Potentially blinding adverse drug reaction to peribulbar lignocaine anesthesia: A rare case report

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Abstract:
Peribulbar lignocaine anesthesia is commonly used in ophthalmic surgeries. It rarely causes any severe allergic reaction. A 63-year-old male presented with complicated pseudophakia. He underwent successful vitrectomy under local anesthesia. He later presented with acute-onset proptosis, orbital swelling, and extraocular movement restriction. He was afebrile with normal blood workup and radiological investigations and gave a similar past history. The patient was treated successfully with intravenous medications but two months later developed optic atrophy. An adverse reaction to lignocaine appears to be the most probable cause. Early detection and prompt management of this condition may avert a potentially grave visual outcome. Literature review shows that this case is one of its kinds to report this potentially blinding complication of peribulbar lignocaine anesthesia.

Keywords:
Adverse reaction, anesthesia, lignocaine, optic atrophy, periorbital inflammation

Introduction
Carl Koller first investigated the use of cocaine as a topical anesthetic for eye surgery in 1884.[1] Herman Knapp first used cocaine for retrobulbar anesthesia in the same year.[2] Peribulbar anesthesia was popularized by Davis and Mandel in 1986.[3] Peribulbar anesthesia with lignocaine or bupivacaine is safe and commonly used in ophthalmic surgeries. Herein, we present a case of optic nerve dysfunction secondary to acute-onset periorbital edema as an adverse drug reaction to a peribulbar injection of a local anesthetic. To the best of our knowledge, this case is one of its kinds in the literature reporting this potentially blinding complication.

Case Report
A 63-year-old male presented to us with a complaint of diminution of vision in the right eye (OD) for 2 days. He gave a history of facing complication during the cataract surgery elsewhere of OD 2 days back. His visual acuity at the time of presentation was 20/20 in the left eye (OS) and counting finger at 1-m OD. On slit-lamp examination of OD, there was presence of anterior chamber cell (AC) 2+, AC flare 2+, cortical lens matter in AC, intraocular lens in the sulcus, posterior capsular rupture, and intraocular pressure (IOP) of 21 mmHg. OD fundus could not be examined due to the cortical lens matter obstructing the view. OS anterior segment examination was unremarkable, retina on, and disc pink and vertical cup–disc ratio of 0.5 with IOP of 18 mmHg. Ultrasound B-scan OD showed the presence of echoes in the vitreous cavity and over the posterior pole suggestive of lens matter in the vitreous cavity. The patient was then posted for 23-gauge pars plana vitrectomy.

To achieve dilatation of the pupil, tropicamide 1% and phenylephrine 10%
eye drops were used. Peribulbar anesthesia with 4 mL lignocaine hydrochloride 2% with adrenaline 1 in 200,000 and hyaluronidase 500 IU was administered by an experienced anesthetist. Anesthesia was satisfactory, and uneventful 23-gauge core vitrectomy was performed with removal of cortical lens matter from vitreous cavity. OD retina was on, and the disc was pink. Immediate postoperative recovery was uneventful.

Six hours postsurgery, he reported with complaints of pain and swelling of the right eye. OD examination showed noticeable chemosis, periorbital swelling, redness, tenderness of eyelids, axial proptosis, and a tense orbit [Figure 1a]. There was no perception of light OD. The pupil was dilated with sluggish reaction to light and marked restriction of extraocular movement OD. The visual axis was clear with hyperemic disc, and IOP was elevated to 22 mmHg. OS examination showed mild lid edema with unremarkable anterior and posterior segment examination. Systemic symptoms were absent.

On further questioning, he gave a history of a similar episode in OS and OD at the time of cataract surgery done previously under peribulbar anesthesia (lignocaine 2% with adrenaline 1 in 200,000). Complete blood count, erythrocyte sedimentation rate, blood glucose levels, electrolyte levels, serum homocysteine, and angiotensin-converting enzyme levels were normal. Venereal disease research laboratory test (VDRL) was nonreactive. Antinuclear antibodies, antiphospholipid antibodies, and blood cultures were negative. Magnetic resonance imaging scan of the brain and orbit was remarkable. Hence, a differential diagnosis of lignocaine hypersensitivity (on the Naranjo’s causality assessment scale, the adverse event was 8 indicating a “probable” reaction to lignocaine) or orbital infection or hemorrhage was made.

