

Retrobulbar Neurolytic Block with Alcohol for Eye Pain: Experience in 12 Patients and Review of the Literature

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ABSTRACT

Eye pain may be mild to severe, difficult to treat condition with various underlying causes. The modalities for the management of painful eye includes medical treatment, neurolysis and surgical interventions such as evisceration and enucleation. Chemical neurolysis for eye pain is provided by the injection of neurolytic chemical agents such as alcohol, phenol, and chlorpromazine by retrobulbar block technique. Here, we aimed to review the practice of retrobulbar neurolytic block with alcohol for eye pain and share our experience in 12 patients.

Keywords: Eye pain, retrobulbar block, alcohol

INTRODUCTION

Eye pain, mostly reserved in the ocular area, is a type of ophthalmic pain syndrome. It may be mild to severe with various underlying causes.¹⁻³ The etiology of ocular

pain may include but not limited to corneal diseases, orbital tumors, posterior scleritis, optic neuropathy, orbital myositis, phantom eye syndrome and mostly trauma.⁴ The affected eye may be blind or seeing. The character of the eye pain may be described as stabbing, pulsating, throbbing, cutting, penetrating, radiating, shooting or superficial burning.⁵ However, it is often difficult to describe for the patient and to treat for the clinician.

The modalities for the management of painful eye include medical treatment, neurolysis and surgical interventions such as evisceration and enucleation.^{6,7} Neurolysis stands as a bridging option when the medical therapy is insufficient to treat the pain and when the patient isn't physically or psychologically fit for amputation of the eye. Neurolysis is the destruction or disintegration of a nerve tissue by either of the techniques such as chemical agent injection, cryoablation, radiofrequency lesioning and neurosurgery. Chemical neurolysis for eye pain is provided by the injection of neurolytic chemical agents such as alcohol, phenol, and chlorpromazine by retrobulbar block technique.

Here, we aimed to review the practice of retrobulbar neurolytic block with alcohol for

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eye pain and share our experience in 12 patients.

CASES

All patients were referred from ophthalmology department. They had chronic eye pain that was non-responding to medications as well as they weren't medically or psychologically fit for enucleation or evisceration. All patients had thorough ophthalmic examination prior to referral to pain clinic to identify possible difficult or contraindicated eyes for retrobulbar injection with such features as staphyloma, previous buckling, long axial length, myopic eyes, big or small, deep or shallow orbit, infection. The examination of pain included the identification of pain site, pain type and severity, previous medications and interventions. Severity of pain was recorded according to numeric rating scale (NRS) where 0 was "no pain" and 10 was "the worst imaginable pain".

The patients were adults except one patient who was 12 years old. Gender distribution was homogenous. The major cause of eye pain was neovascular glaucoma. NRS scores for pain was between 7 and 10. They were all on antiglaucoma medication and received pain medications such as opioids, NSAIDs, paracetamol and pregabalin. Table 1. demonstrates the demographic data and ophthalmological background of the patients.

All patients gave informed consent for the procedure after receiving related information on the intervention, possible benefits and complications. The site of the pain and intervention was triple-checked before the procedure. The patients had standard monitoring with

electrocardiography, pulse oximetry, non-invasive blood pressure assessment and intravenous access. All blocks were performed by the same pain physician (OYC) in an operating room where resuscitation equipment was readily available. Patients received no sedative premedication. The equipment for retrobulbar alcohol injection was prepared considering the sterilization regulations of the institute (Figure 1).

Topical anaesthesia of the eye with proparacaine HCl 0.5% was followed by regional asepsis with betadine diluted with saline to 5% to protect cornea. Subcutaneous local anaesthesia was obtained by 0.2% lidocaine with a 26 G, 13 mm needle (Shandong Qiao Pai Group Co. Ltd, PRC) at inferotemporal quadrant for retrobulbar needle introduction (Figure 2a). Then, the retrobulbar block was performed with 2 mL lidocaine 2% and a 25 G, 3.8 cm needle (Code no 0120, Sterimedix, Redditch, UK) was inserted percutaneously at the junction of inferior and lateral margins of orbit (Figure 2b). Then the syringe was disconnected but the needle left in place for 5 minutes to ensure block success and adequate analgesia prior to injection of 2 mL absolute alcohol (96%) (Figure 2c). After the block, an ice pack was placed on the lid for an hour to decrease the oedema formation. The patients were discharged home after being observed for 2 hours on the same day with their regular anti-glaucoma medications.

All patients had a pain relief for various durations for 2 months up to 26 months. Their NRS scores were between 0 and 2 after retrobulbar alcohol injection. All remained on antiglaucoma medications, but rarely on analgesics.

