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Diagnosis of odontogenic maxillary sinusitis

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Abstract

Background: *Odontogenic maxillary sinusitis is an inflammatory process of dental origin, localized in the maxillary cavity with all the characteristic manifestations of inflammation. The diagnosis is made on the basis of medical history, objective examination and paraclinical examinations (radiography, computed tomography, pulp vitality test).*

Case report: *The patient is a 33-year-old man with odontogenic maxillary sinusitis. In addition to the medical history and the clinical examination, paraclinical examinations are used during the diagnostic process: thermovisiography, orthopantomography, periapical radiography, pulp vitality test and computed tomography.*

Conclusion: *Chronic periodontitis of the mediovestibular canal of tooth 26 has been identified as the etiological cause of the condition. In addition, we found resorptive changes and a foreign body; secondary caries and a lack of canal filling material in tooth canal. The algorithm we used,for the paraclinical examinations, started from the most non-invasive and continue to the more severe ones in order to maximally spare the patient's health during the diagnostic process.*

Keywords: odontogenic sinusitis, thermography, computed tomography

Introduction

Odontogenic maxillary sinusitis is an inflammatory process of dental origin, localized in the maxillary cavity with all the characteristic manifestations of inflammation. These sinusitis are the second most common after rhinogenic. Most of them are a consequence of untreated periapical periodontitis of the teeth of the upper jaw and their complications, and the etiology also includes iatrogenic factors. [1] They are usually one-sided. They begin as an acute process that eventually becomes chronic. Acute symptoms begin with mild pain and heaviness. Over time, it intensifies and irradiates to the temple, eye socket and forehead, and sometimes covers the teeth of the upper jaw, with a symptom of multiple periodontitis. In the course of the disease there are difficulties in breathing, smell, there is a discharge of pus to the nasopharynx and foetor ex ore.

Intraorally, there is usually hyperemia and mild mucosal edema in the transitional fold, as well as increased pain on palpation and percussion in the affected area. When the head is bent, the pain intensifies.
Regional lymph nodes are enlarged and palpably painful. The general condition is affected, with fatigue, malaise and disturbed sleep.
The diagnosis is made on the basis of the medical history, objective examination and paraclinical examinations (radiography, computed tomography, pulp vitality test).
Differential diagnoses are rhinogenic and allergic sinusitis, acute and chronic diseases of the dental pulp and periodontium, osteomyelitis, neuralgia of n. trigeminus, cysts and tumors. [2]

Case Description

We present a case of a patient who came for a consultation with a dentist at the Faculty of Dentistry - Sofia.

Medical history

The patient is a 33-year-old man from Sofia. His complaints are related to pain and heaviness in the left cheekbone, which has recently become extremely intense. There have been similar complaints in the past, but with lower intensity. He also has difficulty breathing and leakage from the left nostril, especially during sports. The pain reached the temple, and in some cases he had to take non-steroidal anti-inflammatory drugs. The patient did not report any other comorbidities, medications or allergies. There are no data on occupational or familial risk factors associated with the disease.

Clinical examination

The patient is in good physical and mental condition, but looks tired and exhausted. Extraorally there are no pathological changes, but on intraoral examination there is a slight redness in the area of the transitional fold and gums in the area of the upper left molars and the second premolar. It was found that teeth 25 and 26 were prosthetic with a block of metal-ceramic crowns, and tooth 27 had a large obturation. According to the patient's data, dental treatment in this area was more than 6 years ago. Palpation of the transitional fold reveals a slight increase in pain. Percussion of the teeth does not reveal significant changes in the pain sensation.
The patient underwent the following paraclinical examinations: Thermovisiography; Orthopantomography; Sectoral radiography and later 3D examination of the left upper jaw.

