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Case Report

Sinonasal Neuroendocrine Carcinoma of Maxillary Sinus

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Abstract

Sinonasal neuroendocrine carcinoma is a rare and aggressive malignancy that predominantly affects middle-aged and elderly males. We report the case of a 69-year-old male who presented to our hospital with epistaxis, nasal obstruction, and facial swelling. Endoscopic examination and a CT scan revealed an aggressive tumor occupying the right maxillary sinus and nasal cavity. A biopsy was performed, and immunohistochemical analysis confirmed a large cell sinonasal neuroendocrine carcinoma. Following a systemic staging workup, the patient underwent surgical resection combined with adjuvant chemotherapy and radiotherapy. However, the patient passed away 10 months later due to pulmonary and cerebral metastases. The transition of neuroendocrine carcinoma from locoregional to systemic disease necessitates an adaptive evaluation and therapeutic protocol.

Keywords: Sinonasal neuroendocrine carcinoma; nasal bleeding; facial imaging; immunochemistry

Introduction

Sinonasal tumors with neuroendocrine differentiation comprise a group of rare heterogeneous neoplasms of neuroectodermal and epithelial origin, consisting of olfactory neuro blastomas and neuroendocrine carcinomas [1]. Small cell neuroendocrine carcinoma (SNEC) is an uncommon tumor and usually occurs in the lungs. Extra pulmonary form accounts for only 4% of all cases [2]. Furthermore, whereas primary sites documented may include esophagus, salivary glands, gastrointestinal tract (including small intestine and large intestine), pancreas, larynx, cervix uteri, uterus, urinary bladder, prostate, breast, and lacrimal gland. Primary SNEC of the paranasal sinuses is extremely rare and was first described by Ray Chowdhuri in 1965 [3]. The nasal cavity is the most common location followed by the ethmoid sinus and the maxillary sinus. Treatment approaches to these rare tumors have been controversial, with the trend changing from surgery in the past to chemoradiation.

Case Report

A 69-year-old man presented to our department with epistaxis, right-sided nasal obstruction, and facial swelling. The onset of symptoms occurred approximately 9 months prior; however, these were neglected by the patient until a recent worsening of symptoms, accompanied by severe asthenia. The patient's medical history included type 2 diabetes mellitus for 10 years and hypertension for 15 years. He had a 20 pack-year smoking history but had quit 10 years ago. No predisposing occupational risk factors were reported. Clinical examination revealed tenderness upon palpation of the right facial area, accompanied by diffuse edema. A cranial nerve evaluation was negative. Endoscopic examination revealed a large, necrotic, and bleeding mass occupying the right nasal cavity, making it impossible to determine its site of origin. No cervical lymphadenopathy was clinically palpable. A CT scan (axial and coronal views) revealed an invasive, heterogeneous

mass (54 X41X20mm) occupying the right maxillary sinus and the homolateral nasal cavity, with associated destruction of the lateral nasal wall. The orbit and skull base were not involved.

