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Clinical effects of endonasal sinusectomy with reconstruction of the nasal cavity (Takahashi's method)

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SUMMARY

A follow-up investigation of the results of endonasal sinusectomy with reconstruction of the nasal cavity (Takahashi's method) was carried out in 535 of 1338 patients who underwent endonasal sinusectomies during the 6-year period from 1967 to 1972. The subjective results were as follows: cured 196 (36.6%); improved 234 (47.5%); unchanged 69 (12.9%); aggravated 12 (2.2%).

In other words, 450 (84.1%) of the patients were statisfied with the results of the operations. Good results have similarly been obtained in allergic nasal disorders spreading in Japan of late, and concomitant reconstruction of the nasal cavity and desensitization therapy have resulted in improved responses.

INTRODUCTION

There has been a decrease in Japan of severe cases of chronic sinusitis but cases requiring surgical treatment are still frequently encountered. In order to restore both normal structure and function of the nose and paranasal sinuses, we have performed endonasal sinusectomy with reconstruction of the nasal cavity, the method developed by R. Takahashi (1917a), in which the nasal structure, morphological abnormalities of the middle nasal meatus, natural ostium as well as sinus pathology are corrected at the same time (Takahashi and Iida, 1971i; Takahashi et al., 1971f; Hamano, 1971).

Surgical procedure

The endonasal sinusectomy with reconstruction of the nasal cavity (Takahashi's method) is carried out in in seven steps as described hereunder. Nasal polyps when present should be excised prior to the procedure.

Stage 1: the lower anterior half of the ethmoid sinus up to the ground lamella bordering the anterior and posterior ethmoid cells are excised via the middle nasal meatus.

Stage 2: removal of the ground lamella and exenteration of the posterior ethmoid cells. (Figure 1).

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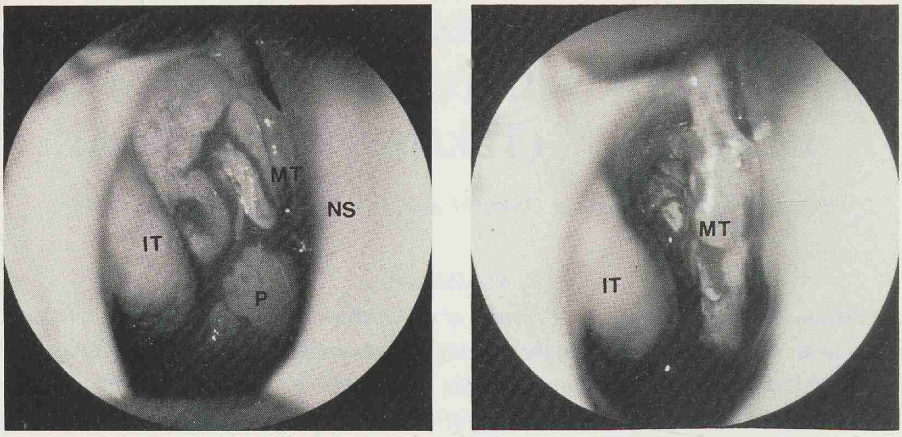

Figure 1. left: A preoperative view. The right nasal cavity is filled with polyps.
right: The posterior ethmoid cells are entered after removal of the polyps and the ground lamella.
IT: inferior turbinate, P: nasal polyps, MT: middle nasal turbinate, NS: nasal septum.

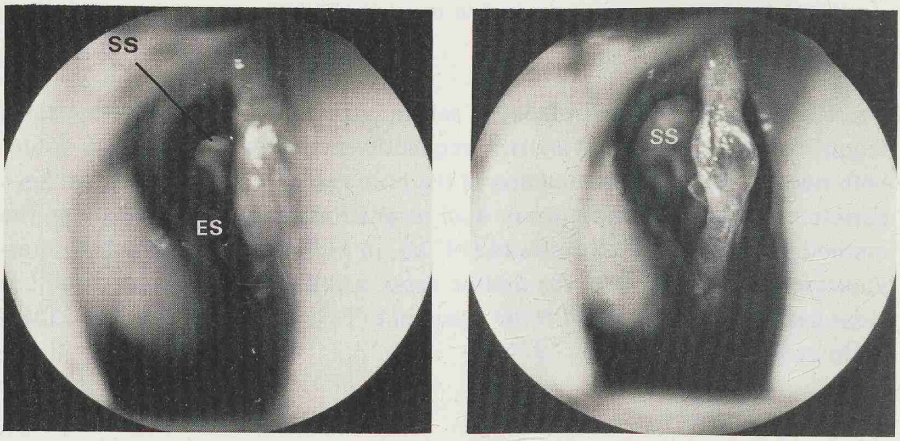

Figure 2. left: The sphenoid sinus is exposed.
right: The ethmoid cells are exentrated and then wide communications are created to the frontal and sphenoid sinuses.
ES: ethmoid sinus, SS: sphenoid sinus.

