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The Globe Lockdown

(Regional anaesthesia for opthalmic surgery)

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REGIONAL ANAESTHESIA FOR OPHTHALMIC SURGERY

INTRODUCTION

Anaesthestists in training globally and locally receive relatively less exposure to regional ophthalmic anaesthesia. This brings difficulties to trainees when they are writing final year college examinations as they are assessed on this section and unfortunately have little experience to draw from. The royal college of anaesthetists and the royal college of ophthalmology advocates that every ophthalmology unit should have a designated anaesthetist to oversee the efficiency of ophthalmic anaesthesia services(1). A junior anaesthetist should be comfortable in providing anaesthetic, prioritizing ophthalmology cases appropriately thus a sound knowledge of the conditions and time constraints tied to the complications is of utmost importance. The involvement of anaesthetists in ophthalmic surgery has changed significantly over the last 3 decades.

Following some publications in the 1990s that stated that majority of globe perforation after needle blocks were done by the anaesthesiologists, the anaesthesia community were noted to avoid performing these blocks altogether. Some anaesthesiologists communicated that they had inadequate training to perform these blocks(1, 2). To date in my training institution; anaesthetics still offers very little experience on ophthalmic regional anaesthesia(2). However, specialists tend to do these blocks in the private sector without this training, and hence the need to know the principles plus perform these blocks whilst being trained as a registrar.

PRE-OPERATIVE CONSIDERATIONS FOR OPTHALMIC BLOCKS

1. Age – Paediatrics cannot tolerate regional anaesthesia
2. Comorbidities – Altered GCS, cognitive and motor disorders, Hypertension, diabetes and arthritis
3. Current medications- Anticoagulants, anti-platelets, angiotensin converting enzyme inhibitors (associated with chronic coughing, and this not ideal for surgery) and diuretics (leading to polyuria, and patients may interrupt surgery).
4. Duration of surgery – Over 1hour is too long for a patient to remain still
5. Psychological factors – Claustrophobia and anxiety (3).

CLINICAL ANATOMY

Bone structures

The bone structures that house the globe form the orbit. The orbit has a pyramidal shape with the apex pointing towards the posterior fossa. Its superior border also known as the roof is made up of the frontal bone and the less wing of the sphenoid bone. The medial border is formed by the ethmoid, lacrimal, palantine and the postero medial wing of the maxilla. It encompasses the optical canal and the superior orbital fissure. The inferior border is formed by the maxilla and zygomatic bone and an inferior wing of the palantine bone. The lateral wall is made of the zygomatic bone and a lateral extension of the maxilla. Lastly the posterior border is formed by the inferior border of the frontal bone and superior apart of the sphenoid bone(4, 5).

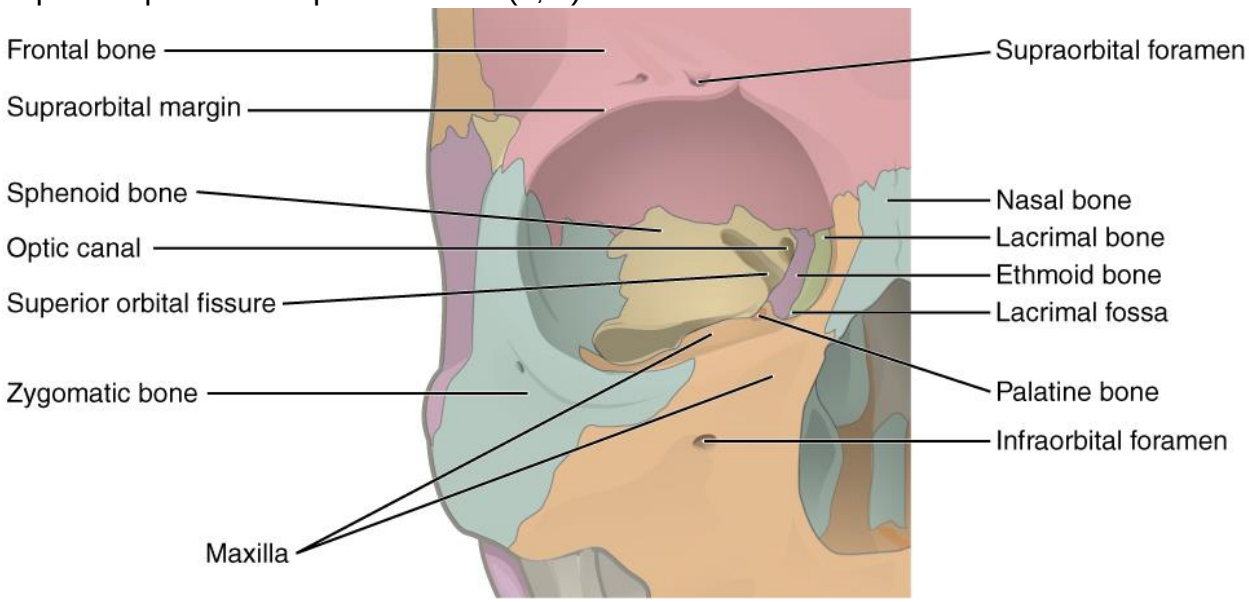

Figure 1: *The orbit (6)*

The globe

It is the spherical structure found the antero- superior part of the orbit. The eyeball has 3 layers of membranes that encapsulate it contents. The outer layer is a thin fibrous membrane opaque posteriorly called the cornea and becomes translucent at the front forming the sclera. The middle layer is a fibrous, vascular membrane containing makes the choroid posteriorly and ciliary body and the iris anterior. The inner most layer is mainly neural and contains the retina (1, 2, 7).

