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Xylocaine Toxicity Following Peribulbar Anaesthesia for Cataract Surgery: A Rare Case of Combined Retinal Vascular Occlusion with Complete Retinal Ischaemia.

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Abstract

Background: Xylocaine (lignocaine/lidocaine) is widely used for regional ocular anaesthesia during cataract surgery. Although generally safe, rare but devastating vascular complications can occur, including combined central retinal artery occlusion (CRAO) and central retinal vein occlusion (CRVO). [1-3] We report a case of combined retinal vascular occlusion with 100% retinal ischaemia in the right eye following peribulbar block with xylocaine administered at an outside facility. ***Case Presentation***: A 50-year-old female presented with no perception of light (NOPL) in the right eye following uneventful cataract surgery performed under peribulbar anaesthesia at an outside centre. Examination revealed a posterior chamber intraocular lens (PCIOL) in situ bilaterally, severe optic disc pallor (OD), ischaemic retina on fundoscopy, and an inferiorly shallow retinal detachment in the right eye. The left eye had normal visual acuity (6/6-3) with a grossly normal fundus. Fundus fluorescein angiography (FFA) confirmed combined vascular occlusion with 100% retinal ischaemia in the right eye, while the left eye was within normal limits. Optical coherence tomography (OCT) of the right eye demonstrated significant retinal thinning consistent with ischaemic atrophy. [4,5] Panretinal photocoagulation (PRP) was initiated for the right eye. [6] ***Conclusion***: This case highlights a rare but vision-threatening complication of peribulbar xylocaine anaesthesia. Combined CRAO-CRVO resulting in complete retinal ischaemia is an uncommon but recognised complication that ophthalmologists must be vigilant about. Early recognition, careful injection technique, and appropriate volume and concentration of local anaesthetic are essential to minimise such risks. [7-9]

Keywords: Xylocaine toxicity, peribulbar anaesthesia, combined retinal vascular occlusion, central retinal artery occlusion, central retinal vein occlusion, retinal ischaemia, cataract surgery complication, panretinal photocoagulation.

INTRODUCTION

Cataract surgery is one of the most commonly performed ophthalmic procedures worldwide, with regional anaesthesia being the preferred method of pain control. [1] Peribulbar and retrobulbar blocks using local anaesthetic agents such as xylocaine (lignocaine/lidocaine), bupivacaine, or a combination thereof are standard practice. [2,3] Xylocaine, an amide-type local anaesthetic, acts by blocking sodium channels in neuronal membranes, thereby inhibiting the initiation and conduction of nerve impulses.

While peribulbar anaesthesia is generally considered safer than retrobulbar anaesthesia due to its extraconal approach and reduced risk of globe perforation, [1] it is not without complications. Reported adverse events include haemorrhage, globe perforation, optic nerve injury, extraocular muscle dysfunction, and, rarely, retinal vascular occlusion. [3,7,8] The mechanism of vascular occlusion following local anaesthetic injection is multifactorial and may involve direct mechanical compression of the ophthalmic artery or its branches by the injected volume, [10] vasospasm induced by the anaesthetic

agent, [11] inadvertent intra-arterial injection, or a combination of elevated intraorbital pressure and pre-existing vascular compromise. [7,9]

Combined central retinal artery occlusion (CRAO) and central retinal vein occlusion (CRVO) is exceedingly rare and represents one of the most catastrophic outcomes of periocular anaesthesia. [12-14] The resultant complete retinal ischaemia leads to irreversible visual loss. [4] We present a case of a 50-year-old female who developed combined retinal vascular occlusion with 100% retinal ischaemia in the right eye following peribulbar xylocaine block administered for routine cataract surgery at an outside centre, and discuss the pathophysiology, clinical features, investigative findings, and management considerations.

