

Large exotropia after retrobulbar anesthesia

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A 67-year-old woman complained of horizontal diplopia shortly following bilateral cataract surgery with intraocular lens implantation performed under retrobulbar anesthesia. Retrobulbar anesthesia was administered at an inferotemporal injection site using 1 cc lidocaine hydrochloride 2% mixed with bupivacaine hydrochloride 0.5%. The initial ophthalmologic evaluation showed a 12-prism diopter (PD) exotropia, and ocular motility evaluation revealed marked limitation of adduction without vertical limitation. One year after cataract surgery, the exodeviation increased up to 60 PD. The patient underwent an 8.0-mm recession of the right lateral rectus and a 6.0-mm recession of the left lateral rectus. Both lateral rectus muscles were biopsied, and biopsy revealed dense fibrous connective tissue without viable muscular cells. The lateral rectus muscle might be injured by retrobulbar anesthesia, and it could induce large exotropia.

Key words: Exotropia, muscle toxicity, retrobulbar anesthesia

Diplopia after cataract surgery may result from many factors including prolonged sensory deprivation resulting in disruption of sensory fusion, paresis of one or more extraocular muscles, myotoxic effects of local anesthesia, aniseikonia, and preexisting disorders such as myasthenia gravis and thyroid-associated orbitopathy.^[1] Although retrobulbar anesthesia is generally a safe and effective method, ocular or systemic complications have been reported in some cases. Most side effects occur immediately after surgery and in most cases are temporary. However, others such as retrobulbar hemorrhage, optic nerve damage, globe rupture, occlusion of retinal vessels, diplopia, and systemic complications such as cardiac arrest, respiratory depression, central nervous system depression, and seizure may persist.^[2-4]

Among anatomical conditions, inferior rectus muscle paresis is the most common cause of diplopia after retrobulbar anesthesia.^[5] However, here, we report a case of large angle

exotropia with muscle atrophy after retrobulbar anesthesia and include a literature review.

Case Report

A 67-year-old woman was referred to our clinic with complaints of horizontal diplopia shortly following bilateral cataract surgery with intraocular lens implantation performed under retrobulbar anesthesia. The patient had diabetes, which was under control with medical management. The right eye had been operated 2 months and the left eye 1 month prior. There was no record of strabismus before the left eye surgery. There was no relevant family history or a history of diplopia or diurnal variation of symptoms. Retrobulbar anesthesia was administered at an inferotemporal injection site using 1 cc lidocaine hydrochloride 2% mixed with bupivacaine hydrochloride 0.5%. The initial ophthalmologic evaluation showed a 12-prism diopter (PD) exotropia, and ocular motility evaluation revealed limitation of adduction without vertical limitation [Fig. 1]. There was no abnormal head posture, ptosis, or anisocoria. Orbit computed tomography showed bilateral thickening of the lateral rectus muscles [Fig. 2]. General physical and systemic neurologic examinations including brain magnetic resonance imaging, anti-acetylcholine receptor antibody evaluations, electromyography, neostigmine test, and thyroid function tests were within normal limits. Two weeks after the first visit, deviation of exotropia increased to 25 PD; 1 year after cataract surgery, the exodeviation increased up to 60 PD. The patient underwent an asymmetrical recession of the lateral rectus muscles (an 8.0-mm recession of the right lateral rectus and a 6.0-mm recession of the left lateral rectus) because the tightness of the right lateral rectus muscle was more prominent than the left lateral rectus muscle. Central one-third of the lateral rectus muscles (10 mm length) was biopsied.

Two weeks postoperatively, the patient reported improvement in adduction and had no diplopia. The alternate prism cover test revealed orthophoria at near and 10 PD exotropia at a distance. Muscle biopsy revealed dense fibrous connective tissue without viable muscular cells [Fig. 3]. Six months after surgery, exodeviation intermittently worsened to 20 PD.