The globe contents are divided into the anterior and posterior compartments. The anterior compartment is smaller but further divided into the anterior chamber and posterior chamber. The anterior chamber is found behind the cornea; it is filled with the aqueous humor. The posterior chamber contains the lens and communicates with the anterior chamber via the pupil, a central component of the iris. The posterior compartment is larger

and filled with the vitreous humor, the retina, macula and optic nerve root are found in it (4, 7).

The Tenon capsule is a fibroelastic layer that covers the sclera from the corneal limbus to the optic nerve. This forms a potential space known as the episclera space (sub Tenon's space). The conjunctiva covers the sclera anteriorly. The Tenon capsule originates posteriorly from optic nerve to fuse with the conjunctiva. The axial length is the distance from the anterior to the posterior end of the globe, average is 20-25mm (4, 7). It can be measured by an ultrasound.

Extra ocular muscles and function

They originate from the apex in a structure called the annulus of Zinn and are divided into 2 groups namely the oblique and recti muscles.

The 2 oblique muscles are:

- the superior oblique which makes the globe look down and nasally, innervated by the Trochlear nerve
- Inferior oblique- makes the globe look nasally and upwards and innervated by the Oculomotor

The 4 recti muscles:

- The superior rectus- pulls the eyeball up and is innervated by the Oculomotor cranial nerve
- The lateral rectus- abduction aided by the Abducens nerve
- The inferior rectus – makes the globe look down innervated by the Oculomotor cranial
- The medial rectus- adduction aided by the Oculomotor nerve

Sensory innervation is largely by the terminal branches of the ophthalmic nerve(4, 7).

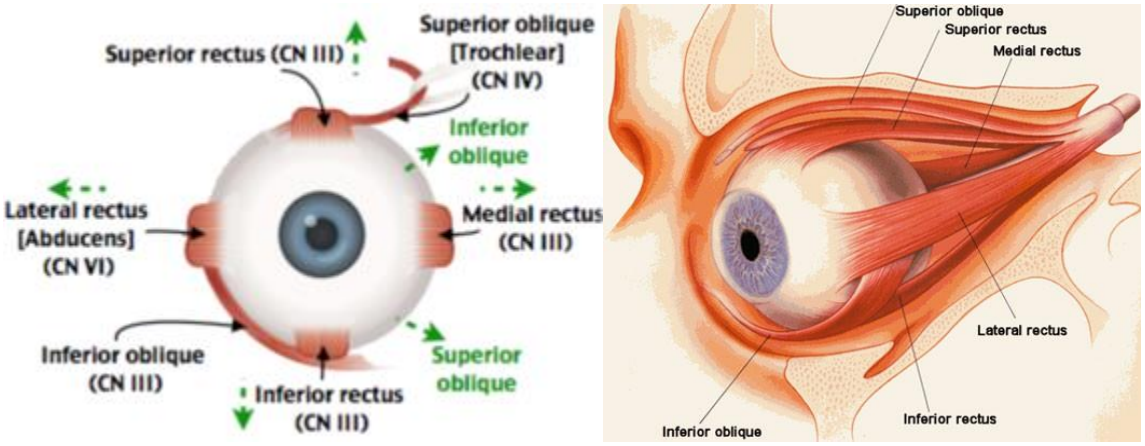

Figure 2. *Left showing the insertion of muscles on the globe and right showing their origin at the apex (8, 9).*

Blood supply and venous drainage

The ophthalmic artery is the first intracranial branch of the internal carotid artery after it exits the cavernous sinus. It branches into the central retinal artery, supra orbital artery and the posterior ciliary artery. The venous drainage is via the ciliary body and veins into the vortex veins which then drain into the ophthalmic artery and subsequently the central retinal vein (4, 7).

