



DIPLOPIA FOLLOWING INTRA-ORAL LOCAL ANAESTHESIA- A CASE REPORT

Maxillofacial Surgery

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ABSTRACT

Context There are several local and systemic complications associated with the administration of intra-oral local anaesthesia. Very few cases of ophthalmic complications following use of intra-oral local anaesthesia are reported till date. **Case Description** Diplopia is one of such very rare complications that follow a posterior superior alveolar nerve block. This article describes a very rare case report, the possible mechanisms and their management. The patient was administered PSA nerve block for the extraction of the upper left third molar tooth. After the extraction, the patient complained of double vision and not being able to abduct the left eye. The patient recovered completely after the anaesthetic effect wore off. **Conclusion** The clinician needs to be aware of such ophthalmic complications and their management.

KEYWORDS

Ophthalmic Complications, Diplopia, Local Anaesthesia, Posterior Superior Alveolar Nerve Block

INTRODUCTION

Intraoral administration of local anaesthetics is the most widely used and safest method for controlling pain during any dental procedure. Several complications both local and systemic, have been associated with its use. Reported local complications are pain during injection, haematoma, blanching of the skin, and temporary peripheral facial nerve palsy or systemic changes, such as anaphylaxis and reactions to overdose. [1,2]

Distant manifestations, such as facial nerve palsy, ipsilateral middle ear and ipsilateral ocular disturbances, have also been reported. Unexpected ophthalmic manifestations can occur both after maxillary (seen most commonly with posterior superior alveolar nerve block) and after mandibular anaesthesia (seen most commonly with inferior alveolar nerve block). The ophthalmic complications range from blurring of vision, amaurosis (temporary blindness) to anaesthesia of motor neurons resulting in mydriasis (pupillary dilation), ptosis (droopy eyelid), and diplopia (double vision). Horner-like manifestations involving ptosis, enophthalmos (recession of the eyeball within the orbit), and miosis (papillary restriction) have also been reported. [2]

Case Report

A 57-year-old male patient visited the Department of Oral and Maxillofacial Surgery of our Institute with the chief complaint of pain at the posterior region of upper jaw over the, since last two months. On intraoral examination, left upper second and third molar were found to be grossly carious and the patient was advised have these teeth extracted. The left posterior superior alveolar nerve block and a left greater palatine nerve block was performed with 2% Lignocaine hydrochloride with 1:80,000 epinephrine, for the extraction of the same. After making sure that the anaesthesia was effective, the teeth were extracted. After about half an hour when after the extraction was already had been completed, the patient complained of double vision. After proper examination, it was found that, the pupil of left eye was shifted medial to midline in straight ahead gaze (Figure 1) and the movement of the pupil of the same eye was restricted laterally. The range of motion in all other eight gazes of left eye were normal (Figure 2). Motility of right eye was not hampered in any of the gazes. For understanding the type of diplopia, patient was asked to follow the finger that was moved along all nine gazes. The patient saw double images in lateral gaze of left eye. It was binocular diplopia and horizontal in nature. Pupillary light reflexes were checked in both the

eyes, and no abnormalities were noted. All the vital signs were checked to be normal. Thus, it was confirmed that there was abducent nerve palsy, resulting in diplopia.



Figure 1- When The Patient Was Asked To See Straight, It Was Seen That The Pupil Of The Left Eye Was Shifted Medial To The Midline.



Figure 2- Movement Of Both The Pupils In All Nine Gazes. It Was Seen That In Straight Ahead Gaze, The Left Pupil Was Shifted A Bit Medially And In Lateral Gaze, The Movement Of Left Pupil Was Restricted.

The patient was assured of the temporary nature of the complication. The patient was kept under observation. As the effect of local anaesthesia gradually reduced, the patient recovered. After about two hours, the patient was checked for double vision and movement of the pupil of the eye, and this was found to be better than before. After about four hours, the patient's eye sight had fully recovered and he was sent home with his attendant.

Communication was carried out throughout the same day about the update to make sure that his vision was continuing to improve and he was also asked to visit the next day for follow up. There was no further complication regarding this.

DISCUSSION

Ocular complications following local anaesthesia are uncommon and the frequency is estimated to be 1 in 1000. From the patient's point of view, this is a totally unexpected event and may be extremely alarming. The clinician, if not acquainted with the nature of these complications, may fail to diagnose such an incident or understand how the situation can be handled on an expert note.

The reasons for ophthalmic complications following extraction of upper molars can be explained as follow: Figure 3- Schematic diagram showing how local anaesthetic solution reaches orbit through different foramina.

Diffusion Through Several Foramens-

Simple diffusion of anaesthetic solution from the pterygomaxillary fossa to the orbit through foramen or fissure in the bone or via the vascular, lymphatic, and venous networks that link these spaces may result in ocular consequences. (Figure 3)

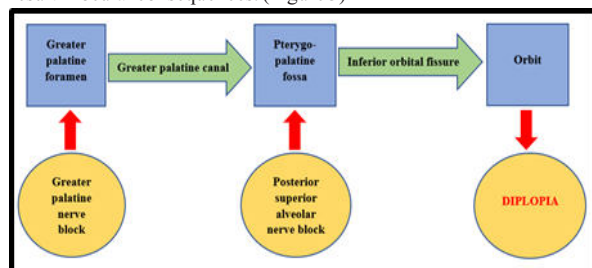


Figure 3- Schematic Diagram Showing How Local Anaesthetic Solution Reaches Orbit Through Different Foramens.