He was started on intravenous (IV) methylprednisolone 1gm/day, IV amoxicillin, and clavulanic acid 1.2g 2 times/day for 3 days. Over the next 3 days, the ocular condition improved and the IV medications were changed to oral medications [Figure 1b]. After 1 week, there was a resolution of proptosis, ocular motility was not restricted, but his visual acuity in OD remained at counting finger at 1 m with relative afferent pupillary defect (RAPD) positive. He was discharged and put on topical brimonidine tartrate 0.2%, timolol maleate 0.25%, prednisolone acetate 1%, and also referred for allergological tests. Subcutaneous injection of lignocaine showed an erythematous reaction at the test site which resolved within 2 h. The rechallenge test with hyaluronidase did not show any erythematous reaction.

Two months later, his visual acuity was counting finger at 3 m, RAPD was positive [Figure 1c]. IOP was 18 mmHg, fundus examination showed the presence of optic atrophy [Figure 2a and b], visual field analysis showed field loss in three quadrants [Figure 2c and d], and visual evoked potential showed reduced amplitude [Figure 2e] OD. The sequence of events is depicted in Figure 1d.

Discussion

Lignocaine is the most commonly used anesthetic agent for many ophthalmic surgeries due to its quick onset of action, good efficacy, and tolerance.[4] It is commonly used in combination with hyaluronidase, a hydrolytic enzyme, which hastens the onset and spread of the peribulbar anesthesia.[5] The time of onset of adverse

![Figure 1: The sequence of events. (a) Periorbital edema, chemosis, erythema, and proptosis in the right eye 6 h after administration of local anesthesia. (b) Resolution of edema after three doses of intravenous steroid. (c) At 2-month follow-up, right eye mid-dilated pupil. (d) Timeline of events and interventions done](image-url)
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Reactions to these agents is unpredictable, and it may involve both the orbital and periorbital structures.

The allergic reaction to local anesthetic agents used in ophthalmic surgeries is rare. Literature review shows only three documented cases with allergic reaction to lignocaine. The first patient developed a reaction after subconjunctival anesthesia, the second patient developed after peribulbar anesthetic injection, and the third one developed after local infiltration for blepharoplasty.\[4,6,7\]

The first two cases developed reaction several hours after the administration of anesthetic, but the third case developed reaction immediately after the injection. In our case, we considered orbital hemorrhage, orbital infection, and drug allergy as the initial differential diagnosis. Infection was thought to be the most probable cause, but it could not be justified as the patient was afebrile with no systemic manifestation and the total white blood cell count was within normal limits and the blood cultures were negative. A delayed orbital hemorrhage was also unlikely as there was no complication before, during, or immediately after surgery. Since the patient developed a similar reaction previously after peribulbar injection of lignocaine, the most plausible cause could be allergic reaction to lignocaine, although reaction to hyaluronidase also cannot be excluded.

**Figure 2:** Optic disc photographs. (a) Right eye showing optic atrophy and (b) left eye showing normal disc at 2-month follow-up. Humphrey visual field 30-2 of (c) right eye showing field loss in three quadrants and (d) left eye showing normal field at 2-month follow-up. (e) Visual evoked potential showing reduced amplitudes in the right eye at 2-month follow-up.
**Conclusion**

Thus, to conclude, this case report highlights a sporadic reaction to the peribulbar lignocaine anesthesia which resulted in grave visual impairment. The possibility of hemorrhage, infection, and allergy should be kept in mind in such cases. Broad-spectrum IV antibiotics should be started if infectious etiology cannot be excluded initially. An allergic reaction, if suspected, should be promptly treated with systemic corticosteroids. Prompt recognition and management can prevent potentially grave visual impairment.

**Declaration of patient consent**

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his consent for his images and other clinical information to be reported in the journal. The patient understands that his name and initials will not be published and due efforts will be made to conceal identity, but anonymity cannot be guaranteed.

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**Conflicts of interest**

There are no conflicts of interest.

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