CASE PRESENTATION

Patient Demographics and History

A 50-year-old female patient (name withheld for confidentiality) presented to the Department of Ophthalmology, SVS Medical College and Hospital, Mahabubnagar, Telangana, India, with a chief complaint of complete loss of vision in the right eye following cataract surgery. The patient had undergone bilateral cataract extraction with posterior chamber intraocular lens (PCIOL) implantation at an outside centre. The surgery was performed under peribulbar anaesthesia using xylocaine (lignocaine). While the left eye surgery was uneventful with good visual recovery, the patient noticed complete loss of vision in the right eye in the immediate postoperative period.

Ophthalmic Examination

Auto-Refraction:

Parameter	OD (Right Eye)	OS (Left Eye)
SPH	-0.25	+0.75
CYL	-3.75	+0.50
AXIS	170	50

Visual Acuity:

Parameter	OD (Right Eye)	OS (Left Eye)
Unaided Distance VA	NOPL	6/6-3
Unaided Near VA	N-	N18
Pinhole	NIF	NIF
BCVA	NOPL	6/6-3
BCNVA	N-	N6

Subjective Refraction:

Parameter	OD	OS
SPH	PLANO	NAG
CYL	-	-
ADD	+2.00	+2.00

Binocular balancing was not performed.

Anterior Segment Examination:

Slit-lamp biomicroscopy revealed a well-positioned posterior chamber intraocular lens (PCIOL) in both eyes. The anterior segments were otherwise unremarkable with clear corneas, deep and quiet anterior chambers, and round reactive pupils in the left eye. The right eye showed a sluggish or absent pupillary response consistent with afferent pathway disruption.

Posterior Segment Examination:

Finding	OD (Right Eye)	OS (Left Eye)
Optic Disc	Pallor +++	Normal
Retina	Ischaemic retina	Grossly normal
Periphery	Inferiorly shallow RD	Normal

Investigations:

Fundus Fluorescein Angiography (FFA):

FFA was performed for both eyes. The right eye demonstrated features consistent with combined central retinal artery and central retinal vein occlusion. The angiographic phases revealed marked delay in arteriovenous transit time with widespread capillary non-perfusion involving the entire retina, confirming 100% retinal ischaemia. There was absent or severely delayed choroidal filling in some areas, and diffuse hypofluorescence secondary to retinal opacification from ischaemic oedema was noted in the late phases. [4,15] The left eye FFA was within normal limits with normal arteriovenous transit and no areas of capillary non-perfusion or leakage.

Optical Coherence Tomography (OCT):

Macular 3D OCT (9.00 x 9.00 mm, A512 x B96) of the right eye was performed. The OCT scan demonstrated significant retinal thinning across all macular subfields consistent with ischaemic atrophy. The summary parameters showed reduced average thickness, foveal thickness, and perifoveal thickness values. The central subfield thickness was approximately 121 microns with superior thickness of 118 microns, inferior thickness of 130 microns, and nasal thickness of 140 microns. The ETDRS map showed values predominantly in the red zone on the normative database, indicating severe thinning below the 1st percentile. [5,16] The cross-sectional B-scan showed loss of inner retinal architecture with atrophic changes consistent with chronic ischaemic damage. [17]

Diagnosis

Based on the clinical findings and investigative workup, the following diagnoses were established:

1. Status post cataract surgery with PCIOL implantation in both eyes (performed elsewhere)
2. Combined central retinal artery and vein occlusion (CRAO + CRVO) of the right eye secondary to xylocaine toxicity during peribulbar anaesthesia
3. 100% retinal ischaemia of the right eye
4. Optic atrophy of the right eye
5. Inferiorly shallow retinal detachment (tractional) of the right eye

Management

Given the severity of retinal ischaemia and the risk of neovascular complications including neovascular glaucoma, panretinal photocoagulation (PRP) was planned in 2-3 sittings for the right eye. [6,18] The first sitting of PRP was completed. The patient was prescribed Nepafenac eye drops (one drop three times daily for one month) and Brimonidine-Timolol (Bidin-T) eye drops (one drop twice daily for one month) for the right eye. The patient was instructed to follow up for the 2nd and 3rd sittings of PRP laser treatment.