Stage 3: exenteration of mainly the upper anterior half of the ethmoid cells.
Stage 4: exenteration of the extreme anterior part of the anterior ethmoid cells in relation to the frontal sinus.
Stage 5: exenteration of the ethmoid sinus in relation to the maxillary sinus.
Stage 6: exposure of the sphenoidal sinus, if necessary (Figure 2).
Stage 7: excision of the hypertrophied conchae (Figure 3). Submucous resection

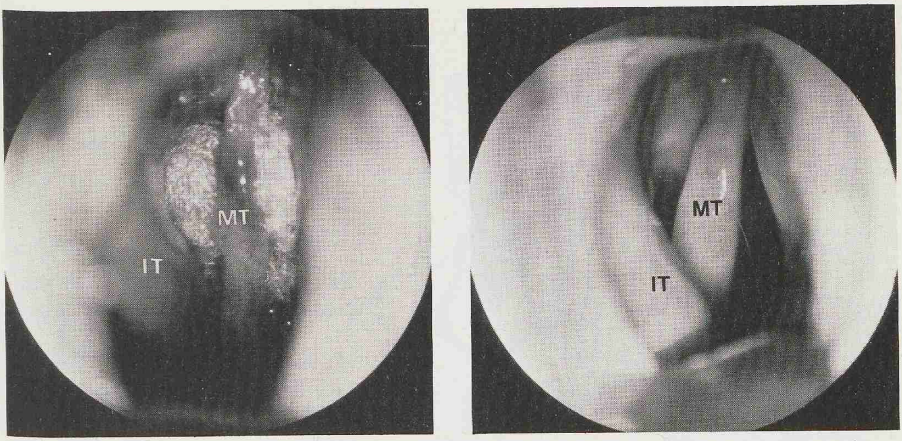

Figure 3. left: Packs are placed in the ethmoid sinus and olfactory fissue.
right: Intranasal view one year postoperatively. The sinus cavity is well epithelized.

of the deviated septal cartilage is performed in most of the cases to correct the abnormalities of the nasal passages.

Results of surgical treament

A follow-up study was carried out on 535 of 1338 patients who underwent endonasal sinusectomies (Takahashi's method) at the Jikei University Hospital or related hospitals during the 6 years from 1967 to 1972.

The result of treatment on the basis of improvement in subjective symptoms was as follows:

Cured 196 (36.6%) Improved 234 (47.5%)
Unchanged 69 (12.9%) Aggravated 12 (2.2%).

450 (84.1%) of the 535 patients were satisfied with the surgical results.

Of the 535 patients, 268 patients underwent endonasal sinusectomy plus peroral maxillary sinusectomy, while the remaining 161 patients underwent sinusectomy only (Takahashi's method).

Reconstruction of the nasal septum which is considered to be an essential part of successful treatment of chronic sinusitis was also performed in almost all cases except for a few with slight deviation (Takahashi, 1971b) (Figure 4).

From the viewpoint of nasal symptoms, 233 of 268 patients who were treated with radical surgery (endonasal sinusectomy plus peroral maxillary sinusectomy) were either cured of improved, while in 32 cases (11.9%) the subjective symptoms remained unchanged or were aggravated. Of the 161 patients who were treated with endonasal sinusectomy only, 127 (78.9%) were cured or improved, and 34 (21.1%) remained unchanged or were aggravated.

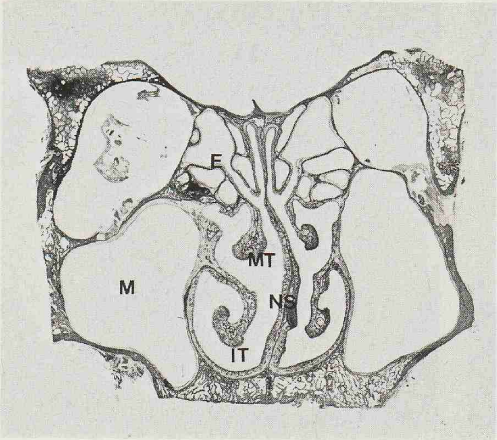

Figure 4. A frontal section of the nasal cavity and paranasal sinuses.
M: maxillary sinus, IT: inferior turbinate, E: ethmoid sinus, NS: nasal septum, MT: middle turbinate.

DISCUSSION

In general, the subjective postoperative improvement in patients who underwent endonasal sinusectomy was found to be less marked than that after radical surgery. Because of various extrinsic and intrinsic effects on the mucous membrane of the paranasal sinuses, which were deliberately left out in endonasal sinusectomy the postoperative reactions were quite variable.

