Frontal mucocele after frontal sinus transgression

Additional complications that have been reported include the intracranial extension of mucoceles following unrecognized frontal sinus posterior wall injury during craniotomy [1]. Proposed methods for the prevention of complications include mucosal stripping with fat obliteration or cranialization of the frontal sinus. These methods may be more important in a patient who has a history of chronic frontal sinusitis or allergy [2]

Some neurosurgeons have advocated sinus preservation by avoiding frontal recess obstruction and removing mucosa from the inferior surface of the bone flap followed by placement of fascia over the bare bone [3]

Once frontal sinus complications have developed, the only described methods of management have been obliteration [4]. and one report of endoscopic frontal mucocele marsupialization [5].

Meticulous removal of mucosa with drilling of the underlying bone to remove mucosal imbrications and complete obliteration of the frontal recess is essential in both frontal sinus obliteration and cranialization [6]

In most cases, harvested autologous adipose tissue is cut into several pieces, then placed into the sinus [7].

One of the largest series in the study of postoperative complications associated with frontal sinus obliteration included 208 patients with long-term follow-up. Computed tomography and MRI were not available at the time of the study; thus, follow-up consisted of physical examination and questionnaires in 129 and 79 patients, respectively. During a median period of 8 years (range, 3–19 y), only one mucocele was detected [8].

In contrast, Weber et al. studied 82 frontal sinus obliteration procedures in which 51 patients underwent postoperative MRI at a mean time of 24.1 months after obliteration. Five of 51 patients (9.8%) developed mucoceles within 11 to 49 months after obliteration. The authors suggested that in earlier series clinically asymptomatic mucoceles may have been overlooked and that the rate of mucocele formation following obliteration is approximately 10%. Their study also demonstrated the importance of MRI in detecting these mucoceles, and previous reports examining mucocele formation with postoperative CT may have underestimated their incidence [9].

Frontal sinus cranialization, as first described by Donald and Bernstein, [10] is often required when the integrity of the posterior table has been violated either by disease or by trauma. It has also been proposed as a method to prevent frontal sinus complications following frontal craniotomy. This technique involves the removal of mucosa from the intact anterior table using both cutting and diamond burrs. The posterior table of the frontal sinus is removed using rongeurs, and the remaining portions are drilled flush with the anterior sinus walls, floor, and anterior skull base.

The frontal recess is then occluded, followed by intracranial placement of the previously raised pericranial flap through a small defect in the anterior table [11].

As shown by Day et al., when the posterior table is disrupted because of trauma, cranialization provides a safe reconstructive option with a low complication rate. The 11 patients in their series were followed for a mean period of 27 months (range, 1–61 mo). Computed tomography scans were obtained as part of their follow-up evaluation, although the time at which the examinations were performed was not provided. None of the scans showed evidence of intracranial abnormality, but CT may not demonstrate a mucocele in a patient after cranialization because it would be difficult to differentiate between the soft tissue of the frontal lobe and a mucocele. The authors' review of the literature using the cranialization approach included 103 patients underwent cranialization with an average follow-up period of 28 months (range, 22–42 mo). There was no mention of mucocele formation, and only 5 major complications occurred. No information was provided regarding the use of CT or MRI for postoperative surveillance [12].

In 1921, Howarth [13] first described the concept of an intranasal marsupialization of mucoceles.

There is a growing body of evidence validating the efficacy of endoscopic sinus surgery in mucocele management. In a series reported by Har-El, [14] 65 of 66 frontal or frontoethmoidal mucoceles were successfully managed endoscopically without recurrence. His technique included marsupialization and wide frontal sinusotomy with the removal of agger nasi cells, anterior ethmoids, and the middle turbinate as necessary. All patients were followed for a minimum period of 3 years, and CT scans were obtained only if symptoms or nasal polyposis recurred

Constantinidis et al. [15] successfully managed seven median frontal sinus mucoceles endoscopically. Computed tomography scans were obtained 6 to 12 months after surgery, and no recurrences were found after an average follow-up of 2.8 years. In additional,

Endoscopic marsupialization may provide an effective, safe means of management [16].

Endoscopic management of frontal sinus diseases after frontal craniotomy [17].

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