeMonte F, Triantafyllou A, Lewis JS Jr, et al. Neuroendocrine neoplasms of the sinonasal region. Head Neck. 2016;38(Suppl 1):E2259-66. Doi: 10.1002/hed.24152.
[3] Eggesbø HB. Imaging of sinonasal tumours. Cancer Imaging. 2012;12:136-52. Doi: 10.1102/1470-7330.2012.0015.
[4] Soldatova L, Campbell RG, Carrau RL, Prevedello DM, Wakely, Otto BA, et al. Sinonasal carcinomas with neuroendocrine features: Histopathological differentiation and treatment outcomes. J Neurol Surg B Skull Base. 2016;77(6):456-65. Doi: 10.1055/s-0036-1582432.
[5] van der Laan TP, Iepsma R, Witjes MJ, van der Laan BF, Plaat BE, Halmos GB. Meta-analysis of 701 published cases of sinonasal neuroendocrine arcinoma: The importance of differentiation grade in determining treatment strategy. Oral Oncol. 2016;63:01-09. Doi: 10.1016/j.oraloncology.2016.10.002.
[6] Su SY, Bell D, Hanna EY. Esthesioneuroblastoma, neuroendocrine carcinoma, and sinonasal undifferentiated carcinoma: Differentiation in diagnosis and treatment. Int Arch Otorhinolaryngol. 2014;18(Suppl 2):S149-56. Doi: 10.1055/s-0034-1390014.

[7] Hanna E, DeMonte F, Ibrahim S, Roberts D, Levine N, Kupferman M. Endoscopic resection of sinonasal cancers with and without craniotomy: Oncologic results. Arch Otolaryngol Head Neck Surg. 2009;135(12):1219-24. Doi: 10.1001/archoto.2009.173.
[8] Likhacheva A, Rosenthal DI, Hanna E, Kupferman M, Demonte F, El-Naggar AK. Sinonasal neuroendocrine carcinoma: Impact of differentiation status on response and outcome. Head Neck Oncol. 2011;3:32. Doi: 10.1186/1758-3284-3-32.
[9] Akay S, Pollard JH, Saad Eddin A, Alatoum A, Kandemirli S, Gholamrezanezhad A, et al. PET/CT imaging in treatment planning and surveillance of sinonasal neoplasms. Cancers (Basel). 2023;15(15):3759. Doi: 10.3390/cancers15153759.
[10] Liu KY, Goldrich DY, Ninan SJ, Filimonov A, Lam H, Govindaraj S, et al. The value of 68 Gallium-DOTATATE PET/CT in sinonasal neuroendocrine tumour management: A case series. Head Neck. 2021;43(6):E30-E40. Doi: 10.1002/hed.26695.

PARTICULARS OF CONTRIBUTORS:
1. Professor, Department of Ear Nose and Throat, Dr. D. Y. Patil Medical College, Hospital and Research Centre, Pimpri, Pune, Maharashtra, India.
2. Junior Resident, Department of Ear Nose and Throat, Dr. D. Y. Patil Medical College, Hospital and Research Centre, Pimpri, Pune, Maharashtra, India.
3. Assistant Professor, Department of Ear Nose and Throat, Dr. D. Y. Patil Medical College, Hospital and Research Centre, Pimpri, Pune, Maharashtra, India.
4. Head and Professor, Department of Ear Nose and Throat, Dr. D. Y. Patil Medical College, Hospital and Research Centre, Pimpri, Pune, Maharashtra, India.
5. Professor, Department of Ear Nose and Throat, Dr. D. Y. Patil Medical College Hospital and Research Centre, Pimpri, Pune, Maharashtra, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Megha Doiphode,
Ganga Skies Housing Society, Vallabhnagar, Pimpri, Pune-411018,
Maharashtra, India.
E-mail: meghadoiphodepatel@gmail.com

PLAGIARISM CHECKING METHODS: [Jain H et al.]
- Plagiarism X-checker: Mar 25, 2025
- Manual Googling: Apr 26, 2025
- iThenticate Software: May 08, 2025 (10%)

ETYMOLOGY: Author Origin

EMENDATIONS: 7

AUTHOR DECLARATION:
- Financial or Other Competing Interests: None
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. Yes

Date of Submission: **Mar 19, 2025**
Date of Peer Review: **Apr 12, 2025**
Date of Acceptance: **May 10, 2025**
Date of Publishing: **Jul 01, 2025**