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(CASE REPORT)

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Endoscopic surgical approach of sinonasal inverted papilloma: A case report and mini review

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Abstract

Sinonasal inverted papilloma (SNIP) is a relatively rare benign tumor that occurs in 0.2-1.5 per 100.000 persons each year, comprising 0.5% - 4% of all sinonasal neoplasms. Despite being benign in nature, SNIP exhibits local aggressiveness due to its distinctive proliferation of metaplastic surface epithelium that undergoes inversion into the underlying stroma. Also, it carries a risk of malignant transformation. These characteristics thus emphasize the necessity for complete surgical excision as the primary treatment.

A 50-year-old woman presented with sinonasal inverted papilloma classified as stage T2 according to Krouse staging, suitable for a less invasive endoscopic approach. However, CT scan revealed maxillary sinusitis. Adhering to SNIP management principles, a surgical excision through Endoscopic Sinus Surgery (ESS) followed by Endoscopic Modified Medial Maxillectomy (EMMM) or prelacrimal approach was chosen to provide better visualization of the anterior, lateral, posterior, inferior, and medial walls of the maxillary sinus. This approach aimed to preserve the inferior turbinate and nasolacrimal, avoiding postoperative lacrimation.

Keywords: Sinonasal Inverted Papilloma; Endoscopic approach; Endoscopic modified medial maxillectomy; Prelacrimal approach; Benign tumor

1. Introduction

Sinonasal inverted papilloma (SNIP) is a relatively rare benign tumor that occurs in 0.2-1.5 per 100.000 persons each year, comprising 0.5% - 4% of all sinonasal neoplasms.[1] SNIP arises from the Schneiderian mucosa that lines the nasal cavity and paranasal sinuses.[2] The most common site of occurrence is the lateral nasal wall in the region of middle turbinates. Nevertheless, various studies have reported its presence in various areas, including the nasal septum, ethmoid sinus, maxillary sinus, sphenoid sinus, sphenoethmoidal recess, and frontal sinus.[3,4]

Despite being benign, SNIP exhibits local aggressiveness due to its distinctive proliferation of metaplastic surface epithelium that undergoes inversion into the underlying stroma.[3] Also, it carries a risk of malignant transformation, ranging from 5% to 15%, accompanied by a substantial recurrence rate of up to 78%.[5] These characteristics thus emphasize the necessity for complete surgical excision as the primary treatment.

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Two surgical methods are available for treating SNIP: open and non-open or endoscopic approaches. Considerations based on the tumor's location, site of attachment, and extensions are crucial in choosing the most suitable surgical approach.[6,7] This study aimed to report a case of SNIP managed by combined endoscopic approaches and provide a mini-review of surgical strategies tailored to specific SNIP locations.

2. Case Presentation

A 50-year-old woman presented at our Otorhinolaryngology outpatient clinic with complaints of recurrent nasal congestion, rhinorrhea, and hyposmia persisting for the past year. The patient was referred from a Type C hospital with a biopsy result indicating papillomatous nodules covered by transitional epithelium, with extension of growth into the stroma and no signs of malignancy, warranting surgical intervention.

Upon physical examination, no facial asymmetry was observed, whereas anterior rhinoscopy revealed a solid pinkish-gray mass filling the right nasal cavity (Figure 1). On closer inspection through nasal endoscopy, a solid pinkish-gray mass with lobulated surfaces and irregular borders was attached to the lateral wall of the right nasal cavity, filling the whole nasal cavity (Figure 2). The same mass was observed in the choanae region when nasal endoscopy advanced to the nasopharynx via the contralateral nasal cavity.

Figure 1 Anterior rhinoscopy showed a solid pink mass filling the right nasal cavity

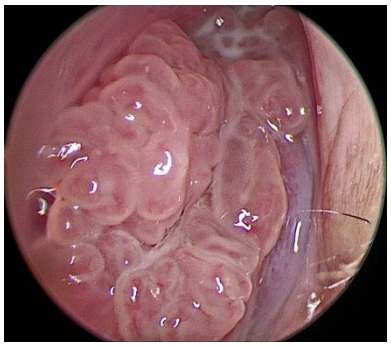

Figure 2 A solid pinkish-gray mass with lobulated surfaces and irregular borders was attached to the lateral wall of the right nasal cavity

CT examination was performed, and it showed a hypodense lesion occupying the right nasal cavities and ethmoid sinus accompanied by slight deviation of the nasal septum to the left and bilateral maxillary sinusitis on coronal view (Figure 3a). The axial view further demonstrated the presence of the same mass within the right nasal cavity, extending into the nasopharynx (Figure 3b).