DISCUSSION

This case illustrates a devastating but recognised complication of periocular anaesthesia for cataract surgery. Combined retinal vascular occlusion (simultaneous CRAO and CRVO) following peribulbar xylocaine block is an exceedingly rare event, with only scattered case reports in the literature. [7-9,12-14] The pathophysiology underlying this complication is multifactorial and involves several potential mechanisms.

Pathophysiology of Xylocaine-Induced Retinal Vascular Occlusion

Several mechanisms have been proposed to explain retinal vascular compromise following periocular anaesthesia. First, the injection of a large volume of anaesthetic solution into the periocular space can lead to a significant rise in intraorbital pressure. This elevated pressure can mechanically compress the central retinal artery and vein as they traverse the orbital tissue and optic nerve sheath, leading to simultaneous arterial and venous occlusion. [10] The critical closing pressure of the central retinal artery is estimated to be approximately 70 mmHg, and periocular injections can transiently raise intraorbital pressure well above this threshold. [2,10]

Second, xylocaine itself may exert direct vasospastic effects on retinal vasculature. In vitro studies have demonstrated that local anaesthetics can cause dose-dependent vasoconstriction of vascular smooth muscle through direct action and inhibition of endothelium-dependent vasodilation. [11,19] At higher concentrations, this vasospasm can be severe enough to cause complete cessation of blood flow.

Third, inadvertent intra-arterial injection, even of small quantities of anaesthetic, can cause direct endothelial damage and thrombosis. The ophthalmic artery and its branches lie in close proximity to the injection trajectory during peribulbar block, and needle tip migration during injection may result in partial intravascular delivery. [7,9]

Fourth, pre-existing subclinical vascular disease (atherosclerosis, diabetes, hypertension) may lower the threshold for vascular occlusion, making the retinal circulation more susceptible to the combined insult of mechanical compression and vasospasm. [4,8] In our patient, the fact that the left eye underwent a similar procedure without complications suggests that the event was likely related to injection-specific factors in the right eye rather than systemic predisposition alone.

Clinical Features and Natural History

Combined CRAO and CRVO presents with sudden, profound, and usually irreversible visual loss. The inner retinal layers, which derive their blood supply from the central retinal artery, undergo ischaemic necrosis within 90-100 minutes of complete arterial occlusion. [4] The concurrent venous occlusion exacerbates the ischaemic insult by preventing any residual venous drainage and collateral flow. [12,13] In our case, the patient had no perception of light (NOPL) in the right eye, consistent with complete retinal ischaemia.

Fundoscopic findings typically include diffuse retinal whitening (ischaemic oedema), cherry-red spot at the macula (which may be absent in combined occlusion due to associated choroidal ischaemia), attenuated arterioles, dilated and tortuous veins, and in later stages, optic disc pallor. [4,12,20] Our patient demonstrated marked optic disc pallor (graded +++), ischaemic retinal changes, and an inferiorly shallow retinal detachment, likely tractional in nature secondary to fibrovascular proliferation.

Role of Fundus Fluorescein Angiography

FFA is the gold standard investigation for confirming retinal vascular occlusion and quantifying the extent of ischaemia. In combined CRAO-CRVO, FFA characteristically shows markedly delayed or absent arterial filling, prolonged arteriovenous transit time, widespread capillary non-perfusion, and blocked fluorescence from retinal opacification. [4,15] In our case, FFA confirmed 100% retinal ischaemia in the right eye, which is a critical finding as it dictates the need for aggressive prophylactic treatment to prevent neovascular complications. [6]

Role of OCT

OCT provides valuable structural information in retinal vascular occlusion. In the acute phase, inner retinal thickening due to ischaemic oedema is observed. In the chronic phase, as in our case, progressive retinal thinning occurs due to neuronal loss and atrophy of the inner retinal layers (ganglion cell layer, inner plexiform layer, and inner nuclear layer). [5,16] The OCT findings in our patient demonstrated generalised macular thinning with values below the normative database, consistent with chronic ischaemic atrophy. [17]

