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Document heading **doi: 10.21276/apjhs.2017.4.1.26** **Case report**

Abducens nerve palsy and diplopia concomitant with psa nerve haematoma secondry to posterior superior alveolar nerve block

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ABSTRACT

Complications in local anesthesia practice have been described in literature in terms of their local and systemic manifestations. These complications arise to a variable degree. It is important for a practicing clinician to be aware of all of these complications whether common or rare, for the effective management of the same. In this article we will discuss about a rare local ophthalmic complication following the commonly practiced posterior superior alveolar (PSA) nerve block concomitant with relatively more commonly occurring local complication of hematoma.

Keywords: Abducens nerve palsy, Transient Diplopia, PSA block hematoma, ophthalmic complication, Lateral rectus palsy

Introduction

In a day to day practice lot of minor surgical procedure are carried out under local anesthesia. various techniques of nerve blocks are described but practice of local anesthetic administration is not without complications. Many systemic and local complications are known to occur as a result of these local anesthetic injections. These complications occur with varying frequencies being commonly or rarely encountered. Few rarer complications reported in the published literature are ophthalmic disturbances following maxillary or, mandibular nerve blocks. It is estimated that ophthalmologic complications occurs in ~1 in 1000 local intraoral anesthetic injection[1].The only blocks leading to such ocular disturbances as described are inferior alveolar nerve blocks, posterior superior alveolar nerve blocks and greater palatine nerve block approach for maxillary nerve as reported in the Literature [2].Ophthalmic manifestation after nerve blocks, though unexpected to occur may include blurred vision, transient diplopia, amaurosis, abnormal papillary light reflex, posies, mitosis, retro bulbar pain, restricted eye movement, nystagmus, enopthalmos [4].Permanent loss of vision is also reported as a result of administration of local anesthesia for a dental extraction[5].Out of all ophthalmic manifestation, a much rare presentation seen is diplopia with abducens nerve palsy. None of the reports have mentioned a concomitant occurrence of above complication along with posterior superior alveolar nerve block hematoma. In this article we have discussed occurrence of rare complication of ocular symptoms concomitantly with common complication of hematoma formation after PSA nerve block administration. We have also reviewed the literature to discuss about the varied kind of ophthalmic symptoms which may arise following PSA Nerve block and management of the same.

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Case report

A 38 yr old woman reported to the department of Oral and Maxillofacial Surgery with complaint of pain in upper right back tooth region. After clinical and radio graphical examination, upper right third molar was indicated for extraction. Extraction of the offending tooth was planned to be carried out after local anesthesia (posterior superior alveolar nerve block) with all the necessary recommended armamentarium in place. Then recommended technique for PSA block [12] was strictly followed. A 25 gauge short needle was used. After loading local anesthetic agent, the needle was inserted upward, backward and inward into the height of mucobuccal fold over the second molar at an angle of 45 degrees to occlusal plane. Aspiration within the tissues was done in two planes by rotating the needle one fourth turn. Negative aspiration was achieved and solution was deposited. After approximately 1 minute patient developed swelling in upper right side of face (figure1 & figure 2). Patient also complained of double vision with right side eye. Initial clinical, ophthalmic examination was carried out by us (figure 3). The eye movements were normal for right eye except impaired abduction on lateral gaze. The left movement was normal in all direction of gaze. Binocular nature of diplopia was confirmed clinically. The procedure was aborted and patient was sent for ophthalmic evaluation. Fundoscopy revealed to be normal. Patient was reassured for the transient nature of the symptoms and was sent home with instructions for eye care. Patient was recalled on next day. All ophthalmic symptoms, diplopia and impaired abduction had disappeared (figure 4). Swelling and skin color change pertaining to hematoma was still present (figure 4). Patient was kept for follow up for hematoma which resolved in a week's time.

Expected Pathophysiology

Reported case is a rare complication therefore its incidence of occurrence is difficult to calculate. Majority of such reported cases are transient in nature. Many hypotheses have been put forward to explain the pathophysiology of such rare ophthalmic complication occurring secondary to maxillomandibular nerve block administration. Ocular complication as a result of mandibular nerve block may be due to vascular, neurologic reason or due to myofascial planes providing the path of least resistance for the diffusion of anesthetic solution. Similarly maxillary nerve block causes complication by various pathways. These include (1) direct diffusion for anesthetic solution from pterygomaxillary fossa to the orbit through defect in the bone. (2) Vascular cause. In this reported case the reason for the ophthalmic complication seem to be vascular cause due to concomitant occurrence of hematoma.[7]

Inadvertent intra-arterial injection:- It states that inadvertent injection in directly in superior alveolar artery with excessive pressure result in retrograde flow to the maxillary artery. It can be described with the help of a flowchart.

