

Osteoplastic endonasal approach to the maxillary sinus*

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SUMMARY

A new surgical approach for removal of isolated maxillary sinus pathology, mainly of symptomatic maxillary sinus cysts, is presented. It is based on the principles of osteoplastic sinus surgery and uses the transnasal approach. It allows a safe removal under direct vision or endoscopic control with standard surgical instrumentation. The normal maxillary ostium and healthy ethmoidal cells are not sacrificed and thus the lymphatic pathways as well as the mucociliary transport are not endangered.

Key words: maxillary sinus, sinus surgery, endonasal approach, osteoplastic flap

INTRODUCTION

The maxillary sinus can be approached via the canine fossa or endonasally through the inferior or middle meatus (Draf, 1983). As all approaches have distinct advantages and disadvantages we have developed a modification of the inferior meatal antrostomy that is especially suitable for isolated sinus cysts, which are found in 10% of all sinuses (Grossman et al., 1944). This new approach is based on the principles of osteoplastic transfacial frontal and maxillary sinus surgery (Tato et al., 1954; Feldmann, 1978). It offers a direct view into the sinus without creating a large, permanent opening and allows the safe removal of cysts or even other pathologies such as small tumours, foreign bodies, et cetera. It is indicated in cases without additional disease of the ethmoid that has to be excluded by tomography.

SURGICAL TECHNIQUE

The procedure may start (but this is not obligatory) with an antroscopy through a puncture in the inferior nasal meatus after medializing the inferior turbinate (Figure 1). This confirms the location of the cyst in the maxillary sinus. Starting from the antroscopy opening a posteriorly pedicled flap is created in the lateral nasal wall of the inferior meatus using a sharp curved knife, scissors, osteotome and elevator (Figure 2). The flap consists of the nasal mucosa, the bony lateral nasal wall, and the mucosa of the medial maxillary sinus wall. By means of an elevator this mucosa-bone flap is in-fractured into the nose after careful sharp dissection of all remaining adhesions, allowing a direct view to the pathology in the maxillary sinus. Diseased tissue can now be

removed under direct vision using a nasal forceps and the operative site can be controlled endoscopically (Figure 3). The operation is completed after careful re-alignment of the mucosa-bone flap into the original position on the lateral nasal wall (Figure 4).

RESULTS

With this new method we have gathered experience in 20 patients that were followed for at least 6 months to 1 year post-operatively. In all cases the mucosa-bone flap has healed well (Figures 5 and 6). In 50% of patients a residual defect, 3-4 mm wide, at the site of the former antroscopy has been documented. There have been no signs of oedema, polyps or recurrent cyst formation in the maxillary sinus. No complications such as bleeding or stenosis of the lachrymal duct orifice were observed.

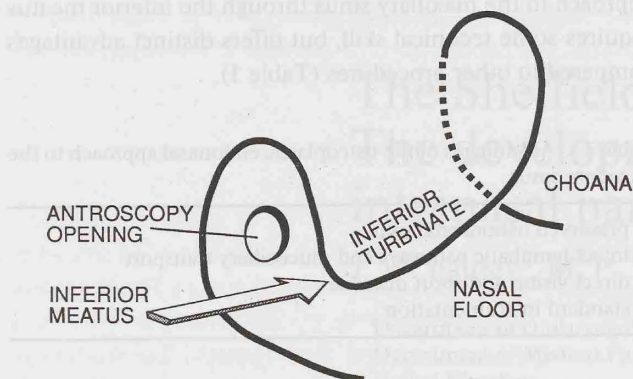
DISCUSSION

Maxillary sinus cysts may present as incidental findings on sinus X-rays, but sometimes they may be found concomitant with a broad spectrum of symptoms such as dull pain in the cheek, recurrent sinus infections or vertigo (Van Alyea, 1956; Mills, 1959). The typical finding on X-rays is a convex opacity in the alveolar recess of the maxillary sinus without pathologies in the region of the maxillary ostium or the ethmoid.

