Intra-operative Frontal Glow as a Parameter to Predict a Successful Outcome of Frontal Sinus Surgery


Abstract
Over the last decade, functional endoscopic sinus surgery has been accepted as the procedure of choice for the surgical management of chronic sinusitis. However, the results of endoscopic frontal sinus surgery are very variable. A prospective study of 25 patients was undertaken and the intra-operative frontal glow was evaluated as a parameter to predict the successful outcome of endoscopic frontal sinus surgery. 76% of the patients, who showed the presence of an intra-operative frontal glow, had a successful outcome. However, in the group in whom a frontal glow was not seen intra-operatively, 44% patients revealed a successful outcome. The presence of an intra-operative frontal glow does correspond with a better post-operative outcome. However, an absent frontal glow does not always mean a bad outcome, though it can be concluded that the presence of an intra-operative frontal glow is a reassuring sign to the surgeon.

Introduction
Over the last decade, functional endoscopic sinus surgery (FESS) has been accepted as the procedure of choice for the surgical management of chronic sinusitis. Endoscopic surgery of the frontal sinuses is the most difficult and challenging among all the paranasal sinuses. There are several reasons for this:

a) The anatomy of the frontal recess is complex and varies in different individuals.
b) Since the frontal sinuses lie in the antero-superior part of the skull, surgery in this region requires angled telescopes and special curved instruments.
c) Good hand-eye co-ordination skills are required in order to operate in this region.
d) Complications of frontal sinus surgery are potentially serious due to the proximity of this area to the orbit, the anterior ethmoidal artery and the anterior cranial fossa.

The ideal methodology in dealing with the frontal drainage pathway is to carry out a careful and delicate dissection using the appropriate instrumentation and causing the minimum amount of damage to the mucosa of the internal frontal ostium. This is necessary to prevent fibrosis in this area and subsequent iatrogenic frontal sinus disease. This sub-mucosal technique of dissection has resulted in the success rates of the endoscopic frontal sinus surgery surpassing those of the external approach in centres specializing in sinus diseases. Preservation of normal frontal sinus anatomy has the advantage that future radiologic or endoscopic evaluation is not distorted.

Material and Methods
This is a prospective study of 25 patients, who presented in the ENT OPD over duration of one and a half years from March 2006 to October 2007.
A clinical evaluation of the patients was done on OPD basis. Symptoms pertaining to the frontal sinus were enquired about specifically. The patients were initially treated conservatively with antibiotics, anti-histaminics, topical decongestants, steroid nasal sprays and steam inhalation. Those patients, who failed to improve or showed only partial improvement with medical management or had recurring symptoms following stoppage of medical line of treatment, were subjected to surgery.

A high resolution CT scan of the paranasal sinuses (with or without contrast) was performed in all patients. Complete haematological investigations were performed along with routine urine examination and X-ray chest (PA view).

All patients underwent a functional endoscopic sinus surgery (FESS). During surgery, the frontal recess was operated by an intact bulla technique or after clearance of all the other sinuses and base skull, depending upon individual anatomy. The presence or absence of an intra-operative frontal glow was noted intra-operatively (Fig. 1).

Post-operatively, all patients were evaluated by performing a nasal endoscopy. The appearance of the frontal recess was classified as healthy, if the recesses had normal or oedematous mucosa or unhealthy, if the recesses had polyps or were not visualized due to middle meatus adhesions or fibrosis of the frontal recess area (Figs. 2 and 3).

Observations

The presence of a frontal glow at the end of the surgery was looked for documented in each case. A frontal glow was seen in 21 cases (Table 1).
Results

The presence or absence of an intra-operative frontal glow was compared with state of the frontal recess seen on post-operative nasal endoscopy. The results are as shown below (Table 2).

Discussion

A frontal glow is the lighting up of the frontal sinus as seen externally on the forehead, when the endoscope is placed at the opening of the frontal sinus. Presence of the glow suggests that all the frontal recess cells have been cleared and the frontal sinus mucosa is relatively healthy. This was a fairly reliable parameter to predict outcome. More than 75% of the patients who had a positive frontal glow intra-operatively, finally showed healthy frontal recesses on long-term follow-up. In contrast, only 44% of patients in whom the frontal cells that may have been inadvertently missed. All the same, the absence of a frontal glow at the end of surgery does not always necessarily indicate a poor surgical technique. The glow may be absent due to other factors such as oedematous mucosa within the sinus, a thick bony anterior wall, dark skinned individuals etc. The operating surgeon should, however, be able to differentiate between the ethmoidal glow which is seen at the medial canthus as compared to the frontal glow which is seen above the medial canthus and on the forehead.

Conclusion

The presence of an intra-operative frontal glow corresponds with a better post-operative outcome. However, an absent frontal glow does not always mean a bad outcome, though it can be concluded that the presence of an intra-operative frontal glow is a reassuring sign to the surgeon.

References


Table 1: Cases showing frontal glow intra-operatively

<table>
<thead>
<tr>
<th>Intra-operative frontal glow</th>
<th>Number of frontal recesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present</td>
<td>21</td>
</tr>
<tr>
<td>Absent</td>
<td>18</td>
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</table>

Table 2: Comparison of intra-operative frontal glow with the post-operative healing of the frontal recess

<table>
<thead>
<tr>
<th></th>
<th>Healthy</th>
<th>Unhealthy</th>
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<tr>
<td>Present</td>
<td>16 (76%)</td>
<td>8 (44%)</td>
</tr>
<tr>
<td>Absent</td>
<td>5 (24%)</td>
<td>10 (56%)</td>
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