

A SUDDEN TOTAL LOSS OF VISION AFTER ROUTINE CATARACT SURGERY

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SUMMARY

We share our experience of a 50-year-old controlled hypertensive woman who had routine cataract surgery in her left eye. She was given retrobulbar Xylocaine with adrenalin and postoperative gentamycin. She subsequently became blind in the operated eye after developing macular infarction by the first day post operative and optic atrophy by 2 months postoperative. This could have been caused by vascular occlusion in an already compromised arteriosclerotic vessels. It could also have been due to gentamycin toxicity. Gentamycin injection given subconjunctivally is known to rarely result in severe retinal toxicity. This case illustrates that even though cataract surgery is considered a simple routine procedure, and is performed in high volumes, it is not without its blinding complications. We recommend that the use of adrenaline in xylocaine should be used with caution in hypertensive patients and also the routine use of subconjunctival gentamycin injection after cataract surgery should be reviewed and other modes of endophthalmitis prophylaxis be considered.

INTRODUCTION

Cataract is a blinding condition resulting from an opacity of the crystalline lens of the eye. It is the most common cause of blindness in Ghana and worldwide. The only treatment to restore sight is by performing cataract surgery to remove the opaque lens. Therefore cataract surgery represents the most frequent surgical procedure performed by most ophthalmic surgeons. The 2010 eye care report indicates that in Ghana, 18,405 cataract operations were performed.¹

Cataract surgery has its complications. The most feared complication of the procedure is endophthalmitis as a result of intraocular infection. To prevent this serious complication many surgeons employ various measures, including the use of a subconjunctival injection of a bolus of gentamycin immediately post operative². In Ghana many eye centres routinely use subconjunctival injection of gentamycin as post operative prophylaxis for endophthalmitis. All antibiotics however have the potential to cause significant ocular toxicity when they gain access into the intraocular tissues.

The Aminoglycosides, in particular gentamycin, are the most toxic of the antibiotics commonly used in ophthalmology.^{3,4} A subconjunctival injection of gentamycin and other aminoglycosides has the potential of causing severe complications that can result in loss of sight. These complications, though rare, are well documented in the literature. The clinical presentation of gentamycin toxicity resembles a vaso-occlusive and non-perfusion event⁵ and includes macular infarction and optic atrophy.⁶ Extreme caution is needed when administering a periocular injection of aminoglycoside for treatment or prophylaxis of infection.³

To achieve anaesthesia in adults, retrobulbar or peribulbar injection of xylocaine with adrenaline is also routinely given. According to Huber and Remky⁴, in addition to complications like central retinal artery occlusion, ischaemic optic neuropathy and retinal or outer retinal ischaemia, retrobulbar xylocaine (when compared with subconjunctival xylocaine) induces a high reduction of velocity of blood flow in the retrobulbar vessels. Xylocaine is sometimes used in combination with adrenaline (a vasoconstrictor) to promote local haemostasis, reduce systemic absorption and prolong the duration of action of xylocaine. This vasoconstrictive effect of adrenaline has its disadvantages and may severely reduce blood flow in patients with damaged or susceptible blood vessels.

The ocular complications of hypertension are vaso occlusive in nature and are similar to that of subconjunctival xylocaine and adrenaline. They include central retinal artery occlusion, optic atrophy and retinal ischaemia. The use of xylocaine with adrenaline in a patient with hypertension considerably increases the risks of vascular occlusion in an already susceptible and compromised eye.

In this case, the combinations of retrobulbar injections of xylocaine, adrenaline and postoperative injection of gentamycin and hypertension are all associated with complications that are vaso occlusive in nature.

The purpose of this case study is to illustrate the potential of inducing an acute severe ocular vascular occlusion after “routine” cataract surgery in a patient with multiple vaso occlusive risks and the need to recognise these risks.

CASE REPORT

We present the case of a 50 year old woman who is a known hypertensive, with blood pressure of 110/80 mm Hg on oral nifedipine 40 mg daily who presented with 6/36 vision in both eyes and intolerable glare, preventing her from driving at night.

Examination revealed posterior subcapsular cataract in both eyes. There was normal pupillary reaction to light in both eyes and no relative afferent pupillary defect. Macular function using the Maddox rod technique was normal. Funduscopy showed a normal optic disc, macula and retinal vessels in both eyes. Intraocular pressures were normal (16mmHg) in both eyes. She was scheduled for cataract surgery on her left eye.

She received a retrobulbar injection of 5mls of 2% xylocaine with 1 in 100000 adrenaline for anaesthesia. There was no retrobulbar haemorrhage. Routine small incision cataract surgery (SICS), performed with insertion of +18.0 Dioptre posterior chamber intra-ocular lens implant, was uneventful and uncomplicated. She received sub-conjunctival injection of gentamycin (20mg in 0.5ml) and dexamethasone (1mg in 0.5ml) injection immediately after surgery.

On her first postoperative day review, her visual acuity in the operated eye was nil perception of light (NPL). Vision in her other eye was 6/36. Evaluation of the operated eye showed clear cornea, pupils were round with mild afferent pupillary defect. The intraocular lens (IOL) was central and there was no wound leak. A cherry-red spot lesion at the macular was noted, with normal looking optic nerve. Fundus photography and fluorescein angiography were not performed because of unavailability of these facilities at the time that this case occurred. The macular lesion did not resolve on follow-up. Subsequently by 2 months post operative, she also developed a frank optic atrophy. Her vision was NPL. One year post operative, vision in her left eye remains NPL and her optic nerve is pale.