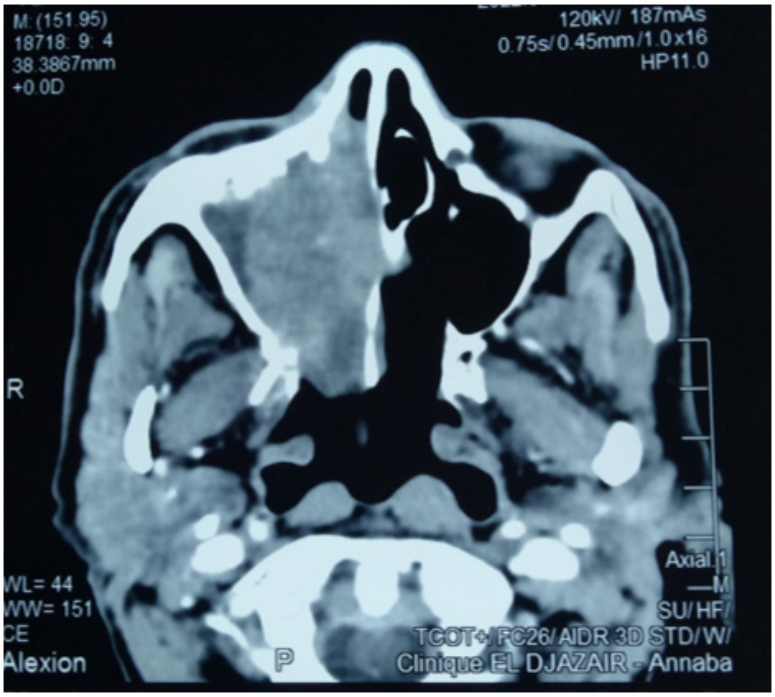

Figure 1: Axial CT scan showing an isodense, aggressive tumor of the right maxillary sinus, displacing the lateral nasal wall.

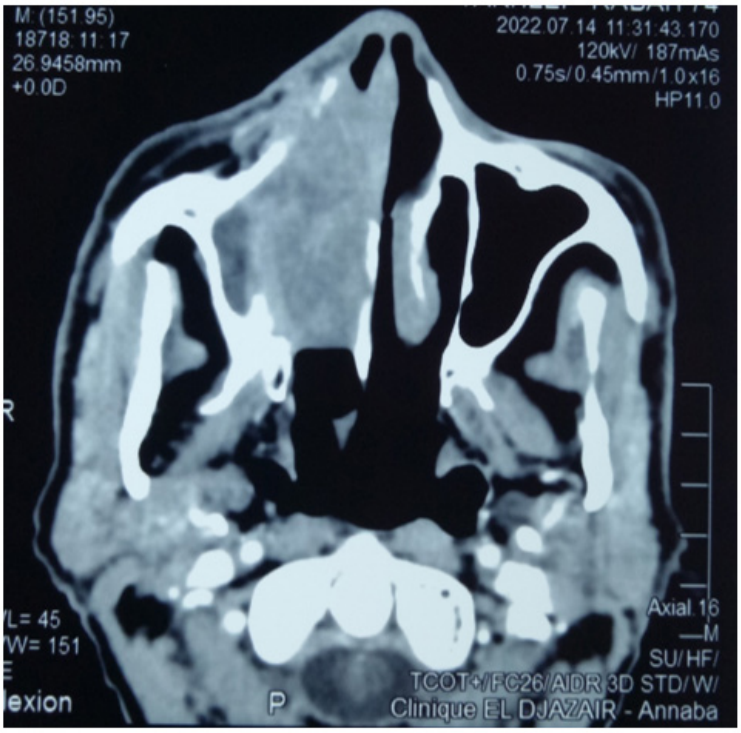

Figure 2: Axial CT scan showing an aggressive tumor of the right maxillary sinus with bony destruction of the anterior wall.

