Aesthetic Outcome of Transfacial Sinus Surgery

The Patient’s View

Juergen Alberty, MD; Wolfgang Hermann, MD, PhD; Christoph Mueller, MD; Claudia Rudack, MD; Wolfgang Stoll, MD

Objective: To investigate the patient’s view of the cosmetic outcome of transfacial sinus surgery.

Design: Prospective survey of patients after transfacial sinus surgery in a tertiary referral academic otolaryngology department.

Setting: Academic outpatient clinic of otorhinolaryngology.

Patients: Seventy patients (52 men, 18 women; mean±SD age, 56.2±14.9 years) who had undergone transfacial sinus surgery more than 4 months prior to study entry.

Interventions: Standardized patient self-assessment for postoperative alteration of facial appearance and emotional impairment and standardized observer assessment by surgeons and laypersons by means of visual analogue scales.

Results: Seventy-nine percent of the patients rated their appearance unaltered or minimally altered after transfacial surgery, and 91% reported no or minimal cosmetic morbidity. Postoperative cosmetic morbidity was significantly more common in women, in patients with chronic disease, and in those operated on for trauma. The surgeons’ assessment was significantly correlated with the patients’ self-assessment of altered appearance, but not with the patients’ emotional impairment.

Conclusion: Consideration of these risk factors may help to further improve patient selection for, and patients’ satisfaction with, transfacial sinus surgery.

Arch Otolaryngol Head Neck Surg. 2006;132:1190-1195

TRANSFACIAL APPROACHES TO the nasal cavity, the paranasal sinuses, or the anterior skull base are commonly achieved by performing a paranasal facial incision, particularly an external ethmoidectomy incision, lateral rhinotomy incision, or modifications of these. These incisions provide excellent exposure of the operating field. However, there is an ongoing debate about the functional and aesthetic outcome of transfacial sinus surgery.

Over the last decades, new surgical techniques have been introduced to gain access to this anatomic region without visible incisions, especially by means of endoscopic or microscopic endonasal surgery, bicoronal incision for frontal sinus surgery, or facial degloving procedures. The outcome of these techniques with regard to facial aesthetics is excellent in most cases. However, whether these techniques might entirely replace the classic transfacial open procedures is controversial.

One of the main arguments against transfacial sinus surgery is the aesthetic outcome. To date, this aspect has hardly been evaluated systematically from the patient’s viewpoint. We analyzed the patient- and observer-rated aesthetic outcome in a large cohort of patients who had undergone transfacial sinus surgery. Furthermore, an attempt was made to identify patient-related risk factors for significant postoperative cosmetic morbidity.

METHODS

SAMPLE

Seventy patients were consecutively recruited at an academic outpatient otorhinolaryngology clinic. Inclusion criteria were as follows: patients who had been operated on externally in the midface or the anterior skull base by means of a unilateral paranasal incision (external ethmoidectomy incision, lateral rhinotomy incision, or modifications of these) (Figure 1), minimum age of 18 years, and a minimum intervening period of 4 months between study entry and the operation. All patients gave their informed consent to participate in the study.

PATIENT QUESTIONNAIRE

We used a standardized patient questionnaire, including structured questions concern-
ing patient characteristics such as sociodemographic data and illness- and treatment-related data. To minimize any bias, the questionnaire was handed out to the patients prior to the clinical examination, and the patients were asked to perform their self-assessment independently, without the assistance of the evaluating physicians. The type of incision and the visible length of the paranasal scar were determined by the evaluating physician.

PATIENTS’ SELF-ASSESSMENT

All patients were asked to rate the cosmetic outcome on two 100-mm visual analog scales (VASs) representing their self-assessment of the following aspects (questions and end points translated from German):

To what extent has your facial appearance been altered by the scar? [End points: not visible, worst imaginable alteration.]

To what extent do you feel emotionally impaired by the appearance of the scar? [End points: not at all, worst imaginable.]

PHOTOGRAPHY

Standardized photographs were obtained from 54 patients in frontal, oblique (both sides), and detailed views from a distance of 100 cm; the patient was photographed in front of a blue background. Photographs were taken on Kodak (Rochester, NY) Elite Chrome 100 slide films using a Nikon (Melville, NY) F-301 35-mm camera (focal length 105 mm; shutter speed, 1/125 second; lens opening f/16). The patients were illuminated from the front at 45° using 250-W Multiblitz Vari-lux 250 professional flash units (D. A. Mannesmann GmbH, Cologne, Germany) with honeycomb reflectors and filters.

Figure 1. Types of incisions analyzed. A, external ethmoidectomy; B, lateral rhinotomy.