Table 1. Patients' demographics

Case	Age (yrs)	Gender	Diagnosis	Medications	NRS
1	46	Female	Neovascular glaucoma	Antiglaucoma, opioids	8
2	55	Female	Neovascular glaucoma	Antiglaucoma, opioids, pregabalin	9
3	57	Male	Neovascular glaucoma	Antiglaucoma, pregabalin	8
4	78	Female	Neovascular glaucoma	Antiglaucoma, opioids, paracetamol, pregabalin	7
5	82	Female	Neovascular glaucoma	Antiglaucoma drugs, paracetamol	7
6	58	Male	Absolute glaucoma	Antiglaucoma, NSAID, opioids	8
7	80	Male	Absolute glaucoma	Antiglaucoma, pregabalin	9
8	71	Female	Absolute glaucoma, phthisis bulbi	Antiglaucoma, paracetamol, opioids	9
9	55	Male	Neovascular glaucoma	Antiglaucoma, opioids, NSAID, pregabalin	10
10	67	Female	Absolute glaucoma, phthisis bulbi	Antiglaucoma, opioids, pregabalin	9
11	59	Male	Neovascular glaucoma	Antiglaucoma, opioids, NSAID, paracetamol, pregabalin	9
12	12	Male	Congenitally blind eye Vitreous haemorrhage, increased IOP	Antiglaucoma, paracetamol, NSAID	8

NRS: Numeric rating scores for pain (0=no pain, 10= the worst imaginable pain)

NSAID: Non-steroidal anti-inflammatory drugs

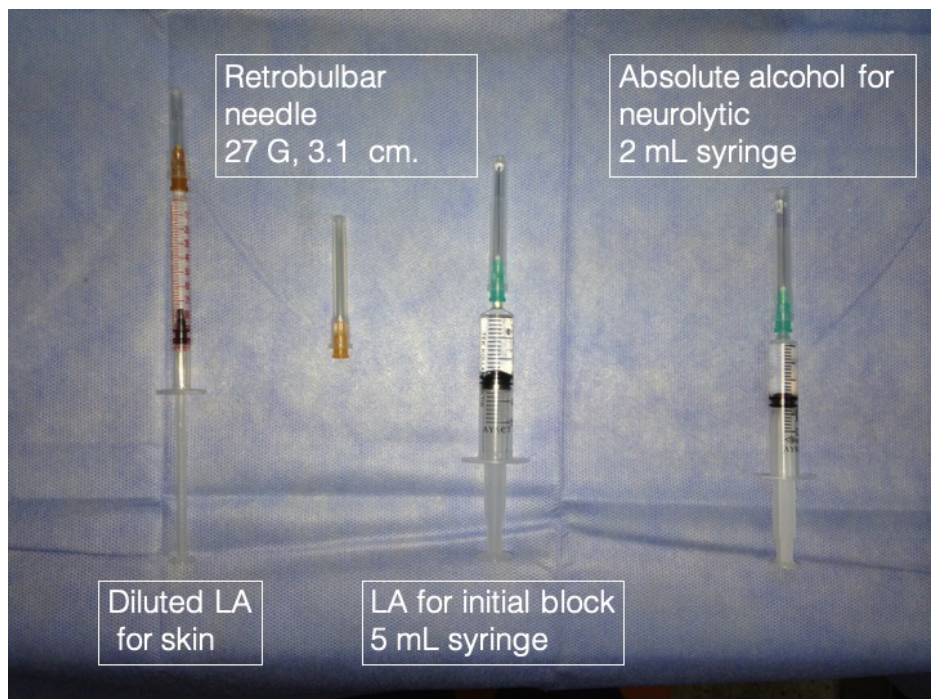


Figure 1. Retrobulbar alcohol injection preparation

Table 2. Patient and pain outcomes of the retrobulbar alcohol injection

Case	Duration of pain relief	Complications	Current Status	
			NRS	Medications and interventions for pain
1	24 months	Eye lid edema	2	NSAID
2	18 months	Eye lid edema, chemosis	1	None
3	13 months	Eye lid edema, transient blepharoptosis	2	None
4	10 months,	Eye lid edema, chemosis	0	None until the repeat block at 12th month
5	26 months	Eye lid edema	0	None Died of other causes
6	6 months	Eye lid edema, chemosis	1	None
7	5 months	Eye lid edema, chemosis	1	None
8	9 months	Eye lid edema	1	None until repeat block at 9th month
9	21 months	Eye lid edema, chemosis	2	NSAIDs
10	2 months	Eye lid edema, chemosis	2	Bacterial corneal ulcer, corneal melt, evisceration
11	10 month	Eye lid edema	1	None
12	5 months	Eye lid edema	2	Enucleation due to increased haemorrhage



Figure 2. Retrobulbar alcohol injection

Two of the patients needed repeat injections. Two patients required surgical intervention due to ophthalmological factors. One died of natural causes during the follow-up. Patient and pain outcomes of the retrobulbar alcohol injection were shown in Table 2.