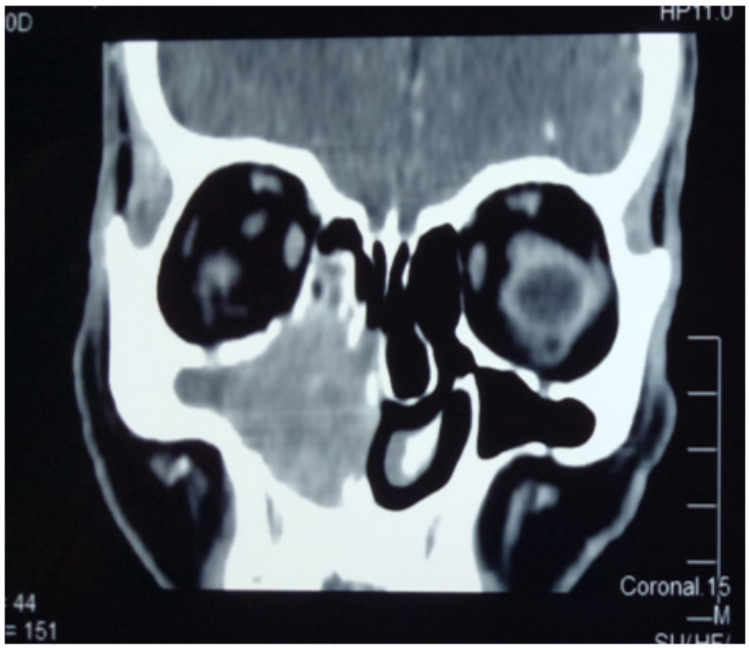

Figure 3: Coronal CT scan showing an isodense tumor occupying the right maxillary sinus.

Multiple biopsies were performed. Following immunohistochemical analysis, a diagnosis of small cell sinonasal neuroendocrine carcinoma (SNEC) was identified (positivity of Neuron specific enolase (NSE), synaptophysin, chromogranin and CD56).

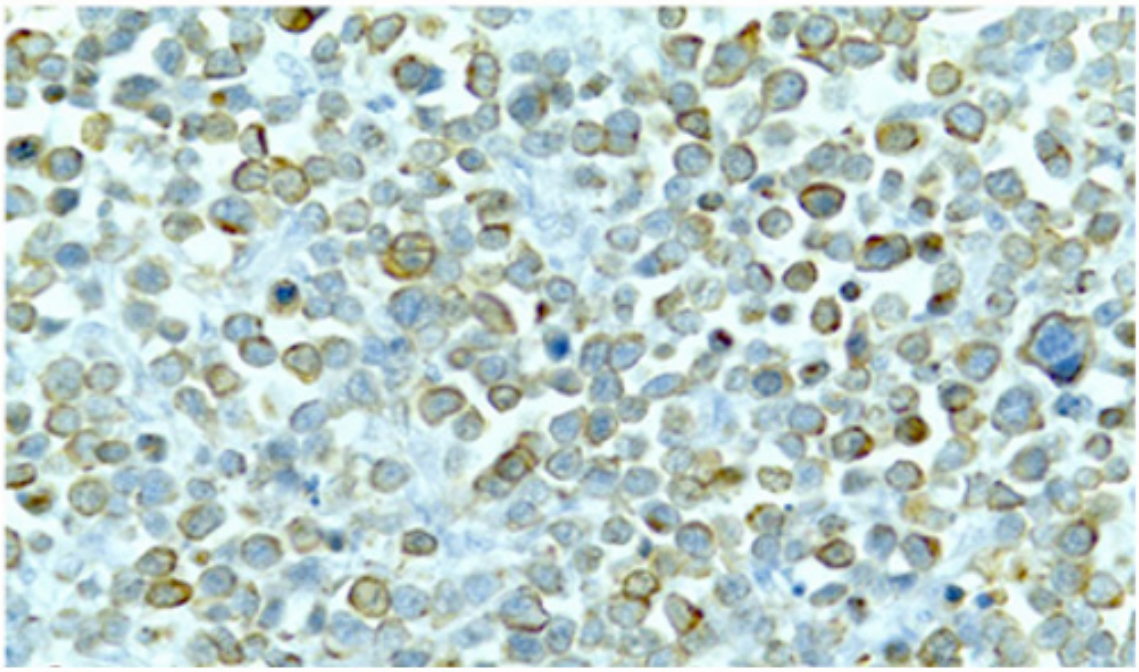

Figure 4: Neuroendocrine carcinoma: Positivity of CD56 and chromogranin.

A whole-body CT scan was performed, and the preoperative workup revealed no abnormalities. The tumor was classified as T3N0M0, Stage III, and an initial surgical protocol was proposed to the patient. Under general anesthesia and via a paralateronasal approach, a total resection of the tumor was performed, with an uneventful postoperative course. Following a multidisciplinary tumor board meeting, the surgical treatment was complemented by adjuvant chemotherapy (cisplatin and etoposide) and intensity-modulated radiation therapy (IMRT) to a total dose of 55 Gy. Ten months later, the patient was readmitted with progressive dyspnea. Radiological imaging revealed two metastatic pulmonary nodules (30 mm and 25 mm) and a 20 mm cerebral metastasis. A new cycle of chemotherapy (cisplatin-etoposide) was administered. The patient passed away four months later.

