



ORIGINAL RESEARCH PAPER

Oral & Maxillofacial Surgery

AN UNUSUAL OCULAR COMPLICATION FOLLOWING INTRAORAL LOCAL ANESTHESIA – A CASE REPORT AND REVIEW OF LITERATURE

KEY WORDS: ocular, complication, local anesthesia , PSA block

Dr. Supriyo Paul	Final year PGT, Dept. of Oral & Maxillofacial Surgery, Guru Nanak Institute of Dental Science and Research(GNIDSR), Kolkata
Prof. Dr. Amit Ray	Prof. and HOD, Dept. of Oral & Maxillofacial Surgery, GNIDSR, Kolkata
Dr. Labani Kole	Final year PGT, Dept. of Oral & Maxillofacial Surgery, GNIDSR, Kolkata
Dr. Rajarshi Bandopadhyay	Sr.Lect., Dept. of Oral & Maxillofacial Surgery, GNIDSR, Kolkata
Dr. Satyajit Kundu	Sr.Lect., Dept. of Oral & Maxillofacial Surgery, GNIDSR, Kolkata
Dr. Md Rabiul Islam	Asst. Professor, Dr.R Ahmed Dental College and Hospital, Kolkata

ABSTRACT

Intraoral administration of local anesthetics is one of the most common dental procedures. Although this procedure is well known for its safety, complications can still occur. Ocular complications due to intraoral local anesthesia are rare but most distressing to the surgeon and patient. Ocular complications after local anesthetic injections are rarely reported in the literature and these complications include strabismus, ptosis, diplopia, blindness, ophthalmoplegia, loss of accommodation. A 50 year-old male patient developed transient diplopia and ipsilateral lateral rectus muscle paralysis following administration of local anesthesia for left maxillary third molar extraction. The patient was informed and proper instructions were given regarding the complications. Most of ocular complications are temporary; They can revert back to normalcy after anesthetic affect wears off. Complete resolution occurred within 2 h. Oral surgeons should be well aware of the ocular complications and its prevention and immediate management.

INTRODUCTION:

Occasionally patients may present with complications associated with administration of local anaesthesia. There are few local complications like trismus, hematoma, edema, facial nerve paralysis, burning upon injection, post anesthetic intra oral lesions, infections, soft tissue injury, sloughing of tissues, needle breakage, anesthesia failure, and ophthalmologic complications etc. and few systemic complications like Headache, syncope, allergy, and undesirable cardiovascular effects etc. Ophthalmic complications are relatively rare and account for 0.04 to 0.1% of all complications^{8,10} Typical ophthalmologic complications after intraoral local anesthesia include- amaurosis (13.0%), diplopia (39.8%), enophthalmos, miosis , mydriasis (14.8%), ophthalmoplegia and ptosis (16.7%), hypoesthesia on the lateral aspect of the upper and lower eyelids squinting difficulty in reading due to paralysis of accommodation, transient dizziness etc.²

Causes of ophthalmologic omplications associated with La²-

- Damage to blood vessels and hematoma formation.
- Displacement of the orbital structures.
- Classic retrobulbar block producing mydriasis, corneal anesthesia, and ophthalmoplegia.
- Regional block of the sixth cranial nerve, producing diplopia

The ocular muscles can also be indirectly affected during anesthesia of the maxillary nerve via the greater palatine canal, the infratemporal fossa, or the infraorbital sulcus. A reflex vasospasm of the central retinal artery results in ischemia and necrosis of retinal tissue causing permanent blindness.¹⁶

A Case Report

A 50 year-old male patient came to the OPD of Dept. of Oral & Maxillofacial Surgery in Guru Nanak Institute of Dental Sciences and Research, Kolkata for extraction of carious left maxillary 2nd molar (Fig- 1). He had no relevant medical and

surgical history. But after few minutes of administration of local anesthesia (1.5 ml 2% lignocaine with adrenalin 1:80000) and extraction of concerned tooth he suddenly complained of blurred vision. After systemic evaluation and neurological evaluation clinical examination revealed paralysis of the sixth cranial nerve at left side, apparent from absence of abduction movement of the left eye (Fig 5). As the vital signs of patient were within normal limit the patient was assured and asked to wait. He was informed about the complication, a cover was placed over the left eye, and proper instructions were given regarding the tooth extraction performed. Binocular diplopia and restriction of abduction of the left eye ceased, coinciding with the end of the local anesthetic effects. The patient was recalled after 7 days. At the recall appointment, no visual or motility alteration of the involved eye was observed.



