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Endoscopic surgery of the frontal sinus without external approach

D. Perko

Dept. of O.R.L. and Cervico-Facial Surgery, C.H.U.V. Lausanne, Switzerland

SUMMARY

Many surgical techniques have been described for the treatment of recurrent or persistent frontal sinusitis. The major difficulty of all techniques is to avoid recurrent stenosis of the frontonasal duct. Our endoscopic surgical technique without an external approach is described, which allows the creation of a bony and rigid frontonasal duct. Our first results seem to confirm the hypothesis that the creation of such a duct reduces the frequency of secondary stenosis and therefore the recurrencies of frontal sinusitis.

INTRODUCTION

Recurrent or persistent isolated frontal sinusitis is a rare but difficult problem for the rhinologist. A surgical treatment is often justified, especially in cases with ocular or intra-cranial complications.

The surgical exclusion of a frontal sinus is often difficult and secondary complications are relatively common (Hardy and Montgomery, 1976; Barton, 1980; Guggenheim, 1981). However, functional surgery of the frontal sinus by external approach, aiming to restore the drainage and ventilation of the infected cavity, shows frequent recurrence of frontal sinusitis (Morgan and Robinson, 1973; Schenk, 1975; Neel, 1976; Perrin et al., 1982; Friedrich, 1985).

These recurrencies are generally caused by a secondary stenosis of the frontonasal duct. In our opinion, the occurrence of secondary stenosis results from scarring tissue in the surgically created frontonasal channel, when a rigid and bony support is missing.

The creation of a bony channel between the frontal sinus and the middle meatus by endoscopic surgery alone, without an external approach, should therefore prevent secondary stenosis.

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A new radiological technique that allows us to obtain sections parallel and perpendicular to the drainage route of the frontal sinus and the study of the endoscopic anatomy of the anterior ethmoid gives us the possibility to perform this entirely endoscopic surgery, and thus abandoning the external approach. (Duvoisin et al., unpublished data).

SURGICAL TECHNIQUE

Figures 1a and 2a show the anatomy of the anterior ethmoid (Terrier et al., 1985; 1987). The frontal sinus generally drains through the pre-infundibular cell (Mouret, 1898; 1901). It is necessary to open this cell for access to the frontal sinus. The first step of the technique, performed with a 30° and 70° optic, is the resection of the uncinate process including its terminal cell (Grünwald). This structure has to be resected as inflammatory reactions are often found in this area and its removal also gives the surgeon a better view of the frontal recess (Killian) and the ostia of the anterior ethmoidal cells.

The lamella separating the anterior and posterior cells has to be removed to create a large opening of the frontal sinus. Large cells anterior to the pre-infundibular cell (Mouret) and/or a double ethmoido-frontal cell (Mouret) also have to be opened in cases where radiological investigations show the presence of infection. Corticosteroid cream is applied at the end of the surgical procedure to prevent scarring tissue.

Figures 1b and 2b show the final situation. As it is the resection of the pre-infundibular cell and the ethmoido-frontal cell(s) (called by Mouret also "cells of the middle meatus in the strict sense") that allows the creation of the frontonasal channel, we call this operation a "frontomeaticotomy".

In the postoperative phase, regular cleaning of the cavity has to be performed under endoscopic control.

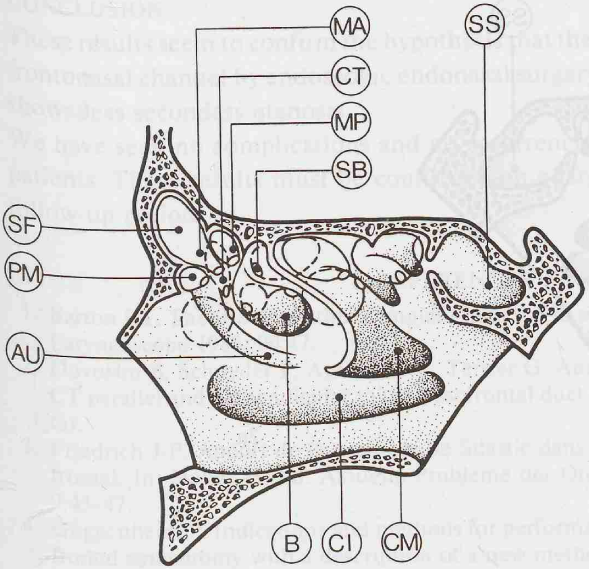
If an external trepanation of the frontal sinus has been performed before surgery, the drainage tubes are used for irrigation.

CLINICAL STUDY

Seven patients having undergone fronto-meaticotomy for recurrent (three patients) or persisting (four patients) frontal sinusitis were examined after an average of 11 (8–27) months. Patients having had a complete ethmoidectomy for polyposis of all sinuses were excluded from this serie.