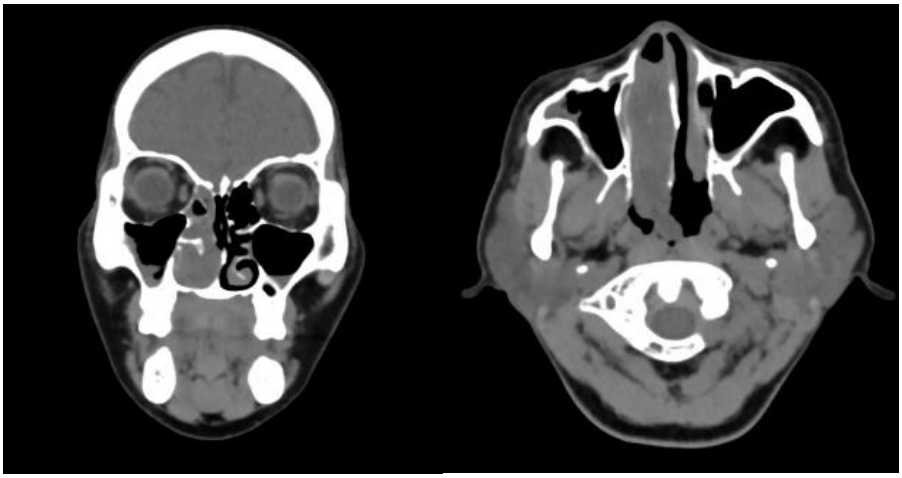

Figure 3(a) Coronal view of mass occupying the right nasal cavities and ethmoid sinus accompanied by slight deviation of the nasal septum to the left and bilateral maxillary sinusitis. (b). Axial view of mass occupying the right nasal cavities extending to the nasopharynx

The patient underwent surgical excision through an Endoscopic Sinus Surgery (ESS) (Figure 4). Subsequently, we proceeded with an Endoscopic Modified Medial Maxillectomy (EMMM) or prelacrimal approach to ensure comprehensive exploration and better visualization of the maxillary sinus's walls. (Figure 5).

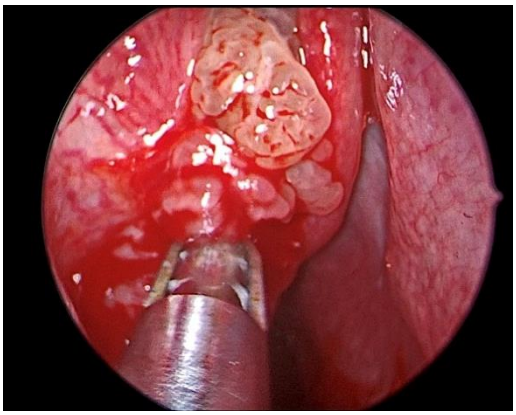

Figure 4 Endoscopic surgical excision using microdebrider

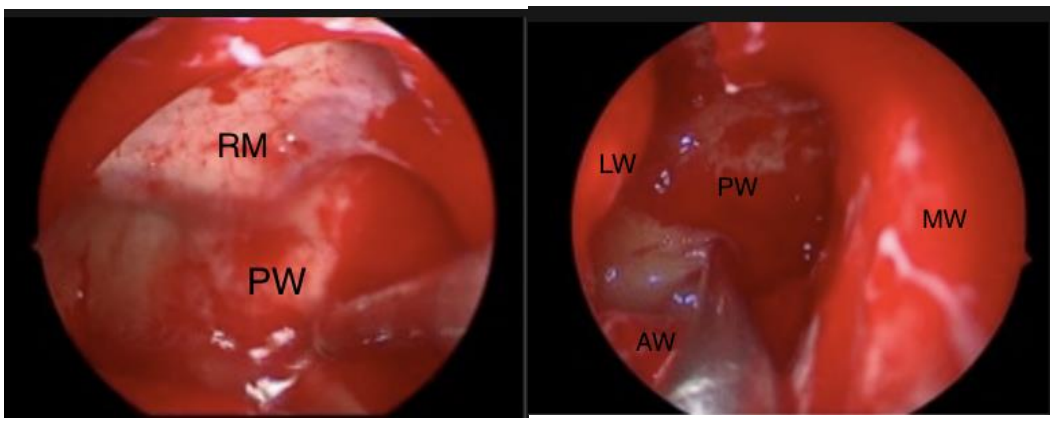

Figure 5 (a) The anterior, lateral, and medial maxillary walls were not visible after the middle meatal antrostomy with a 70-degree endoscope. **(b).** The anterior, lateral, and medial maxillary walls were visible with a 0-degree endoscope after EMMM, and no remnant of the tumor was found. *RM,* Roof of maxilla*; PW,* posterior wall; *LW,* lateral wall; *AW,* anterior wall; *MW,* medial wall

The excised tissue was then submitted to the Pathological Anatomy Department for histopathological evaluation. Upon gross examination, the excised tissue displayed an irregular shape with a pinkish-gray color, a lobulated surface, and a firm consistency. Histological examination showed polypoid tissue covered with transitional and squamous epithelium. The tissue exhibited endophytic growth into the stroma, forming distinct nests of epithelial cells, suggesting a final diagnosis of inverted papilloma.

