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Rhinology

A Targeted Problem and Its Solution

Intraoperative and Postoperative Assessment of Frontal Sinus Patency by Transillumination

Michael Friedman, MD; Roy Landsberg, MD; Hasan Tanyeri, MD

INTRODUCTION

Transillumination of the paranasal sinuses was once considered an adjunctive technique in the diagnosis of sinus disease, but it has been replaced by modern diagnostic techniques that are far more accurate. Even when used, however, transillumination was limited to the maxillary and ethmoid sinuses only.[1] Even with perfectly healthy sinuses, frontal sinus transillumination does not occur if the frontal sinus has not been operated on. The use of frontal sinus transillumination as an aid to intraoperative or postoperative identification of the frontal sinus has never been popularized.

Endoscopic sinus surgery has evolved to include the frontal sinuses. Often, the novice frontal sinus surgeon, and sometimes even the experienced frontal sinus surgeon, needs to differentiate an agger nasi cell,[2] a frontal cell,[3] a supraorbital cell, or a high superior attachment of the uncinate process (terminal recess)[4] from the frontal sinus. In the early years of frontal sinus surgery, intraoperative cross table lateral radiographs or fluoroscopy was recommended to differentiate these cells from the frontal sinus and to confirm that the frontal sinus was opened. Currently, image-guided technology is often used to confirm the location of the frontal sinus. We have used frontal sinus transillumination in more than 200 cases of frontal sinus surgery and have found transillumination to be 100% accurate in differentiating the frontal sinus from its neighboring cells. Although the frontal sinus can be identified with 30° or 70° telescopes once it is opened and cleaned of polyps and secretions, early identification of the sinus before removal of obstructing cells is sometimes difficult. The access to the frontal sinus at this point is inadequate for visualization but is adequate for transillumination.

Postoperative examination to assess the patency of the frontal sinus can also be difficult because an open cell may be one of the "neighboring cells" rather than the frontal sinus. We have used frontal sinus transillumination to confirm a patent frontal sinus (Fig. 1). Transillumination is either positive with an open sinus or completely negative if an obstruction has recurred.

Only one study has been published that describes frontal sinus transillumination to verify patency.[5] However, in that study transillumination was used to verify the patency of connected frontal sinuses after endoscopic Lothrop procedure. We suggest that an exposed natural frontal ostium is all that is needed to efficiently transfer transillumination.

TECHNIQUE

Placing a telescope inside a nose that has not been operated on will produce some transillumination of the ethmoid and maxillary areas, but light is not transillu-

Department of Otolaryngology and Bronchoesophagology, Rush–Presbyterian–Saint Luke's Medical Center, Chicago, Illinois.

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Send Reprint Requests to Michael Friedman, MD, Department of Otolaryngology and Bronchoesophagology, Rush–Presbyterian–Saint Luke's Medical Center, 1653 West Congress Parkway, Chicago, IL 60612-3833, U.S.A.

Send Correspondence to Michael Friedman, MD, 30 North Michigan Avenue, Suite 1107, Chicago, IL, 60612

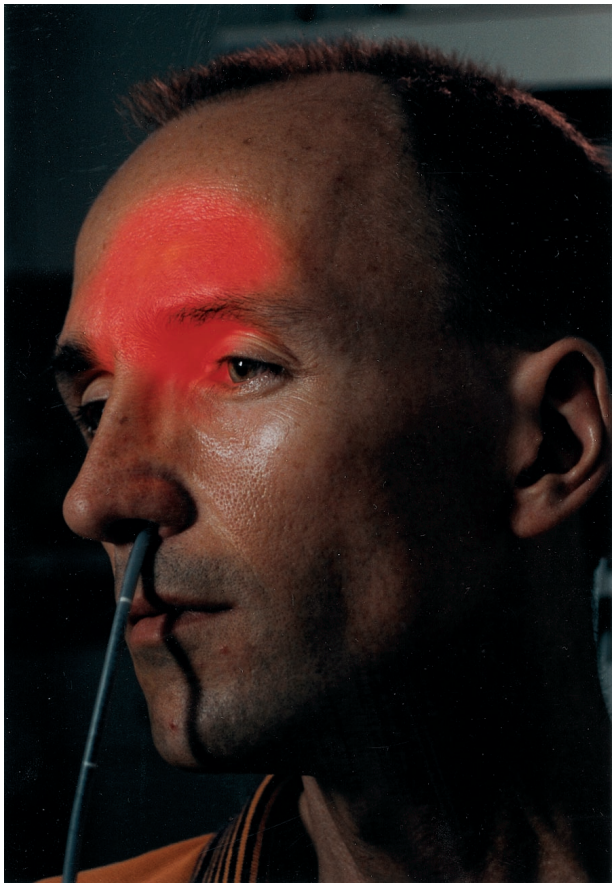

Fig. 1. Flexible endoscopic transillumination of the left frontal sinus 8 months after dissection of the frontal recess. The endoscope is placed at the front recess.

minated to the frontal area. Only after removal of the superior attachment of the uncinate process and the agger nasi cell will transillumination occur. At this point the amount of light transilluminated is minimal but easily visible. After exposure of the frontal ostium by removing agger nasi cells, polyps, and secretion, the level of transillumination intensifies. Once the sinus has been suctioned, a precise outline of the sinus is obvious on the patient's forehead. Opening into agger nasi cells or high ethmoid cells will provide a very different pattern of transillumination.

In all operative cases when transillumination results were compared with an image-guided surgery system (Visualization Technology, Wilmington, MA) (n = 90), it was found to be 100% accurate in identifying the frontal sinus. In postoperative cases, negative transillumination was not always associated with symptoms but was associated with an opacified frontal sinus on computed tomography scan (n = 15).

CONCLUSION

Frontal sinus transillumination is not a new technique nor is it a substitute for precise surgical dissection or image-guided assisted surgery. It is, however, a simple adjunctive technique that is highly reliable for differentiating the frontal sinus from its neighboring cells.

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