Fig 1- IOPA xray of left maxillary 2nd molar



FIG:2



FIG:3



FIG:4

FIG:5

Fig 2,3,4- Normal movements of superior rectus, medial rectus and inferior rectus of both eye. Fig 5- Loss of abduction due to left side lateral rectus palsy and hyperactivity of left medial rectus.



Fig 6- Partial resolution of paralysis after 30 mins



Fig 7- Complete resolution of paralysis after 2 hrs



Fig 8- Normal motility of affected eye after 7 days on follow up.

Review of Literature:

The first case of ocular complication after intraoral anesthesia was reported by Brain in 1936. He described an unusual case of permanent oculomotor palsy that developed 2 days after a maxillary incisor extraction.¹⁷ Penarrocha-Diago and Sanchis-Bielsa (2000) presented a series of 14 cases of ophthalmologic complications after intraoral anesthesia of the PSA. Joseph Horowitz et al (2005) presented three case reports.³ Rood reported a case in whom 1.5 ml of lidocaine with epinephrine (1:80,000) was injected into the inferior alveolar nerve and the patient experienced vision impairment in the ipsilateral eye, palpebral ptosis and medial strabismus. The patient also experienced palatal mucosa ischemia. Nevertheless, the symptoms remitted after 5 to 45 minutes.¹⁴ Magliocca et al (2006) presented a case of 36-year-old female patient who developed diplopia and an ipsilateral lateral rectus paresis following local anesthetic administration to remove a left maxillary second molar.¹³ In 2006 Wei Cheong Ngeow, Chen Kiong Shim and Wen Lin Chai presented a case report of two

patients who developed transient loss of power of accommodation of the eye resulting in blurred vision after routine inferior alveolar nerve blocks on the ipsilateral side.¹⁹ Williams and Williams (2011) reported the unusual case of a young patient who experienced amaurosis, total ophthalmoplegia, complete upper eyelid ptosis, mydriasis and periorbital blanching following inferior alveolar nerve anesthesia.²⁰ Kini, Kharkar and Kini (2011) have explained details about an iatrogenic paresis of the abducent nerve and partial palsy of the oculomotor nerve leading to diplopia, strabismus and ptosis following a posterior superior alveolar nerve block and extraction of maxillary right second molar.²¹ Jose-Maria Aguada et al (2011) carried out a review of 19 articles to find out the incidence and type of ocular complications after intraoral local anesthesia.¹⁰ Almost all of the complications were of a temporary nature, with an average recovery time of 68 minutes. Verma, Rajan and Prabhu (2012) have reported two rare cases of transient isolated amaurosis. Both the instances of amaurosis were seen after inferior alveolar nerve blocks. The condition was transient and resolved without any active intervention.¹⁷ Steenen et al (2012) reviewed the literature from the Years 1936 to 2011 and showed 131 cases with this type of complication and also presented a case report of a patient with right lateral rectus muscle palsy and blurred vision after bimaxillary anesthesia.¹⁵ P. RAVI ET AL² told in their study that all complications commonly occurring complications are diplopia and lateral rectus palsy (fig.9)

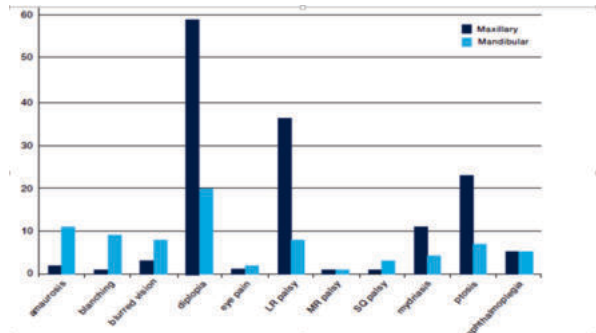


Fig.9 – Distribution of ocular complications given in the study of P.Ravi et al.²

DISCUSSION

The CNVI emerges from the brainstem between the pons and bulbar pyramid. It courses behind the anterior inferior cerebellar artery and enters the cavernous sinus, leaving the skull through the medial end of the superior orbital fissure (Fig 10) as it enters the orbit, running on and penetrating the medial surface of the lateral rectus which abducts the eye.⁵

Ophthalmologic complications associated with the inferior alveolar nerve (45.8%) or the posterior superior alveolar nerve (40.3%) has been reported in literature. There are several hypotheses explaining paralysis of the CNVI.³

