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Методы лечения пациентов с одонтогенными верхнечелюстными синуситами

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АННОТАЦИЯ

В статье рассматриваются современные подходы к лечению одонтогенных верхнечелюстных синуситов — одного из распространенных стоматологических заболеваний. Особое внимание уделено патогенезу данного состояния, а также влиянию стоматологических инфекций на развитие синусита. Рассмотрены как консервативные методы терапии, такие как антибактериальная и противовоспалительная терапия, так и хирургические вмешательства, включая синусотомию и дренирование. Проанализированы клинические случаи и результаты лечения, что позволяет выявить наиболее эффективные стратегии в управлении данной патологией. В заключение подчеркивается важность междисциплинарного подхода в диагностике и лечении одонтогенных верхнечелюстных синуситов.

Ключевые слова: хронический верхнечелюстной синусит; одонтогенный синусит; функциональная эндоскопическая риносинусохирургия.

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Treatment options for patients with odontogenic maxillary sinusitis

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ABSTRACT

This article reviews current treatment approaches for odontogenic maxillary sinusitis, one of the most common dental diseases. Special attention is paid to the pathogenesis of this disease and to the effects of dental infections on the development of sinusitis. Both non-surgical treatment options, such as antibacterial and anti-inflammatory therapy, and surgical procedures, including sinusotomy and drainage, are described. Clinical cases and treatment outcomes were analyzed to identify the most effective management strategies for this disease. Finally, the important role of a multidisciplinary approach in the diagnosis and treatment of odontogenic maxillary sinusitis is highlighted.

Keywords: chronic maxillary sinusitis; odontogenic sinusitis; functional endoscopic rhino-sinus surgery.

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INTRODUCTION

Chronic maxillary sinusitis is a significant social problem for modern society. Unfortunately, the number of patients with this condition is increasing every year [1]. The literature suggests that 10% to 75% of chronic maxillary sinusitis cases are stomatogenic [2]. Although the overall incidence of odontogenic sinusitis remains relatively low, the incidence of sinusitis due to dental causes has increased over the past decade [3]. Odontogenic sinusitis is most common between the ages of 40 and 60, with a slight predominance in women. Approximately half of the patients had a history of dental procedures, but only one-third had dental pain. Inadequate treatment of the acute inflammation often leads to chronic disease [4]. This may be related to gross anatomical changes (significantly deviated nasal septum, topography and anatomy of the ostiomeatal complex), low adherence to treatment, or the presence of an odontogenic source of infection. Dental causes of the chronic inflammation are often overlooked in the routine practice due to the low level of detection of the odontogenic problem at the diagnostic stage. Therefore, standard nasomental radiographs do not provide detailed imaging of the maxillary alveolar process. Compromise of the border area (maxillary teeth adjacent to the maxillary sinus) may be suspected in follow-up radiographs with only mild positive changes despite adequately prescribed and followed therapy; and recurrent unilateral sinusitis. Odontogenic maxillary sinusitis has no specific clinical signs [5]. However, a unilateral process, dental history (including recent treatment), and pain in the maxillary teeth at the causative side may suggest the presence of an odontogenic source of infection. With effective drainage of the natural anastomosis of the maxillary sinus, the dental discomfort can be alleviated by pressure absence and evacuation of pathological contents. In contrast, a patient with rhinogenic sinusitis may have toothache, hypersensitivity to palpation and chewing due to the lack of normal sinus ventilation.

X-ray computed tomography of paranasal sinuses and maxillofacial region is the gold standard for the diagnosis of odontogenic maxillary sinusitis [6]. This type of examination allows detailed imaging of changes in bone structures and soft tissues and selection of conservative and surgical treatment strategies. Orthopantomography also assesses the presence of apical cystic granulomas, periodontitis of maxillary premolars and molars, pneumatization of basal parts of maxillary sinus, and foreign bodies localized in sinus. Unfortunately, due to the two-dimensional characteristics of the acquired images, specialists fail to detect a stomatogenic source of infection in 55%–86% of cases. Cone beam computed tomography is the most preferred imaging test. Advantages include detailed imaging of the anatomy of interest, low radiation

exposure, and the ability to repeat the technique within a short time to assess treatment efficacy.

Anaerobic microorganisms are often found in the sinus discharge along with aerobic colonies of staphylococci, streptococci, and other bacteria in patients with odontogenic maxillary sinusitis. This is due to the fact that dental and periodontal infections are always polymicrobial in nature. Some of them, through the formation of microbial biofilms, can lead to persistent apical lesions that are resistant to systemic antimicrobial therapy and local orthograde endodontic treatment [7].

