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Case Report

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Endonasal Surgery of the Maxillary Sinuses in Their Pathology as a Stage of the Preoperative Process of Subsinus Augmentation of the Floor of the Maxillary Sinus

Vavin VV[1], Sivolapov KA[2*] and Likhanova MA[3]

[1]Endenica Medical Center LLC, endENTica, Deputy Chief Physician for Medical Work, PhD, Moscow, Russia

[2]Doctor of Medical Sciences, Head of the Department of Maxillofacial Surgery and General Dentistry, NGIMUV – branch of the Federal State Budgetary Educational Institution of Higher Professional Education, Russian Medical Academy of Postgraduate Education, Ministry of Health of the Russian Federation, Russia

[3]Associate Professor of the Department of Otolaryngology named after prof. A. N. Zimin, NGIMUV - branch of the Federal State Budgetary Educational Institution of Higher Professional Education RMANPO of the Ministry of Health of the Russian Federation, Russia

[*]Corresponding author

Sivolapov KA, Doctor of Medical Sciences, Head of the Department of Maxillofacial Surgery and General Dentistry, NGIMUV– branch of the Federal State Budgetary Educational Institution of Higher Professional Education, Russian Medical Academy of Postgraduate Education, Ministry of Health of the Russian Federation, Russia.

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Introduction

Surgical treatment of patients with maxillary sinus pathology is one of the most common procedures in otolaryngology and maxillofacial surgery. Current trends in this field are based on minimally invasive, tissue-sparing surgery. Most modern surgeons tend to avoid access through the anterior wall of the maxillary sinus due to the potential for trauma, which is associated with a high risk of intraoperative and delayed complications. Furthermore, the creation of a permanent anastomosis in the inferior nasal meatus should be avoided, as this procedure leads to the formation of a pathological mucociliary pathway and the development of chronic maxillary sinusitis with a symptom complex that is refractory to effective conservative therapy. The above-mentioned factors hinder orthopedic rehabilitation of patients with dental implants due to deficient alveolar bone tissue in the maxillary bones, complicating augmentation and implantation, and sometimes making it impossible in this area.

This has necessitated the development of endonasal, minimally invasive approaches to the maxillary sinus that effectively address the pathological process, adhere to the principles of functional surgery, and minimize damage to the mucosa and periosteum in the alveolar sinus. It is also important to evaluate the feasibility of bone augmentation and dental implantation in this area with minimal risk of complications.

Materials and Methods

Between 2023 and 2024, we observed 53 patients who required surgical treatment of maxillary sinus pathology and augmentation of its floor.

Specifically, chronic maxillary sinusitis was diagnosed in 16 patients, and chronic polypous-cystic maxillary sinusitis was diagnosed in 11 cases. Foreign bodies in the maxillary sinus, specifically filling material and implants, were observed in 14 patients.

An additional anastomosis of the maxillary sinus in the inferior nasal passage was found in 2 patients, a block of the natural anastomosis of the maxillary sinus was found in 8 examined patients, and we encountered neoplasms of the maxillary sinus in 2 cases (Table 1).

Table 1: Structure of the Pathological Process in the Maxillary Sinuses

	The nature of the pathological process	Quantity Human	Average duration of clinical manifestations of the disease/months
1	Chronic cystic sinusitis	16	18
2	Chronic polypous sinusitis	11	36

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3	Foreign and fungal body of the maxillary sinus	14	28
4	Accessory sinus ostium	2	23
5	Sinus ostium block	8	11
6	Sinus neoplasm	2	14

Depending on the pathological process, a detailed analysis of clinical manifestations and the duration of their presence before seeking help revealed that complaints of difficulty breathing through the nose were more prevalent in patients with polypous sinusitis and sinus tumors. Complaints of pain, discomfort, and a feeling of heaviness in the projection of the pathological process typically manifested as cystic sinusitis, foreign and fungal sinus bodies, sinus ostium blockage, and sinus tumors at various stages of the disease. A sensation of viscous secretions dripping into the nasopharynx, sometimes accompanied by coughing, was a characteristic symptom of accessory sinus ostium and in some patients with a fungal body. We observed decreased sensitivity of the teeth and hard palate in one patient with a sinus tumor (inverted papilloma) in the late stage of the disease.