OBSERVER ASSESSMENT

Fifty-four standardized sets of photographs were used to rate the patients’ cosmetic appearance (Figure 2). The sets were consecutively presented in randomized order in a PowerPoint presentation (Microsoft Corp, Redmond, Wash). Each set was presented for 30 seconds. Two experienced head and neck surgeons (W.H. and C.R.) and 45 laypersons separately assessed the aesthetic outcomes. The surgeons were unaware of the patients’ data and self-assessment scores. The laypersons were third-year medical students who had no previous experience with patients who had undergone surgery in the head and neck region.

The rating was marked on a 100-mm VAS (end points: not visible, worst imaginable alteration). The observers were advised to concentrate on the midface and ignore other surrounding facial features. The mean scores of the 2 groups were used for further statistical analysis.

PATIENTS AT RISK FOR SIGNIFICANT COSMETIC MORBIDITY

Cosmetic morbidity was defined as significant in case of an emotional impairment VAS score of 20 or higher of a possible 100. Patients with significant cosmetic morbidity were further analyzed to identify preoperative risk factors for postoperative cosmetic morbidity.

PATIENTS’ PREFERRED SURGICAL APPROACH

A multiple-choice question at the end of the questionnaire investigated the patient’s preferred type of sinus surgery (the patient was asked to choose only 1 answer):
Would you prefer a technique of sinus surgery without any visible incisions or scars?

(1) Yes, even if the surgical risk is higher and the likelihood of cure lower compared with a surgical technique with visible incisions and scars.

(2) Only if the surgical risk and likelihood of cure are equal to or better than the risk and cure rate of the procedure with visible incisions and scars.

(3) I would leave the decision to the surgeon.

(4) No.

(5) I don’t know.

STATISTICAL ANALYSIS

SPSS software (SPSS Inc, Chicago, Ill), version 12.01, was used for statistical analysis. Quantitative data were analyzed for normal distribution by q-q plots. Logarithmic transformation of data was done in case of right-skewed data distribution.

Correlations of quantitative data were analyzed by the parametric Pearson test and are reported as Pearson correlation coefficients ($r_p$). The $t$ test or 1-way analysis of variance was used to identify significant differences between the means of 2 or more categories of normally distributed quantitative data. Significant results were confirmed by logistic regression. Categorized data were analyzed by the $\chi^2$ test and Fisher exact test. $P \leq .05$ was considered statistically significant.

RESULTS

DESCRIPTION OF SAMPLE

The sample consisted of 70 patients (52 men and 18 women; 74%;26%), mean ± SD age, 56.2 ± 14.9 years. The types of paranasal incisions used were external ethmoid incision (n = 38; mean ± SD visible length of scar, 23 ± 6 mm) and lateral rhinotomy incision (n = 32; mean ± SD visible length of scar, 50 ± 11 mm). Patient characteristics are listed in Table 1.

PATIENT SELF-ASSESSMENT

Figure 3 provides a summary of the patients’ self-assessment. The median VAS score of altered appearance was 6.5 (interquartile range [IQR], 3-15). The median VAS score of emotional impairment was 4 (IQR, 2-8). Intrapatient correlation of both VAS scores was $r_p=0.749$ ($P \leq .01$); the difference between the 2 VAS scores was significant ($P \leq .01$).

Fifty-five (79%) of 70 patients rated their alteration in appearance to be less than 20 of a possible 100, while 64 (91%) of 70 patients rated their emotional impairment to be less than 20 of 100.

The patients’ VAS scores of altered appearance were significantly correlated with the length of the facial scar ($r_p=0.288; P \leq .05$) but were not significantly correlated with the type of incision used. There was no significant correlation between the VAS score of emotional impairment and the length of the facial scar ($r_p=0.100; P = .41$) or the type of incision.

OBSERVER-RATED ASSESSMENT OF AESTHETIC OUTCOME

The results of the observer-rated assessment are shown in Figure 4.

The layperson median VAS score of the aesthetic outcome was 11.9 (IQR, 8-19), and the surgeon median VAS score was 21 (IQR, 12-34). Although the correlation between the 2 observer groups was significant ($r_p=0.579; P \leq .01$), the aesthetic outcome was scored less favorably by surgeons than by laypersons ($P \leq .01$).
Surgeons' and laypersons' VAS scores of aesthetic outcome showed a significant correlation with the length of the persisting scar (r_p = 0.479, P < .01 for surgeons; r_p = 0.592, P < .01 for laypersons). The ratings for external ethmoidectomy incisions were more favorable than those for lateral rhinotomy incisions (P < .01).

The surgeon assessment of the aesthetic outcome correlated significantly with the patient self-assessment of altered appearance (r_p = 0.285; P = .04) but not with the patient emotional impairment (r_p = 0.207; P = .13).

