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Running title: Sinusitis misdiagnosed as ethmoid tumor

Abstract

A patient with chronic unilateral maxillary sinusitis caused by a foreign body (dental amalgam) and mistaken diagnosis of extensive ethmoid neoplasm is presented. The imitation of tumour symptoms was due to a long presence of foreign body in the maxillary sinus and chronic inflammation of maxillary, ethmoid and sphenoid sinuses.

Key words: Foreign body, dental amalgam, maxillary antrum, ethmoid sinus

Case report

A 61-year-old woman was referred to the Department of Oral Surgery by her general dental practitioner with complaints of pain in the left upper jaw and nasal discharge mainly from her left nostril. There were occasional episodes of pus and blood taste in the mouth and intermittent headache of 3 months duration. She gave no history of facial trauma, but her left first upper molar was removed several years ago. There was no history that suggested a presence of sinusitis or oroantral fistula immediately after tooth extraction. Clinical examination did not reveal any sign of intraoral inflammatory changes such as oroantral fistula. A paranasal sinus x-ray revealed the presence of a metal foreign body in the ostiomeatal complex of the left maxillary sinus (Fig. 1). The patient was referred to the Department of Ear, Nose and Throat for sinus endoscopy and further management.

Two days later in attempt to find the foreign body, sinus endoscopy through the nasal cavity was performed, but failed due to significant bleeding from the sinus. In the

epipharynx there was a sign of bleeding from the left choana projection. Computed tomography was performed five days later and the medial and posterior part of the left ethmoidal sinus showed an expansive formation with a scattered visible dehiscence of bone structures (Fig. 2a). A partially destroyed perpendicular lamina of the ethmoidal bone and a part of the medial lining of the left maxillary sinus, along with an evident filling in the left portion of ethmoid sinus, could be seen (Fig. 2b). There was a visible thickening of the mucous lining of the left maxillary sinus with an evident metal foreign body located at the anterior part of the maxillary sinus (Fig. 2c). The frontal and right maxillary sinuses were without any visible pathological content. The radiologist recommended a biopsy of the expansive formation in the left portion of ethmoidal labyrinth.

Diagnosis of ethmoid tumor was made and preoperative digital subtractional angiography of the left common carotid artery was performed because of bleeding during the sinus endoscopy. On the left external carotid artery there was a pathological vascularization formed by superficial and deep branches of the maxillary artery, but the terminal branches of the mentioned arteries seemed hypertrophic, forming a rich net of mutual fistulae and shunts. The patient was informed of a well vascularized tumoural process, which did not impress as an angiomatous type.

Five days later the patient was operated on under general anesthesia. An incision was done through a window in the anterior wall of the maxillary sinus. Hypertrophic mucous lining of the sinus was removed, as well as a foreign body (amalgam, size 3x5 mm shaped as part of tooth filling) placed at the bottom of the sinus. The formation (tumour) was removed in a combined transmaxillary and transnasal approach. The defect remained on the medial lining of the maxillary sinus, which involved the region above the lower

nasal conha and the part of the middle nasal conha in its posterior portion (medial ethmoidal lining). Immediate cytology at surgery indicated the presence of chronic inflammation. The cavity was tamponed with an iodoform strip. The sphenoid sinus filled with a thick purulent secretion was drained. The patient was treated with antibiotics post-operatively and released ten days later after the removal of the sutures.

Histopathological examination of the biopsies from the sinus mucous membrane and ″tumour formation″ showed that there was inflammatory infiltration of the mucosa with the presence of papillary endothelial hyperplasia without any signs of cellular atypia. Finding showed chronic inflammation with some elements of acute exacerbation. There was no finding that might suggest a presence of specific infection.

At follow-up investigation five years after the operation the patient did not have any simptoms of sinusitis and there were no clinical or radiographic signs of ethmoid tumour.