Thermovisiographic examination

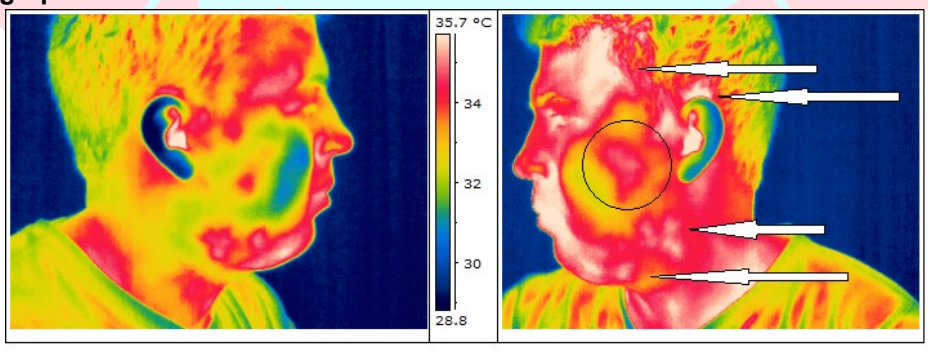

Fig. 1 Thermal imaging examination of right and left profile

Figure 1 clearly shows the asymmetry in the temperature of both halves of the face. In the area of porus acusticus externus the difference is only 0.2 degrees (36.6 ° C and 36.8 ° C). This shows that the body temperature is normal (below 37 ° C). In the area of the maxillary sinus the difference reaches 0.7 degrees. Arrows indicate that the temperature is also elevated in the area of the temple and regional lymph nodes (pre-auricular, post-auricular, submandibular and submental).

Orthopantomographic X-ray:

In accordance with the requirements of the Card for Focal Diagnostics, the thermal imaging examination was combined with an orthopantomographic X-ray. [3]

Fig. 2 Orthopantomography

The image shows shading of the upper left sinus, while the right one has no changes. The roots of teeth 25, 26 and 27 are located near the floor of the sinus, and the medial wall of the roots of the upper retained sage also rests on the sinus. The image of the palatal and medial root falls inside the sinus. The data from the study show that the patient has maxillary unilateral (left) maxillary sinusitis of odontogenic origin. Further tests are needed to determine which of the teeth is the cause of the inflammation. Clearly visible shading of the sinus ruled out the need for X-ray positioning “Paranasal Sinuses”.

Periapical radiography:

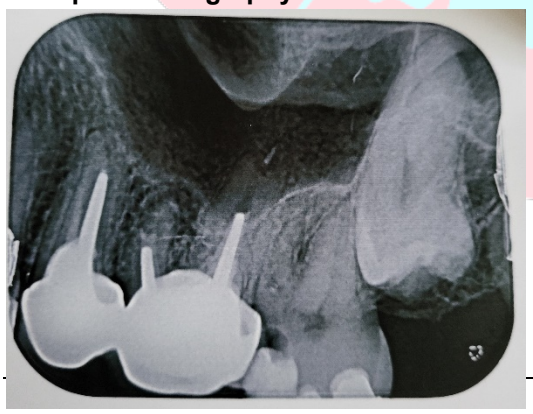

Fig.3 Periapical radiography

Periapical X-ray of the affected area allowed us to examine in detail the location of the roots of the teeth.

The root of tooth 25 reaches the floor of the sinus, but does not enter the sinus cavity. However, there is no presence of a canal filling under the patellar structure in the apical third of the canal. The medial canal of tooth 26 has a faint shadow in the area of the apex, surrounded by an

osteosclerotic shaft, and there may be communication between the chronic periapical periodontitis and the floor of the sinus. There is also no root canal filling material under the radicular post. A similar absence is found in the palatal canal, as here the gap in the wide canal under the radicular post is clearly visible. An object with a strong shadow at the end of the canal with a size of about 1 mm, which partially enters the periapical space, is also observed. In tooth 27, a slight shadow is observed under the obstruction in the medial wall, which is probably due to deep secondary caries in the neck area. Tooth 28 is located next to the sinus wall.

Pulp vitality test:
Radiographic data show that teeth 25 and 26 are non-vital. Pulp vitality test was performed on tooth 27, and the data (10μA) obtained corresponded to the diagnosis of Caries profunda.

Computed tomography
The choice of this test was made in order to establish as accurately as possible whether there is communication with the sinus, where it is located and what are it`s dimensions, as well as to obtain additional information about the condition of the teeth. The reading was performed by a specialist in image diagnostics from the Faculty of Dental Medicine - Sofia.