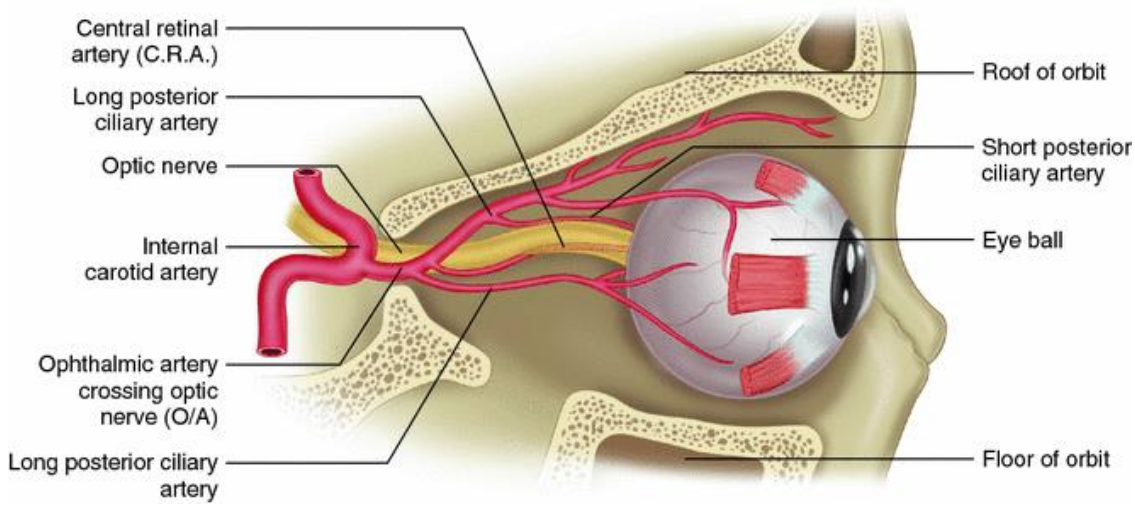

Figure 3: *The arterial supply of the globe (8)*

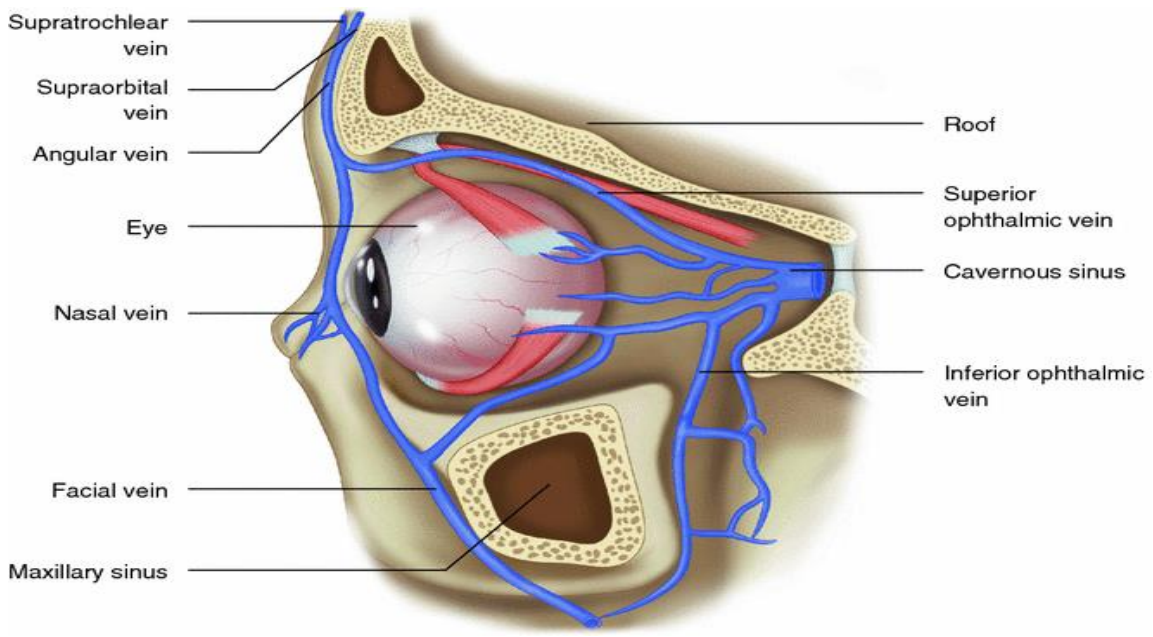

Figure 4: *Venous drainage (8)*

Autoregulation

It is the process whereby the vessels of the optic nerve and the retina change the vascular tone. Their endothelium responds to myogenic, metabolic and light stimuli by releasing endothelin and nitric oxide causing vasodilatation. The metabolic factors that cause vasodilation are hypoxia, hypercarbia and lactic acidosis. The decrease in perfusion pressure and flickering light also cause vasodilation. The choroid has limited autoregulation that decreases with arterial pressure and increased intraocular pressure (10).

THE PHYSIOLOGY OF THE INTRAOCULAR PRESSURE

Intra ocular pressure is the tissue pressure of the soft tissues in the orbit. The orbit is surrounded by bone structures making it essentially non-compliant. The normal intraocular pressure (IOP) IS 10-20mmHg and this level is important to us for many reasons namely:

1. Several anaesthetic drugs and procedures affect IOP
2. Patients with chronically raised IOP present for non-ophthalmic surgery
3. Open globe or penetrating eye injuries can present for surgery, and
4. Patients with raised IOP may present for corrective surgery.
   An acute increase in the IOP may cause expulsion of the globe and its contents through a surgical opening or open injury. Chronic increase can cause nerve damage and visual loss. Intraocular pressure is affected by intraglobular factors, extra globular and some drugs (10).

Table 1. *Factors affecting Intraocular pressure*

Intraglobular	Extraglobular causes
Aqueous humor volume Blood volume Foreign bodies Tumours Haemorrhage Vitreous humor volume Sclera rigidity	Anesthetic blocks Extraocular compression devices Extra muscle tone Scleral strapping Retrobulbar or peribulbar (haematoma abscesses and tumour) Face mask and prone position(4)

ANAESTHESIA OPTIONS FOR OPTHALMIC SURGERY

1. General anaesthesia
2. Topical
3. Intracameral
4. Peribulbar block
5. Sub-Tenon’s block

The choice is individualized based on patient factors, surgical and pathology factors. The patient factors include comorbidities, movement disorders, chronic cough and patient refusal. Duration of surgery play as an important role in deciding whether a case amenable to regional anaesthesia gets done as patients may not to be able to lie still for many hours. Most trauma cases necessitate a general anaesthesia over the other options (3, 11).

