

FOLLOW-UP OBSERVATIONS AFTER LONG-TERM INTUBATION OF THE MAXILLARY OSTIUM

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The purpose of long-term intubation of the maxillary sinus ostium is to provide a possibility for favourable regeneration of a permanently impaired ostial canal (Kortekangas, 1969). The diagnosis of a permanent ostial impairment is by no means easy. The main reason for this is the very limited knowledge of ostial functions. The secretions from the maxillary sinus are partly expelled via the ostium to the nasal chamber and partly eliminated via resorption. To the author's knowledge, there are no means of studying these functions clinically. Another function of the ostium is to transmit the cyclic respiratory pressure changes from the nasal chamber to the maxillary sinus. This function can be measured without it being too much influenced by the test itself as several authors have reported (Cottle, 1968; Drettner, 1965 and Kortekangas, 1970). The idea of the operation and our present results indicate that long-term intubation of the maxillary sinus ostium should always be based on tests of the ostial function, which at present is the same as testing the patency of the ostium. The indication for this operation is accordingly a maxillary sinus inflammation with persistently impaired ostial patency or other symptoms apparently due to an impaired ostial patency.

The technique used in testing the ostial patency has been described earlier (Kortekangas, 1970) and gives the same information as the original method of Drettner (1965).

This report of our experience of ethmoidal antrostomy and long-term intubation includes a number of cases in whom no ostial patency tests had been done. The reason for this is that rhinomanometric equipment was not available until 18 months ago. When the application of long-term intubation in the treatment of maxillary sinusitis was started, the indication was the often unsatisfactory end result of a Caldwell-Luc operation and recognition of the decisive role of ostial impairment in maxillary sinusitis supported by simultaneous reports of Cottle (1968) and Horowitz (1967).

Two main approaches have been used for this operation. In the canine fossa approach, the maxillary sinus is explored the usual way from an incision in the labial sulcus. When a look inside the sinus is desirable, this approach is used. When an inspection inside the sinus is considered less important, an intranasal approach is applied. A partial ethmoidectomy is made to allow easy access to the ostium which is first probed and then enlarged either by probing or and preferably by taking away tissues to make the ostial canal large enough to allow a no. 4 ½ Ritter probe to be moved in every direction. Then the tube is introduced on a no. 3 ½ Ritter probe. The shape of the

silastic no. 601 - 365 tubing (manufactured by Dow Corning International Ltd., 23 Rue de la Loi, Brussels 4, Belgium) is made suitable by a bone marrow pin fixed into the wall of the tube. The tube is left in the ostial canal for several weeks, in the present series for 8 weeks on the average. In addition, a suitable antibiotic is administered during one week, sometimes supplemented by corticosteroids. At the time of extraction of the tubing, an antimicrobial treatment is initiated on the basis of bacteriological findings. At the time of extubation, corticosteroids have been regularly administered during one week to make the regeneration process as smooth as possible. The patients complain astonishingly little of symptoms produced by the tubing. These symptoms have been carefully recorded in 26 patients. The intubation operation was repeated with 3 of these patients, in one of them bilaterally. The observations relate to 36 intubation periods. The symptoms reported by the patients are given in Table 1.

Table 1. Symptoms during the intubation period
Twenty-nine operations were performed on 26 patients (on 36 maxillary sinus ostia).

| | No. of patients with significant symptoms | insignificant symptoms |
|-------------------------------------|---|---------------------------|
| Transient pain | 4 | |
| Trismus and pain | 1 | |
| Subcutaneous emphysema in lower lid | 1 | |
| Odorous nasal secretion | 4 | |
| Abundant nasal secretion | 2 | |
| Nasal obstruction of vasomotor type | | 2 |
| Increased postnasal secretion | | 6 |
| No noticeable symptoms reported | | 9 |

Some of these symptoms are considered to be complications connected with the long-term intubation. These complications are separately given in Table 2. In addition to the cases that are analyzed below, there were two cases with complications. These are not included in the general evaluation owing to the very short observation period after extubation. The complications listed seem to have very little influence on the general result as only one of the patients

Table 2. Complications in connection with ethmoidal antrostomy and long-term intubation and the procedures employed to eliminate the complications.

- Case 1. Mandibular joint irritation (trismus) with pain; relieved by early extubation one week after operation.
 - Case 2. Excoriation of septal mucosa and odorous secretion; relieved by early extubation two weeks after operation.
 - Case 3. Air emphysema in lower lid three hours after the operation; spontaneous recovery during continued intubation.
 - Case 4. Air emphysema in lower lid after extubation; spontaneous recovery.
 - Case 5. Early spontaneous detachment of the tubing.
- Recent complications; these patients are not included in the series.
- Case 6. Sudden pain on first and second week after the operation on both sides due to a broken cuff on the tubing; immediate extubation relieved the symptoms.
 - Case 7. Tubing slipped into the sinus in connection with the removal of the packing which was applied because a simultaneous discision of synechiae between the turbinates was made. Corrected by secondary intranasal operation using a fluoroscopic technique.

was a failure, and this complication was only an early spontaneous detachment of the silastic tubing from the ostial canal.