Treatment of stomatogenic maxillary sinusitis should include restoration of the drainage and ventilation functions of the maxillary sinus and the infection source elimination [8]. Systemic antibacterial agents are the main therapy. Inhibitor-protected penicillins in combination with standard dose metronidazole are preferred. Patients with allergic reaction to this group of agents, may receive tetracycline (doxycycline), lincosamide (clindamycin), or respiratory fluoroquinolone (levofloxacin) antibiotics. Systemic antifungal therapy is generally not prescribed, but may be given if large counts of *Aspergillus* spp. are detected and there is evidence of mycological invasion. Pain relievers (non-steroidal anti-inflammatory drugs) may be prescribed for the first few days of treatment to manage pain. Decongestants are also needed for ventilation and drainage.

The main goal of treatment of stomatogenic maxillary sinusitis is the elimination of the infection source. Antibacterial therapy alone may not provide a lasting effect due to the ability of bacteria to form microbial biofilms. Besides the elimination of the odontogenic source of infection, it is required to sanitize the maxillary sinus cavity, improve sinus drainage and ventilation, and, if necessary, perform endoscopic endonasal surgery.

In addition to conservative treatment options, sinus puncture is an alternative to surgery for clearing the maxillary sinus. Sinus puncture, combined with inpatient antibacterial therapy, can significantly reduce contamination of the affected area and shorten the patient's preparation time for subsequent surgery. Global data shows that when conservative therapy fails, surgery is the only option. The extent and technique of endonasal maxillary antrostomy depends on the severity and stage of the sinus pathology. The surgery may be limited to widening the natural anastomosis or the paranasal sinus through the middle and lower nasal passages to remove foreign bodies, polyps and cyst-like lesions. The authors who publish their case reports have no consensus on the order of surgical procedures. Some of them recommend to perform endoscopic endonasal surgery after the acute process is resolved and then to treat the dental problem. Others recommend to eliminate the odontogenic source of infection and then to choose a treatment option for the intranasal

structures. However, combined multidisciplinary surgery by an otolaryngologist and a dentist (oral surgeon) is still recommended by the majority of authors. Such procedures significantly reduce the economic burden, save the patient's personal time, and result in good outcomes in terms of sustained relief of maxillofacial inflammation [4, 9].

CASE REPORT No. 1

Patient C, 20 years old, was urgently admitted to the Clinic of Oral Surgery of the First Pavlov State Medical University of St. Petersburg with complaints of nasal congestion, more severe on the right side, mucopurulent posterior pharyngeal discharge, pain in the right cheek and cheekbone. Cone beam computed tomography showed subtotal shadowing of the right maxillary sinus with exudate component, defect in the posterior wall of the right maxillary sinus, diverted tooth 1.8 (Figure 1). A puncture of the right maxillary sinus provided a moderate amount of purulent discharge with a foul odor. The decision was made to perform a right maxillary antrostomy. Under general anesthesia, a linear incision was made in the oral mucosa along the upper fornix of the vestibule at the level of tooth 1.4 to create an antrostomy opening with a cutter after the detachment of the mucoperiosteal flap. The cyst capsule was visualized. A cyst and a diverted tooth 1.8 were removed, and the sinus was curetted. Under the guidance of a 0° rigid endoscope, the right maxillary sinus was opened via an infratubinal approach and the identified granulation and polypous tissues were removed. The sinus was examined using 45° and 70° endoscopes. Sinus and nasal cavity tamponade was performed. In the postoperative period, the patient received systemic antibacterial, decongestant, and analgesic therapies. Follow-up cone beam computed tomography 1 month after the surgery showed complete restoration of maxillary sinus airiness and absence of foreign body.