Possible explanations given by John Crean and Alison Powis⁴

- (1) The inadvertent deposition of local anesthetic solution passes through the inferior orbital fissure to cause direct anesthesia of the abducent nerve.
- (2) The local anesthetic solution reaches the inferior ophthalmic vein via the pterygoid plexus or its communicating branches. This vein contains no valves and connects directly with the extrinsic muscles of the eye via the infra orbital foramen. An intraluminal injection may easily reverse the flow within the vessel, thus predisposing the muscles to the effect of the anesthetic solution.
- (3) Deposition of the anesthetic solution within the PSA artery causes a back flow into the connecting maxillary artery and subsequently into the middle meningeal artery. There exists a

constant anastomosis between the orbital branch of the middle meningeal and the recurrent meningeal division of the lacrimal branch of the ophthalmic artery. This lacrimal artery supplies the lateral rectus muscle, the lacrimal gland, and the outer half of the eyelids, which due to these anatomical considerations may explain these symptoms.

(4) The local anesthetic solution reaches the abducent nerve within the cavernous sinus through the infratemporal fossa and the pterygoid plexus and its connecting emissary veins passing through the foramen ovale and lacerum.

Other possible hypotheses include the possibility of the anesthetic solution penetrating the orbital fossa via the maxillary sinus wall.⁷

The ophthalmic branch of the middle meningeal artery may connect to the lacrimal artery supplying the right lateral muscle and the anesthetic may reach it and paralyze it. Right lateral muscle paralysis is the most common.¹¹

Ocular complications may also occur by simple diffusion of the anesthetic from the pterygo-maxillary fossa into the orbit through defects in the bone or via the vascular, lymphatic, and venous pathways.⁵

Autonomic dysregulation²: Ocular complications occur despite negative aspiration. Kronman et al reported that inadvertent scraping of arterial wall causes sympathetic impulse which reaches from ASA/MSA/PSA to internal carotid plexus and then via ophthalmic artery it reaches to orbit.

Campbell et al reported that stellate ganglion may be blocked by diffusion through the fascial planes resulting in miosis and enophthalmos in certain cases.

In our case, loss of abduction of left eye due to left lateral rectus muscle palsy set in about 10 minutes, after intraoral local anesthetic injection in the left posterior superior alveolar nerve and its effect disappeared after 2 hours.

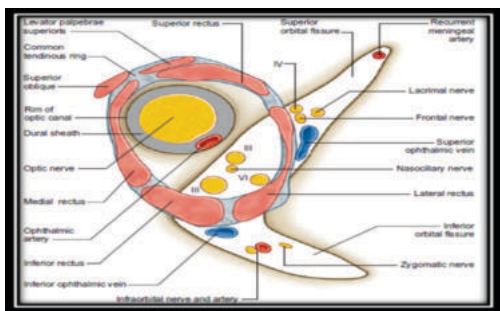


Fig 10- Supra Orbital Fissure



Fig 11- Placement of needle towards Infra Orbital Fissure.

Management:

In the case of ocular complications the vital signs, level of consciousness, eye movement, vision, facial muscle movement, and blanching must be evaluated to obtain a definitive diagnosis. As far as the patient is concerned, these

incidents may be very alarming. The doctor, if he/she is not acquainted with these types of complications, may fail to diagnose such an incident and may even attribute it to a more serious event, like a transient ischemic attack. It is therefore vital that the doctor understand the etiology and pathogenic mechanism of these complications.¹¹

Once an ocular complication has occurred, the guidelines recommended by Lee, Vander Bijl and Boynes may be followed⁵

- Reassurance of the patient is the most important step.
- An eye patch may be applied to the affected eye, to protect the cornea, due to the anesthetic effects as well as to restore functional monocular vision.
- An evaluation by the ophthalmologist is quintessential in case the complications last for longer than 5 hours.
- When visual acuity is affected patients should be warned against difficult tasks like driving, using sharp objects and going home unaccompanied until the anesthetic effect wears off.
- Care must be taken especially when procedures are attempted on children, who cannot express the symptoms. Therefore, the clinicians must be vigilant during such times, and must foresee ocular complications.

The precautions one needs to take to prevent ophthalmic complications are²:

1. Avoid injections into vascular systems
2. Aspirate prior to injection and slowly administer the anesthetic agent
3. Knowing the anatomical structures properly with regard to the particular nerve block.
4. Follow the accepted injection techniques and procedures.
5. Use the needle of proper size.
6. Use the anesthetic solution in proper amount.

CONCLUSION:

Temporary paralysis of the CNVI is a possible complication of LA of the posterior maxilla. Right location, depth using a needle of appropriate size with proper amount of LA should be accessed. Reassurance to the patient is needed. Use of eye patch and taking eye care.

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