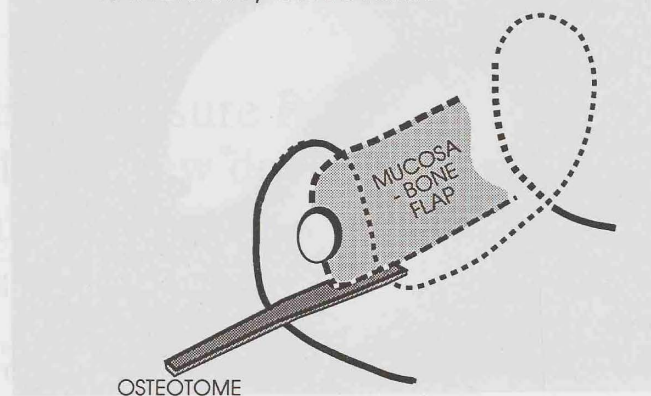
For the removal of symptomatic, isolated cysts or other pathology in the maxillary sinus several surgical approaches have been described. The approach through the middle nasal meatus, if not performed through a fontanelle, may

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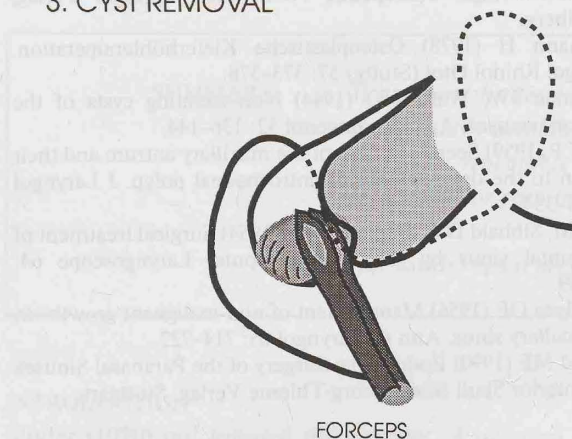
1. ANTROSCOPY (right inferior meatus)



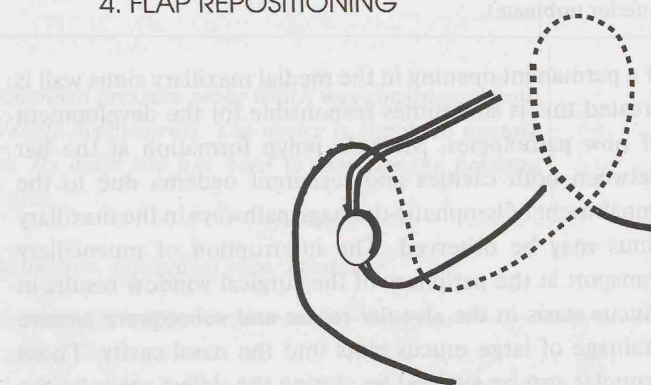
2. INCISION / OSTEOTOMY



3. CYST REMOVAL



4. FLAP REPOSITIONING



Figures 1-4. Surgical steps (right inferior turbinate and meatus; for explanation, see text).

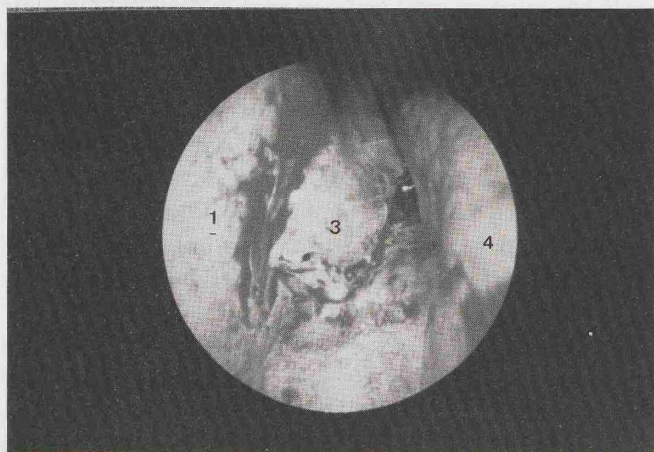


Figure 5. Endoscopically-controlled endonasal osteoplastic maxillary sinus surgery (right nasal cavity). Mucosa-bone flap created on the lateral nasal wall in the right inferior nasal meatus (1: lateral nasal wall; 3: mucosa-bone flap; 4: inferior turbinate).