Discussion

In the 2005 WHO classification of neoplasms of the head and neck, carcinoid tumor, atypical carcinoid tumor and small cell carcinoma neuroendocrine-type were identified as the three main subtypes of sinonasal Neuroendocrine carcinomas (SNEC) [4]. There are a number of reports on SNEC in the gastrointestinal tract and lungs in the literature, but reports on paranasal sinuses involvement are rare. In 2013, Krishnmurthy collaged 76 cases in the literature [5]. Keilin has collected 242 cases of SNEC in 2016 [6]. Our review of the literature has founded 253 cases. The most common sites of tumor origin were the ethmoid sinus (64%), the nasal cavity (32%), and the maxillary sinus (14%) [7]. In general, a minority of cases have secondary involvement of the nasopharynx. Advanced tumors may invade the skull base, orbit, or brain. In rare cases, serum levels of ACTH and calcitonin are elevated. Bell, in his report, found that the median age was 56 years, with an equal sex distribution; the majority of patients presented with T3 or T4, node-negative disease (82%) [8]. Chapurrin notes that males are more likely to be affected, with an age range from 24 to 79 years and a mean of approximately 50 years. Globally, small cell neuroendocrine carcinoma is more common in middle-aged and elderly adults; the average age of incidence is approximately 50 years, with no sex predilection.

Small cell NEC of the sinonasal tract is a rare tumor without predilection for a specific sex, race, or geographic area and no known association with smoking or radiation. Only a few studies have suggested a probable link between smoking and a male gender predominance. Most of the studies lacked data on racial diversity that further investigation is needed for racial predilection [9]. Silva and Mendel off suggested olfactory epithelium as the original cell of neuroendocrine carcinoma, Schall reported spheno-palatine nerve origin [10,11]. Furthermore, some authors in the literature have reported the synchronous occurrence of neuroendocrine carcinoma and adenocarcinoma within the same maxillary sinus. An association with squamous cell carcinoma has also been described [12,13]. The majority of cases (75.0-84.6%) are diagnosed at stage IV [7]. The initial presentation typically includes nasal obstruction, nasal discharge, and recurrent epistaxis; however, this symptomatology is non-specific and can also be found in benign or inflammatory nasal diseases. Additional signs and symptoms include headache, maxillary swelling, exophthalmos, visual changes, proptosis, cranial nerve dysfunction, discomfort, or facial pressure.

Cervical lymphadenopathy is particularly rare, occurring in only 10–20% of sinonasal tumors [14]. Kath report a neuroendocrine carcinoma presenting as metastasis of unknown origin in cervical lymph nodes [15]. Wu reported a case that presented with epiphora [16]. Endoscopic examination typically reveals a large, bleeding mass with necrosis within the nasal cavity. A biopsy is essential; multiple samples must be obtained, and fresh specimens should be sent for frozen section analysis and immunohistochemistry. Cranial nerve evaluation is recommended because these tumors are frequently diagnosed at an advanced stage. The association between the paraneoplastic endocrine syndrome and SNEC is well documented. Although SNEC tumors may produce ectopic hormones. However, the incidence of ectopic hormone secretion of adrenocorticotropic hormone (ACTH), calcitonin, serotonin, vasopressin, and β-melanocyte-stimulating hormone (MSH) is as low as 1.4% [7]. Radiological imaging is essential to diagnose and stage sinonasal tumors, offering detailed insights into tumor invasion across critical anatomical landmarks such as the skull base, orbit, and intracranial compartment.