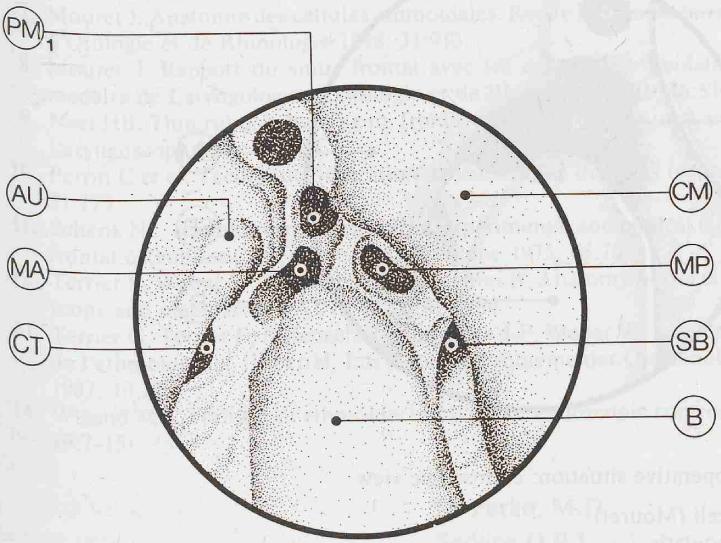
Six of the seven patients are now asymptomatic. One patient who had undergone several neurosurgical operations for chronic headache and several trepanations for persisting frontal sinusitis was relieved from pain for about 12 months. After this time, the headache started again even though the frontonasal opening remained patent.

The endoscopic control showed that the frontonasal duct was patent in all patients.



1a.

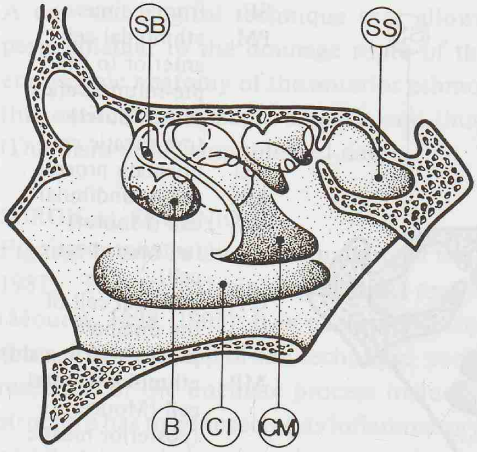
SF frontal sinus
PM_1 ethmoidal cell anterior to the pre-infundibular cell (Mouret) (pre-meatic cell)
AU uncinate process
MA pre-infundibular cell (Mouret) (anterior meatic cell)
CT terminal cell of the uncinate process (Grünwald)
MP ethmoido-frontal cell (Mouret) (posterior meatic cell)
SB susbullar cell (Mouret)
B bulla ethmoidatis
CI inferior concha
CM middle concha
SS sphenoid sinus



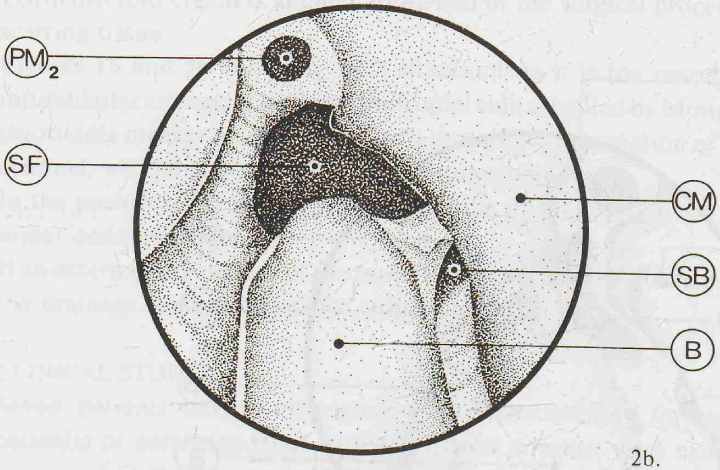
1b.

Figure 1. Anatomy of the anterior ethmoid: lateral view*

* Mouret, 1898, 1901; Terrier et al., 1987 calls the pre-infundibular cell and the ethmoido-frontal cell the cells of the middle meatus in the strict sense or the meatic cells.



2a.



2b.

Figure 2. Post-operative situation: endoscopic view

SB susbullar cell (Mouret)
B bulla ethmoidatis
CI inferior concha
CM middle concha
SS sphenoid sinus
SF frontal sinus
PM_2 ethmoidal cell anterior to the pre-infundibular cell (Mouret)

CONCLUSION

These results seem to confirm the hypothesis that the creation of a rigid and bony frontonasal channel by endoscopic endonasal surgery without external approach shows less secondary stenosis.

We have seen no complications and no recurrencies of frontal sinusitis in our patients. These results must be confirmed on a larger scale and after a longer follow-up period.

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D. Perko, M.D.
Service O.R.L.
Centre Hospitalier Universitaire Vaudois
CH-1011 Lausanne
Switzerland