An alternative access to the frontal sinus alongside a rare orbital finding in chronic sinusitis.
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Abstract

Significance:
Advances in minimally invasive techniques have provided new strategies in the management of chronic frontal sinusitis. Surgical access to the frontal sinuses remains essential for treatment.

Findings:
Retrograde atraumatic cannulation of the frontal recess serves an adjunctive role to the external trephine approach to frontal recess stenosis.

Conclusion:
Chronic inflammation of the frontal sinuses may further coexist with orbital neoplasia. Retrograde access of the frontal recess is a useful technique in such challenging refractory cases.

A 68yo Caucasian female nurse with a history of hypertension and chronic rhinosinusitis with polyposis requiring multiple (eight) previous endoscopic sinus surgeries 10-weeks status-post revision frontal sinus surgery presented with complaints of right frontal headache and right periorbital swelling during the preceding week. These symptoms were preceded by bilateral epiphora for eight weeks due to 100% bilateral nasolacrimal duct obstruction. She denied fever, change in vision, photophobia or purulent nasal drainage. Ongoing medical management of chronic sinusitis included daily 0.25mg/mL budesonide topical sinus irrigation and 200mg oral itraconazole therapy for the past four-years in addition to daily 2% mupirocin topical sinus irrigation during the preceding one-year. She is a nonsmoker and denied use of alcohol or illicit drugs. Her family history was notable for her father who is deceased secondary to complications of leukemia.

On examination, there was right forehead tenderness to palpation with ptosis and a palpable two-centimeter subdermal mass of the right upper eyelid that was superficial to the tarsal plate. Pupils were equal, round and reactive to light and extra-ocular movements were intake in all cardinal directions. There were no external nasal deformities. Nasal endoscopic examination revealed healthy nasal mucosa of the nasal cavities without evidence of purulent drainage or polyps obstructing the sinus ostia despite partial obstruction of the right frontal recess secondary to mucosal thickening. Cranial nerves II-XII were tested and intact. The patient was evaluated by the Ophthalmology service and examination revealed 20/25 (OD) and 20/20 (OS). Confrontation fields were full bilaterally and slit lamp exam demonstrated normal conjunctiva, anterior chamber, lens, and cornea. Lacrimal examination demonstrated puncta in good position and without stenosis, however 100% obstruction on probing/irrigation of the nasolacrimal ducts bilaterally.
CT imaging of the paranasal sinuses demonstrated complete opacification of the frontal sinuses bilaterally with internal debris (orange arrow) seen in the left maxillary sinus and additional osteoneogenesis of the frontal bone (orange arrow) compatible with chronic inflammatory change (Figures 1 - 6).
The patient was taken to the operating room and underwent general anesthesia. The right upper eyelid lesion was completely excised under sterile conditions, closed primarily and submitted for further histopathologic evaluation. Initial trans-nasal attempts using an angled endoscopes and a guidewire proved unsuccessful for cannulating the right frontal recess. Therefore, a 0.5cm stab incision was concealed along the medial aspect of the right eyebrow providing access for a 2.0mm drill for right frontal sinus trephination. The right frontal sinus was irrigated copiously with normal saline and mucopus was evacuated transnasally. Flexible tip lighted-guidewire was placed via the trephine approach (Figure 11) with successful retrograde cannulation into the nose (Figure 12, Video 1).
Transnasally, a 7mm balloon catheter was advanced over the flexible tip guidewire and successfully inflated to twelve atmospheres on two occasions (Figure 13 - 14). All instrumentation was withdrawn and the frontal recess that now could easily be cannulated using anterograde approach appeared widely patent on 30-degree endoscopy (Figure 15 - 16).

Discussion

Balloon catheter-assisted sinus surgery is a well-accepted tool in minimally invasive endoscopic sinus surgery. Multiple trials including the CLEAR study have demonstrated it to be a safe and effective modality with excellent long-term results. [1,2] Balloon catheter use in frontal sinus surgery has been especially popular given its improved mucosal preservation and capability to access the frontal sinus with minimal trauma to functional respiratory epithelium. This applies to both primary and revision sinus procedures and further minimizes the inherent risks of iatrogenic frontal recess stenosis.

Cannulation of the frontal sinus with a flexible-tip guidewire can be technically demanding and even impossible in select patients. In the formerly presented case, dense scar tissue and altered frontal recess anatomy made successful cannulation impossible despite multiple attempts using the Relieva Luma Sentry™ Sinus Illumination System. The combination of frontal trephination with conventional intranasal endoscopic sinus surgery is well established for the management of certain frontal sinus conditions. [3] However, concomitant frontal trephination with balloon catheter sinus dilation is less common. Drexler reported a case of retrograde frontal sinus cannulation using a “minitrephination” with a successful clinical outcome. [4] Similarly, our case allowed for successful dilation of a chronically infected frontal sinus that would otherwise have mandated an extensive drillout procedure. This mucosal-sparing approach with close postoperative follow up has helped avoid the need for more morbid surgery.
This case additionally presents a case of longstanding chronic rhinosinusitis with the rare occurrence of metachronous orbital B-cell lymphoma. Whilst the lesion in our case manifested in the soft tissue of the upper-eye lid, and not in the lacrimal apparatus, other authors have suggested an association of chronic inflammatory paranasal sinus disease with orbital neoplasia. [5,6] In contrast to the case presented by Chain et al., our patient did not demonstrate evidence neoplasm of the sinonasal tract nor was there evidence of osteomyelitis. Our patient’s right upper eyelid mass initially mimicked extension of ipsilateral frontal sinusitis. Close palpation revealed the mass to be non-tender, mobile and isolated within the soft tissue of the upper eyelid. MRI imaging (Fig. 9,10) confirmed an isolated mass, which histopathological analysis confirmed to be Non-Hodgkin B-cell Lymphoma.

Extranodal lymphoma adjacent to long-standing refractory chronic rhinosinusitis raises concern about the long-term implications of chronic inflammation of the paranasal sinuses. Extranodal B-cell lymphoma has previously been reported in patients with underlying granulomatous disease (Wegener’s), rheumatologic disorders (Lupus, Sjogren’s) and hematologic dyscrasias (chronic lymphocytic leukemia, macroglubulinemia). However, this is the first report of non-Hodgkin’s B-cell lymphoma manifesting within the ocular adnexa in the setting of chronic frontal sinusitis.

References