Management Considerations

In cases of complete retinal ischaemia, the primary concern is the prevention of neovascular complications. Retinal ischaemia is a potent stimulus for the production of vascular endothelial growth factor (VEGF), which drives neovascularisation of the iris (rubeosis iridis), angle (neovascular glaucoma), disc, and retina. [6,18] Neovascular glaucoma (NVG) is a particularly devastating consequence that can lead to intractable pain and phthisis bulbi.

Panretinal photocoagulation (PRP) is the established treatment for preventing neovascularisation by destroying ischaemic retina and thereby reducing the overall VEGF production. [6] In our patient, PRP was planned in 2-3 sittings to provide adequate coverage while minimising treatment-related complications. The first sitting was completed, and the patient was advised follow-up for subsequent sessions.

Anti-VEGF agents (bevacizumab, ranibizumab, aflibercept) may be used as adjunctive therapy, particularly if signs of neovascularisation develop. [18] However, in the setting of 100% retinal ischaemia with no visual potential, the primary goal of treatment is to prevent painful complications rather than restore vision.

Prevention

Prevention of xylocaine-induced retinal vascular occlusion requires attention to several factors. [1-3,7] These include using the minimum effective volume and concentration of local anaesthetic, aspirating before injection to avoid intravascular delivery, avoiding rapid injection that can cause sudden intraorbital pressure spikes, [10] applying gentle orbital compression or digital massage after injection to distribute the anaesthetic and reduce intraorbital pressure, monitoring for signs of vascular compromise (loss of red reflex, absence of ocular movements, pupil dilation) immediately after injection, and considering alternative anaesthetic techniques (topical or intracameral anaesthesia) in high-risk patients. [2,3]

CONCLUSION

This case report highlights a rare but devastating complication of peribulbar xylocaine anaesthesia resulting in combined central retinal artery and vein occlusion with complete (100%) retinal ischaemia of the right eye. [7-9,12] The case underscores the importance of careful injection technique, appropriate anaesthetic dosing, and vigilant post-injection monitoring during regional ocular anaesthesia. [1-3] Ophthalmologists should maintain a high index of suspicion for vascular complications following periocular blocks and should counsel patients regarding this rare but serious risk. Early recognition and prompt initiation of prophylactic PRP are crucial to prevent secondary neovascular complications in eyes with extensive retinal ischaemia. [6,18]

CONSENT

Written informed consent was obtained from the patient for publication of this case report and accompanying images.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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REFERENCES

