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Case Report

Rare presentation of oncocytic schneiderian papilloma with intracranial extension: Diagnostic and surgical insights

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Abstract

Oncocytic Schneiderian papilloma is a rarely seen benign tumor, which originates from the sinonasal respiratory epithelium, due to the proliferation on oncocytes. A unilateral nasal obstruction or nasal polyp usually leads to such a case and can mimic several other lesions, making its diagnosis challenging. The Histopathological analysis of this case would be able to rule out other potential diagnosis due to the inconclusiveness of the imaging investigations. Surgical excision remains the primary treatment approach, with a favorable prognosis and low recurrence rates. And increased awareness of the characteristics and understanding of this entity will facilitate prompt diagnosis and appropriate management in clinical practice.

We present a case of oncocytic Schneiderian papilloma originating in the nasoethmoidal region, which extends to the intracranial skull base through a bone dehiscence, with involvement of both the intradural and orbital spaces. Surgical treatment is the primary approach, and the endonasal endoscopic technique has proven to be the both effective and safe, even in cases with extension beyond the nasal cavity.

Keywords: Oncocytic Schneiderian Papilloma, Sinonasal Tumors, Unilateral Nasal Obstruction, Diagnosis, Surgical treatment.

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1. Introduction

Schneiderian papilloma, also known as cylindrical cell papilloma, is a rare epithelial tumour originating from the Schneiderian membrane that lines the nasal cavity and paranasal sinuses. This membrane contains a vascularized lamina propria and osteoprogenitor cells, which is associated with pericytes within the microvascular walls, which can also be located in the bone marrow as the adventitial subendothelial cells.[1,2] Schneiderian papilloma's can be divided into three main types based on their histological characteristics and growth patterns, The most common type is the exophytic papilloma (everted or fungiform), which grows outward like a small mushroom-like structure. Then the inverted papilloma, which grows inward into the surrounding tissues which is less common; it has a greater likelihood of recurring back after treatment. Finally, there's the oncocytic papilloma (columnar or cylindrical).[3] Barnes and Bedetti showed that the epithelial cells in cylindrical cell papilloma are oncocytes originating from sinonasal respiratory epithelium. This finding has led to the term Oncocytic Schneiderian papilloma [OSP]. Schneiderian papilloma's are primarily located in the lateral nasal wall, particularly near the middle turbinate, as well as the ethmoid recesses and the maxillary sinuses. Interestingly this type of tumor's can manifest beyond the sinonasal tract. They may develop in the middle ear cavity, mastoid region, nasopharynx, pharynx and even in the lacrimal sac.[4] While generally benign, the tumors can also lead to complications, necessitating careful diagnosis and surgical intervention.

2. Case Presentation

A 77-year-old woman came to the emergency department following an accidental fall, which resulted in a substantial scalp injury. During her assessment, an urgent CT scan of the brain was performed, revealing an incidental left sinonasal

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mass that extended into both the intracranial and infraorbital regions (**Figure 1**). The size of the mass made it challenging to identify its precise origin from the lateral nasal wall. The patient's medical history included hypertension, but she reported no instances of epistaxis, rhinorrhea, or any ophthalmic symptoms. This lack of typical symptoms associated with sinonasal masses adds complexity to her case. Considering the mass extensions and the patient's age, further evaluation was vital to establish whether it is benign or malignant and to formulate an appropriate management plan.

After a thorough diagnostic evaluation, including imaging studies, the patient was scheduled for a biopsy and excision of the sinonasal mass under general anesthesia, following medical clearance. The surgical plan involved an endoscopic approach to remove the nasal component of the mass.

Prior to the procedure, the patient was instructed to temporarily discontinue any blood thinners to minimize the risk of excessive bleeding during surgery. During the operation, the patient was positioned with slight head extension to provide better visibility of the frontal recess region. The nasal mass was excised in a piecemeal fashion using cold instruments, ensuring meticulous technique to gradually remove the mass from both the anterior and posterior ethmoid sinuses. Great care was taken to avoid damaging the surrounding orbital structures, as the mass displayed significant vascularity, which posed a risk of bleeding. Haemostasias was achieved using adrenaline-soaked pledgets and suction cautery, effectively controlling any bleeding. A particularly challenging aspect of the surgery was ensuring complete clearance of the mass from the frontal recess and frontal sinus. To assist with this, an angled 70-degree endoscope was used, providing improved visualization and access to these challenging areas (**Figure 2**). During the surgery, a bony breach was observed in the lateral portion of the posterior ethmoid roof. At this location, bipolar cautery was utilized to excise the tumor and to prevent intra operative CSF leak. To ensure proper hemostasis, the sinuses were packed with Surgicel and Gel foam.