In the preoperative period, to clarify the diagnosis and optimally plan the scope of the operation and surgical endonasal access, multispiral tomography was performed on an Orthophos SL 3D SIRONA dental computed tomography scanner.

To eliminate the pathological process, all patients underwent surgical treatment via an endonasal approach. Surgical approaches were made through the middle nasal meatus in 35 patients, through the inferior nasal meatus (infraturbinary approach) in 16 cases, and a modified premaxillary approach was used in 2 patients. In 18 cases, the infraturbinary and premaxillary approaches were supplemented by infundibulotomy with expansion of the natural sinus ostium to 4 mm, the purpose of which was to prevent the formation of hemosinus and ensure adequate postoperative care.

Following the surgical sinus debridement, patients underwent orthopedic rehabilitation on implants, i.e., restoration of the dental arch. The initial stage of this involved increasing the alveolar bone volume of the maxillary lateral alveolar process in the area of the missing teeth.

Below are clinical examples of the use of the endonasal approach as a minimally invasive intervention.

Patient B. presented with complaints of missing teeth in the upper jaw. Upon examination, the following diagnosis was established: partial secondary edentia (in the area of the first molar of the right upper jaw), a foreign body in the right maxillary sinus. The foreign body was located in the area of the upcoming augmentation (Figure 1).

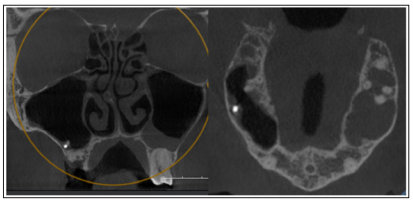

Figure 1: Foreign Body in the Right Maxillary Sinus

The alveolar bone volume in segment 16 was insufficient for orthopedic rehabilitation using dental implants. Therefore, a decision was made to perform subsinus augmentation of the maxillary sinus floor and remove the foreign body from the maxillary sinus lumen.

During the surgical intervention through the inferior nasal passage (infraturbinal access), the following manipulations were performed: removal of a foreign body from the maxillary sinus and subaxillary augmentation in segments 15-16.

Figures 2-7 show endonasal intervention aimed at removing a foreign body from the right maxillary sinus.

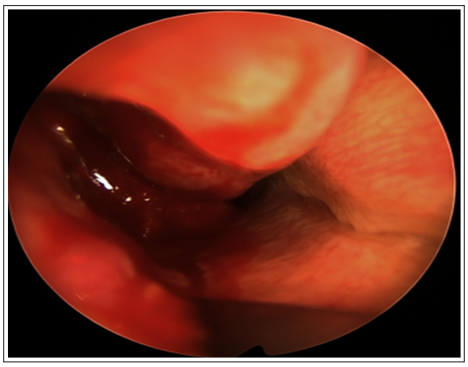

Figure 2: Incision in the area of the Inferior Nasal Passage with the Formation of a Mucoperiosteal Flap

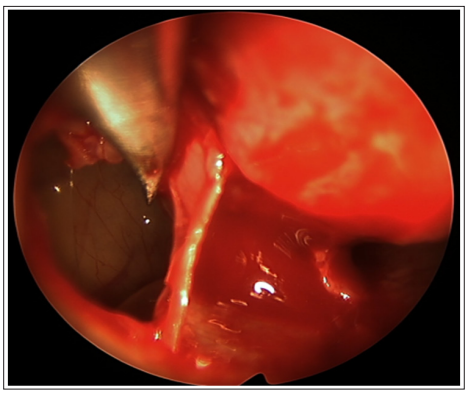

Figure 3: Opening of the Maxillary Sinus with Osteoplastic Access Through the Inferior Nasal Passage