Therefore, radical surgery appears to be a better choice for all patients with chronic sinusitis. Radical surgery, however, has its drawbacks. On the contrary, endonasal sinusectomy is a more physiological approach.

It should also be remembered that endonasal sinusectomy (Takahashi, 1917c) is a far more difficult procedure to perform correctly than the radical procedure.

Therefore, endonasal sinusectomy by an inexperienced surgeon may produce insufficient results as compared to those of radical surgery. The complicated topographical anatomy (Takahashi, 1971d; Takahashi, 1971e) would make endonasal sinusectomy more difficult for inexperienced surgeons. The ceiling of the ethmoid sinus consists of a part of the base of the skull (Takahashi and Ashikawa, 1971g). About two-thirds of the orbital walls are exposed to the paranasal sinuses and the maxillary sinus is in the proximity of the upper teeth.

Anatomical features of the paranasal sinuses are variable and asymmetric. Variations in size and formation are common and irregularities of the bony walls and unusual extention of cells to the adjacent areas are often seen in the paranasal sinuses (Figures 5 and 6).

In cases with poor pneumatization or smaller sinus cavities, the bony walls are usually thick (Wakai and Ashikawa, 1980), while in those cases with good pneumatization, the ceiling and lateral walls of sinus are often found to be thin like a

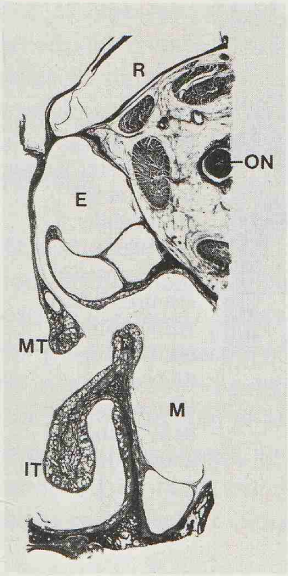

Figure 5. A frontal section of the left nasal cavity and paranasal sinuses.
R: recessus lateralis, E: ethmoid sinus, IT: inferior turbinate, MT: middle turbinate, M: maxillary sinus, ON: optic nerve.

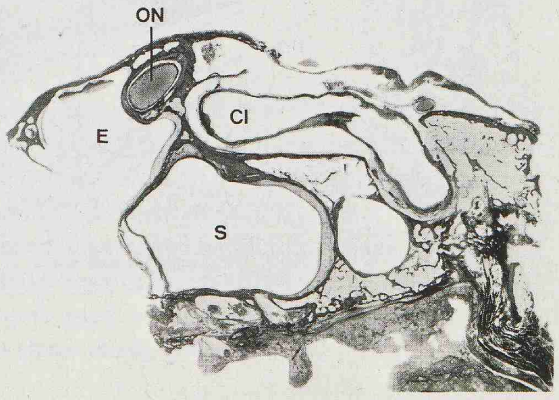

Figure 6. Due to marked pneumatization of the sphenoidal sinus, projection of the optic canal into the posterior ethmoid sinus has occurred and the internal carotid artery is in close contact with wall of the sphenoid sinus. S: spenoid sinus, ON: optic nerve, E: Ethmoid sinus, CI: internal carotid artery.

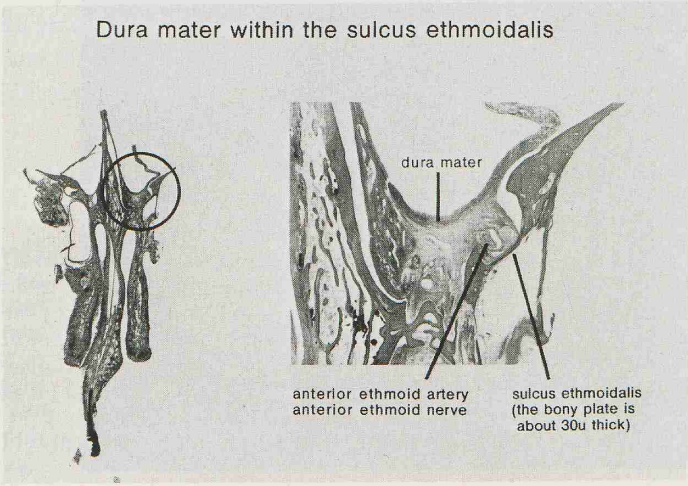

Figure 7.
A bone defect at the roof of the ethmoid sinus.
MTC: middle turbinate cells,
BD: bone defect.