Topical anaesthesia

Topical anaesthesia techniques are used to facilitate regional blocks and to do minor short eye surgeries. The first topical anaesthetic given was cocaine by Dr Koller in 1884 for cataract surgery. In the mid-1980s it was a method of choice for about 61% cataract surgeries undertaken in America (7). Topical anaesthesia has evolved markedly as more drugs were tried and found to be adequate. The several solutions of local anaesthetics are made up of single agent but are of different concentrations. These are administered in the form of drops or gels at least 5 – 10minutes prior to surgery or a regional anaesthetic. Topical anaesthetics provide good anaesthesia by blocking the sensory innervation of the conjunctiva and sclera by the trigeminal nerve terminal branches.
Amongst its main advantages is that it is easy to do and avoids the hazards of needle and cannula use. It's use is limited by the unreliable analgesia, lack of akinesia which has caused patients to move during surgery predisposing them to surgical mishaps (7). It is also cost effective and it is the preferred option by experienced surgeons. Tetracaine has been cited as the drug that causes corneal epithelial damage as a complication, however this is usually reversible. The commonly used drugs for topical anaesthesia are as follows

- Proxymetacaine 0,5%
- Oxybuprocaine 0.4%
- Tetracaine 0.5%
- Lignocaine 3.5%

Intracameral injection

This is an adjunctive technique whereby the surgeon injects lignocaine directly into the anterior chamber. It was employed as one of the techniques to improve analgesia in a patient who has been given topical anaesthesia and when the regional anaesthesia given requires augmentation.

Phacoemulsification surgery can cause pressure discomfort that is not anaesthetized by the topical block (12). A small volume of about 0.1ml of 2% lignocaine is the preferred agent of choice because of its rapid onset and has been considered to be safe(5, 7). Globally, the use of topical anaesthesia with or without intracameral injection has been recommended as the first option after discussions on minimizing the adverse effects during cataract surgery, the second option being the cannula-based Sub-Tenon techniques (13).

REGIONAL ANAESTHESIA IN EYE SURGERY

The regional anaesthesia practice followed the initial use of cocaine drops to anaesthetize the conjunctiva in 1884. In the early 1990s, an article on retrobulbar regional anaesthesia was published, it was subsequently followed by numerous reviews on the peribulbar block and finally the Sub-Tenon capsule block. The majority of practitioners prefer peribulbar block because of the complications associated with the retrobulbar block. The regional anaesthesia component is divided into 2 groups namely: the needle-based (Retrobulbar and Peribulbar), and the cannula-based techniques namely Sub -Tenon capsule injection (7). Patient selection for this block is informed by a thorough understanding of patient's medical conditions, detailed counselling to ensure patient cooperation.

The decision to cannulate is dependent on the patient factors and the possibility of a sedation plan. The following local anaesthetic solutions are the ones that are commonly used (4):

- **Lignocaine 2%.** Onset of action 5-10 minutes. Anaesthesia duration 30-60 minutes. Analgesia lasts approximately 1-2hours
- **Bupivacaine 0.5%.** Onset of action is 10-15 minutes. Anaesthesia duration is 2-4 hours. Analgesia 6-8 hours
- **Ropivacaine 0.75%.** Onset 10-15 minutes. Anaesthesia duration is 1.5-2 hours. Analgesia lasts 4-6 hours
- **Lignocaine 2%: Bupivacaine 0.5**%: 5-10 minutes. Anaesthesia duration is 1-3 hours. Analgesia 4-6 hours.

Ya-li Zhou et al performed a randomized study comparing these local anaesthetics for vitreoretinal surgery. They concluded that all these drugs had equal efficacy in terms of anaesthesia, akinesia and analgesia effects, the only difference noted to be related to long surgery over 80 minutes where lignocaine required a top up (14).

Adjuvants that can be used are added to the local anaesthetic solution are as follows:

- Clonidine 1mcg/kg
- Dexmedetomidine 0.5mcg/kg
- Hyaluronidase 50-150U/ml

A study done by Emile Calenda et al for vitreoretinal surgery in 2002 proved a mixture of lignocaine, bupivacaine and clonidine provided adequate anaesthesia, analgesia and akinesia making it a substitute for the etidocaine, bupivacaine and hyaluronidase mixture (15). Dexmedetomidine has also been added to the retrobulbar block and shown to increase the duration of the block (16). Gujral, Gangajeet et al also agreed that dexmedetomidine as an adjunct to lignocaine plus bupivacaine during a peribulbar block for vitreoretinal surgery added the benefit of less hemodynamic changes, sedation and more conducive surgical environment (17). AM Abdelhamid 's study further agreed with this and cited a reduction of the intraocular pressure in patients (18).