**CORRELATION OF SELF-ASSESSMENT AND PATIENT CHARACTERISTICS**

The mean±SD VAS score for self-assessment of altered appearance was significantly higher in patients who had undergone surgery for trauma (22.8 ± 16.2; n = 6) than in those operated on for sinusitis (6.41 ± 6.7) or neoplasms (14.2 ± 19.1). No significant correlation was registered between the patients' self-assessment of altered appearance or emotional impairment with age, sex, marital status, number of operations, time after surgery, and wearing glasses.

**PATIENTS' PREFERRED SURGICAL APPROACH**

The results of the multiple-choice question concerning the patients' preferred surgical approach are listed in Table 2.

**PATIENTS AT RISK OF SIGNIFICANT COSMETIC MORBIDITY**

Six patients had a VAS score of 20 or higher for self-assessment of emotional impairment; their characteristics are listed in Table 3. These patients were significantly more often women (P < .01) and had chronic diseases significantly more often (P < .01) than did patients without significant cosmetic morbidity.

**COMMENT**

Our investigation focused on the aesthetic outcome after transfacial sinus surgery from the patients' view-
point and aimed to identify patient-related risk factors for significant postoperative cosmetic morbidity. Generally, cosmetic outcome after surgery is determined by how one defines the cosmetic outcome and who measures it. A clear distinction can be made between the subjective cosmetic outcome rated by the patient and the objective cosmetic outcome rated by an observer. The patient’s subjective assessment of the postoperative cosmetic outcome focuses on 2 main aspects: alteration of facial appearance and emotional impairment due to the alterations.

We asked our patients to separately rate (1) the extent to which they believed their facial appearance had been altered and (2) their emotional impairment due to the alteration. Approximately 79% of the patients rated their appearance unchanged or minimally altered after transfacial surgery, while 91% reported no or minimal cosmetic morbidity. These data show that in most cases, the patients’ subjective facial appearance is minimally altered after transfacial surgery. The results are in conformity with those reported by Lueg and coworkers in a smaller cohort of 21 patients who had undergone lateral rhinotomy.

Although there was a high intrapatient correlation between the alteration of appearance and emotional impairment in the present study, the mean VAS score for emotional impairment was even lower than the VAS score for alteration of facial appearance, reflecting a low level of cosmetic morbidity despite a noticeable subjective facial alteration in some patients.

The observers’ evaluations of facial appearance were based on standardized photographs. The postoperative change in facial appearance was independently rated by surgeons and laypersons. The results of the 2 groups were in good agreement and confirmed the patients’ subjective ratings. However, the surgeons’ mean objective ratings of the aesthetic outcome were more critical than the ratings of laypersons or patients. This phenomenon is known from studies in patients with mutilations after cancer surgery and may, to some extent, explain why many surgeons are hesitant to use facial incisions.

The patients’ view is reflected by the preferred surgical approach. Notwithstanding the fact that we investigated a preselected cohort of patients who had previously undergone surgery, which signifies a considerable bias, we found that a large number of patients relied on the surgeons’ decision for the best surgical procedure. Thus, the surgeon is called on to identify patients at risk for significant postoperative cosmetic morbidity. Patient selection for transfacial surgery is rendered complex by the absence of a correlation between the surgeon’s rating of aesthetic outcome and the patient’s emotional impairment. Therefore, we evaluated a number of potential risk factors for increased postoperative cosmetic morbidity that may help surgeons to make their decision.

Among all patients, we identified those operated on for trauma to be at greater risk for postoperative cosmetic morbidity. In patients with minor facial lacerations, the persisting minor facial scars may have a significant psychological impact for some individuals. A large scar size, living alone, and the cause of the injury may lead to self-consciousness and anxiety. These findings confirm the significantly increased cosmetic morbidity we observed in patients operated on for trauma. It is significant to note that we were unable to identify marital status as an independent risk factor.

Although most patients reported no or minimal cosmetic morbidity, 6 patients reported significant emotional impairment. In this subgroup we identified a significant overrepresentation of women and patients with chronic disease. According to Lueg and coworkers, women registered a greater alteration in their appearance than did men, but the difference did not achieve statistical significance. Newell described greater disturbances in women than in men following plastic surgery in the face. However, the increased postoperative cosmetic morbidity in women may be because women generally tend to be more concerned about their appearance than men. The surgeon would do well to discuss the anticipated postoperative facial appearance in detail prior to surgery.

We were unable to find other studies investigating the impact of general health status on postoperative patient satisfaction. A compromised health status may lead to reduced general well-being, and this may be an additional risk factor for postoperative cosmetic morbidity. However, this aspect warrants further investigation.

