

Transient diplopia in dental outpatient clinic: An uncommon iatrogenic event

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ABSTRACT

A healthy 32-year-old female patient required an extraction of the right maxillary third molar. Lidocaine containing 1:80,000 epinephrine for right posterior superior alveolar nerve block was administered in the mucobuccal fold above the third molar to be extracted at our hospital. After few minutes of posterior superior alveolar block anesthesia, patient felt double vision. The condition was subsequently diagnosed as transient diplopia due to temporary paralysis of lateral rectus muscle due to involvement of the VI cranial nerve. The patient recovered in 30 minutes and the treatment was performed successfully. This article discusses the possible scientific explanation for this phenomenon.

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Sixth nerve palsy has been described due to various causes including trauma, infection, neoplasm and iatrogenic causes. Paralysis of the sixth nerve following nerve block, as given in dental surgery, was first reported in English literature by Goodside and Waignest in 1946 for a sphenopalatine block.^[1] Since then various dental anesthetic-related ophthalmological complications have been reported in the available English literature.^[1-4]

A posterior superior alveolar nerve (PSAN) block injection is a routine and reliable procedure employed for effective pain control for the posterior maxillary teeth and surrounding structures supplied by this nerve, when the recommended protocol is followed. Case reports of patient's experiences of ophthalmological visual or motor problems from PSAN injections are seldom in English Literature.^[2] Visual problems include blurring of vision^[3,4] and blindness, which can be temporary^[5] or permanent.^[6,7] Motor problems include mydriasis, palpebral ptosis and diplopia. Horner-like manifestations involving ptosis, enophthalmos and miosis of the eye have also been reported.^[8] Fortunately, most complications reported in English literature, in the eye have been transient.

This article reports a case that developed transient lateral rectus palsy due to the involvement of sixth cranial nerve after a PSAN block given for the purpose of a dental extraction.

CASE REPORT

A 32-year-old otherwise healthy woman reported to our hospital for an extraction of the maxillary right third molar. As she had no other remarkable medical conditions, the attending assistant dental surgeon performed a PSAN block using 1.8 mL of 2% lignocaine with 1:80,000 epinephrine and a 24-gauge-long disposable sterile needle after placing in a comfortable recumbent position. As the assistant surgeon was supervising preparation of the operatory for extraction, the patient complained of blurry vision in the right eye, otherwise, she felt fine, although a little nervous and apprehensive. The patient's vital signs were well within normal range. Functions of cranial nerves VII, V₁, and V₃ were normal bilaterally and V₂ on the right side was normal. The area expected to be anesthetized were completely anesthetized. No blanching of facial skin and color changes were noted.

On clinical examination it was observed that the right eyeball could not be moved to the right side [Figure 1]. Both pupils were of the same size on both sides and reacted to light. Further examination revealed that her right eye was still able to differentiate between bigger and nearer objects, but was mildly unable to define clearly very small objects. The distance between the upper and lower eyelids appeared dilated. There was no clinical evidence of ptosis, proptosis, bleeding in the eyes or epiphora. There was no accompanying paresthesia of the lateral parts of the upper and lower eyelids, nor was there any blanching around the same region. Hence, considering the facts that the right eyeball could not be abducted and the double vision, a subsequent diagnosis of transient palsy of the lateral rectus muscle due to the effect of PSAN local anesthetic was made.

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The patient was reassured with explanation of the situation. After discussing this unusual complication with the patient and her mother, it was decided not to proceed with the extraction and wait for an hour and take an opinion of an ophthalmologist should the patient's visual acuity and diplopia does not improve after the period. The right eyelid was taped in a closed position to reduce sensation of diplopia and the possible dryness. After 30-35 minutes the tape was removed and the diplopia was found to have sufficiently disappeared [Figure 2].

The patient still remained sufficiently numb in the anesthetized region. The tooth was removed and the remaining procedure was uneventful without pain or

additional need of local anesthesia. The numbness wore off about two and half hours after the initial injection. The visual acuity was 6/6 in both the eyes as confirmed by a consultant ophthalmologist immediately after the surgery. On the fifth day, the patient reported for follow-up during which she reported of no ophthalmological complications.

DISCUSSION

Maxillary local anesthetic injections, particularly those deposited near the pterygoid canal are known to cause diplopia of the ipsilateral eye and are estimated to occur in about 35.6% of cases. This often results from the local anesthesia diffusing superiorly and medially to anesthetize



Figure 1: Note that the right eyeball could not be moved toward the extreme right side. Patient under influence of local anesthesia



Figure 2: Photograph after recovering from the effect of anesthesia

Table 1: Possible ways of transient diplopia in present case

Pathways	Ways	Present case	References
Vascular			
Intra-arterial injection	Inadvertent penetration of the needle into artery or solution diffusing into an artery	Not possible-aspiration was negative and because arterial transportation would cause widespread effects	Walker <i>et al.</i> (2004), Malamed <i>et al.</i> (1997), Crean <i>et al.</i> (1999), Koumoura <i>et al.</i> (2001), Goldenberg (1990)
Intravenous injection	Via the cavernous sinus and pterygoid plexus	Possible in this case	Walker <i>et al.</i> (2004), Crean <i>et al.</i> (1999), Koumoura <i>et al.</i> (2001)
Needle size			
Size of needle	25-Gauge needle or above has the potential to involve pterygoid plexus if placed incorrectly	A 24-gauge needle was used	Freuen <i>et al.</i> (2007)
Bony pathways			
Unique infraorbital fissure and/or unique pterygopalatine fossa	Anatomic variations possibly aggravated by recumbent position	Possible in the present case	van der Bijl and Meyer (1998), Sved <i>et al.</i> (1992)
Autonomic nervous system stimulation			
Stimulation of autonomic nervous system by local anesthetic solution	Local anesthetic solution stimulates the autonomic nervous system	Not possible as other signs and features are not consistent	Kim (2001)
Response to local anesthetic solution			
Response to lignocaine solution	Articaine has demonstrated such ophthalmological complication	Lignocaine was used in the present case	Penarrocha-Diago <i>et al.</i> (2000)

the orbital nerves. There are no known reports in the literature of permanent diplopia.^[9] The hypothesis for ophthalmological manifestation of an inferior alveolar nerve block has been proposed as local anesthetic solution reaches the orbit through vascular, neurological and lymphatic network.^[10] They proceed to describe that oculomotor disturbances after injection of dental local anesthetics is that of inadvertent deposition of some of the drug into the inferior alveolar artery, mandibular canal or PSA artery. By reverse flow, the anesthetic agent then reaches the internal maxillary and middle meningeal arteries, the orbital branch of the latter anastomosing with the lacrimal branch of the ophthalmic artery.^[11]

A short needle is usually recommended for a PSAN block injection as a long needle will harm the pterygoid plexus. A cadaver study proved that improper size and placement of the needle could damage the pterygoid plexus.^[12]

A patient whose abducent nerve is involved may complain of double vision and may exhibit limitation of abduction of the ipsilateral eye as well as paresthesia of the lateral side of the upper and lower eyelids in limited cases including the present case. Several explanations have been put forward to explain the phenomenon.^[13] Table 1 compares all the above mentioned possible ways by which this uncommon transient abducent nerve palsy secondary to a local anesthetic injection could be caused.

CONCLUSION

Diplopia secondary to dental local anesthetic solution is rare in dental literature. Though in dentistry thousands of local anesthetic injections are administered to patients

daily, only a few neuro-ophthalmological complications are reported. One such rare event is reported and discussed in this article.

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