

International Journal of Radiology and Diagnostic Imaging



E-ISSN: 2664-4444
P-ISSN: 2664-4436
www.radiologypaper.com
IJRDI 2024; 7(4): 48-50
Received: 08-11-2024
Accepted: 14-12-2024

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Multidisciplinary approach to nasal squamous cell carcinoma: Merging clinical insights and imaging for enhanced management

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DOI: <https://doi.org/10.33545/26644436.2024.v7.i4a.426>

Abstract

Squamous cell carcinomas, or epidermoid carcinomas, while common in the skin, are exceedingly rare in the nasal cavity. This location presents a significant diagnostic challenge due to the region's complex anatomy and the heightened risk of severe complications. Here, we report the case of a 79-year-old male with a recurrence of epidermoid carcinoma in the left nasal antrum following prior radiotherapy. A thorough clinical and imaging evaluation, incorporating computed tomography (CT) and FDG-PET/CT, facilitated a multidisciplinary approach. This approach underscored the importance of early recognition of risk factors and close collaboration among radiology, oncology, and surgical specialties (otolaryngology, head and neck surgery, and oncologic surgery) to improve patient outcomes and minimize complications. This case highlights the critical role of timely diagnosis and rigorous follow-up in preventing recurrence, as well as the necessity of a collaborative strategy to manage this aggressive malignancy effectively, given its occurrence in such a delicate and anatomically significant region.

Keywords: Squamous cell carcinoma, epidermoid carcinoma, nasal cavity, nasal cancer, oncologic radiology, nasopharyngeal cancer

Introduction

Squamous cell carcinomas (SCC), also known as epidermoid carcinomas, represent the second most prevalent non-melanoma skin cancer, accounting for approximately 20% of all cutaneous malignancies ^[1]. These tumors most commonly arise in regions of the body with significant exposure to ultraviolet (UV) radiation, whether from sunlight or artificial sources such as tanning beds ^[2]. Although rare, their occurrence within the nasal cavity poses a formidable clinical and diagnostic challenge due to the intricate anatomy of the region. Delayed diagnosis can lead to severe local consequences, including orbital invasion and skull base involvement. Moreover, the tumor's proximity to vital structures, such as major blood vessels, significantly increases the risk of dissemination, highlighting the critical importance of prompt recognition and intervention.

Case Presentation

A 79-year-old male, a fisherman by profession for most of his life, presented to the medical service complaining of pain in the nasal septum for approximately four weeks. On physical examination, the patient appeared in overall good health, with vital signs within normal limits. Notable positive findings included a 1 cm nodular lesion palpated at the inner canthus of the left eye, conjunctival mucosal erythema, and, upon rhinoscopy, atrophic mucosa in the nasal cavity along with an ulcerative, infiltrating lesion on the floor of the nasal cavity. No concomitant adenomegaly was evident.

His medical history includes hypertension and a 20-year smoking history (more than 10 cigarettes per day until the age of 49). Additionally, a CT scan from two years ago revealed inflammatory disease in the frontal, sphenoid, and ethmoidal sinuses, along with a solution of continuity in the nasal pyramid. No associated lesions or abnormal enhancement were identified at the time. A biopsy was performed, which revealed carcinoma in situ with focal invasion.

As a result, the patient underwent radiotherapy with a dose of 66Gy in 33 fractions after being deemed initially unsuitable for surgery by the surgical team. He was considered disease-free for 13 months post-treatment.

Given the recent clinical presentation and his medical history, the patient was ordered a new contrast-enhanced and non-contrast CT scan, which showed a small left-sided bone defect at the level of the ipsilateral nasal pyramid, with ethmoidal cells showing marginal mucosal thickening, as well as similar mucosal thickening in the maxillary sinuses. A subsequent biopsy revealed sinonasal papilloma with malignant transformation into non-keratinizing squamous cell carcinoma. The treating team diagnosed it as left nasal antrum epidermoid carcinoma (cT2N1M0) with recurrence on the floor of the nasal pyramid. Based on clinical, imaging, and biopsy findings, an FDG-PET/CT was ordered to delineate adjacent areas and to guide a potential multidisciplinary management approach involving radiation oncology, oncologic surgery, otolaryngology, and head and neck surgery (Fig 1 and 2).



Fig 1: Non contrast CT. Axial (a, b, c, and d) and coronal (e, f, g, and h) images reveal a soft tissue density lesion, containing some calcifications, causing bone erosion and thickening of the nasal septum mucosa, which is displaced to the right in Cottle's area 3. There is also mucosal thickening in both maxillary sinuses and ethmoidal cells

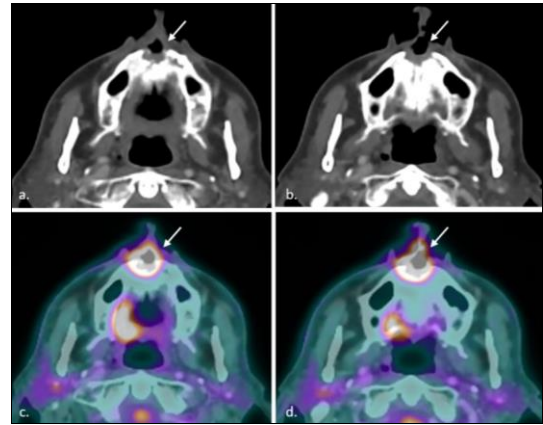


Fig 2: Contrast enhanced CT and PET/CT with 2-[18F] FDG. Axial images demonstrate minimal peripheral enhancement (a and b) and intense radiopharmaceutical uptake (c and d), indicating a hypermetabolic lesion with a SULmax of 7.8