Discussion

To the best of our knowledge, this is the first case of bilateral lateral rectus contracture after retrobulbar anesthesia. Strabismus after cataract surgery is a well-recognized complication of retrobulbar anesthesia. Extraocular muscle damage is the most common cause, and the inferior rectus is one of the most frequently implicated muscles, probably because of its anatomical location.^[6] Possible mechanisms include direct

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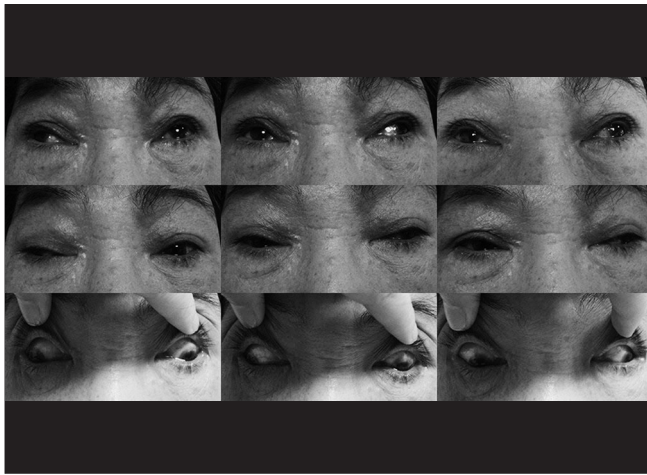


Figure 1: Preoperative nine gaze photograph shows large exotropia and limitation of adduction in the both eye



Figure 2: Initial computed tomography reveals both lateral rectus muscle thickening. (a) Axial view. (b) Coronal view

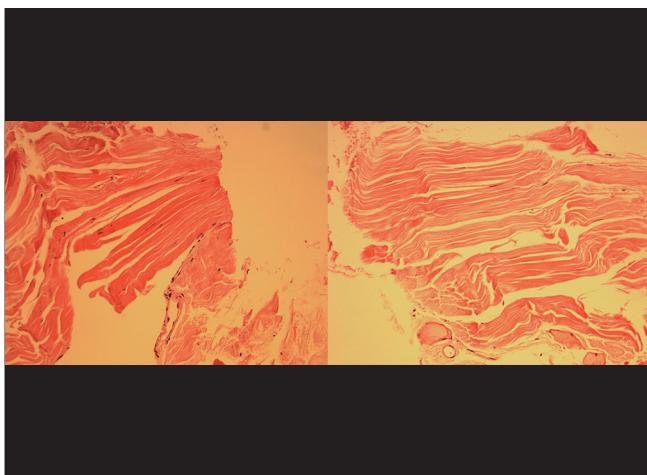


Figure 3: H and E staining shows dense fibrous connective tissue without viable muscular cells

trauma from the needle or bridge suture, myotoxicity due to the local anesthetic, or subconjunctival gentamicin injection.

This is a unique case in which damage to the lateral rectus muscle, secondary to thickening, was probably caused by retrobulbar anesthesia. Local anesthetics have proven selective myotoxicity based on animal testing, in which histological degeneration and regeneration of extraocular muscles has been demonstrated. Degeneration associated with lidocaine is greater than with bupivacaine.^[7,8] The role of subconjunctival gentamicin cannot be ruled out; however, the injection site was not noted in the records.

Other etiologies of strabismus related to retrobulbar anesthesia and cataracts include sensory causes, for example, prolonged occlusion by the cataract; preexisting disorders such as myasthenia; thyroid eye disease; causes related to aphakia/pseudophakia and accompanying optical aberrations; and disorders precipitated by surgery, e.g. myasthenia gravis and thyroid-associated orbitopathy.^[9] We performed a full workup for myasthenia gravis and thyroid-associated orbitopathy. The patient had no ptosis or diurnal variation, and all tests yielded negative results. Furthermore, biopsy of the lateral rectus muscle showed atrophic muscle fibers. Bleik *et al.*,^[10] also reported inferior oblique overaction with atrophic muscle fibers after cataract surgery.

To summarize, the lateral rectus muscle might be injured by retrobulbar anesthesia. Myotoxicity of the lateral rectus due to anesthetic injection should be considered in cases of exodeviation after cataract surgery.

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Conflicts of interest

There are no conflicts of interest.

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