

Eyelid Approach with “Orbitalization” of the Lateral Frontal Sinus - Approaching a Post-Surgical Mucocele

Rosso Cecilia^{1,*}, Colletti Giacomo², Saibene Alberto Maria¹, Felisati Giovanni¹ and Pipolo Carlotta¹

¹*Department of Otorhinolaryngology, University of Milan, Department of Health Sciences, Italy*

²*Department of Maxillo-Facial Surgery, University of Milan, Department of Health Sciences, Italy*

***Corresponding author:** Cecilia Rosso, Department of Otorhinolaryngology, University of Milan, Via A. di Rudinì 8, Milan, Italy. E-mail: rosso.cecilia1@gmail.com. ORCID: 0000-0002-2187-0799

Received: August 24, 2021

Published: September 20, 2021

Abstract

Superior eye-lid approach is a technique usually performed with fat obliteration and closure of bony flap.

We present a 41-year-old female who previously underwent to a combined endoscopic transnasal and osteoplastic flap approach and subsequently to DRAFIII procedure for left frontoethmoidal sinusitis. In November 2019 was diagnosed a mucocele of the most lateral part of the residual left frontal sinus, which was not communicating with the DRAFIII opening. She underwent the removal of the frontal mucocele through an eyelid approach and creation of a bony window at the level of the frontal sinus floor. No reconstruction of the frontal sinus floor was undertaken: periorbital and orbital content was used as passive filler of the excluded and therefore “orbitalized” sinus.

Eyelid approach with “orbitalization” of sinus seems to be a valid option in rare cases of lateral frontal sinus rehabilitation. It decreases the risk of post-operative sequela with excellent aesthetic results.

Keywords: Eye-lid approach; Trans-palpebral approach; Frontal sinus surgery; Orbitalization; Frontal mucocele

Introduction

Endoscopic approaches to the frontal sinus allow to manage the majority of benign and malignant frontal sinus pathologies with low complication rates. Nevertheless, there are some conditions where an endoscopic technique does not provide a sufficient surgical field vision, so surgeons need to perform either an isolated or combined external approach.

Current open approaches to the frontal sinus focus mainly on osteoplastic flaps and supraorbital eyebrow approaches. These techniques provide a wide management of the areas but expose the patient to a higher risk of complications like intracranial injury, orbital fat herniation, bone flap fracture or malposition, as well as cosmetic defect, neurologic sequelae, mucocele formation, fistulas and osteomyelitis [1].

Eyelid approach is a recently proposed minimally invasive procedure that uses superior eyelid crease incision to expose the bony floor of the frontal sinus with low rates of major complications. This article firstly reports the eyelid approach targeting the lateral part of a frontal sinus with an obliterated outflow tract and “orbitalization” of the remaining frontal sinus. We discuss the case of a 41-year-old female with a history of previous combined surgery to frontal sinus and the DRAF III procedure, with diagnosis of a postoperative mucocele of the lateral portion of the frontal sinus and hyperostosis of the

outflow tract. The patient underwent superior eyelid approach to the frontal sinus with mucocele removal and consequent no reconstruction of frontal floor but passive filling with orbital and periorbital content.

Case Report

L.T.R. firstly presented to our Unit in 2017 complaining left-side nasal obstruction and rhinorrhea, and left frontoethmoidal inverted papilloma was diagnosed. She then underwent surgical excision with a combined endoscopic and coronal approach to left frontoethmoidal sinuses. In March 2018, at MRI and CT scan follow-up, a symptomatic frontoethmoidal sinusitis due to partial obstruction of left frontal recess was detected. The patient then underwent a DRAF III procedure. At endoscopic follow-ups we recorded an ongoing narrowing of the DRAF III on the left side with reduction of frontal sinus access. In November 2019 the woman reported the recurrence of an intermittent left supraorbital headache; MRI confirmed the presence of mucocele at the most lateral part of residual left frontal sinus, not communicating with the nasal fossa. Therefore, in May 2019 the patient underwent frontal mucocele removal through an eyelid approach: we performed a cutaneous incision at the level of the supratarsal crease, dissected parallel to the layers of the orbicularis oculi and identified the preseptal

plane above the levator palpebrae. A silicon sheet was inserted above the orbital content in order to protect it during dissection of tissues. Once the superior orbital rim was identified, the periosteum was incised and elevated off the bone. Then, an orbitofrontal window was performed using drilling instruments, lateral to the supraorbital notch, in order to protect the homonymous nerve from mobilization or damage. Next, we got access to the sinus and removed all inflammatory tissue. To avoid mucocele recurrence, we completed the procedure with precise frontal sinus mucosa removal and drilling of the bone. No reconstruction of the frontal sinus floor was undertaken, and the periorbital and orbital content was used as passive filler of the excluded sinus. No post-operative complications have been recorded, except for an expected temporary periorbital edema which resolved within 3 days. At 1-year follow-up, MRI scans showed fibrotic reaction of the excluded and “orbitalized” sinus with a contraction of its diameter and no more inflammatory tissue (fig.3); the patient remained asymptomatic and no visible scars were noticeable.