1. Pterygopalatine fossa communicates with the orbit through the inferior orbital fissure. This may serve as the connection between posterior superior alveolar nerve block and ocular complication.
2. Greater palatine foramen communicates with the pterygopalatine fossa through the greater palatine canal. Thus, when anaesthetic solution is deposited for greater palatine nerve block, it may reach the pterygopalatine fossa, followed by orbit.

Arterial Cause-

The main blood supplying to the orbital structures is the ophthalmic artery and its branches, lacrimal artery being the most significant one. The most crucial collateral blood supply to the orbit is the middle meningeal artery. There lies an anastomosis between the middle meningeal artery and a branch of the lacrimal artery or a branch directly arising from the ophthalmic artery through the superior orbital fissure. (Figure 4)

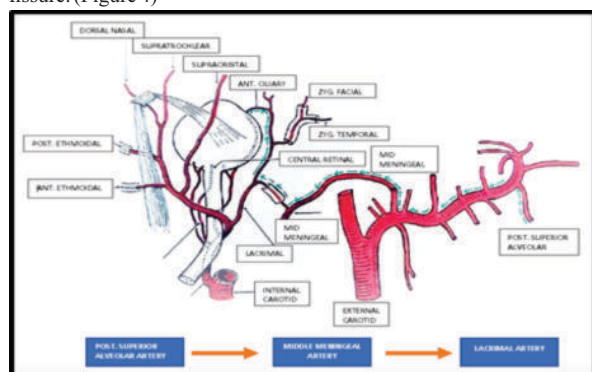


Figure 4- Schematic Diagram Showing How Local Anaesthetic Solution Reaches Orbit Through Artery In Retrograde Fashion.

Inadvertent intra-arterial injection into the posterior superior alveolar artery, with retrograde flow to the internal maxillary artery and then to the middle meningeal artery followed by affecting the lacrimal artery due to their anastomosis, may be considered as one of the theories.

Venous Cause-

This hypothesis proposes an inadvertent venous injection into the pterygoid venous plexus to explain a possible cause of ocular complication. The pterygoid plexus of veins that surrounds the lateral pterygoid muscle would transfer the anaesthetic solution via emissary veins through the foramina ovale to the cavernous sinus. (Figure 5)

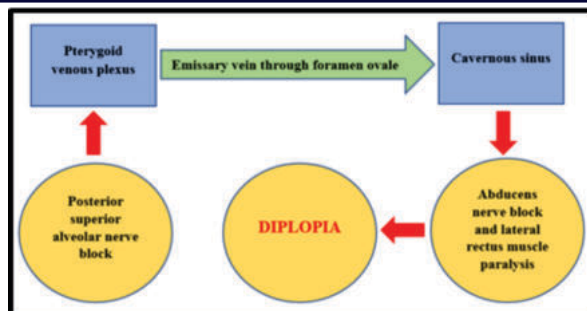


Figure 5- Schematic Diagram Showing How Local Anaesthetic Solution Reaches Orbit Through Veins.

From there, the anaesthetic solution could block the abducens nerve leading to transient paralysis of lateral rectus muscle eventually resulting in diplopia. [3]

Prevention And Treatment

Although ocular complications of intraoral anaesthesia are very rare, once they occur, they are very distressing to the dentist and also creates serious anxiety to the patient. So, to prevent such complications, following precautionary measures can be taken: [2,4]

1. A thorough knowledge of the anatomical structures properly with regard to the particular nerve block is important.
2. Aspiration in all three planes at the point where the local anaesthetic is administered should be done before depositing the anaesthetic solution. Also, the needle tip should remain stationary during the administration of anaesthetic solution.
3. Deposition of anaesthetic solution should be done performed slowly.
4. Forceful deposition of anaesthetic solution should must be avoided.
5. The depth of needle insertion should not be too high. For the proper administration of the PSA nerve block, after palpating all the anatomical landmarks, a 25-gauge needle is inserted to the depth of 14 – 16 mm and the solution is deposited.

In some cases, if such ocular complications occur despite following all the precautionary measures, it should be managed with utmost care. Lee and van der Bijl suggest the following management guidelines: [2,5]

1. Reassure the patient as to the usually transient nature of these complications
2. Continue to monitor the patient's vital signs
3. Cover the affected eye with gauze dressing to protect the cornea for the duration of anaesthesia
4. Functional monocular vision will be restored by covering the affected eye. The patient should be escorted home by a responsible adult, because monocular vision is devoid of distance-judging capability
5. Should the ocular complications last longer than 6 hours, refer patients to an ophthalmologist for evaluation
6. Continue regular follow-up procedures.

CONCLUSION

Ocular complications of local anaesthetic injections in dentistry although rare but it should not be ignored. Practitioners should have proper knowledge about the ocular complications and its prevention and immediate management. Patient should be referred to ophthalmologist if there are lingering ocular disturbances after anaesthesia wears off. Prompt diagnosis and appropriate management prevents permanent ocular damage.

Consent

Written informed consent were obtained from the patients for publication of this research article and accompanying images.

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Conflicts Of Interest

The authors of this manuscript declare that they have no conflicts of interest, real or perceived, financial or nonfinancial in this article.

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