Subjective alterations of facial appearance and objective facial disfigurement were significantly correlated with

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Table 2. Patients’ Preferred Surgical Approach

<table>
<thead>
<tr>
<th>Answer to the Question “Would You Prefer a Technique of Sinus Surgery Without Any Visible Incisions or Scars?”</th>
<th>Patients, No. (%) (N = 70)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes, even if the surgical risk is higher and the likelihood of cure lower compared with a surgical technique with visible incisions and scars.</td>
<td>0</td>
</tr>
<tr>
<td>Only if the surgical risk and likelihood of cure are equal to or better than the risk and cure rate of the procedure with visible incisions and scars.</td>
<td>31 (44)</td>
</tr>
<tr>
<td>I would leave the decision to the surgeon.</td>
<td>30 (43)</td>
</tr>
<tr>
<td>No.</td>
<td>6 (9)</td>
</tr>
<tr>
<td>I don’t know.</td>
<td>3 (4)</td>
</tr>
</tbody>
</table>

Table 3. Characteristics of Patients With Cosmetic Morbidity

<table>
<thead>
<tr>
<th>Patient No./Sex/ Age, y</th>
<th>Health Status</th>
<th>Diagnosis</th>
<th>VAS Score for Emotional Impairment*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/F/24 Healthy</td>
<td>Esthesio-neuroblastoma</td>
<td>93</td>
<td></td>
</tr>
<tr>
<td>2/F/62 Chronic disease</td>
<td>Schwannoma</td>
<td>48</td>
<td></td>
</tr>
<tr>
<td>3/F/66 Chronic disease</td>
<td>Optic nerve decompression</td>
<td>47</td>
<td></td>
</tr>
<tr>
<td>4/M/78 Chronic disease</td>
<td>Inverted papilloma</td>
<td>43</td>
<td></td>
</tr>
<tr>
<td>5/M/34 Chronic disease</td>
<td>Fracture of anterior skull base</td>
<td>38</td>
<td></td>
</tr>
<tr>
<td>6/F/58 Chronic disease</td>
<td>Chronic sinusitis</td>
<td>25</td>
<td></td>
</tr>
</tbody>
</table>

Abbreviation: VAS, visual analog scale. *Score ranged from 0 (not at all emotionally impaired) to 100 (worst emotional impairment imaginable).
the size of the persisting scar. Although our data revealed no significant impact of the size of the incision on cosmetic morbidity, patient acceptance of transfacial sinus surgery clearly depends on minimizing the size of facial incisions. On the other hand, postoperative cosmetic morbidity can be reduced by optimizing the shape of the facial incision. Over the last decades, numerous modifications of paranasal sinus incisions have been described. Vural and Hanna\textsuperscript{3} reported an extended lateral rhinotomy incision for total maxillectomy that avoids the classic subciliary Weber-Fergusson incision by starting the incision 1 to 1.5 cm lateral to the medial end of the eyebrow. We affirm the authors’ positive results achieved by the use of this modification. Hussein and coworkers\textsuperscript{10} presented another modification that takes into account the nasal aesthetic subunits by placing the incision between the dorsal and the side wall nasal subunits and extending it inferiorly along the alar groove. Careful reapproximation of the medial canthal ligament prevents telecanthus. The use of broken-line incisions along the relaxed skin tension lines between the nasal dorsum and the medial canthus can help to avoid prominent scars in this region.\textsuperscript{10,18} Finally, a combination of endoscopic surgery and sublabial incisions for midfacial or hemifacial degloving\textsuperscript{9,11,19,20} may further minimize the size of facial incisions in the hands of experienced surgeons.

In conclusion, the aesthetic outcome after transfacial approaches to the nasal cavity, the paranasal sinuses, or the anterior skull base is excellent in most cases. However, women, patients with chronic disease, and patients operated on for cancer may be at risk for postoperative cosmetic morbidity. Consideration of these risk factors may help to further improve patient selection for, and the patients’ satisfaction with, transfacial sinus surgery.

Submitted for Publication: November 23, 2005; final revision received April 25, 2006; accepted May 31, 2006.

Correspondence: Juergen Alberty, MD, Department of Otorhinolaryngology, Kardinal-von-Galen-Ring 10, 48129 Munster, Germany (alberty.hno@uni-muenster.de).

Author Contributions: Dr Alberty had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis. Study concept and design: Alberty, Hermann, and Mueller. Acquisition of data: Alberty, Hermann, Mueller, and Rudack. Analysis and interpretation of data: Alberty, Hermann, and Stoll. Drafting of the manuscript: Alberty, Hermann, and Stoll. Statistical analysis: Mueller. Administrative, technical, and material support: Alberty, Hermann, Mueller, and Rudack. Study supervision: Alberty and Stoll.

Financial Disclosure: None reported.

Acknowledgment: We thank Juergen Gerß, PhD, Dipl-Stat, for his expertise in statistical evaluation, and Hans Kreisel for professional photography.

REFERENCES