The study has been independently reviewed and approved by San Paolo University Hospital ethical board.

Discussion

Eyelid or trans-palpebral approach is a relatively new technique: with a hidden incision at superior eyelid, it provides access to all walls of ipsilateral sinus, to intersinus septum, and the medial aspect of the contralateral sinus. Indications include frontal sinus pathologies expanding towards the orbit or involving the lateral portion of the frontal sinus, e.g. mucoceles, osteomas, tumors, lateral Khun cells, or iatrogenic/ post-traumatic hyperostosis of the frontal recess that hinders the frontal sinus from a natural drainage towards the nose.

Certainly, “orbitalization” has restricted indications: it is useful in case of lateral portion of frontal sinus that remains isolated from the rest of the sinus due to previous surgeries with a blockade of physiological drainage into the nasal cavity. Such cases enhance the risk of developing mucoceles, and when it's not possible to re-establish the natural pathway of drainage it becomes useful to fill the sinusal cavity with autologous, stable material with no need of reconstruction of the inferior frontal wall as periorbit and orbital fat creates a natural padding of the remaining isolated frontal sinus.

Coronal and supraorbital accesses are nowadays commonly used in cases like the one proposed, but invasive procedures may raise risk of post-operative sequelae: intracranial injury, orbital fat herniation, bone flap fracture or malposition, as well as cosmetic defect, neurologic sequelae, mucocele formation, fistulas and osteomyelitis may be encountered [1].

The proposed eye-lid approach shows its advantage when compared to other external accesses, due to its mini-invasiveness. A potential complication may be scarring with eyelid retraction, but this is rare through a careful raising of a skin-muscle flap before exposing the frontal bone. A frequent consequence is transient forehead numbness that usually resolves within weeks. Our case report did not record any post-operative complication.

Fat obliteration is usually performed in open procedures, but due to its tendency to resorption, mucocele or sinusitis recurrence may be found. Moreover, material used to close the bony flap may encounter post-operative osteitis, palpable reconstruction plates, mobilization or infection of foreign material [2]. Moreover, the use of heterologous materials to fill bone defects such as titanium mesh may have disadvantages: literature reports infective risk, toxic or immunogenic properties and variable reabsorption [3].

Finally, failure of endoscopic procedure and restenosis of a newly formed ostium with DRAFIII technique have been reported as well. Exposed bone and subsequent neo-osteogenesis, along with excessive scarring and polyp formation, contribute to the closure of an even broadly opened sinus [4]. Different strategies of reoperation have been proposed, but restenosis remains a challenge with varying results [5].

Obviously, wider studies with consistent case series are necessary to validate the procedure and to attest low sequela rate.

Conclusion

Eyelid approach to frontal sinus with “orbitalization” seems a valuable alternative to classic external approaches in order to reduce invasiveness. No need for reconstruction or abdominal fat collection decreases the risk of post-operative sequelae with excellent aesthetic results. Obviously, this approach has restricted indications, and wider studies with consistent case series are necessary to validate the procedure and to confirm a low sequela rate.

Rosso C. contributed with design of the study and acquisition, analysis and interpretation of data. Colletti G. conceived and designed the study. Pipolo C. drafted the article and revised it critically. Felisati G. and Saibene AM. Revised the article critically and gave the final approval of the version to be published.

Conflict of Interest:

The authors declare to have no conflict of interest.

Funding:

The author received no specific funding for this work

Acknowledgement:

No acknowledgements are required.

References

1. Lawson W, Ho Y. Open Frontal Sinus Surgery: A Lost Art. *Otolaryngol Clin North Am.* 2016; 49(4): 1067-1089.
2. Weber R, Draf W, Keerl R, et al. Osteoplastic Frontal Sinus Surgery with Fat Obliteration: Technique and Long-Term Results Using Magnetic Resonance Imaging in 82 Operations. *Laryngoscope.* 2000; 110(6): 1037-1044.
3. Della Puppa A, Mottaran R, Scienza R. Image-guided cranial osteoma resection and bioceramic porous hydroxyapatite custom-made reconstruction in a one-step surgical procedure. Technical notes and illustrative case. *Acta Neurochir (Wien).* 2010; 152(1): 155-159.
4. Gosain A, Persing J. Symposium on Biomaterials in the Face: Benefits and Risks, *Journal of Craniofacial Surgery.* 1998; 10(5): 404-414.
5. Schlosser RJ, Zachmann G, Harrison S, Gross CW. The endoscopic modified lothrop: Long-term follow-up on 44 patients. *Am J Rhinol.* 2002; 16(2): 103-108.