Patient care considerations for regional blocks

- The patient must be sufficiently counselled and cooperative
- The bladder emptied just before surgery begins
- Extra padding on the operating table to aid patient's comfort
- The patient must be kept warm
- A bar placed over the shoulders for drapes to avoid carbon dioxide accumulation and minimize the feeling of claustrophobia
- Supplementary oxygen via nasal prongs if sedation is to be considered

Antithrombotic medication

The risk of thrombotic events and complications thereof outweighs the risk of bleeding due to local anaesthesia. There are no strict guidelines on how to manage this risk, however studies done have concluded that warfarin, aspirin and anti-platelets can be safely continued as discontinuation of these had resulted in serious morbidities (19, 20). Surgeries done under local anaesthesia can be safely done on patients on antithrombotics, however, trabeculotomy and other major oculoplastic surgeries have shown to fail or result in visual loss due to bleeding if the antithrombotics are continued. The anaesthesiologists, surgeons, cardiologists and haematologists must be the multidisciplinary team to weigh the risk benefit ratio on each case (19). The ophthalmology units in our setting omits warfarin 3-4 days pre-operatively and monitors internationalized ratio levels. I would not recommend injecting a local anaesthetic with a 22gauge needle into the orbit of patient on warfarin.

Monitoring

This should begin before any anaesthetic is given and documented until the end of surgery. Based on ASA monitoring; the mandatory forms are blood pressure, electrocardiogram, pulse oximetry, and respiration. The advantage of having an intravenous line inserted is to preempt local anaesthetic complications, and a possibility of sedation. SASA guidelines recommend pulse oximetry and non-invasive blood pressure only for ASA 1 patients and the electrocardiogram is added for ASA >2 patients capnography is recommended for sedated patients. Communication with the patient throughout the surgery has proven to improve patient's comfort and cooperation, holding the patient's hand has also been suggested(1).

RETROBULBAR BLOCK (INTRACONAL)

It was traditionally the gold standard; it has been replaced by the peribulbar due to its complication profile. It blocks ciliary nerve, 3rd & the 5th nerve, whilst the 4th nerve is not blocked as it lies outside the muscle cone. The aim is to provide akinesia, analgesia, anaesthesia and pupil dilatation. It was favored because of quicker onset of action and smaller volume requirements. The patient lies supine and maintain the primary gaze. The practitioner then stands on the side of the patient and injects between medial 2/3rd and lateral 1/3rd of lower lid margin (1, 21). The needle must be directed straight to the back

then angled upwards and medially. A local anaesthetic solution of choice is then injected, being the volume of 3-5mls.
The complications of this block are as follows: -

- Haemorrhage
- Brainstem anaesthesia
- Globe perforation
- Optic nerve injury and atrophy
- Decreases visual acuity
- Retinal vessel occlusion

Contra indications to the retrobulbar block are:

- Bleeding disorders
- Myopia
- Open eye injury
- Posterior staphyloma

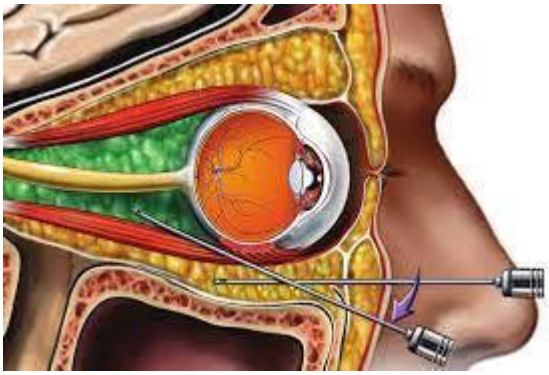

Figure 5: *Picture showing the direction of the needle, first it is directed posteriorly parallel to the globe until it is estimated have passed the globe then it is angled upwards (22).*

PERIBULBAR BLOCK(EXTRACONAL)

The peribulbar block provided the same quality of anaesthesia and akinesia as the retrobulbar. It is favored over the retrobulbar block because of its lower risk of globe perforation. The technique aims to inject local anaesthetic in the peribulbar space and allowing it to spread to the lid and other spaces. It provides akinesia and anaesthesia to the globe and the orbicularis muscle. The patient must be supine and maintain the primary gaze. There are two points of injection; the first point on the lower lid at the junction of medial 2/3 and lateral 1/3 of the orbital rim and the second is on the upper lid at the junction of the medial 1/3 and lateral 2/3 orbital rim. The upper lid injection is only done if the lower lid injection is deemed inadequate. The needle used is 27gauge and 15 -25mm long. The volume of the chosen anaesthetic solution to be given 8-10millilitres. Addition of dexmedetomidine to the solution has been proven to augment the quality and duration of this block (23).

The advantages of this block are that it poses less risk of optic nerve damage and globe perforation. However, it is painful on injection, causes conjunctiva chemosis and less akinesia. It is also used as an adjunct to general anaesthesia resulting in reduced incidence of oculocardiac reflex, pain and post op nausea and vomiting. This block was compared with Sub-Tenon cannula block and noted to be associated with a higher risk of globe perforation, nerve injury and haemorrhage (24).

