

## **Bilateral Diplopia and Abducent Nerve Palsy Secondary to Odontogenic Sinusitis: An Unusual Presentation**

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**We present a patient with double vision, photophobia, headache and gait disturbance secondary to odontogenic sinusitis. The initial diagnosis was meningitis; the patient had bilateral diplopia, severe unilateral facial pain, nasal blockage, photophobia, headache and gait disturbance. The Patient underwent a septic screening and CT scan of the nose and paranasal sinuses which confirmed unilateral pan-sinusitis. MRI revealed enhancement of bilateral abducent nerves secondary to irritation of the meninges by the opacified sphenoid sinus.**

**The abducent nerve is the first cranial nerve to be affected when the dura is inflamed leading to bilateral diplopia. This unusual presentation led to the initial diagnosis of arachnoiditis. Patient underwent a unilateral full endoscopic sinus surgery and dental extraction of the affected tooth and had a full recovery with intravenous antibiotics and intravenous steroids.**

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Severe infections in the maxillary sinus may present with neurological inflammation, which may delay the definitive diagnosis and treatment. Odontogenic sinusitis is a well-recognized condition and accounts for approximately 10%-12% of maxillary sinusitis<sup>1</sup>. An odontogenic cause should always be considered in patients with symptoms of maxillary sinusitis who had odontogenic infection such as a periapical or perilateral abscess or periodontitis<sup>1</sup>. The diagnosis could be confirmed with intraoral periapical radiographs, percussion tests and sometimes pulp electric tests to determine the vitality of the pulp. If the pulp is necrotic, an abscess is likely to form.

Another common cause of maxillary sinusitis is residual root following tooth extraction. This can be associated with fracture of the maxillary tuberosity especially if there is an underlying bacterial infection<sup>1</sup>.

The aim of this case presentation is to increase awareness of odontogenic causes of unilateral sinusitis which might present by neurological or visual symptoms.

## **THE CASE**

A fifty-eight-year-old male patient presented with bilateral diplopia, severe unilateral facial pain, nasal blockage, photophobia, headache and gait disturbance. He was admitted with a clinical diagnosis of meningitis. The patient had full septic screening and CT which revealed unilateral pan-sinusitis. MRI revealed enhancement of bilateral abducent nerves secondary to irritation of the meninges by the opacified sphenoid sinus, see figure 1. The patient had functional endoscopic sinus surgery. He had multiple missing teeth and had very bad oral hygiene with calculus covering more than half of the teeth. CT and orthopantomogram revealed oroantral communication from the first and second permanent molar root stumps on the upper left posterior side. Intra oral peri-apical radiograph (IOPA) revealed more detailed image, see figure 2. The final diagnosis was unilateral pan-sinusitis, see figure 3. The patient was given antibiotics and corticosteroids and the decayed molars were extracted. The patient fully recovered.



**Figure 1: CT of Opacified Sphenoid Sinus**



**Figure 2: IOPA of 27 and 28**



**Figure 3: CT Pan-Sinusitis of the Left Side**

## **DISCUSSION**

The most common causes of odontogenic infections of the maxillary sinus are dental and periodontal abscesses affecting the membrane lining the sinus. The closest tooth to the maxillary sinus is the seventh molar where its roots have an average distance of 1.77 mm from the membrane<sup>1</sup>. Sometimes, infections from the palatal roots of molars or lateral incisor roots could spread subperiosteally to the hard palate<sup>1</sup>. However, after loss of teeth, the maxillary sinus pneumatizes downwards, making the sinus closer to the alveolar crest<sup>1</sup>. The lateral wall of the maxilla forms the anterior wall of the sinus and its thickness may vary up to 2.5 millimeters with its thinnest portion being the canine fossa<sup>1</sup>.

Dental abscesses usually present with a lateral bulge in which the infections spread through the maxilla laterally into the buccal vestibule, below the attachment of the buccinators muscle<sup>1</sup>.

Sinusitis is commonly accompanied with headache. Most cases of maxillary sinusitis do not pose a diagnostic problem. Its nature of pain is very characteristic, usually deep, pressure next to or above the nose and between the eyes<sup>3</sup>. The headaches usually range from annoying to severe and there is usually history of acute respiratory infection, nasal discharge and obstruction<sup>4</sup>.

Once severe purulent sinusitis has been diagnosed, the treatment should start with appropriate broad spectrum antibiotics and pus should be drained<sup>1,2,5</sup>. Nevertheless, sometimes sinusitis might be complicated by meningitis or cranial nerves infection: our patient presented with “bilateral” diplopia. Other causes of diplopia are due to problems in the eye such as the cornea, lens, muscle, nerve or the brain<sup>6,7</sup>. There are many neurological conditions which could cause diplopia, but our main focus is the inflammation of the meninges. Meningitis could be a bacterial, viral, fungal, parasitic and traumatic<sup>8</sup>. In suspected meningitis, it is advised to assess motor and sensory neural functions, hearing and speech, vision, coordination and balance, mental status and changes in mood and behavior<sup>8</sup>.

Odontogenic infections are usually mixed aerobic and anaerobic<sup>1</sup>. They commonly include Anaerobic Streptococci, Bacteroides, Proteus, Coliform Bacilli, Veillonella, Corynebacterium and Fusobacterium<sup>1,9,10</sup>. In our case, the patient presented with 2 remaining roots from the upper left second and third molars which were draining into the maxillary sinus.

Normally, treatment of odontogenic pathological condition is sufficient for resolution; however, if there is an oro-antral communication, a surgical management is normally recommended to reduce the probability of chronic sinusitis<sup>9</sup>.

The treatment for systemic spread is by immediate administration of intravenous broad spectrum antibiotics (if the cause is bacterial)<sup>8,10</sup>. The infected sinuses should be drained via endoscopic sinus surgery, corticosteroids are administered to decrease pressure and swelling off the brain and to prevent hearing and vision loss. Anticonvulsants such as Dilantin or phenytoin are prescribed to prevent seizures. If inflammation is severe, analgesics and sedatives may be prescribed<sup>8</sup>. The infected tooth or remaining root stumps should be extracted.

## CONCLUSION

**We present a patient with the initial diagnosis of meningitis presenting with bilateral diplopia, severe unilateral facial pain, nasal blockage, photophobia, headache and gait disturbance. CT scan confirmed unilateral pan-sinusitis. MRI revealed enhancement of bilateral abducent nerves secondary to irritation of the meninges by the opacified sphenoid sinus. This unusual presentation led to the initial diagnosis of arachnoiditis. Patient underwent a unilateral functional endoscopic sinus surgery and dental extraction of the affected tooth and had a full recovery with intravenous antibiotics and intravenous steroids.**

**The possibility of an underlining acute pan-sinusitis with oro-antral communications should be considered in all patients presenting bilateral diplopia.**

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