CASE REPORT No. 2

Patient M, 55 years old, was urgently admitted to the Clinic of Otolaryngology of the First Pavlov State Medical University of St. Petersburg with complaints of mucopurulent discharge from the right side of the nose, nasal congestion, more severe on the right side, discomfort in the right side of the face, swelling of the soft tissues of the right cheek area, headache, weakness, and fatigue. The medical history revealed that the patient had 3 episodes of the right maxillary sinusitis in the past 6 months. Sinus radiography followed by conservative and puncture treatment was performed. The effect was positive, but not lasting. Pain in the right side of face and symptoms of intoxication persisted. The most recent episode occurred after hypothermia. Cone beam computed

tomography showed a cystic granuloma of tooth 1.6 with shadowing of the right maxillary sinus due to an exudative component (Figure 2). A decision was made to perform an endoscopic right maxillary antrostomy through the middle nasal passage and remove tooth 1.6 concomitantly due to the recurrent sinusitis, soft tissue reaction and the presence of a stomatogenic source of infection. The patient reported pain relief and subjective improvement of the well-being in the postoperative period. The maxillary sinus was irrigated through the widened opening, and the patient received systemic antibacterial, decongestant, and vasoconstrictive therapy. A 3-month follow-up showed complete restoration of sinus pneumatization and healing of the socket of the extracted tooth 1.6. No signs of inflammation were detected.

CASE REPORT No. 3

Patient A, 58 years old, was urgently admitted to the Clinic of Otolaryngology of the First Pavlov State Medical University of St. Petersburg with complaints of nasal congestion, difficulty nasal breathing, headache, sensation of pressure and fullness in the maxillary sinuses, and food and water leaking from mouth into the nose. Medical history revealed that the patient had teeth 1.4, 1.5, 1.6 removed approximately a year ago, after which acute right sinusitis developed and an oroantral communication formed. The patient had nasal breathing problems for the past 25 years. The patient had 3 episodes of right maxillary sinusitis within one year. The patient had an episode of severe stress and hypothermia one week prior to hospitalization. Cone beam computed tomography showed subtotal shadowing of both maxillary sinuses with an exudative component, total shadowing of the ethmoidal labyrinth cells, a defect in the right alveolar process of the upper jaw up to 10 mm in the projection of the missing teeth 1.5, 1.6 due to oroantral communication (Figure 3). Objective nasal examination revealed edematous and hyperemic mucosa, moderate bilateral mucopurulent discharge, deflected nasal septum, and a positive right nasal-oral test. After systemic antibacterial therapy and puncture, the acute inflammation was treated, but right oroantral communication and nasal breathing difficulties persisted. The patient underwent combined multidisciplinary treatment of the intranasal structures, including endoscopic septoplasty, endoscopic right maxillary antrostomy, and bilateral inferior vasotomy by an otolaryngologist and plastic surgery of the oroantral fistula by an oral surgeon to restore nasal breathing, improve sinus aerodynamics, and adequately eliminate the stomatogenic source of infection. After 7 days, a follow-up cone beam computed tomography of the sinuses and maxillofacial region showed complete restoration of airiness in both maxillary