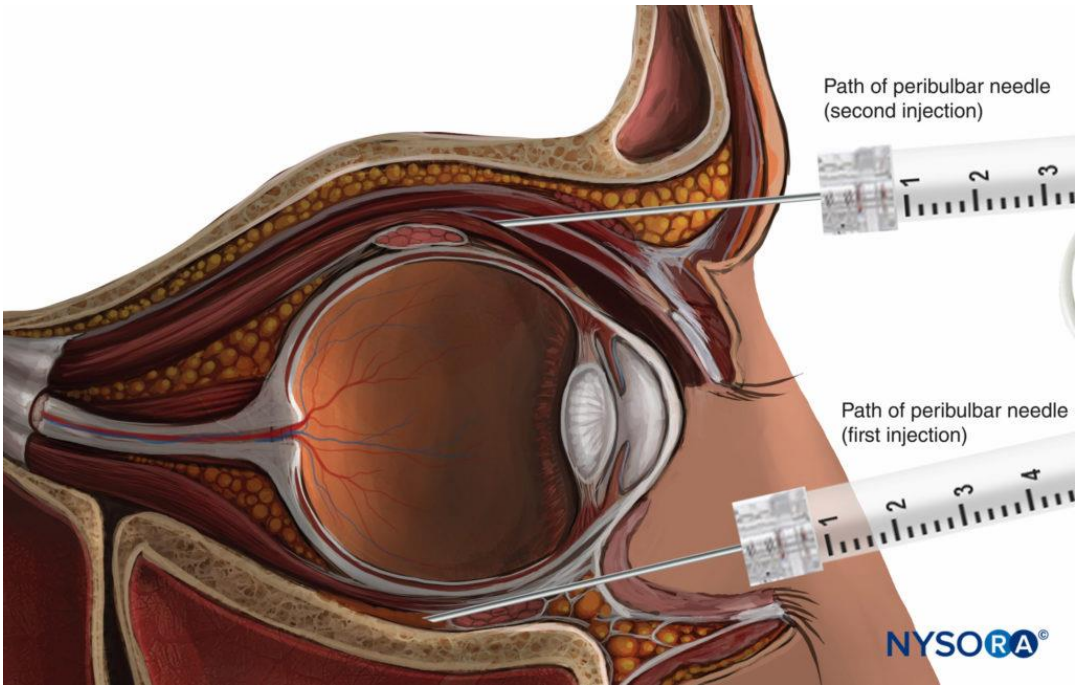

Figure 6. *Pictures depicting the injection points and direction of the needle (25).*

SUB TENON' S BLOCK

This needle-less technique was first done in the 1990s and it requires the instillation of topical anaesthesia first. The patient must look upwards and outwards to maximally expose the inferonasal quadrant. The Barrequer speculum is used to retract the eyelids, a deep bite of the conjunctiva is taken with the Moorfields forceps and then a 2mm incision is made with Westcotts scissors. Sub-Tenon cannula is then passed; it is a blunt curved 19 gauge 25mm long cannula. It must be inserted to a depth of 20mm in the inferonasal quadrant. The usual dose is 4- 6mls of a mixture of a short acting and long acting local anaesthetic, the commonly used mixture is 2% lignocaine with 0.5% bupivacaine on 1:1 concentration ratio. However shorter procedures are done successfully with only lignocaine. The eyelid is then closed and gentle pressure applied for about 5 minutes. The onset of akinesia requires another 5 more minutes (26). This block provides reliable anaesthesia but akinesia is not always adequate (13). It is painful on injection and can cause chemosis and subconjunctival hemorrhage. The chemosis has been noted in 80% of cases and it resolved within 5minutes. Subconjunctival hemorrhage has varied

incidence in literature thus far, vasoconstrictor swab and conjunctival cautery have been suggested to minimize it (27). The complications such as globe perforations, orbital haemorrhage, hyphaema, muscle trauma and diplopia, chronic dilatation of pupils and orbital swelling secondary to concentrated hyaluronidase have been mentioned. It is difficult to perform this block on patient with previous eye surgery as they maybe adhesions hindering the exposure of the sub capsular space. There is generally less incidence of serious complications compared to needle blocks.

Guay et al compared Sub-Tenon with topical anaesthesia for cataract surgery and found them to be both safe with no difference on the risk of complications (28). A study done in Nigeria showed that the onset of full akinesia was slower than with that of peribulbar block, however ultimately it was of equal quality after 5 and 10 minutes. An ultrasound was used during the Sub -Tenon anaesthesia and it was noted that some of the solution leaks through the incision, this could explain the volume and time of onset required for this block (29).

There is also a new technique of advancing the cannula to the retrobulbar space called the Trans Sub-Tenon retrobulbar block. Young-Zvandasara et al demonstrated in a study that this technique achieved better analgesia, a longer duration of the block with no increase in incidence of complications than peribulbar and the standard Sub-Tenon anaesthetic block(30). This technique is not widely practiced.