A measure of the inconvenience to the patient may be the time of hospitalization. The mean hospitalization time after the procedure was 3.4 days in our series and was considerably lengthened by simultaneous procedures like septal reconstruction and radical ethmoidectomy. The mean number of visits during the first week after dismissal was 1.6, during the second week 1.2, during the third 0.9 and during the fourth week 0.7. The main reason for the repeated visits was inflammation which required cleansing by irrigation or suction. The inflammatory reactions were unforeseen. A variety of bacteria were found in the secretions and sometimes the correlation between the bacteriological findings and the clinical observations was difficult to evaluate. Tests of ostial patency were made only in a few patients of the series. Seventeen sinuses of 12 patients have been tested 1 to 24 months postoperatively, several of them more than once. The results of the ostial patency tests are given in Table 3.

Table 3. Tests of ostial patency.

| | |
|---|----|
| Preoperatively: (9 sinuses of 6 patients tested) | |
| Obstruction | 7 |
| Obstruction with valve function | 2 |
| Postoperatively: (17 sinuses of 12 patients tested) | |
| Patent | 11 |
| Partially patent | 1 |
| Variable result in repeated tests | 4 |
| Obstruction with valve function | 1 |

The general end results are given in Table 4. Nine of the 24 patients are apparently cured from sinusitis after an average observation period of 16 months. In two of these 9 patients, nasal symptoms occasionally occur but both patients suffer from a chronic vasomotor rhinitis controllable by drugs. The 7 patients in the group with occasional recurrences are all satisfied with the result when they compare their postoperative symptoms with those of the preoperative period. The patients included in the group with recurrent inflammation have had more than one acute exacerbation per year. Still, even these patients are generally satisfied especially with irrigation therapy which as a rule is easy to perform after ethmoidal antrostomy operation by way of the maxillary ostium without puncturing the lateral nasal wall. The 6 patients in whom the ethmoidal antrostomy and long-term intubation failed to cure sinusitis — possibly with transient improvement — were all chronic nasal cripples already long before this type of operation was tried. The short observation period in this series is due to application of new procedures, often with equally unsatisfactory results.

I wish to stress that ethmoidal antrostomy and long-term intubation only can effect regeneration of the ostial region. If the main pathology is inside the sinus, this operation as such cannot be effective. In any case the physiological conditions are restored by this operation, which is not true when the "window operation" or the Caldwell-Luc procedure is applied. By restricting this procedure only to cases which show persistent impairment of ostial patency, I think we can expect that this kind of procedure will be effective and at least worth further trial.

Table 4. General follow-up results of ethmoidal antrostomy and long-term intubation.

| | Free of symptoms | Occasional recurrences | Recurrent inflammation | Chronic inflammation continues |
|-----------------------------|------------------|------------------------|------------------------|--------------------------------|
| No. of patients | 9 | 7 | 4 | 6 |
| No. of operations (sinuses) | 10 | 8 | 5 | 11 |
| Follow-up period | 34-6 months | 26-11 months | 30-17 months | 24-4 months |

Bilateral operation gave divergent results in one patient.

SUMMARY

A clinical follow-up of 26 patients after ethmoidal antrostomy and long-term intubation of the maxillary sinus ostium shows the value of this operation in certain types of chronic maxillary sinusitis. The indication for this operation is a persistently impaired patency of the maxillary sinus ostium which can be tested by measuring respiratory pressure variations in the nasal chamber and in the maxillary sinus. The failures (17%) were due to extensive inflammatory processes beyond the ostial region. In recovered cases, apparently normal conditions are restored and in case of recurrency, irrigation by a probe through the ostium is more agreeable to the patient than puncture of the lateral nasal wall.

RÉSUMÉ

Les suites post-opératoires de 26 sujets opérés d'antrostomie ethmoidale et de drainage prolongé de l'ostéotome du sinus maxillaire montrent la valeur de cette intervention dans certains types de sinusites maxillaire chroniques. L'indication de cette opération est l'obstruction permanente du sinus maxillaire qui peut être attestée par la mesure des variations de pression respiratoire dans la fosse nasale et dans le sinus maxillaire.

Les échecs (17%) ont été dûs au processus inflammatoire développé autour de la région ostiale.

Dans les cas de guérison une situation normale a été retrouvée, et dans les cas de récidives l'irrigation par une canule à travers l'ostium est mieux acceptée par le patient que la ponction diamétrique.

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