

Case Report**Frontal Sinus Inverted Papilloma: A Case Report and Literature Review**Danah Aljomah¹ and Tariq Tatwani^{1*}*Department of Otolaryngology - Head and Neck Surgery, Prince Sultan Military Medical City, Riyadh, Saudi Arabia***Abstract**

Inverted papilloma is a rare benign tumor of the nasal fossa. Primary frontal sinus involvement is a rare entity. Although considered a benign lesion, the tumor has a potentially invasive nature and associated malignancy rate of 7 to 15%. Surgical management of frontal sinus (FS) inverted papilloma (IP) remain a significant challenge.

We report a case of IP originating in a rare location, the frontal sinus, and to review the literature to delineate the possible surgical strategy. A 30-years-old man, presented with unilateral frontal headache, and occasional facial numbness. Sinus computed tomography showed an opacified left frontal sinus with apparent bony integrity. Transnasal endoscopic biopsy suggested IP. The lesion was completely resected by combined approach, followed by Draf IIb procedure. The patient was followed for 1 year after the last surgery; no signs of recurrence were found upon flexible nasofibroscope examination and radiologic imaging.

Key Words: Inverted Papilloma; Frontal Sinus; Endoscopic Tumor Resection; Frontal Trephination; Draf IIa; Draf IIb

Introduction

Inverted papilloma is a rare benign tumor of the nasal fossa and its true incidence is not yet known. From hospital-based studies, the incidence has been estimated to approximately with estimated incidence of 0.74/100,000 per year [1], which usually originates from the lateral wall of the nasal cavity. The maxillary and ethmoid sinuses are most frequently affected [2]. Although this tumor is considered a benign lesion, it has a potentially locally invasive nature, and it is correlated with bony erosion. It also has a tendency for local recurrence with incomplete resection, and associated malignancy rate of 7 to 15%, with squamous cell carcinoma being the most common histopathology type [2,3].

Traditionally these lesions have been treated via external approaches such as Denker or medial maxillectomy performed from a lateral rhinotomy approach. Although open approaches remain in the armamentarium of the practicing otolaryngologist, endoscopic removal of benign tumors of paranasal sinuses has become popular in the last 15 years. Several evidence based studies have demonstrated comparison between endoscopic and open techniques outcomes [4,5].

The incidence of inverted papilloma originating from frontal sinus is between 1% - 16% based on published case series [6]. Despite the recent advances in the endoscopic techniques, the surgical management of inverted papilloma involving the frontal sinus (FS) remains a challenge given the narrow confines of the frontal recess and the close proximity to critical structures. The surgical options include open approaches (osteoplastic flap OPF), endoscopic frontal trephination (EFT), endoscopic frontal sinusotomy (EFS), endoscopic modified Lothrop (EML), or a combined open and endoscopic techniques. In addition, staging of the procedures could be considered.

Case Report

The patient, a 30-year-old man, presented to our outpatient clinic with a 3-months history of left side frontal headache, worsened when

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bending the head forward, and associated with mild facial numbness. No nasal obstruction, nasal discharge, change in smell, epistaxis, or vision disturbance were reported. He was evaluated by a clinical neurologist who requested a head computed tomography (CT) scan. A lesion was found filling and expanding left frontoethmoidal sinuses with apparent bony integrity.

In the Otolaryngology clinic full ENT exam was done for the head and neck including cranial nerves, Rigid endoscopic examination using 0 and 30 degree scopes showed clear nasal cavity no polyps or secretions seen, except of what looks like polypoidal mucosa at the frontal recess. After repeating a proper Sinuses CT with thin cuts, the patient underwent transnasal endoscopic approach under sedation for better visualization of the mass and to obtain a biopsy from it. The lesion was identified in the frontal recess, multiple biopsies were taken and sent for histopathology. During the procedure a minimal left orbital herniation was noticed, which was conservatively preserved. Histopathologic study suggested inverted papilloma.

A second procedure a frontal trephination, combined open and endoscopic approach, was performed. The tumor was removed under general anesthesia using a 45° scope, shaver and curved diamond drill. After the lesion was removed, ethmoidectomy was performed. Frontal recess was widened to obtain as easy access. At this stage of the procedure it became clear that the site of origin of the lesion was located inside the left frontal sinus. Bony fragments found inside the sinus were probably frontal cell and inter-sinus septum remnants. An external 1 cm incision was done to access the frontal sinus. Frontal sinuses were easily inspected with the 30° and 45° scope at the end of the procedure. And again histopathology revealed an inverted papilloma. Postoperatively, the patient did well and was discharged the next day.