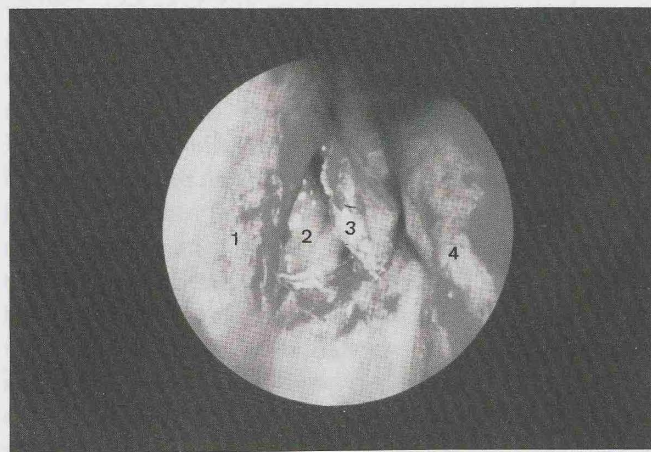


Figure 6. Endoscopically-controlled endonasal osteoplastic maxillary sinus surgery (right nasal cavity). Elevation of mucosa-bone flap and view into the maxillary sinus (1: lateral nasal wall; 2: maxillary sinus cavity; 3: mucosa-bone flap; 4: inferior turbinate).

require the resection of healthy ethmoidal cells and then sacrifices the intact ostiomeatal unit. Furthermore, specially-designed curved instruments are necessary for the endoscopically controlled manipulations in the alveolar recess of

the maxillary sinus when operating through the middle meatus (Wigand, 1990). The approach using the inferior nasal meatus offers the shortest way between nasal floor and maxillary sinus floor.

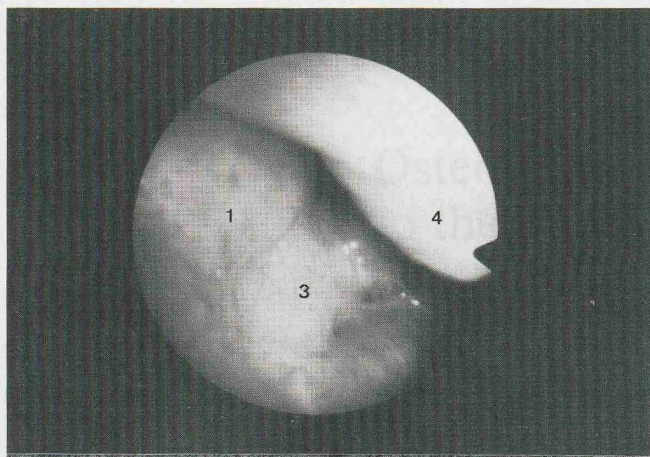


Figure 7. Endoscopically-controlled endonasal osteoplastic maxillary sinus surgery (right nasal cavity). Status of the same patient 6 months after surgery (1: lateral nasal wall; 3: mucosa-bone flap; 4: inferior turbinate).

If a permanent opening in the medial maxillary sinus wall is created this is sometimes responsible for the development of new pathologies. Multiple polyp formation at the bar between both cavities and recurrent oedema due to the impairment of lymphatic-drainage pathways in the maxillary sinus may be observed. The interruption of mucociliary transport at the periphery of the surgical window results in mucus stasis in the alveolar recess and subsequent passive drainage of large mucus clots into the nasal cavity. These sequelae can be avoided by closing the defect again by the combined flap described, this way minimizing scar formation.

The transoral Caldwell-Luc approach, although modified in the last decade to be less radical by trying to reconstruct the bony anterior maxillary sinus wall (osteoplastic approach), is still connected with post-operative complications (e.g. neur-

algia) and in our opinion is not adequate for the treatment of isolated minor pathology. The endonasal osteoplastic approach to the maxillary sinus through the inferior meatus requires some technical skill, but offers distinct advantages compared to other procedures (Table 1).

Table 1. Advantages of the osteoplastic endonasal approach to the maxillary sinus.

- preserved ostiomeatal unit
- intact lymphatic pathways and mucociliary transport
- direct vision and short distance
- standard instrumentation

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