

## Transient Diplopia Following Posterior Superior Alveolar Nerve Block

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### Abstract:

*Diplopia is a rare complication that follows posterior superior alveolar nerve block. A 24 year old patient developed diplopia and ipsilateral lateral rectus paresis following local anesthetic in order to extract right side maxillary third molar. Being a rare complication various anatomical pathways are discussed. The patient can be assured of a good prognosis since cessation of symptoms generally occurs within a few hours.*

### Introduction

The use of local anesthetics has proved to be boon for most of the dental procedures. Many practitioners safely deliver millions of local anesthesia every year. For treatment of maxillary molars, posterior superior alveolar nerve block is commonly given in conjunction with greater palatine nerve block. Common complications associated with posterior alveolar nerve block are hematoma and mandibular anesthesia<sup>(1)</sup>. Although ocular complications after intra oral anesthesia are rare but unexpected events following anaesthetic administration are likely to occur at some point in the life of a practitioner. Appropriate treatment and gentle assurance are absolute necessities for management after occurrence of complication. This paper reports transient diplopia after administration of PSA Nerve block.

### Case Report

A 24 years old female reported to us with the complaint of pain in maxillary right side posterior region. Patient had carious maxillary third molar. Extraction of the carious tooth

was planned. There was no evidence of extra oral and intra oral swelling. The patient reported no systemic symptoms, nor any medical concerns or allergies contraindicating the planned treatment.

After obtaining the written and verbal consent, the patient was placed in recumbent position dental surgeon performed Posterior superior alveolar nerve block administered using 1.5 mL of 2% lignocaine with 1:80,000 epinephrine with a 26 gauge, 1 ½ inch needle disposable sterile needle, in an aspirating syringe. To anaesthetize the palatal root of maxillary third molar Greater palatine nerve block administered in conjunction with PSA nerve block where 0.6 mL of anesthetic.

After checking for symptoms tooth was extracted using a standard, flapless, forcep technique. Following irrigation with normal saline, patient's chair was slowly returned to upright position and she was asked to bite firmly on the gauze. The entire procedure was uneventful and lasted for about 10 minutes.

A few moments after the patient was brought into an upright position the patient complained of double vision. Patient had no other complaints. The vital signs were normal and no other systemic or local complications were noted. Ocular examination revealed pupils that were equally round and reactive to light, with normal visual acuity and full extra

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ocular movements in all directions with one exception that patient's right eye was unable to abduct past the midline. There was no evidence of ptosis, proptosis, conjunctivitis or epiphora. Further examination of head and neck, as well as general systems, revealed nothing unusual.

Symptoms showed that the patient had acquired paresis of abducens nerve secondary to the local anesthetic injected in the maxillary region. The patient was explained that her vision will return to normal after within 2 to 3 hours, once the local anesthetic effects have fully dissipated. The patient was calm, alert, oriented, asked appropriate questions and demonstrated understanding of the event. The right eyelid was taped in the closed position to reduce the sensation of diplopia and she was sent home. A postoperative visit the following day confirmed that the disturbance has resolved.

## Discussion

To block the PSA nerve the anaesthetic is to be deposited on the posterior surface of maxilla. At the final position the needle is not in contact with the bone, hence making it more susceptible to complications. Most common complications of PSA nerve block is hematoma resulting from trauma to the pterygoid plexus of veins or the maxillary artery and another is mandibular anesthesia as the mandibular division of fifth cranial nerve is located lateral to the PSA nerves (1).

Transient abducens nerve palsy secondary to local anesthetic injection is an uncommon complication. Several vascular and anatomical pathways have been proposed to explain its occurrence based on the underlying regional anatomy, the sites of injection and the pathways of spread of anesthetic agent.

### Vascular pathways:

There are two pathways which explain the occurrence of the complication (a) Intra-arterial injection and (b) venous pathway

#### (a) Intra-arterial injection

This can be due to inadvertent needle puncture of the maxillary artery, followed by spread of anesthetic agent

into several successive arterial branches (middle meningeal artery, then via a common anastomotic branch of the ophthalmic artery). Arterial transport of anesthetic into orbit would also probably produce more widespread effects and not be restricted to paresis of lateral rectus muscle (2) (3).

#### (b) Venous Pathway

The venous pathway into the cavernous sinus is the most commonly cited explanation for post injection abducens paresis. The pterygoid venous plexus is found within the infratemporal fossa, and any anesthetic agent reaching this location would be in close contact with numerous small, thin walled veins. Absorption would seem relatively easy, and transport into the cavernous sinus should occur via small emissary veins passing through foramen ovale to directly enter the cavernous sinus. Here the abducens nerve is in close contact with the venous blood and vulnerable to the effects of any anesthetic agent present (3) (2) (4).

#### Bony Pathways

Several bony pathways are responsible for unintended spread of anesthetic agent

1. Inferior orbital fissure and pterygopalatine fossa are in open communication with one another in the orbital region and greater palatine canal is in communication with inferior aspect of the pterygopalatine fossa. Anaesthetic solution may diffuse widely among these bony openings.

2. The abducens nerve is most vulnerable in the region of the orbital apex, where it lies deep on the (intraconal) surface of the lateral rectus muscle. Anterior to this region, the nerve quickly enters the muscle, which is covered by dense fascia (3) (2).

It has also been stated that the recumbent position of the patient during anesthetic administration may also play the role (2).

## Conclusion

The patient can be assured of a good prognosis since cessation of symptoms generally occurs within a few hours. Since there were multiple injection sites and the bony

pathways are not strictly separated from one another, it is impossible to conclude which of the suspected scenarios was fully or partially responsible for the observed paresis of the lateral rectus muscle.

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