The patient was followed in the outpatient clinic and after 8 months complained of frontal headache and pressure, CT sinuses was done and revealed partial thickening at the left frontal recess. The patient was taken to the operative room for atransnasal endoscopic Draf IIB procedure. He was followed in the outpatient clinic for 1 year with no symptoms or signs of recurrence found upon flexible nasofibroscope examination or CT imaging.

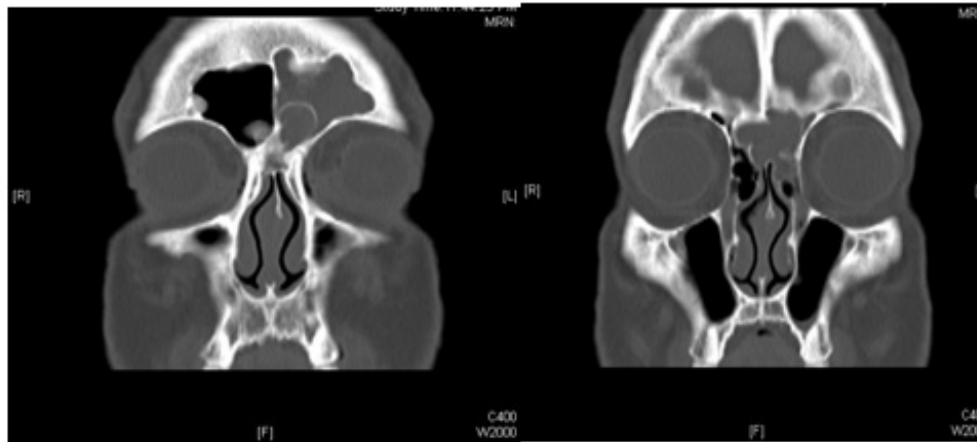
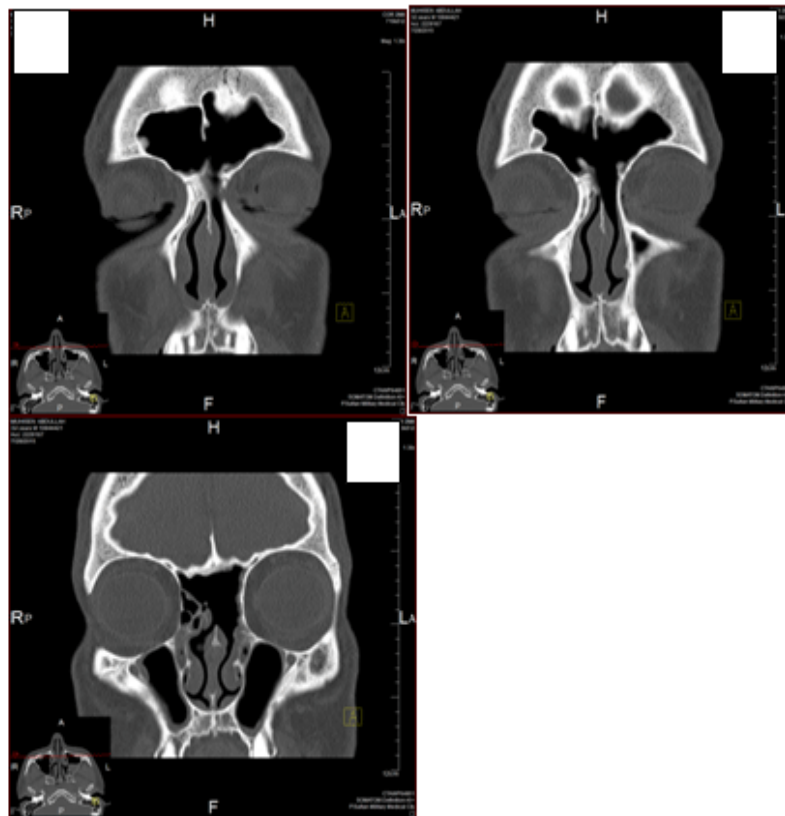


Image (1) (2): Pre-operative CT coronal cut shows left frontoethmoidal mass.



Images (3)(4) (5): Post-operative coronal cut after 1 year follow up.