3. Discussion

SNIP is a rare benign tumor originating from the Schneiderian epithelium, mostly the lateral nasal wall.[2] SNIP is characterized by its benign nature, local aggressiveness, and tendency towards malignant transformation and is frequently observed in men aged between 40 and 70 years.[3] While its etiology remains undefined, several studies have found a correlation between SNIP and chronic inflammation.[8,9] Furthermore, one study also found an association between occupational exposure and SNIP.[8] However, larger-scale studies are needed to confirm the significance of these findings. Consistent with previous SNIP literature, this current case was a 50-year-old textile worker who came to the otorhinolaryngology clinic with a mass attached to the lateral wall of her right nasal cavity.

Surgical excision remains the gold standard for managing SNIP.[7,10] The fundamental principle that should always be applied in every approach is the complete removal of the tumor, followed by removal of the mucoperiosteum, which is the origin of the tumor.[11,12] Two surgical techniques for SNIP exist, which are open and non-open or endoscopic approaches.

The open surgical technique comprises medial maxillectomy (MM) with a lateral rhinotomy (LR) approach, midfacial degloving, Caldwell-Luc, and frontal osteoplastic flap. Aggressive LR and MM approaches were the gold standard treatments for a long time.[10,13] Open approaches are indicated for SNIP originating from or extending to the extra-sinus areas, such as the skull base, orbit, or intracranial cavity. These approaches are also indicated for SNIP associated with malignancy, recurrence after endoscopic surgery, or those difficult to access or visualize endoscopically.[10]

In general, the open surgical approach for SNIP involves incision, tumor exposure, resection, reconstruction, and closure of the surgical area. The recurrence rate of SNIP after an open approach varies in different studies, depending on the follow-up period, completeness of resection, and malignancy.[14,15,16] However, a recent systematic review found a significantly higher recurrence rate associated with open approaches than endoscopic approaches (16.58% vs.12.8%, respectively). [17]

Improvements in endoscopy technology have led to a growing preference for a less invasive endoscopic approach. However, it is essential to locate and determine the tumor's size using CT or MRI scans. Based on the Krouse staging, patients with T1 and T2-stage tumors generally can undergo an endoscopic approach, while T3 and T4 stages require multiple transnasal approaches and/or open surgery.[11,18] To achieve complete resection, including its attachment site, transnasal endoscopy can be combined with a Caldwell-Luc approach or other open approach.[14,19]

Various endoscopic techniques for SNIP include endoscopic sinus surgery (ESS), endoscopic medial maxillectomy (EMM), endoscopic modified medial maxillectomy (EMMM), endoscopic modified Denker's procedure, and endoscopic modified Lothrop procedure (EMLP). The endoscopic approach for sinonasal tumor resection begins by completely removing the macroscopic tumor, followed by resection in its attachment area. Bones suspected to be involved can be drilled using a diamond burr to lift the infiltrated tumor focus.[20]

In our case, the tumor was considered as T2 based on Krouse staging (involving the osteomeatal complex, ethmoid sinus, and/or the medial part of the maxillary sinus, with or without the involvement of the nasal cavity), which is a suitable candidate for a less invasive endoscopic approach. However, on the CT scan, maxillary sinusitis was observed. Adhering to the principles of SNIP management, an endoscopic surgical excision followed by EMMM or prelacrimal approach was chosen to assess the anterior, lateral, posterior, inferior, and medial walls of the maxillary sinus. This approach was made to confirm whether the CT findings indicated sinusitis was possibly caused by inflammation due to the closure of the osteomeatal complex or tumor tissue within the sinus. Moreover, this approach ensures the preservation of the inferior turbinate and nasolacrimal, maintaining the function of the inferior turbinate and avoiding postoperative lacrimation. [21,22]

In contrast to open surgery, endoscopic excision offers several benefits, including enhanced visualization, preservation of normal sinonasal physiologic function, and the establishment of effective mucociliary clearance patterns.[13] Moreover, it is shown to have lower recurrence rates.[14-17] However, it is important to note that the use of endoscopy and other

surgical instruments by less experienced operators may lead to incomplete removal of tumors or potentially catastrophic complications, such as penetration into the orbit or intracranial.[16]

4. Conclusion

Managing SNIP is challenging due to its locally aggressive nature, potential for malignant transformation, and notable recurrence rates. The fundamental principle for SNIP management revolves around complete tumor excision, with the choice of surgical approach should be guided by the tumor's location, site of attachment, and extensions.

In our case, surgical excision through ESS followed by EMMM demonstrated a favorable outcome, allowing a less invasive approach while adhering to the principle of SNIP management. While endoscopic techniques offer advantages such as improved visualization and reduced morbidity, it is crucial to acknowledge the potential complications, emphasizing the importance of operator expertise.

Compliance with ethical standards

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Disclosure of conflict of interest

The author reports no conflict of interest in this work.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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