The excised tissue was then sent for histopathological examination. The results confirmed the diagnosis of oncocytic Schneiderian sinonasal papilloma (**Figure 3**).

Three weeks later, a follow-up endoscopy was performed to assess the healing process and gradually remove the dissolving Gel foam from the sinuses (**Figure 4**). During this procedure, the sinonasal lining appeared well-healed, indicating a positive recovery. However, a pulsatile area was noted at the lateral part of the posterior ethmoid roof, with no active CSF leak.

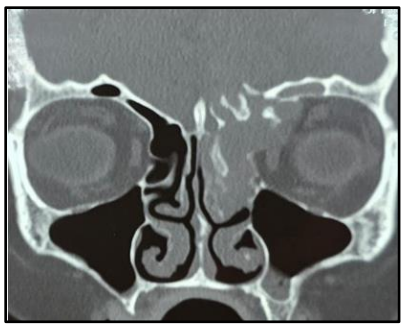

Figure 1: Pre-operative Ct – coronal section view of paranasal sinuses

Figure 2: Zero-degree view of left sinonasal mass

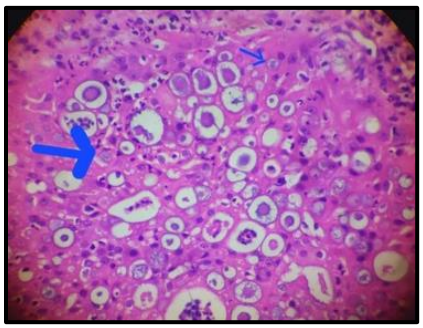

Figure 3: Histopathological slide of oncocytic Schneiderian papilloma stained with Hematoxylin and Eosin (H&E) at 40x magnification.

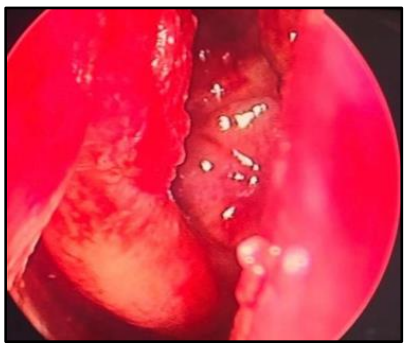

Figure 4: Zero-degree view of left sinonasal cavity at 3 weeks post surgery

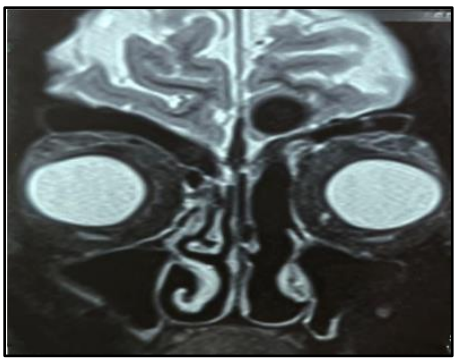

Figure 5: Post- operative MRI of left oncocytic schneiderian papilloma

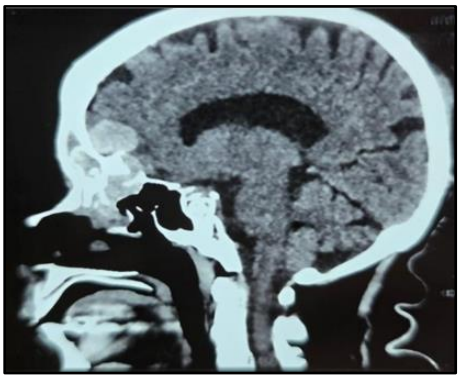

Figure 6: Pre-operative CT – sagittal sectional view of paranasal sinuses

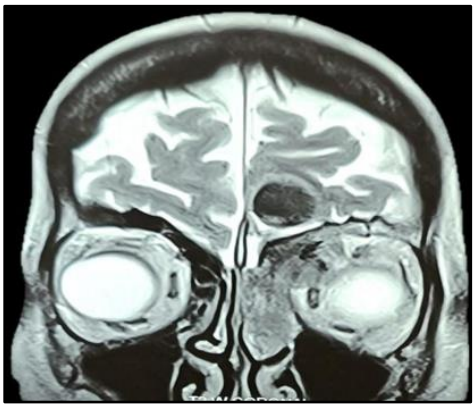

Figure 7: Pre -operative MRI of oncocytic schneiderian papilloma

Given these findings, a repeat MRI was done to further evaluate the situation (**Figure 5**). Additionally, the patient was referred to a neurosurgeon for specialized assessment and potential treatment of the intracranial component associated with the sinonasal mass. This multidisciplinary approach ensures comprehensive management of the patient's condition, addressing both the sinonasal and intracranial aspects of the tumors.

