Endoscopic surgical treatment of the frontal sinus — more than any other sinus — is associated with greater technical difficulty and increased risk of complication and failure. Consequently, the selection of a technique which will minimize risk while optimizing the probability of failure is paramount.

There is some evidence that ethmoidectomy alone may effectively resolve frontal sinus disease. Avoidance of direct manipulation of the frontal recess may be beneficial in minimizing the risk of complications and reducing operative time.

The aim of this prospective, multi-center study is to compare the efficacy of ethmoidectomy performed with and without frontal sinusotomy for improvement of disease-specific quality of life (QOL) outcomes and use of adjunct medical therapies.

Methods

Patient Population

Adult (≥18 years) subjects diagnosed with medically refractory chronic rhinosinusitis (CRS) were prospectively enrolled into a multi-center observational cohort investigation between 2011 and 2014. All participants were enrolled for 18 months and evaluated postoperatively in 6-month intervals.

Inclusion and Exclusion Criteria

Inclusion criteria:
- Functional endoscopic sinus surgery (FESS) incorporating anterior (partial) or total ethmoidectomy
- Chronic frontal sinusitis on CT imaging

Exclusion criteria:
- Failure to complete baseline evaluations or to complete 36 months follow-up
- Comorbid conditions (cylindrical dinesyinosis, cystic fibrosis, malignancy, autoimmune disorders)

Study Data Collection

- History and physical examination
- Computer tomography (CT) scan of the sinuses staged using Lund-Kennedy system
- Endoscopy scored using Lund-Kennedy system
- 22-item Sinonasal Outcome Test (SNOT-22) at the first baseline enrollment visit and 26 months postop
- No of days within preceding 90 day timeframe with use of nasal steroids, oral steroids, oral antibiotics

Data Management and Statistical Analysis

- Participants dichotomized between participants with and without (unilateral or bilateral) frontal sinusotomy
- PRIMARY OUTCOME: Postop improvement in mean SNOT-22 scores
- SECONDARY OUTCOMES: Postop improvement in endoscopy scores; No. of days of medical therapy

Results

Table 1: Comparison of baseline characteristics between patients with and without frontal sinusotomy (SD, standard deviation; ASA, acetylsalicylic acid; COPD, chronic obstructive pulmonary disease; n,nRST, modified NRSOT; SNOT-22, 22-item Sinonasal Outcome Test)* indicates significant improvement over time with matched pairings (p<0.001); †indicates significant improvement over time with matched pairings (p<0.05)

Table 2: Comparison of preoperative outcome evaluations between study participants with and without unilateral or bilateral frontal sinusotomy using FESS (SD, standard deviation; SNOT-22, 22-item Sinonasal Outcome Test)

Table 3: Comparison of postoperative outcome evaluations between study participants with and without unilateral or bilateral frontal sinusotomy during FESS (SD, standard deviation; SNOT-22, 22-item Sinonasal Outcome Test)

Table 4: Comparison of postoperative improvements in QOL and outcomes between patients undergoing ethmoidectomy alone and those undergoing frontal sinusotomy.

Discussion

The objective of the current study was to determine the efficacy of anterior or total ethmoidectomy, without frontal sinusotomy, in improving QOL measures and medication usage in patients with chronic frontal sinusitis. When compared to endoscopic frontal sinusotomy, this study indicates that QOL symptoms — total SNOT-22 and subsymptom scores — improved to a similar degree in chronic frontal sinusitis patients undergoing ethmoidectomy without frontal sinusotomy and those undergoing frontal sinusotomy.

Both cohorts saw significant improvements between their pre- and postop endoscopic scores, but the magnitude of the mean improvement was superior in the frontal sinusotomy group. Lastly, both groups saw comparable decreases in postop use of oral steroids and antibiotics.

There is evidence that the CT radiodensitometry characteristics of sinusitis in the frontal and anterior ethmoid sinuses closely approximate one another. When considered together with every additional relation between high-density opacification of the paranasal sinuses and severe sinonasal symptoms, this “fronto-ethmoidal linkage” may explain our findings and suggest that extensive ethmoidectomy can successfully resolve chronic frontal sinusitis without the need for frontal sinusotomy in some cases.

Conclusions

- Ethmoidectomy can achieve comparable QOL improvements and similar reductions in postoperative use of oral steroids and antibiotics as frontal sinusitis in patients with chronic frontal sinusitis.
- Chronic frontal sinusitis patients who do not definitively require frontal sinusotomy, ethmoidectomy could be considered a first-step procedure with the goal of producing significant symptom improvement.

References