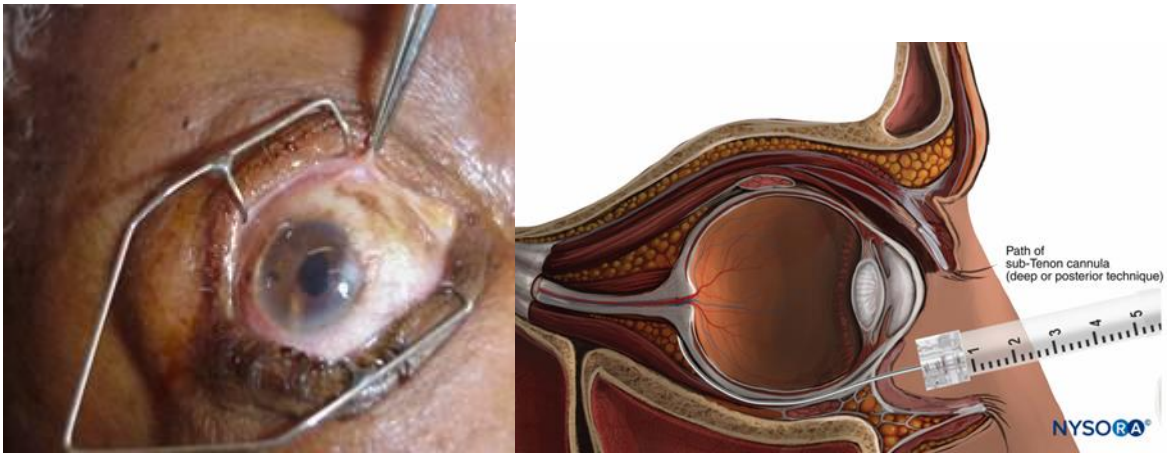

Figure 6. *Practical illustration on how to inject on the left and on the right is an anatomical landmark where the solution is deposited (25, 31)*

THE OCULO-COMPRESSION DEVICES

These are devices used after injection of local anaesthetic to decrease intra-ocular pressure and improve the block quality. Manual compression can also be done. This practice is not recommended in patients with known retinal arterial insufficiency as this may cause occlusion and ischaemia. If necessary, use pressure of <30mmHg for 5-10 minutes. Watkins et al compared peribulbar and retrobulbar effect on intraocular pressure and concluded that the Honan's balloon didn't cause a significant increase in intraocular pressure (32).

COMPARISON OF ALL THE BLOCKS

	Advantages	Disadvantages
Retrobulbar block	Low volume Rapid onset Low pressure Less anterior haemorrhage Good quality block	Skill required Proximity to nerves and vessels at the apex Risk of globe injury Retrobulbar haemorrhage and 7th nerve block
Peribulbar block	Reliable akinesia and anaesthesia Injected away from key structures Minimal anterior haemorrhage No globe rotation	Skill required Some risk of globe injury Chemosis due to higher volume requirements Requires multiple injections Increases intraocular pressure Need for oculocompression
SubTenon's block	Simple Quick onset Reliable anaesthesia Relatively safe Minimum risk to globe Can be topped up easily	Surgical skill required Chemosis Conjuctival haemorrhage Sight and life-threatening complications reported Risk of infection Not for patient with previous eye surgery

COMPLICATIONS OF THE REGIONAL BLOCKS

Retrobulbar haemorrhage

It can be venous or arterial causing elevation of intraocular and volume thus pressure. The incidence is 0.3%, it is higher than that of peribulbar blocks. It also causes temporary blindness. The risk is higher if a longer needle is inserted too deep into the orbit. A history of preexisting vascular or haemorrhagic conditions also elevates the risk. Controversial reports have been made about the effects of continuation of aspirin and warfarin in the

perioperative period as a risk factor for haemorrhage(32). A study involving 19000 patients showed no difference for the risk of bleeding in patients who continued, and also those who discontinued these drugs. This study investigated the incidence of significant bleeding in patients who continued their aspirin through the perioperative period and those who stopped it 14 days preoperatively. They also assessed the incidence of bleeding in patient who stopped their warfarin 4 days before surgery and those who continued with it. The final conclusion on this study was that the risk of thrombotic events outweighs the bleeding risk in patients receiving the regional ocular anaesthesia. Thus the recommendation is that patients on oral anticoagulants must continue with this treatment throughout the perioperative period (19, 20). This conclusion should be a consideration when choosing the needle type to do the block.

The venous bleeding has been noted to be of insidious onset with excessive chemosis and high intraocular pressure. It is recommended that one applies intermittent digital pressure on a closed lid while deciding whether to postpone or proceed with the surgery. On the contrary arterial bleeds have rapid onset and are difficult to arrest. The practitioner must act swiftly to minimize secondary complications. The recommended course of action is as follows: - close the lid and apply firm pressure, caution not to cause ischaemia of the rest of the globe, lateral canthotomy, acetazolamide intravenously and paracentesis (19, 20).

Globe injury

This is a rare but serious complication; its incidence is the same as that of peribulbar and retrobulbar block. The globe perforation refers to 2 wounds (entry and exit), while penetration refers to only the entry wound. The patients with axial length > 26mm have been noted to have a 45% risk of developing myopia, this puts them at a 30% higher risk of globe injury (4, 33). The single medial peribulbar block is preferred in patients with myopia. The other risk factors include enophthalmos, repeated injections, uncooperative patient, previous sclera debulking, bevel of the needle facing away from the globe, inexperienced or poorly skilled practitioner and previous retinal detachment or corneal refractive surgery.

With regards to clinical manifestation; 50% of patients may have no signs, and others may have intense ocular pain and sudden loss of vision (7).

The acute management includes informing the surgeon, to stop surgery, perform ultrasound or ophthalmoscopy to confirm and assess damage. The retinal surgeon must also be informed (34).

Poor visual acuity is a common complication and retinal detachment is prognostic sign (33).