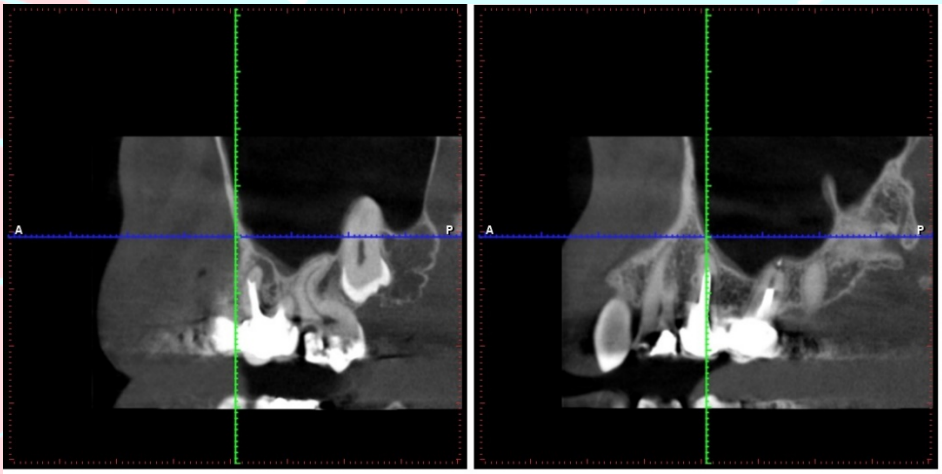

Fig. 4 Computed tomography – medial and palatal rooth of tooth 26

An oval osteolytic focus with a sharp contour was found at the apex of the mediovestibular root of the non-vital tooth 26, which remodels the compact at the floor of the left maxillary sinus, probably a manifestation of chronic localized periodontitis. The apex of the palatal root of the tooth has discretely expressed resorptive changes.

Discussion

Diagnosis of odontogenic sinusitis is a complex process. Previous studies have found that many patients with the disease remain undiagnosed for years. One of the reasons is that the pathological process may remain hidden in two-dimensional studies. Pain and odor due to inflammation may be absent in less than half of patients. [4]

Thermal imaging is not a mandatory part of the diagnosis of odontogenic sinusitis. However, it is a rapid non-invasive method that is part of the diagnosis of disturbance fields. [5] His data, in contrast to the medical history, is objective and showed that it is a local inflammatory disease that involves the regional lymph nodes in the left half of the face. This provides information on both the severity of the process and its scope. Information about the body temperature is also obtained, and from there the general condition of the organism can be assessed.

Data from orthopantomography and thermovisiography indicate an active field of disturbance. According to their classification, it is an endogenous, chronic-inflammatory field of disorder - chronic sinusitis. [6]

The results of two-dimensional studies are not sufficient in this disease, because between 55% and 86% of dental pathology in this condition remains unreported, although it is associated with the disease. Computed tomography is considered the gold standard because of its high resolution and the ability to distinguish soft from hard tissues. [7]

The pulp vitality test is a method for examination the condition of the pulp innervation through irritation with an electrical current with a very small size. [8] In the presented clinical case, the patient experiences pain in the whole area and the test results cannot be accepted unambiguously. The test needs to be repeated after treatment of the main pathology in order to make a definitive diagnosis of tooth 27.

Clinical examination failed to identify a carious lesion of tooth 27, probably due to its location below the level of the gums. The diagnosis of deep caries of the medial proximal wall of the tooth was made on the basis of X-ray examination, which is being more accurate in cases with early lesions, compared to visual diagnosis. [9]

Conclusion

When comparing the data from the medical history, the objective examination and the paraclinical examinations, a diagnosis of left unilateral odontogenic maxillary sinusitis was made. Chronic periodontitis of the mediovestibular canal of tooth 26 has been identified as the etiological cause of the condition.

In addition, we found resorptive changes and a foreign body with strong X-ray contrast in the area of the palatal canal of tooth 26, deep secondary caries of the medial wall of tooth 27 and lack of canal filling material in the root of tooth 25.

Thermovisiography is an extremely useful method for the initial diagnosis of diseases in the maxillofacial area, due to its non-invasiveness and objectivity of the data obtained. Orthopantomography complements it to determine the presence of an active field of disturbance and its origin.The other two methods of examination, especially computed tomography, provide detailed information about the patient's condition and allow you to choose the most appropriate treatment plan. In this algorithm, in paraclinical examinations, we start from the most non-invasive and continue to the more severe ones in order to maximally spare the patient's health during the diagnostic process.

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