Discussion

Foreign bodies in the maxillary sinuses are not uncommon. The most commonly found foreign bodies are accidentally displaced fractured roots of teeth or in some instances the whole tooth.[1,2] Metal foreign bodies of dental origin include dental implants,[3-6] silver points,[7] dental burs[8] and amalgam.[9,10] Other metal foreign bodies are occasionally found in the sinuses usually as the result of facial trauma.[11-13] Frequently, the diagnosis of sinus foreign body is not made in an acute setting, and patients may present years later with chronic symptoms due to obstruction of drainage and chronic irritation of the mucosa.[7,9,10]

In this case amalgam was probably displaced into the maxillary antrum several years ago during the extraction of the first molar. CT examination carried out while the

patient lay on her back showed the foreign body located at the anterior part of the maxillary sinus. During surgery it was located at the bottom of the sinus because it was probably floating.

The symptomatology of chronic sinusitis is often nonspecific. The maxillary antrum is the most commonly affected among paranasal sinuses and from here the infection can spread to other sinuses and ultimately cause pansinusitis.

The diagnostic procedure for chronic unilateral sinusitis consists of patient's history, careful clinical otolaryngologic testing, dental examination, and appropriate radiographs. Orthopantomogram together with the Waters and lateral skull views are useful. The involvement of other sinuses requires computed tomography scans to determine the presence of any foreign body.[11,14,15] Magnetic resonance imaging (MRI) may also be necessary in the detection of organic foreign bodies, because it is superior to computed tomography for soft tissue imaging.[14,15] Before performing a MRI one must be sure that metallic foreign bodies are not magnetic (danger of shifting). In case of doubt, it is recommended to give up. Further information can be obtained with sinus endoscopy and sinus membrane biopsy (in this case unfortunately was not done), functional endoscopic sinus surgery and/or Caldwell-Luc sinus exploration.[16]

Foreign bodies in the paranasal sinuses should be removed, even when they are asymptomatic in order to prevent tissue reactions. The weight, size and chemical composition of metal foreign body cause chronic irritation of the mucosa, leading to partial or complete ciliar insufficiency.[17] Birnmeyer[18] has reported a case of a maxillary carcinoma developed in a patient with a metal foreign body in the antrum for 48 years. Mladina[11] believes that metal foreign bodies should always be removed from the paranasal sinuses in

order to prevent any theoretical or practical possibility of the development of chronic irritation or even malignant mucosal alteration. The method of removal depends on the location and size of the foreign body, relation to adjacent structures, and the surgeon's preference.

"Ostiomeatal unit or ostiomeatal complex" is the outflow tract form the sinuses and includes the ostium of each sinus and meati. The ostiomeatal complex is intimately involved in the drainage of the ethmoidal sinuses. Maxillary sinuses drain through the maxillary sinus ostia into the middle meatus. The ethmoid sinuses (anterior cells) drain into the middle meatus and posterior cells drain into the superior meatus. Some authors further separate the ethmoidal bulla from the anterior cells calling them the middle ethmoid cells. A narrowing in this area could be very critical, causing the obstruction of the maxillary and anterior ethmoid sinuses. Acute ethmoid sinusitis denotes inflammation of the mucosal lining of the sinus. It is often a sequela of an upper respiratory tract infection but the impairment of drainage from the ostia of the sinus can also be caused by other factors including foreign bodies. Alternatively, dentition can also be a source of the infective material. The inflammation of the sinus mucosa results in edema of the mucosa and can cause blockage of the natural ostia of the sinus leading to impairment of mucocilliary drainage.[19-21]

The described case showed the mistaken diagnosis of the ethmoid tumour on the basis of sinus computerized tomography results (although the radiologist recommended biopsy) and pre-operative angiography. The symptoms of tumoural process were caused by a foreign body of dental origin (amalgam) displaced into the maxillary sinus several years previously during the tooth extraction. Probably an oroantral communication was present

and later healed spontaneously. The inflammatory reaction in the paranasal sinuses mimicked the neoplasm. The foreign body was floating and could impair the drainage of sinuses as well as the oedema of the sinus mucosa could cause blockage of the ostia. It should be emphasized that the tumour diagnosis should be based on further physical and histopathological examinations and not only on the results (although perfectly done) of x-ray examinations and angiography.