DISCUSSION

Eye pain has mostly been managed by different specialties of medicine such as ophthalmology, neurology and pain medicine. These specialties use various treatment options including medical and surgical modalities as well as neurolytic interventions. Medical treatment for eye pain may target the etiological factors with medications such as antiglaucoma drugs or may manage the somatic and neuropathic symptoms according to World Health Organization Analgesic ladder with paracetamol, non-steroidal anti-inflammatory drugs, opioids, antidepressants and anticonvulsants.⁸ Surgical interventions' success rates have been between 70 and 90%, however they also carry risks. Enucleation has the higher pain relief up to 93%. But it is not well-accepted and consented by the patients, and not very suitable in most of malignant cases. Although evisceration is a simpler procedure, its efficacy for ocular pain is less due to remaining intact sensory ciliary nerves.

Neurolytic blocks for ocular pain may only be performed by retrobulbar technique. Peribulbar and sub-Tenon approach aren't feasible for injection of a neurolytic agent such as alcohol, phenol, and chlorpromazine. Retrobulbar block, which was first described by Atkinson⁹ in 1936, with a long needle

(3.8 cm) introduced to intraconal space, has evolved into a modern technique with a shorter needle, a more inferolateral site of injection and neutral gaze during the block. Retrobulbar block, theoretically, affects all nerves in the intraconal space such as all motor nerves except the trochlear nerve, nasociliary or nasal nerve, long and short ciliary nerves, ciliary ganglion, optic nerve. This also applies to retrobulbar alcohol injection which may lead to loss of muscle functions and vision while providing pain relief. For this reason, retrobulbar alcohol (and phenol) injection has rarely been recommended for pain in seeing eyes, but mostly reserved for blind eyes. However, there are papers advocating chlorpromazine use for retrobulbar injection in seeing eyes.^{10,11}

Alcohol used for retrobulbar block must be at a concentration of 95% or above to provide neurolysis. It precipitates mucoprotein and lipoprotein and extracts phospholipids, cholesterol and cerebroside from neural tissues.¹² Its affinity to vascular tissue is less in comparison to phenol. Twelve to 24 hours is required before the assessment of its effect. Retrobulbar local anaesthetic injection and a few minutes for it to take an action is essential prior to alcohol administration because sole alcohol injection causes a severe burning pain along the nerve trajectory during the procedure. Alcohol also spreads rapidly in the surrounding connective tissue leading to excessive oedema on the upper and lower lid and temporary blepharoptosis in many patients. The other agent-related complications include chemosis, cellulitis, corneal ulcer, orbital inflammation and loss of sensation in the surrounding region.^{13,14} Furthermore, technical complications such

as retrobulbar haemorrhage, globe penetration or perforation, optic nerve injury, and subarachnoid injection can be observed with various incidence rates during retrobulbar block.^{15,16} Possible nerve regeneration affects the outcomes such as unpredictable duration of pain relief and reoccurrence of pain.

The use of alcohol for retrobulbar block has first reported in 1949 by Kornblueth and Maumenee.^{17,18} Although retrobulbar alcohol injection has lost its popularity in the last three decades, this intervention reported to have a success rate up to 100% with a pain relief duration of 2 weeks to 2 years even in difficult circumstances such as presence of malignancy and even after enucleation.¹⁹⁻²¹ Recent papers remind its place in the armamentarium of the pain physicians.²² Retrobulbar alcohol injection has been reported to be as effective as chlorpromazine for neurolysis regarding success rate of the block and the decrease in intraocular pressure, but transient eye lid oedema was more frequent following the alcohol administration.²³

In our case series, the outcomes and the complications resembled the findings of previous studies and case reports regarding the etiology of the pain, pain severity and type, duration of pain relief, follow-up medications and need for a repeat block. We treated patients with severe pain, mostly due to neurovascular glaucoma, with retrobulbar alcohol injection, and the most prominent complication was eye lid oedema and the pain relief lasted approximately for 14 months.

In conclusion, the use of retrobulbar neurolytic blocks is established in the management of ophthalmic pain, and alcohol is an effective agent for chemical neurolysis. The main objective for performing retrobulbar alcohol injection should be the selection of appropriate patients and careful block performance considering possible benefits and complications.

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Conflicts of interest

There are no conflicts of interest.

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