Imaging included contrast-enhanced CT and MRI scans of the skull base and facial structures. On unenhanced CT, tumors tended to show iso attenuation, and after administration of the contrast agent, mild or moderate enhancement was observed with hypo intense areas, indicating necrosis and cysts. Calcification is uncommon in SNEC, which was consistent with previous studies. Computed tomography is useful for assessing osseous involvement of the anterior skull base, ethmoid sinus, frontal bone, sphenoid bone, and orbit. Structural bone changes, particularly resorption and erosion, are generally observed. Magnetic resonance imaging assesses the intrinsic characteristics of SNEC much better than CT. Typically, the lesions present with ill-defined borders and heterogeneous, iso intense, or slightly hyper intense T2 signals, with frequent cystic changes and marked enhancement after the administration of Gd-DTPA. Dynamic contrast-enhanced MRI has been applied to distinguish sinonasal lesions and provide information about tumor microcirculation for decades.

In the series by Lin, all cases demonstrated enhancement with an immediate, rapidly progressive linear increase in signal intensity, followed by a washout time-intensity curve (TIC) pattern in four lesions and a plateau pattern in one. These results demonstrate that sinonasal small cell neuroendocrine carcinoma (SNEC) is a hyper vascular malignancy characterized by increased vessel density and high vascular permeability [17]. 18F-FDG PET/CT is a valuable imaging modality that should be performed systematically. It plays a complementary role in the initial staging, restaging, and clinical follow-up of neuroendocrine tumors [18]. Furthermore, 18 F-FDG PET has high value in predicting the prognosis of neuroendocrine tumors, in which positive patients have shorter survival and worse prognosis [19]. In histopathology the microscopic hallmarks of

this tumor include necrosis, large numbers of apoptotic cells, high mitotic rate, and lack of neurofibrillary stroma. Definitive diagnosis is made by correlation with immunohistochemistry and/or electron microscopy. Immunohistochemical markers are useful to establish the diagnosis.

Neuron specific enolase (NSE), synaptophysin, and chromogranin tend to be positive in most of the cases. Other markers include CD56, Cytokeratin AE1/ AE3, and Insulinoma-associated protein 1 (INSM-1). The expression is variable [20]. The diagnosis of SCNEC in the nasal cavity and para nasal sinuses is especially complex and depends on histopathological proof because to the variety and non-specificity of the presenting symptoms. Thus, a definitive diagnosis requires a combination of imaging modalities, laboratory tests, and biopsy findings. The differential diagnosis includes sinonasal undifferentiated carcinoma (SNUC), malignant melanoma, high-grade olfactory neuroblastoma, lymphoma, rhabdomyosarcoma, Ewing's/PNET. SNECs are aggressive tumors with high potential for local invasion as well as distant metastasis. As most patients present in advanced stages, the prognosis is extremely poor. A recent review of literature by Han et al stated that local recurrence rate was 33% and rate of distant metastasis was 31%. Metastatic deposits occur in the brain, bones, lungs, and skin. The one-and-5-year survival rates were about 57% and 10%, respectively [21]. Predictors of poor outcomes were orbital involvement, tumor originating outside of the nasal cavity, degree of differentiation (grade) and choice of treatment modality [22].

Treatment

There is no specific recommendation on management guidelines due to rarity of this neoplasm. Treatment options are generally extrapolated from similar tumors of pulmonary origin. Previously, surgery followed by radiotherapy or chemotherapy was preferred. In general, these patients present at an advanced stage; consequently, surgery can be extremely challenging and may not be curative due to tumor involvement of the skull base, orbit, and neighboring neurovascular structures. Surgery is now reserved for non-responders. Muhammad et al. had reported the radiation dose ranging from 50 to 60Gy with good local control as compared to 60 to 70Gy which was standard protocol in other centers [23]. Chemotherapy using cisplatin and etoposide followed by high dose proton photon radiotherapy has been proven by some authors to be an effective line of treatment [24,25]. Chemotherapy does not appear to prolong survival [22]. Fitzek et al used cisplatin and etoposide regimen followed by radiation, which demonstrated a 5-year survival rate of 74% [25]. The French cervico-cacial carcinology Society developed a treatment protocol for neuroendocrine tumors based on primary (neoadjuvant) chemotherapy followed by radiological evaluation and radiotherapy or surgery:

Neoadjuvant chemotherapy: 2 cycles 15 days apart.