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Legends to illustrations

Figure 1. - A paranasal x-ray, showing a metallic shadow in the projection of the left maxillary sinus

Figure 2a. - An axial CT-scan at the level of ethmoid labyrinth showing an expansive formation with a scattered dehiscence of bone structures

Figure 2b. - Coronal CT-scan showing partial destruction of the perpendicular lamina of the ethmoidal bone and a part of medial lining of the left maxillary sinus with an evident filling on the left portion of sphenoid sinus

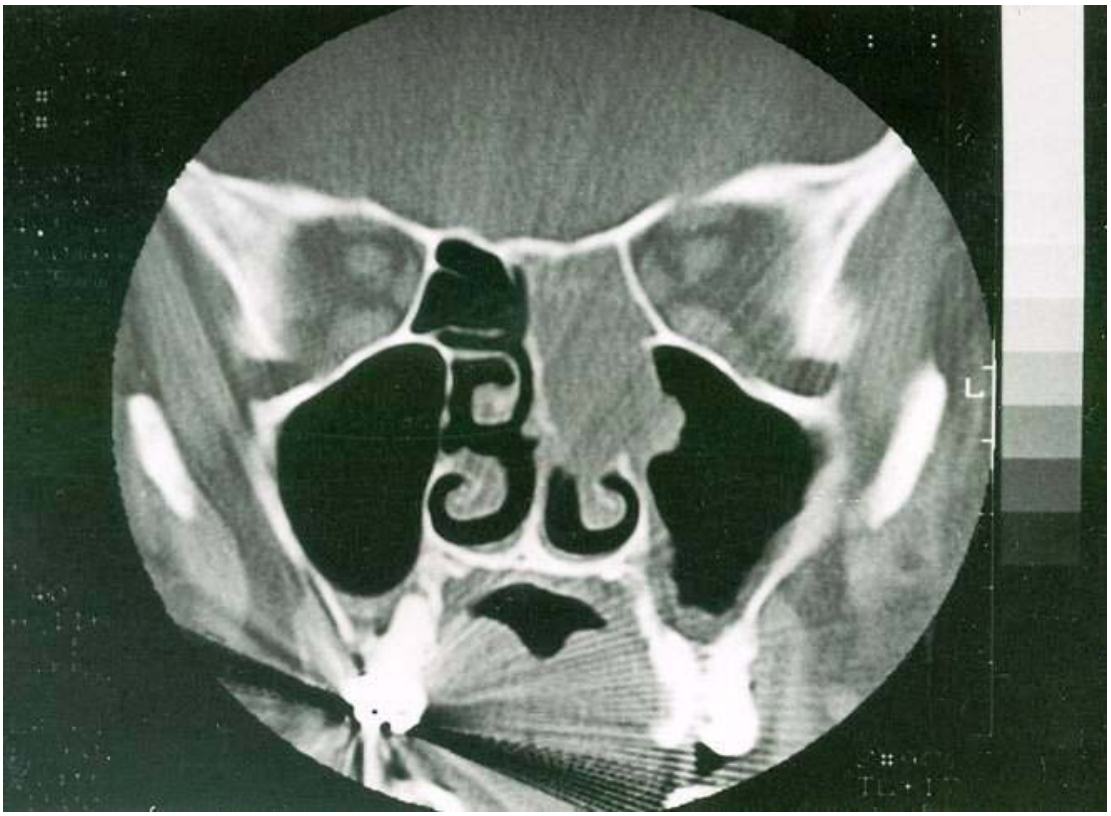

Figure 2c. - An axial CT-scan at the level of maxillary sinus showing a free metal foreign body with reactive mucosa thickening