Inadvertent intra arterial injection

↓

Superior alveolar artery

↓

Retrograde flow to internal maxillary artery

↓

Middle meningeal artery (often penetrate to)

↓

Superior orbital fissure

↓

Anastomose to lacrimal branch of ophthalmic artery

↓

Arterial transfer of anesthetic solution to the orbit

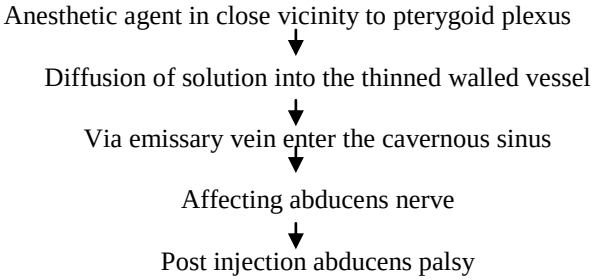
↓

Wide spread ophthalmic effect including paresis of lateral rectus muscle.

↓

Inadvertent venous injection:- This hypothesis states that possibility of depositing the solution too close to pterygoid plexus present within the infratemporal fossa .

↓



Amongst the several hypotheses most appropriate theory that can be correlated to the reported case is intravenous pathway. This can be supported by the evidence concomitant occurrence of hematoma.

Discussion

Ophthalmic disturbances following dental nerve blocks are not so common finding. Diplopia secondary to PSA block is a rare finding and simultaneously there may be limited abduction of ipsilateral eye. Diplopia is the most common ophthalmic manifestation as reported in the published literature[1].Brain WR IN 1931 was the first one to report the unusual case of occurrence of permanent occulomotor palsy after 2 days following extraction of maxillary incisor[8].In 1962 JC Cooper published a paper reporting a case of development of transient amaurosis diplopia, and Horner like manifestation following inferior alveolar nerve block[9].Epstein et al published a paper in 2005 showing permanent vision loss in one eye following local anesthetic injection for dental extraction. Proposed mechanism was an intra-arterial injection with excessive pressure resulting in retrograde flow leading to occlusion of retinal and choroidal vasculature[5].Mostly the encountered ophthalmic complication are transient in nature which are expected to get resolved in 6 hours. These complications are more common in maxilla as compared to mandible because of difference in bone density owing to increased diffusability. Diffusion properties of articaine are more extensive as compared to other local anaesthetic [6].So as to prevent such ocular complications LA administration should always be accompanied with aspiration. Solution should be administered slowly, without undue pressure and with frequent aspiration. One such complication has occurred; they should be managed according to guidelines suggested by lee[10].and Vander bije[11].Patient should be reassured about the transient nature of the disease. Patient's vital signs should be monitored. Proper eye care should be done for the affected eye to protect the cornea during the course of anesthesia. Eye care also helps in restoring the functional monocular vision. If the ocular complication lasts for more than 6 hours then patient should be referred for detailed ophthalmic evaluation. Patient should be kept on regular continuous follow up.In our experience diplopia and lateral rectus palsy was seen concomitantly with hematoma secondary to PSA nerve block. Literature mentions two main causes of hematoma. If the onset of hematoma is sudden, it is due to maxillary artery whereas if it occurs with late onset then it is due to injection and rupture of pterygoid plexus[12].Immediate management for hematoma includes digital pressure application in the mucobuccal fold as distally as tolerated by patient along with ice packs. Though these complication seem to be transient but may result in permanent loss of vision because of anatomic complexity invasive procedures should be done with due attention taking care of any possible complication that may occur.

Fig 1 : patients showing dumbbell shaped swelling with right side of face after PSA nerve block.

Fig 2: bird's view – swelling with right side of face after PSA nerve block.

Fig 3: impaired abduction with right side eye on lateral gaze after PSA nerve Block.

Fig 4:normal bilateral eye movements on lateral gaze, ecchymosis present with right side cheek region.

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