- Cisplatine: 33mg/m2/day for 3 days.
- Etoposide :100mg/m2/day for 3 days.
- Situation 1: Tumor reduction greater than 50% reduction in tumor volume or less than 50% and resection impossible: radiotherapy (68Gy). Imaging evaluation and chemotherapy.
- Situation 2: Tumor less than 50% reduction in volume tumor: surgery followed by radiotherapy (68Gy). Imaging evaluation and chemotherapy [26].

Conclusion

Neuroendocrine carcinoma of the nasal cavity and paranasal sinuses is a rare but aggressive neoplasm with a poor prognosis and a strong propensity for local recurrence and distant metastasis. The symptomatology is no specific and based essentially in recurrent epistaxis and nasal obstruction. Imaging is essential, as it allows for an accurate locoregional evaluation and facilitates the surgical approach. Diagnosis is based to anatomy pathologic exam after biopsy (endonasal or surgical). A systemic evaluation via a whole-body CT scan or PET-CT is mandatory, given the highly aggressive nature of the disease and the high frequency of metastases. Multimodality treatment remains the most common strategy, although no proven algorithm has been established due to the rarity of this disease. The transition of neuroendocrine carcinoma from locoregional to systemic disease necessitates an adaptive evaluation and therapeutic protocol. To advance research and development in sinonasal cancer biology and clinical management, databases and banking cooperatives are needed to support comprehensive characterization of the genomic features of these tumors.

Declaration of Conflicting Interests

The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

References

1. S Uccella, G Ottini, C Facco, R Maragliano, S Asioli, et al. (2017) Neuroendocrine neoplasms of the head and neck and olfactory neuroblastoma. Diagnosis classification. Pathologica 109(1): 14-30.
2. Ibrahim NB, Briggs JC, Corbishley CM (1984) Extrapulmonary oat cell carcinoma. Cancer 54: 1645-1661.
3. Raychowdhuri RN (1965) Oat-cell carcinoma and paranasal sinuses. J Laryngol Otol 79: 253-255.
4. Barnes EL, Eveson JW, Reichart P, Sidransky D (2005) Pathology and Genetics of Head and Neck Tumours. World Health Organization Classification of Tumours. Lyon: IARC Press.
5. Krishnamurthy A, Ravi P, R Vijayalakshmi R, Majhi U (2013) Small cell neuroendocrine carcinoma of the paranasal sinus. Natl J Maxillofac Surg 4(1): 111-113.
6. Keilin CA, VanKoevering KK, McHugh JB, McKean EL (2022) Sinonasal neuroendocrine carcinoma: 15 years of experience at a single institution. J Neurol Surg B Skull Base 84(1): 51-59.
7. Mitchell EH, Diaz A, Yilmaz T, Dianna R, Nicholas L, et al. (2012) Multimodality treatment for sinonasal neuroendocrine carcinoma. Head Neck 34(10): 1372-1376.
8. Bell D (2018) Sinonasal Neuroendocrine Neoplasms: Current Challenges and Advances in Diagnosis and Treatment, with a Focus on Olfactory Neuroblastoma. Head Neck Pathol 12(1): 22-30.
9. Chapurin N, Totten DJ, Louis PC, James SL, Naweed IC, et al. (2022) Sinonasal small cell carcinoma-case series of a rare malignancy. Ear Nose Throat J 101(6): 392-395.

10. Silva EG, Butler JJ, Mackay B, Goepfert H (1982) Neuroblastomas and neuroendocrine carcinomas of the nasal cavity: a proposed new classification. Cancer 50(11): 2388-2405.

11. Mendeloff J (1957) The olfactory neuroepthelial tumors; a review of the literature and report of six additional cases. Cancer 10(5): 944-956.