DISCUSSION

Macular infarction and extensive retinal non-perfusion, though uncommon, may occur after uncomplicated subconjunctival injection of Aminoglycosides (especially Gentamycin) for prophylaxis against endophthalmitis after cataract surgery. The clinical picture resembles a central retinal artery occlusion.⁷

Post-operative endophthalmitis is the most common form of endophthalmitis, making up 70% of all cases of infectious endophthalmitis.⁸ Out of these cases, occurrence after cataract surgery is the greatest (80%).⁹ Endophthalmitis is also considered as an emergency because of its associated profound and irreversible visual loss.

The Endophthalmitis Vitrectomy study found the main infective organisms in post operative endophthalmitis to be Gram positive organisms, with Gram negative organisms contributing only 6.0%.⁹ The study also reported that although Gentamycin was used initially for the treatment of endophthalmitis, it was found to be associated with retinal toxicity.

In view of the high incidence of endophthalmitis after cataract surgery and its disabling nature in terms of profound vision loss, it is important to consider prophylaxis against the infection. The drug of choice is Amikacin in combination with Vancomycin, which has a broad spectrum of action against Gram positive and especially Gram negative organisms.¹⁰ Gentamycin, which belongs to the same drug class as amikacin (both are Aminoglycosides) is used in certain centers, especially the resource-poor ones.

However there are increasing reports of gentamycin-induced macular toxicity. A survey by Campochiaro *et al* reported 23 cases of macular infarction in eyes that were treated with prophylactic subconjunctival injections of aminoglycosides after routine ocular surgery. The recommendation was that the role of aminoglycosides in the prophylaxis of ocular infections and the management of endophthalmitis should be re-evaluated.¹¹

Cardascia *et al*¹² concluded in their case report on gentamycin-induced macular infarction in transconjunctival sutureless 25-gauge vitrectomy that antibiotics, in particular gentamycin, have the potential to cause significant ocular toxicity when they gain access to the inside of the eye, through thinned sclera or sutureless sclerotomies of transconjunctival sutureless vitrectomy.

The potential for causing macular infarction has led the American Academy of Ophthalmology to recommend in its Basic and Clinical Science course that “routine subconjunctival aminoglycoside prophylaxis at the conclusion of cataract surgery is no longer recommended”.⁷

The cherry red spot and subsequent optic atrophy found in this patient are suggestive of a generalised vaso-occlusive neurotoxic event of the retina.

Even though causality cannot be proven in this case, we believe this could have been caused by several factors, such as macular infarction induced by subconjunctival injection of gentamycin, arterial constriction in an already arteriosclerosed artery caused by the retrobulbar injection of adrenaline or xylocaine, or direct injection of xylocaine into the optic nerve.

Surgical complications, which could have caused a vaso-occlusive event, were absent: there was no retrobulbar haemorrhage and no intraoperative positive pressure in this patient. The patient's blood pressure was controlled at the time of the cataract surgery there are no known ocular complications for the oral nifedipine that this patient was on or any known significant interaction between nifedipine and any of the perioperative medications she received.

Intraocular administration of aminoglycosides is associated with retinal toxicity. The clinical manifestations resemble a vaso-occlusive event which includes oedema, intraretinal haemorrhage, and nonperfusion detected by fluorescein angiogram. Electroretinogram (ERG) studies show that following intraocular administration of gentamycin, a component of the toxicity may be mediated through pathways other than vascular supply – possibly a receptor mediated process.¹³

The use of post-operative subconjunctival injection of gentamycin together with pre operative retrobulbar xylocaine and adrenaline is still widely practiced in many centres in Ghana. Their potential dangers are probably not recognised, even though there is enough evidence in the literature that they can cause damage to retinal vessels. In addition, subconjunctival gentamycin is probably quite ineffective for the common organisms responsible for endophthalmitis.

As far as we know of, no study has been done to look at the incidence of post operative endophthalmitis and the effectiveness or not of subconjunctival injection of gentamycin in this country.

CONCLUSIONS

This case reminds us that even routine and uncomplicated cataract surgeries can be associated with severe unfavourable outcomes. More studies are needed to identify these complications and the associated risks, so as to improve the outcome of cataract surgeries. There is a need to revisit the routine use of postoperative prophylactic subconjunctival injection of gentamycin in Ghana.

The instillation of pre-operative povidone iodine 5% in the conjunctival sac, which has been shown to have the same reduction of the incidence of endophthalmitis as

preoperative and postoperative antibiotics should be encouraged. There should be rigorous attention to intraoperative aseptic conditions.

The use of intra-cameral cefuroxime has been recommended as a prophylaxis for endophthalmitis. Although it has been found to be useful and effective, the preparation of the correct dosage can be quite challenging. The use of this mode of prophylaxis has the potential of causing serious damage to the eye, especially if the exact concentration and composition are not mixed rightly. Intra-cameral cefuroxime has also been recently shown to cause macular infarction.^{14,15}

Retrobulbar injection of xylocaine with adrenaline should be given with caution, especially in patients with vaso occlusive disease even if their condition is stable and well managed. The risk of ocular vascular occlusion after retrobulbar injections in such patients could be reduced by giving them smaller volumes of peribulbar injections.

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