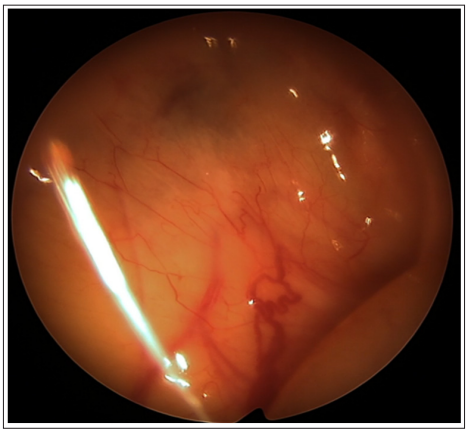

Figure 4: Examination of the Maxillary Sinus with Optics (45 Degrees), the Lower Parts of the Sinus are Occupied by a Cyst

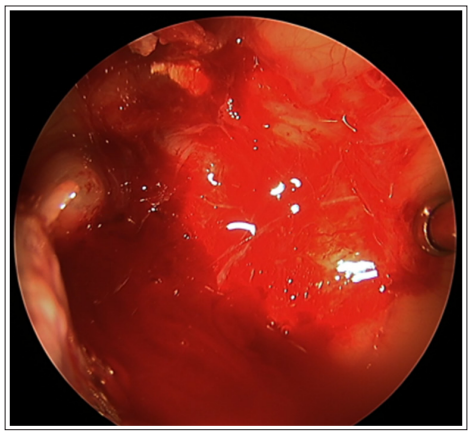

Figure 5: After Removal of the Cyst Membrane, the Sinus was Examined with 70-Degree Optics - a Foreign Body was Identified.

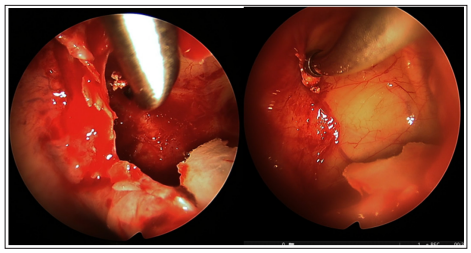

Figure 6: Removal of a Foreign Body with Minimal Damage to the Mucoperiosteum of the Maxillary Sinus Floor

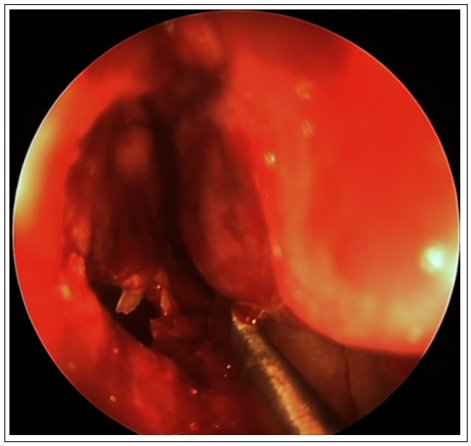

Figure 7: Closure of the Defect in the Inferior Nasal Passage in the Access Zone with a Previously Displaced Bone Wall and a Mucoperiosteal Flap.

Five months after surgery (radiological examination): the foreign body is absent. The augmentation in the floor of the maxillary sinus is intact. The flap in the area accessed through the inferior nasal meatus is intact. The sinus mucosa is intact (Figure 8).

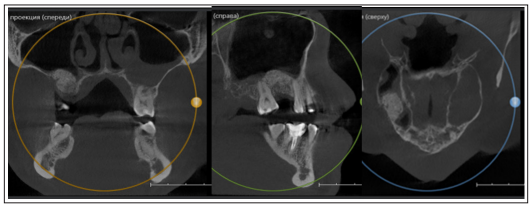

Figure 8: The Condition of the Right Maxillary Sinus and Augmentate in the Postoperative Period

Below is a clinical example of the use of a modified premaxillary approach.

During a radiological examination of Patient A., a formation was discovered in the right maxillary sinus that occupies the entire maxillary sinus and destroys its lateral wall (Figure 9).

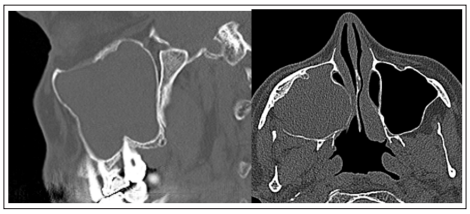

Figure 9: Formation of the Right Maxillary Sinus.