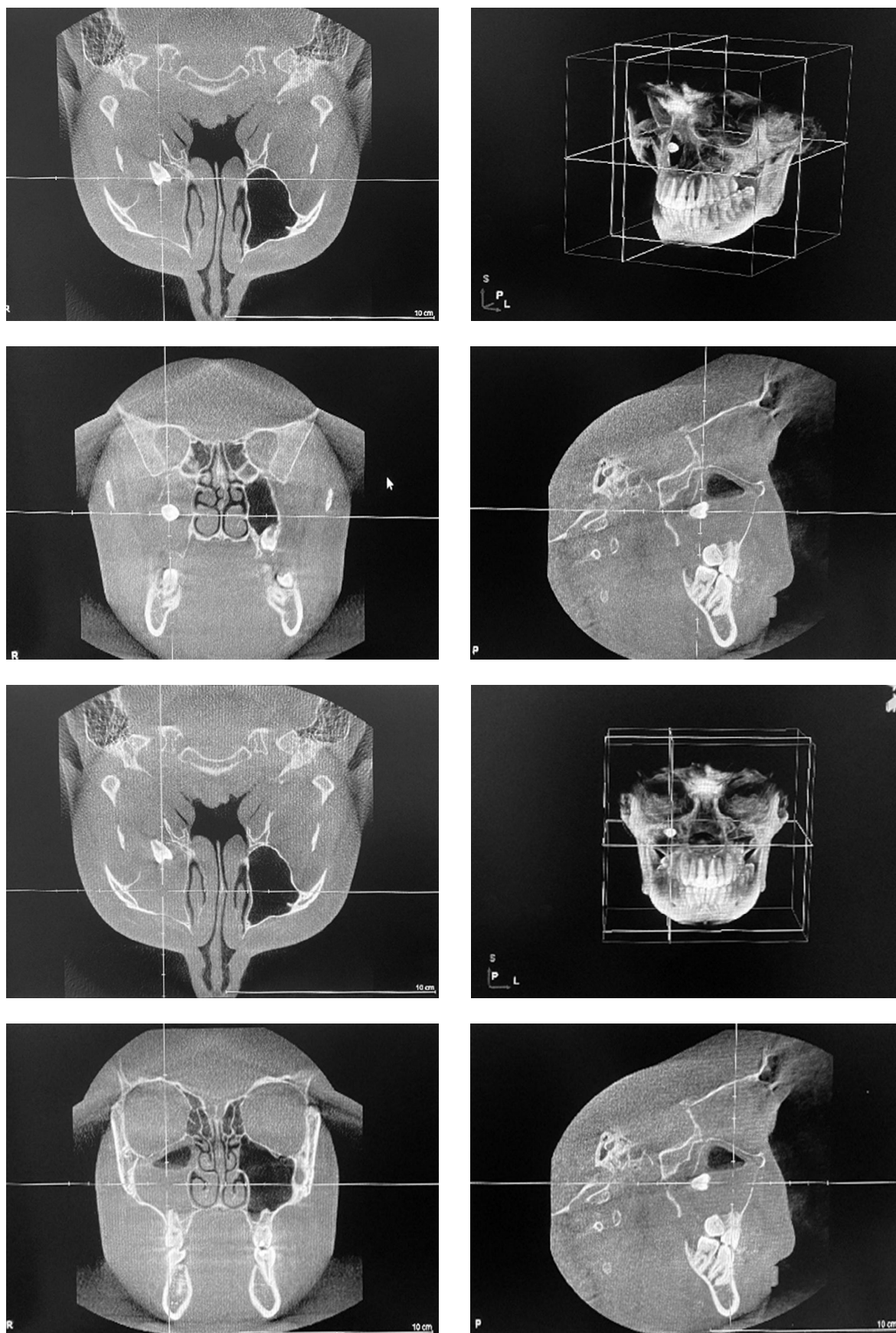


Fig. 1. Cone beam computed tomography: subtotal shadowing of the right maxillary sinus with exudative component, defect in the posterior wall of the right maxillary sinus, diverted tooth 1.8

Рис. 1. Конусно-лучевая компьютерная томография: субтотальное затенение правой верхнечелюстной пазухи с наличием экссудативного компонента, дефект задней стенки правой верхнечелюстной пазухи, ретинированный зуб 1.8