3. Discussion

Oncocytic Schneiderian papilloma, which is also known as cylindrical cell papilloma, is a rare benign new tumour that comes up from the Schneiderian membrane. This type of papilloma accounts for only 3 to 5% of all Schneiderian papilloma's, making it the least common among the three variants.[4] As the Schneiderian papilloma's lines the nasal cavity and paranasal sinuses and it is composed of respiratory epithelium. Oncocytic papilloma are characterized by their oncocytic cells, which contain a high density of cytoplasmic organelles, resulting in a distinctive eosinophilic appearance under the microscope.

Schneiderian papilloma's (SP's) are benign tumors known to be associated with the tendency to recur and perhaps causes cancer. Studies reveal that malignant transformation may occur in 4-17% of the cases, hence close follow ups is recommended.[5] while it is acknowledged that most papilloma's are benign, they are associated with a risk of malignant transformation and intracranial extension, bearing in mind that standard management approaches may not be ideal in all circumstances.[6] Consequently, the diagnostic process often requires advanced imaging technique along with comprehensive histopathological analysis to accurately evaluate the lesion's extent. Many experts now advocate for the endonasal endoscopic approach as a valuable, safe, and minimally invasive technique for addressing Schneiderian papilloma. This method provides direct access to the paranasal sinuses and the nasal cavity through the nostrils, minimizing the need for external excision.[7] Understanding the tumors extension and its surrounding structure is crucial for surgical evaluation. This information can be effectively obtained through the preoperative MRI investigation.[8] Intracranial extension of tumor's is no longer viewed as a contradiction for surgery, because the surgical experience acquired in recent years has demonstrated that endoscopic skull base duraplasty of large defects can be performed with a multilayer approach, this method involves carefully drilling the bone around the defect to create a smooth, regular surface, which facilitates better graft integration .Furthermore, subperiosteal undermining of the dura mater from the neighboring intracranial skull base bone optimizes graft placement in order to improve the chance of successful closure and reduce complications.[9] Based on the literature, the incidence of bleeding complication from vascular injuries during endoscopic sinus surgery ranges from 0.2%-0.8%. However, the risk increases significantly in cases involving tumours, leading to a higher likelihood an intra-operative and postoperative hemorrhage. During these procedures, bleeding can be controlled through the use of suction cautery and bipolar cautery. Suction cautery allows for simultaneous cauterization and suctioning of blood, thus maintaining a clear surgical field, while bipolar cautery allows for precise coagulation of targeted blood vessels, reducing excessive bleeding.[10] During the pre-

operative counselling, it is essential to inform patients about the need to temporary discontinuation of blood thinners to minimize the risk of excessive bleeding during and after surgery. The use of haemostatic techniques including topical thrombin or fibrin sealants can help to manage the bleeding at excised site. Post-operative care is equally importance, as careful monitoring in recovery can help to detect any delayed bleeding. Anticipating different scenarios with Gel-foam wrapped in surgicel enhances success and effectively controls bleeding complications.[11]

The current case report suggests that endoscopy and imaging techniques, particularly MRI and CT scans, are valuable tools in the preoperative assessment of inverted papilloma (IP). While histological analysis is essential for a definitive diagnosis, these imaging methods help determine the tumor's location and extent. The primary goals of radiological assessment are to accurately establish the tumor's boundaries and identify its site of origin. MRI is valuable for distinguishing papilloma's from inflammation and providing clear visualization of the tumour relative to surrounding tissues and retained secretions. It also assesses vascular characteristics, helping to differentiate between secretions, inflammation, and tumour extensions, which improves understanding of the condition before surgery. Bone changes associated with tumour growth and its local aggressive potential are commonly observed, occurring in up to 93% of cases. These alterations can be effectively assessed through CT scans, which provide detailed bony anatomy.[12]

4. Conclusion

The experience from the current case report shows that a carefully staged and meticulously planned surgical approach for sinonasal masses can result in favorable outcomes, especially when there is concurrent intracranial and orbitalextension. Surgical intervention is the preferred treatment option, with the intranasal endoscopic technique being frequently utilized. This method has demonstrated safety and effectiveness, even in cases with extra nasal extension. However, caution is necessary when using powered instruments in cases with bleeding nasal masses or distorted anatomy. Such conditions can complicate the surgical environment, hindering clear visibility and control, which in turn raises the risk of complications. The surgeons should be adaptable and prepare to adjust according to the technique needed in the procedure in order to meet the particular difficulties involved, so the specific possibility for successful results is maximized in even the most complicated cases, with emphasis on safety and a tailored approach for each patient.

5. Source of Funding

None.

6. Conflict of Interest

None.

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