Literature Review

Inverted papilloma is a rare benign sinonasal tumor. It was first described in 1854 by Ward. It accounts for 0.5 to 4% of nasal tumors, and it is most often seen in the fifth and sixth decades of life [7]. This tumor presents a characteristic endophytic growth pattern, its Schneiderian membrane inverts into the underlying stroma [3]. It is also characterized by its potentially invasive nature; 70% of cases have been found to show evidence of bony erosion on computed tomography (CT) scan at diagnosis. It has high rates of recurrence, varying from 20 to 47% according to the current literature [8,9,10]. The recurrence rates noted for endoscopic frontal sinusotomy (EFS), endoscopic modified Lothrop (EML), osteoplastic flap (OPF), and endoscopic frontal trephination (EFT) were 23.8%, 30%, 15.4% and 20%, respectively [10]. The optimum management of inverted papilloma commences with the early diagnosis of the condition. The clinicians should have a low threshold of suspicion for the condition and send material for histological examination, or the diagnosis may go unsuspected. CT scanning remains the imaging modality of choice characteristically showing heterogeneous opacification and sclerosis in adjacent bone. However, the extent of disease may be exaggerated by associated inflammation and/or retained secretions which can be clarified by MRI. Radiological studies showed that in more than 90%

of cases it is possible to identify the site of attachment of IP by the presence of focal bony thickening in high-resolution CT [11].

For years, the recommended treatment of choice consisted of medial maxillectomy and en bloc tumor excision through lateral rhinotomy or a midfacial degloving approach. Nevertheless, recently a more conservative management via a transnasal endoscopic approach has been advocated by some authors and has produced some good results. This technique has remarkably improved throughout the years, presenting a decreased disease recurrence rate compared with the beginning of its use [12]. Preoperative planning based on high-resolution CT and MRI enables an endoscopic attachment oriented approach.

Traditionally IP of the frontal sinus has been managed with OPF. Obliteration of the sinus with fat is contraindicated because it makes radiological control difficult. For this reason, the combined open and endoscopic approach enabling sinus drainage and endoscopic inspection in the postoperative period was found to be a more appropriate mode of treatment [13]. Dubin and Johnson presented a series of 5 patients initially treated endoscopically using classical endoscopic sinus instrumentation [13]. All of these patients underwent a second stage procedure which was an external approach in all

cases except for one. The authors advocate for extend frontal sinus procedures such as Draf IIB or Draf III although they didn't perform in their cases. Due to complex anatomy, high risk of complications and recurrence, a purely endoscopic approach has not been used routinely in cases of frontal sinus involvement.

During the last decade several authors have presented a limited number of patients with frontal sinus or recess IP treated endoscopically [5,14,15]. A series of 8 patients was presented in 2008 by Zhang [16]. There were 4 patients with frontal recess involvement, treated with the Draf IIa procedure; three patients with unilateral involvement of the frontal sinus, treated with Draf IIB; and 2 patients with involvement of both frontal sinuses, both treated with the Draf III procedure. All of the tumors were unifocal (had a single attachment site). There were 3 patients with a history of previous surgery. No additional external approach was used frontal trephination. There were no complications and all the patients remained disease free (observation period ranged from 5 months to 34 months). Later on Yoon et al. [17], a series of 18 patients with frontal sinus inverted papilloma, two of the subjects were treated primarily with OPF, and 16 endoscopically. Five out of these required additional endoscopic frontal trephination during the surgery. Multifocal tumor attachment was found in 6 cases. Endoscopic modified Lothrop procedure (EML, equivalent to Draf III) was used in 6 cases. In the EML treated subgroup multifocal tumor was present in 4 out of 6 patients. In 2 cases surgery was complicated with a cerebrospinal fluid leak. Recurrence was observed in 4 subjects. These patients were successfully treated with endoscopic procedures. Walgama et al. systemic review in 2012, were unable to delineate the best surgical approach for FS IP, but more aggressive approaches frequently employed for secondary or bilateral disease and may facilitate better control of the disease [10].

In our case study the patient although he had frontal trephination, he had symptoms of recurrence after 8 months. We expect that multifocal involvement within the frontal sinus could be the reason. Therefore, he underwent a Draf IIB procedure with successful results and remained disease free up to 1 year on observation and follow up. It is well recognized that most recurrences of IP result from incomplete removal of the attachment site, especially its bony component [12]. If the lesion is limited to the frontal recess and opacification of the frontal sinus is due to mucus retention, Draf IIa or IIB is the most convenient approach. However, if the origin of the tumor is located within the sinus or there is involvement of the contralateral side, probably the median drainage (Draf III) will be the most appropriate technique. This procedure seems to be the most appropriate for endoscopic treatment of bilateral and/or multifocal frontal sinus lesions. Although intranasal surgery can be effective in most cases, some anatomical variants such as small antero-posterior dimension of the frontal recess can make it impossible [18,19].

Conclusion

In conclusion, there is no single right or wrong surgical solution but rather a range of procedures from which a choice may be made in any individual case. In general, more aggressive approaches frequently employed for secondary or bilateral disease and may facilitate better disease control. But if it is limited to the frontal recess or frontal sinus, Draf IIa or IIB is the most convenient approach.

Compliance with Ethical Standards

All procedures performed in this case report were in accordance with the ethical standards of the institutional and national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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