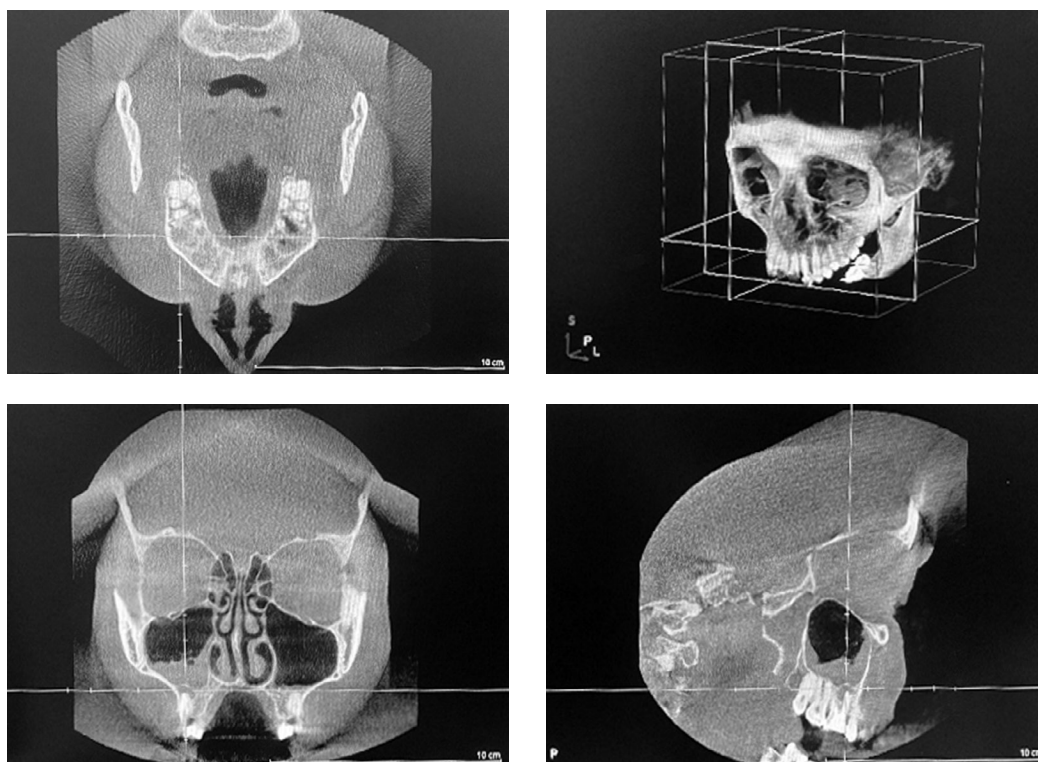


Fig. 2. Cone beam computed tomography: cystic granuloma of tooth 1.6, shadowing of the right maxillary sinus (an exudative component)
Рис. 2. Конусно-лучевая компьютерная томография: кистогранулема зуба 1.6, затемнение правой верхнечелюстной пазухи (экссудативный компонент)

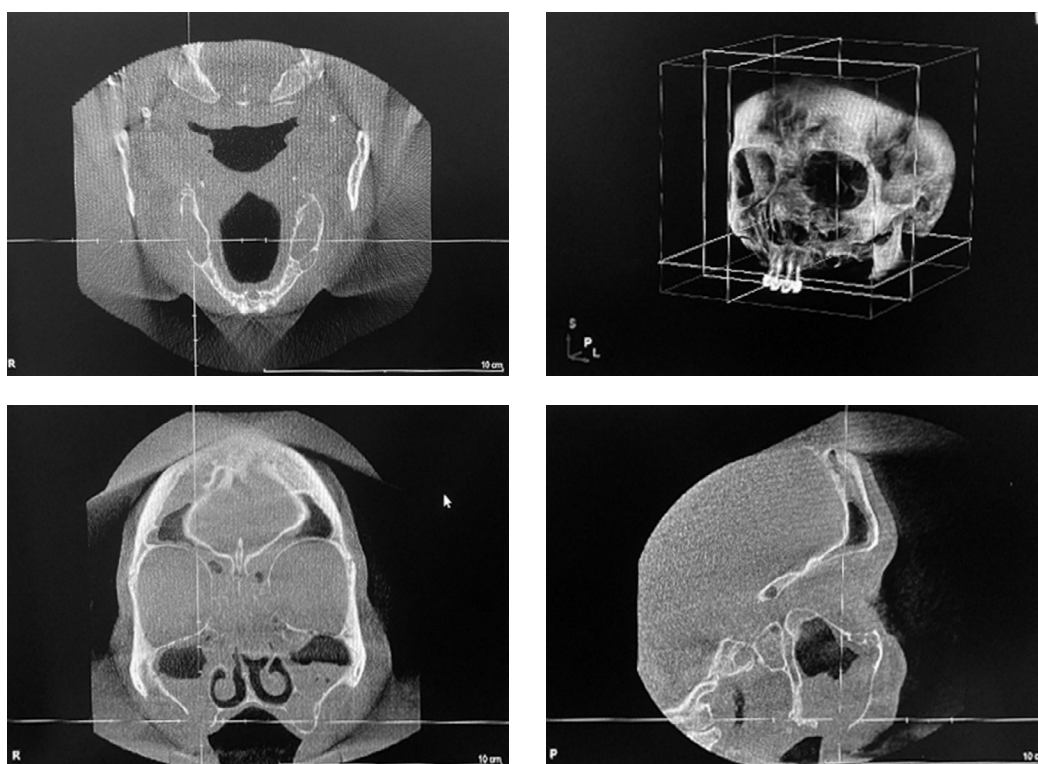


Fig. 3. Cone beam computed tomography: subtotal shadowing of both maxillary sinuses with an exudative component, total shadowing of the ethmoidal labyrinth cells, a defect in the right alveolar process of the upper jaw up to 10 mm in the projection of the missing teeth 1.5, 1.6 (oroantral communication)
Рис. 3. Конусно-лучевая компьютерная томография: субтотальное затемнение обеих верхнечелюстных пазух с наличием экссудативного компонента, тотальное затемнение клеток решетчатого лабиринта, дефект альвеолярного отростка верхней челюсти справа до 10 мм в проекции отсутствующих зубов 1.5, 1.6 (ороантральное сообщение)