Discussion

Squamous cell carcinomas are exceedingly rare within the nasal cavity, accounting for less than 1% of all head and neck tumors. The incidence is reported to range from 0.32 to 0.41 per 100,000 patients annually, particularly in countries such as Denmark [3]. Nonetheless, in most of the literature, nasal cancers are typically discussed in conjunction with those of the nasal antrum [4].

Men exhibit a higher incidence of this cancer compared to women, with a ratio of 2:1, and it generally presents in the later stages of life (sixth and seventh decades), being exceptionally rare in children and adolescents. Its incidence varies across regions, with a higher frequency in Africa and Asia [4], and it is indeed quite uncommon in Latin populations.

In many cases, patients present with advanced disease at the time the first clinical signs appear. Additionally, when the tumor is of small size, it may be mistaken for a variety of other conditions, such as chronic sinusitis, nasal polyps, and others [5].

There are multiple factors that increase the risk of developing squamous cell carcinoma, with one of the primary ones being exposure to sunlight, particularly when this exposure results in skin burns [6]. Similarly, smoking is a major risk factor for squamous cell carcinoma of the nasal antrum. A study conducted in Brazil found that 70% of patients were smokers or former smokers [6-9]. Additionally, a clear association has been observed between viral infections such as Epstein-Barr virus (EBV) and human papillomavirus (HPV) and the development of certain head and neck tumors [10]. Notably, a stronger correlation between HPV and nasal cavity cancer has been demonstrated, as some patients with squamous cell carcinoma had a history of papillomas [9, 11].

Furthermore, although fishing may increase the risk of disease due to its direct association with UV radiation (as is presumed in our case), statistically significant results have shown that individuals with occupations related to carpentry and/or wood have a higher risk of developing squamous cell carcinoma in the nasal antrum [12].

It is crucial to recognize that squamous cell carcinoma of the nasal antrum is typically diagnosed at an advanced stage. Due to its anatomical location as an air-filled cavity, the tumor can grow silently with few or no symptoms until it reaches a considerable size. Diagnosis is made through

clinical history, with contrast-enhanced computed tomography (CT) standing out as one of the primary diagnostic tools^[8]. More advanced imaging studies, such as positron emission tomography (PET) scans, may be used in cases requiring thorough evaluation.

The treatment approach for this pathology is diverse. Early-stage cases can be managed with surgery or radiotherapy, while advanced-stage cases generally benefit from a multimodal treatment strategy^[9]. The decision between surgery and radiotherapy must be carefully debated and individualized. Particularly, radiotherapy, especially with intervention, is gaining prominence as it demonstrates superior results in terms of local tumor control and aesthetic outcomes for the patient^[9]. Nonetheless, surgery remains the gold standard^[8]. The prophylaxis of neck treatment remains controversial, as multiple studies present varying positions. Therefore, it should be indicated based on the characteristics of each tumor^[11]. For radiologists, it is vital to identify potential radiation-induced changes in these patients, to avoid confusion with disease-related processes. During the disease, lymph node metastasis is rare, with an estimated frequency of approximately 0-6% of cases. In contrast, recurrences are considered more common, with rates reported at over 18% among affected individuals. Therefore, close monitoring is essential for the early detection of recurrences. Survival rates are estimated at 83% within the first three years and 69% at the fifth year^[4]. Despite the rarity of its incidence, clinical recognition, accurate imaging diagnosis, and an interdisciplinary approach to managing the disease are essential to achieving positive outcomes, reducing morbidity and mortality, and improving both the quality and life expectancy of patients.

Conclusion

The diagnosis of epidermoid tumors in the nasal or paranasal cavities can pose a significant challenge. Due to their rarity, these tumors are often misdiagnosed as other benign pathologies, particularly in the Latin population, leading to delayed diagnoses. An accurate diagnosis requires a proper approach and clinical suspicion from the healthcare team, with prompt recognition of the risk factors. Additionally, it is crucial for the radiology team to identify these tumors early. In this way, the development of a multidisciplinary management plan can be achieved, which helps reduce mortality, complication rates, and improve the patients' quality of life.

Conflict of Interest: The authors affirm that there are no conflicts of interest to disclose concerning the publication of this manuscript.

Funding information: The authors certify that no external financial support was provided by any institution for the execution of this work. All costs associated with this report and its dissemination were borne solely by the authors.

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How to Cite This Article

Lewis MSM, Guevara AEM, Vélez DE, Bustos VV. Multidisciplinary approach to nasal squamous cell carcinoma: Merging clinical insights and imaging for enhanced management. *International Journal of Radiology and Diagnostic Imaging.* 2024;7(4):48-50.

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