CASE REPORT

Painful Ophthalmoplegia Following Dental Procedure

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ABSTRACT

This case report is about a 26-year-old patient complaining of painful diplopia shortly after a dental procedure. Magnetic resonance imaging demonstrated a mass lesion in the cavernous sinus that responded well to oral corticosteroids. The possible side effect of the intraoral local anaesthetic injection used during the dental procedure was questioned.

Keywords: Cavernous sinus syndrome, dental procedure, intraoral local anaesthesia, painful ophthalmoplegia

INTRODUCTION

Painful ophthalmoplegia is a presenting sign of cavernous sinus syndrome. Cavernous sinus syndrome refers to a group of signs and symptoms caused by infectious, inflammatory, vascular, traumatic, or neoplastic processes in the cavernous sinus. The case presented here, a 26-year-old patient complaining of painful diplopia occurring shortly after a dental procedure, was diagnosed as cavernous sinus syndrome after clinical evaluation and neuroimaging that revealed a mass lesion in the cavernous sinus. A possible side effect of the intraoral local anaesthetic injection used during the dental procedure was questioned.

CASE REPORT

The 26-year-old female patient had recently undergone root canal therapy for the left maxillary first molar tooth. Following this procedure she complained of non-resolving tooth pain for 10 days. Her panoramic and perialveolar dental x-rays were normal, but dental examination revealed severe pain with vertical and horizontal pressure on the tooth. Because of her non-resolving tooth pain, her dentist decided to extract the tooth and change her oral antibiotic

prophylaxis with intramuscular ampicillin-sulbactam 1 g twice a day (b.i.d.). It was an uneventful tooth extraction following routine local infiltration anaesthesia: 2 cc of ultracaine into the maxillary buccal area and the vestibule.

The day following the tooth extraction, she attended to one of the authors' clinic with severe left periorbital pain, diplopia, headache, nausea, and vomiting. Ophthalmic examination revealed a mild dilatation of the palpebral fissure. Corrected visual acuity was 20/20 bilaterally; intraocular pressures were 14 mm Hg in both eyes. Anterior segment findings and fundoscopy was normal. Mild leukocytosis (12,700/ μ L) was the only abnormal finding in the laboratory analysis. Body temperature was 36.5°C. Naproxen sodium 550 mg twice a day was prescribed, which did not provide any pain relief in the following 2 days. Furthermore, abduction deficit consistent with left 6th nerve paresis was added to the clinical picture (Figure 1). Neuroimaging was performed because of the persisting painful diplopia. Magnetic resonance imaging (MRI) revealed enlargement and lateral bulging of the left cavernous sinus with an enhancing abnormal soft tissue area within the cavernous sinus (Figure 2). Corticosteroid therapy was started as 1 g/day pulse intravenous methylprednisolone for 3 days, and continued with 80 mg/day (1 g/kg/day) oral methylprednisolone. Marked pain relief occurred

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FIGURE 1 (A and B) Primary position and left gaze at presentation. (C and D) Primary position and left gaze at the end of treatment.

FIGURE 2 (A and B) Axial and coronal T1-weighted MR images (with contrast). (C and D) Axial and coronal T2-weighted MR images.

within 72 hours. Control MRI performed 3 weeks later revealed a normal appearance of the affected cavernous sinus. At the third month of follow-up, diplopia was present only on extreme left gaze and repeat control MRI was normal. Corticosteroid treatment was tapered gradually and stopped at the end of 5 months. There was complete resolution of diplopia and 6th nerve paresis at the end of treatment (Figure 1).

The patient has been on follow-up for more than 3 years and there has not been any sign of a relapse.

DISCUSSION

Cavernous sinus syndrome following dental procedures and/or infections is an uncommon condition.¹⁻³

Okamoto et al. reported two cases with clinical and laboratory findings similar to ours, both presenting with painful ophthalmoplegia: one following extraction of a maxillary canine tooth with caries and the other following treatment for multiple dental caries and periodontitis including maxillary teeth. Unlike our case, the MRI of these cases demonstrated non-enhanced lesions in the affected cavernous sinus and dilatation of superior ophthalmic veins, indicating cavernous sinus thrombosis. These patients were treated accordingly with parenteral broad-spectrum antibiotics.³ Cavernous sinus thrombosis is usually septic in origin and is due to the spreading of an infectious agent from a primary focus such as sinusitis, otitis, or mid-facial or maxillary tooth infection. However, in our case, the problematic tooth was not infected and there was no associated sinusitis or another focus of infection. Additionally, our patient recently had prophylactic parenteral broad-spectrum antibiotics. Her body temperature was normal and she had only a mild leukocytosis.

The estimated incidence of ophthalmic complications occurring after local anaesthetic administration for dental procedures is 1/1000.⁴ Diplopia and abduction deficit are the most common among these ophthalmic manifestations. Usually, these symptoms are transient.⁴⁻⁷ Steenen et al. reviewed 131 cases with ocular complications following intraoral anaesthesia.⁴ Among these cases the onset of ocular symptoms was mostly within the first hour after the injection and they usually lasted for 15 minutes to several hours. However, there were rare cases in which symptoms started hours or days after the injection and lasted for weeks and even permanently. One of the pathophysiologic hypothesis for the cause of ocular complications is intravenous injection of the local anaesthetic fluid.^{6,8,9} During anaesthesia for maxillary tooth procedures, improper size and placement of the needle can cause damage to the venous pterygoid plexus and the anaesthetic solution may flow via small emissary veins through foramen ovale and into the cavernous sinus. The abducens nerve is especially vulnerable to adverse effects because it does not travel through the cavernous sinus wall and is in close contact with venous blood.^{4,6} This might be the pathophysiologic pathway in our case that may have triggered the inflammatory process causing prolonged painful ophthalmoplegia.

In our case, persistence of the painful ophthalmoplegia led us to further investigation: Neuroimaging with contrast-enhanced MRI revealed an enhancing soft tissue mass lesion. Tolosa-Hunt syndrome, defined as a steroid-responsive granulomatous inflammation of the cavernous sinus, was a possible diagnosis, having similar radiological findings¹⁰⁻¹³; however, we cannot be sure that this was a granulomatous process without biopsy and pathological

examination. Demonstration of the lesion with MRI and clinical and radiological response to corticosteroid therapy is among the diagnostic criteria of Tolosa-Hunt syndrome determined by the International Headache Society (IHS) in 2004.¹⁴ Careful follow-up is recommended by IHS to exclude other causes of painful ophthalmoplegia.

CONCLUSION

To our knowledge, the association of painful ophthalmoplegia and an enhancing cavernous sinus mass lesion following a dental procedure has not been reported before. In case of non-resolving painful diplopia following dental procedures, cavernous sinus syndromes such as cavernous sinus thrombosis and Tolosa-Hunt syndrome should be considered and urgent further investigation with neuroimaging should be done.

Declaration of interest: The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

Note: Figures 1 and 2 of this article are available in colour online at www.informahealthcare.com/oph.

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