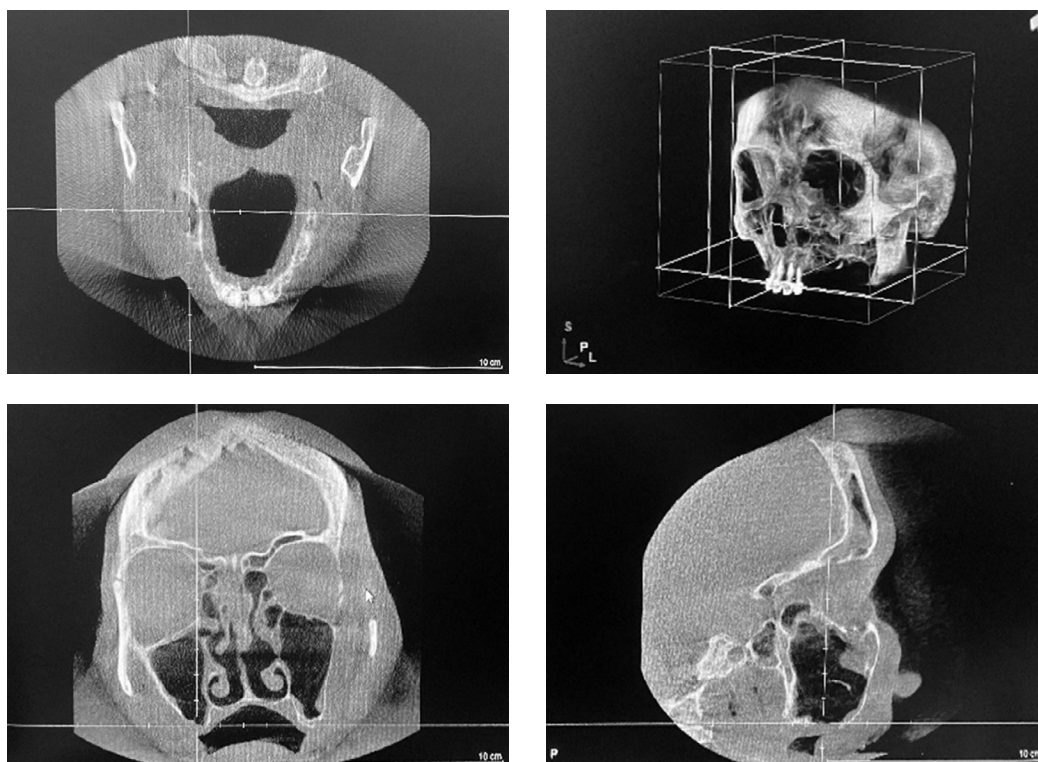


Fig. 4. Cone beam computed tomography: after surgical treatment of the paranasal sinuses and maxillofacial region, complete restoration of airiness of both maxillary sinuses was noticed

Рис. 4. Конусно-лучевая компьютерная томография: после хирургического лечения околоносовых пазух и челюстно-лицевой области отмечено полное восстановление воздушности обеих верхнечелюстных пазух

sinuses (Figure 4). Objectively, the patient reported improved nasal breathing, pain relief, and no communication between the sinuses and oral cavity.

CONCLUSION

The pathophysiology, microbiology, and treatment options for odontogenic maxillary sinusitis differ from those of chronic rhinogenic sinusitis. Periodontitis, parodontitis and iatrogenic damage are the most common causes of stomatogenic sinusitis. When maxillary sinusitis is first identified, an otolaryngologist should carefully collect the patient's dental history. Clinical signs, objective data (anterior rhinoscopy and stomatopharyngoscopy), blood counts, and radiographic findings for odontogenic and rhinogenic maxillary sinusitis are quite similar, but there are some specific clinical features that may be more indicative of a stomatogenic cause of the disease. Notably, dental pain is observed in only a few patients with odontogenic sinusitis, and sinus radiographs often do not allow verification of dental causes of sinusitis. Multi-slice or cone beam computed tomography is currently the gold standard for accurate diagnosis. Treatment of patients with odontogenic sinusitis includes a combination of antibacterial therapy, puncture treatment, elimination of the odontogenic source of infection, and functional endoscopic rhinosinusoscopic surgery (if indicated).

Multidisciplinary cooperation of an otolaryngologist and an oral surgeon (dentist) with a radiologist is necessary to personalize the diagnosis and treatment of patients with odontogenic maxillary sinusitis. The lack of communication between specialists results in longer diagnosis time and failure of the chosen treatment.

ADDITIONAL INFORMATION

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