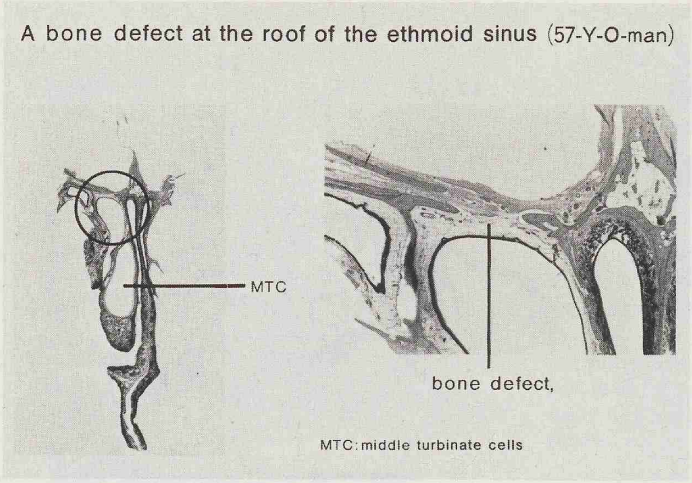

Figure 8.
Dura mater within the sulucus ethmoidalis.
DM: dura mater, AEA: anterior ethmoid artery, AEN: anterior ethmoid nerve, SE: sulcus ethmoidalis (the bony plate is about 30u thick).

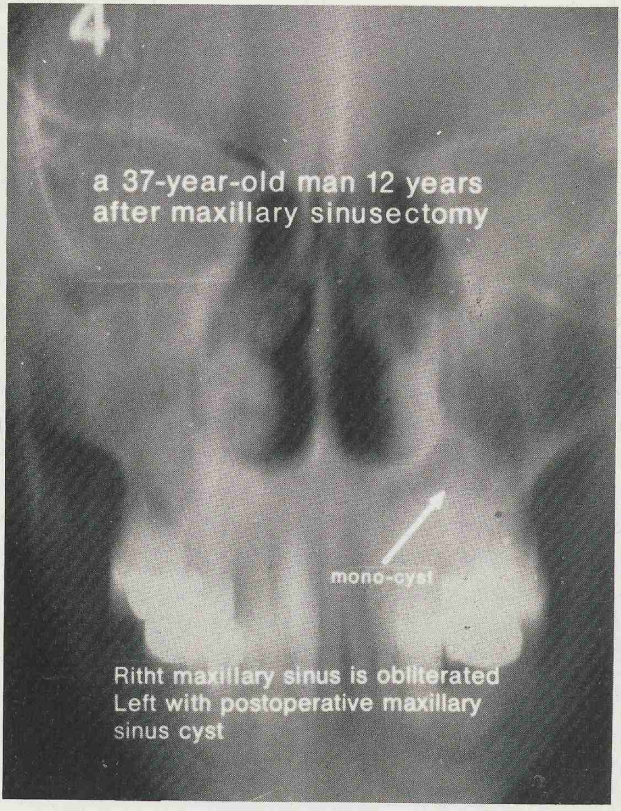

Figure 9.
An X-ray film of a 37-year-old man 12 years after maxillary sinusectomy, both sides. Right maxillary sinus is obliterated and the left with postoperative maxillary sinus cyst.

sheet of paper (about 30u). Dehiscences and bony defects are also frequently observed, and in some cases there is direct adhesion of the mucous membrane of the paranasal sinus with adjacent organs or tissues (Figures 7 and 8).
Accordingly, in order to carry out an appropriate endonasal sinusectomy, surgeons should be fully aware of the topography of the paranasal sinuses prior to operation.

CONCLUSIONS

Since the function of the paranasal sinuses is unique, it would be advisable where possible to conduct a more physiological endonasal sinusectomy, rather than to resort to a more aggressive radical procedure which may result in obliteration of the maxillary sinus by granulation (Takahashi et al., 1971h).
Furthermore, in view of possible postoperative complications such as abnormal sensation in the cheeks, postoperative cyst of the maxillary sinus (Odaware, 1971) and dental disorders, radical surgery might be reserved for those cases which cannot be controlled by endonasal sinusectomy (Figure 9).

RÉSUMÉ

Un examen complémentaire des résultats d'une sinusectomie endonasale avec reconstruction de la cavité nasale (méthode Takahashi) a été effectué chez 535 des 1338 patients ayant subi une sinusectomie endonasale au cours de la période de six ans, de 1967 à 1972.
Voici les résultats subjectifs de cet examen: guérison: 196 cas (36,6%); situation améliorée: 234 cas (47,5%); situation inchangée: 69 cas (12,9%); situation aggravée: 12 cas (2,2%).
En d'autres termes, 450 patients (84,1%) étaient satisfaits des résultats de l'opération.
De la même façon on a obtenu au Japon de bons résultats dans des cas de troubles nasaux allergiques; une reconstruction concomitante de la cavité nasale et une thérapie de désensibilisation ont mené à des réactions améliorées.

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