12. La Rosa S, Furlan D, Franzi F, Battaglia P, Frattini M, et al. (2013) Mixed exocrine-neuroendocrine carcinoma of the nasal cavity: clinico-pathologic and molecular study of a case and review of the literature. Head Neck Pathol 7(1): 76-84.

13. Franchi A, Rocchetta D, Palomba A, Innocenti DRD, Castiglione F, et al. (2015) Primary combined neuroendocrine and squamous cell carcinoma of the maxillary sinus: report of a case with immunohistochemical and molecular characterization. Head Neck Pathol 9(1): 107-113.

14. López-Hernández A, Vivanco B, Franchi A, Bloemena E, Cabal VN, et al. (2018) Genetic profiling of poorly differentiated sinonasal tumours. Sci Rep 8(1): 3998.

15. Kath A, Handa P, Ganesan A, Batra N (2025) Neuroendocrine Carcinoma Presenting as Metastasis of Unknown Origin in Cervical Lymph Nodes: An Unwonted Case Report. Indian J Otolaryngol Head Neck Surg 77(6): 2387-2390.

16. Wu W, Gan P, Xu Q, Wang Y, Liao H (2020) Neuroendocrine carcinoma of the nasal cavity with epiphora as the first symptom: A case report. Medicine (Baltimore) 99(49): e23502.

17. Lin N, Qi M, Wang Z, Luo S, Pan Y, et al. (2021) Small Cell Neuroendocrine Carcinoma of Paranasal Sinuses: Radiologic Features in 14 Cases. J Comput Assist Tomogr 45(1): 135-141.

18. Evangelista L, Ravelli I, Bignotto A, Cecchin D, Zucchetta P (2020) GA-68 DOTA-PEPTIDES AND F-18 FDG PET/CT in patients with neuroendocrine tumor: a review. Clin Imaging 67:113-116.

19. Binderup T, Knigge U, Loft A, Federspiel B, Kjaer A (2010) 18 F-fluorodeoxyglucose positron emission tomography predicts survival of patients with neuroendocrine tumors. Clin Cancer Res16(3): 978-985.

20. Rooper LM, Bishop JA, Westra WH (2018) INSM1 is a sensitive and specific marker of neuroendocrine differentiation in head and neck tumors. Am J Surg Pathol 42(5): 665-671.

21. Han G, Wang Z, Guo X, Wang M, Wu H, et al. (2012) Extrapulmonary small cell neuroendocrine carcinoma of the paranasal sinuses: A case report and review of the literature. J Oral Maxillofac Surg 70(10): 2347-2351.

22. Van der Laan TP, Iepsma R, Witjes MJ, Van der Laan BF, Plaat BE, et al. (2016) Meta-analysis of 701 published cases of sinona sal neuroendocrine carcinoma: the importance of differentiation grade in determining treatment strategy. Oral Oncol 63: 1-9.

23. Faisal M, Haider I, Adeel M, Waqas O, Hussain R, et al. (2018) Smallcell neuroendocrine carcinoma of nose and paranasal sinuses: the Shaukat Khanum Memorial Cancer Hospital experience and review of literature. J Pak Med Assoc 68(1): 133-136.

24. Bhattacharyya N, Thornton AF, Joseph MP, Goodman ML, Amrein PC (1997) Successful treatment of esthesioneuroblastoma and neuroendocrine carcinoma with combined chemotherapy and proton radiation. Results in 9 cases. Arch Otolaryngol Head Neck Surg 123(1): 34-40.

25. Fitzek MM, Thornton AF, Varvares M, Ancukiewicz M, Mcintyre J, et al. (2002) Neuroendocrine tumors of the sinonasal tract. Results of a prospective study incorporating chemotherapy, surgery, and combined proton-photon radiotherapy. Cancer 94(10): 2623-2634.

26. Sirsath NT, Babu KG, Das U, CS Premlatha (2013) Paranasal sinus neuroendocrine carcinoma: a case report and review of the literature. Case Rep Oncol Med 2013:728479.