The advantage for a using a sharp needle is that haemorrhage is easier to control, however the risk of globe injury is much higher. The use of a blunt needle enables the anaesthetist to suspect globe perforation when performing a block and there are changes in resistance felt as the needle passes through different tissues. The disadvantage of

using blunt needles is that when perforation occurs, it is harder to control the haemorrhage (7).
Globe rupture can also occur when a volume exceeding 2mls is injected into the globe. The recommended techniques to prevent globe perforation and rupture are: the use of blunt needles, single injection, to wiggle the needle and aspirate before injection(7). Precautions involve looking for early warning signs, oedema and feeling for resistance during injections.

Optic nerve injury

The optic nerve gets injured primarily by the needle tip. The secondary injuries are due to haemorrhage and pressure necrosis. The risk factors include small orbits, use of long needles, and the incorrect patient's gaze for the block. Katsev et al and Pautler et al agreed that a needle size around 31mm is safer, also that appropriate gaze for the specific block minimizes the risk (35, 36).

Myotoxicity

There are several mechanisms by which muscle injuries happen namely: needle injury, ischaemic pressure necrosis, antibiotic injections, direct local anaesthetic toxicity (muscle do not regenerate well in the elderly leading to permanent damage), and the use of high lignocaine concentrations. The damage to the eye muscles results in diplopia, strabismus and entropion. The incidence is the same as on those patients done under general anaesthesia. The surgical causes are application of the lid speculum and the superior bridal stitch. The inferior rectus has the highest prevalence of injury followed by the superior rectus. Ptosis occurs in over half patients in the first 24 hours postoperatively. Over 92% recover by the 4^{th} day and rest recover in 5weeks (33, 37).

Brainstem anaesthesia

It occurs if the needle perforates the optic nerve sheath, through retrograde flow from an inadvertently cannulated orbitary artery, to ophthalmic and then internal carotid artery. This complication is seen in 0.3% of retrobulbar blocks done with a 38mm maximum plus 25mm depth, and as little as 0.75mls of 0.5% bupivacaine will cause symptoms. Patients present with vomiting, aphasia, immediate seizures, cardiovascular instability, temperature dysregulation and hemiparesis (38). The oculomotor and trochlear nerve palsy of contralateral side is also a characteristic feature. The mainstay of treatment is supportive care until all symptoms resolve. And this further necessitate the presence of a qualified personnel to monitor the patient after the block other than the surgeon (11).

Facial nerve block

In instances where the retrobulbar block is inadequate, the addition of a facial nerve block will prevent excessive blinking; however, it comes with the following complications: ipsilateral facial nerve palsy, vagus nerve palsy, glossopharyngeal and spinal accessory nerve block (39).

Oculocardiac reflex

It is commonly seen in children under general anaesthesia. The incidence is 0.6% after retrobulbar block and it is as high as 60-80% with general anaesthesia (11, 38). Atropine administration is useful in attenuating its course. The afferent pathway begins with mechanical stimulation on the stretch receptors of the ciliary nerve to ciliary ganglion and then the trigeminal nerve. The efferent pathway is via the vagus nerve to the heart. Manifestations of this reflex include a bradycardia and hypotension, arrhythmias and asystole. Acute management is to stop globe manipulation, give atropine and supportive care. The evidence regarding prophylactic atropine administration is inconsistent (11, 38).

SEDATION

It is common practice to sedate patients for topical and regional anaesthesia. Sedation is not an adjunct for the block; however it is given purely to improve patient comfort and cooperation. Patient selection, counseling and monitoring is very important and the adverse effects due to over sedation or under sedation can have perilous consequences. Sedatives are prescribed by surgeons and are given orally in the wards as premedication, our role is to provide intraoperative sedation via the intravenous route. The most commonly used drugs are short acting opiods, propofol, dexmedetomidine, ketamine, and midazolam (11). Drug selection and method of administration is dependent on patient and surgical factors. Short acting opiods are becoming a popular choice (11). SASA guidelines on safe sedation practices suggested the use of University of Michigan sedation score and Wilson Sedation scale. Minimally sedated state or light sedation is preferred for ophthalmic surgery. A thorough airway assessment and supplemental oxygen is mandatory in sedated patients (40). My preference would be to use a drug with a short context sensitive half time, for example propofol or remifentanil infusion, to achieve a UMSS score of 1 or Wilson sedation score of 3. Consider sedation in patients with anxiety and claustrophobia; however careful attention to patient' s underlying comorbidities (for example obstructive sleep apnea) needs to be made.

CONCLUSION

Ophthalmology anaesthesia practice has evolved remarkably over the decades, but the fundamentals remain. The main priorities are the patient's comfort, safety and successful surgeries. These priorities will be better served with adequate training to improve the level of knowledge, skill and confidence in the anaesthesia units. Clear and constant communication between the surgeon, the anaesthetist and the patient is important. The peribulbar block has been the technique of choice for some time because of its superiority to the retrobulbar blocks complication profile. The Sub- Tenon cannula blocks have been proven to be safer than both the above techniques.

Research on this topic showed that it is very important to understand the anatomy of the globe very well before attempting any block as the complications can be life altering for the patient. Furthermore, our patients present with a multitude of comorbidities ranging from congenital cataracts to complications from diabetes and hypertension; and therefore, preoperative evaluation of every patient has to be thorough.

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