1. Alhassan MB, Kyari F, Ejere HO. Peribulbar versus retrobulbar anaesthesia for cataract surgery. Cochrane Database Syst Rev. 2015;2015(7):CD004083. DOI: https://doi.org/10.1002/14651858.CD004083.pub3
2. Bellucci R. Anesthesia for cataract surgery. Curr Opin Ophthalmol. 1999;10(1):36-41. DOI: https://doi.org/10.1097/00055735-199902000-00007
3. Wong DH. Regional anaesthesia for intraocular surgery. Can J Anaesth. 1993;40(7):635-657. DOI: https://doi.org/10.1007/BF03009701
4. Hayreh SS. Central retinal artery occlusion. Indian J Ophthalmol. 2018;66(12):1684-1694. DOI: https://doi.org/10.4103/ijo.IJO_1446_18
5. Ahn SJ, Woo SJ, Park KH, Jung C, Hong JH, Han MK. Retinal and choroidal changes and visual outcome in central retinal artery occlusion: an optical coherence tomography study. Am J Ophthalmol. 2015;159(4):667-676. DOI: https://doi.org/10.1016/j.ajo.2015.01.001
6. Hayreh SS. Photocoagulation for retinal vein occlusion. Prog Retin Eye Res. 2021;85:100964. DOI: https://doi.org/10.1016/j.preteyeres.2021.100964
7. Sen A, Mitra A, Jain D, Mukherjee A, Ganguly R. A cluster of central retinal artery occlusions following cataract surgery. Indian J Ophthalmol. 2019;67(5):630-634. DOI: https://doi.org/10.4103/ijo.IJO_1070_18
8. Chua MJ, Chua AWY, Wai YZ, et al. Retinal artery occlusion after ophthalmic surgery under regional anaesthesia: A systematic review. Anaesth Intensive Care. 2024;52(2):95-107. DOI: https://doi.org/10.1177/0310057X231215826
9. Confalonieri F, Berni A, Ferraro V, et al. Iatrogenic central retinal artery occlusion following retrobulbar anesthesia with lidocaine: a case report. J Med Case Rep. 2022;16(1):308. DOI: https://doi.org/10.1186/s13256-022-03518-0
10. Meyer D, Hamilton RC, Loken RG, Gimbel HV. Effect of combined peribulbar and retrobulbar injection of large volumes of anesthetic agents on the intraocular pressure. Can J Ophthalmol. 1992;27(5):230-232.
11. Nakamura K, Toda H, Kakuyama M, et al. Direct vascular effect of ropivacaine in femoral artery and vein of the dog. Acta Anaesthesiol Scand. 1993;37(3):269-273. DOI: https://doi.org/10.1111/j.1399-6576.1993.tb03714.x
12. Al Fardan AS, Alanazi G, Alqahtani T. Combined central retinal artery occlusion (CRAO) and central retinal vein occlusion (CRVO): a case report. Cureus. 2024;16(1):e51567. DOI: https://doi.org/10.7759/cureus.51567
13. Chang YS, Jan RL, Weng SF, Wang JJ. Combined central retinal vein and artery occlusion in a patient with elevated levels of factor VIII. Int Med Case Rep J. 2019;12:323-327. DOI: https://doi.org/10.2147/IMCRJ.S217742
14. Iijima H, Tsumura T. Combined occlusion of the central retinal artery and vein. Jpn J Ophthalmol. 1994;38(2):202-207.
15. Rodríguez Villa S, Alonso Plasencia M, Arruabarrena Sánchez C. Central retinal artery occlusion after phacoemulsification under peribulbar anaesthesia. Arch Soc Esp Oftalmol. 2016;91(4):190-193. DOI: https://doi.org/10.1016/j.oftal.2015.10.003
16. Yang S, Liu X, Li H, Xu J, Wang F. Optical coherence tomography angiography characteristics of acute retinal arterial occlusion. BMC Ophthalmol. 2019;19(1):147. DOI: https://doi.org/10.1186/s12886-019-1152-8
17. Ghazi NG, Tilton EP, Patel B, Knape RM, Newman SA. Comparison of macular optical coherence tomography findings between postacute retinal artery occlusion and nonacute optic neuropathy. Retina. 2010;30(4):578-585. DOI: https://doi.org/10.1097/IAE.0b013e3181bf5fd5
18. Choudhary RA, Siddiqui MAR, Moiz B, Ishaq S. Combined central retinal artery and vein occlusion associated with antiphospholipid syndrome. BMJ Case Rep. 2022;15(3):e248425. DOI: https://doi.org/10.1136/bcr-2021-248425
19. Behera UC, Panda L, Gupta S, Modi RR. Subconjunctival hemorrhage and vision loss after regional ocular anesthesia. Int Ophthalmol. 2018;38(3):1309-1312. DOI: https://doi.org/10.1007/s10792-017-0539-x
20. Desai S, Rai N, Kulkarni P, Natarajan S. Combined CRVO with CRAO in a patient with protein C deficiency. Retin Cases Brief Rep. 2014;8(2):145-149. DOI: https://doi.org/10.1097/ICB.0000000000000027.