In addition, there is a deficiency of bone tissue in the floor of the maxillary sinus, caused by long-term adentia and compression of the alveolar process by the tumor (Figure10).

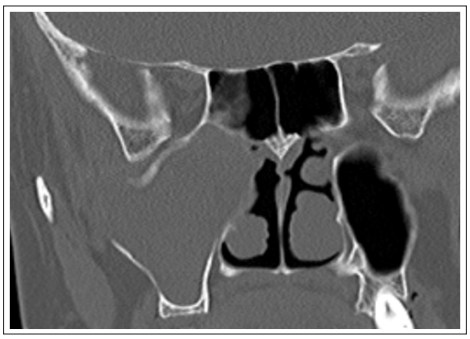

Figure 10: Atrophy of the Bone Part of the Alveolar Process of the Right Upper Jaw.

During surgical intervention using modified Premaxillary approach, after widening the natural ostium of the maxillary sinus. A neoplasm prolapsing into the middle and common nasal passages was detected (Figure 11).

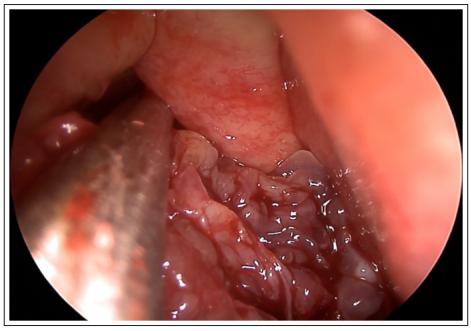

Figure 11: Intraoperative Image: Tumor-Like Formation in the Right Maxillary Sinus.

Next, part of the tumor was removed, the posterior and partially upper walls of the maxillary sinus were freed, and the site of tumor attachment was found (Figure 12).

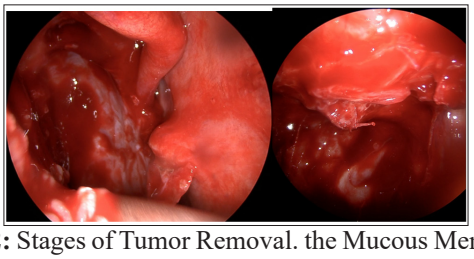

Figure 12: Stages of Tumor Removal. the Mucous Membrane of

the Lower Parts of the Maxillary Sinus is Unchanged.

At the final stage of the operation, the tumor is completely removed, and the area of its attachment is coagulated (Figure 13).

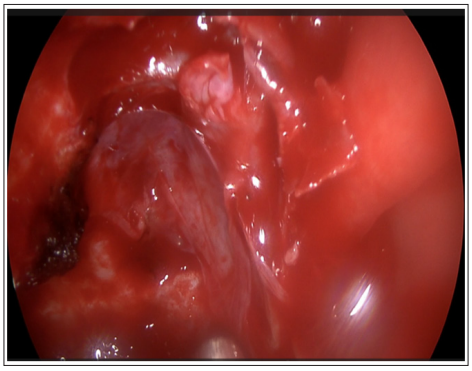

Figure 13: Mucous Membrane of the Maxillary Sinus After Removal of the Formation.

Next, subaxillary augmentation was performed, followed by installation of a dental implant (Figure 14).

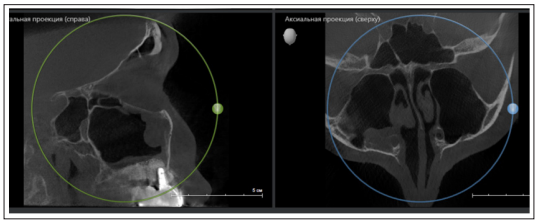

Figure 14: The Condition of the Maxillary Sinus in the Postoperative Period. The Detailed Mmplant is Located in the Graft.

Thus, the presence of a pathological process in the maxillary sinus in most cases allows for simultaneous, gentle endonasal debridement and orthopedic rehabilitation of edentulous patients.

A minimally invasive surgical approach and continuous visual control based on modern optics allow for surgical intervention within the mucous membrane of the maxillary sinus without damaging the periosteal layer in the area of proposed augmentation and subsequent implantation, thereby reducing rehabilitation time.