

Preoperative assessment in ophthalmic regional anaesthesia

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This review will focus on cataract surgery, the commonest ophthalmic operation performed under regional anaesthesia. However, the points made are applicable to other ophthalmic operations if they can be performed under regional block. Eighty percent of patients presenting for cataract surgery are >70 yr of age and 57% have pre-existing medical problems.¹ Regional anaesthesia is therefore preferable as it should be associated with lower morbidity and cause minimal disruption to daily routine. However, this does not release the anaesthetist from the responsibility of performing a thorough preoperative assessment. Regional anaesthesia can have both ocular and systemic complications, many of which are avoidable if predisposing factors are identified and, where possible, controlled before surgery.^{2,3}

General issues

Preoperative clinics are generally undertaken by nurses who assess the patient's overall condition. However, the final responsibility rests with the surgeon and the anaesthetist. Matters such as the patient's ability to lie in the appropriate position for the operation, their ability to comply with instructions, their suitability for day care and how they will travel to and from hospital on the day of operation can be assessed at this time. Factors identified at this assessment that affect any part of the surgical episode must be identified and communicated to the relevant members of the surgical and anaesthetic team.

The preoperative assessment should be carried out within 3 months of the expected date of surgery and the results recorded on a checklist that is completed before the patient enters the operating theatre. As many patients have significant concurrent disease, it is advisable to perform brief checks on the day of surgery to ensure that there have been no important changes since the formal preoperative assessment. Exceptions to this are in areas that do not change, for example axial

length. Any changes in the patient's condition or therapy must be identified and appropriate action taken.

At the preoperative clinic, many units provide patients with general details about the techniques that are likely to be used in their case and about the potential risks and complications. The practitioners actually doing the case will discuss the fine detail on the day of operation. Apart from establishing a good doctor-patient relationship, the main aims of the anaesthetic preoperative assessment are to identify high-risk and potentially difficult cases and plan the appropriate management.

Medical assessment

Even when the patient is undergoing regional anaesthesia, it is advisable to know about their general health, as this could influence the conduct of the whole procedure. In addition to details of previous illnesses, anaesthesia and surgery, Table 1 lists items of particular relevance to ophthalmic cases performed under regional anaesthesia. A number of patient characteristics can significantly influence the smooth conduct of the operation. These include claustrophobia and panic attacks, lumbar spine problems and obesity (can affect positioning), and communication problems, for example deafness, dementia. A full clinical examination is not necessary. However, heart rate and blood pressure should be checked and repeated if abnormal at the first assessment. Check also for the presence of significant dyspnoea, cough, tremor and abnormal body movements.

Laboratory investigations

Laboratory and X-ray investigations are only needed when the history or a finding on physical examination indicates them. In the vast majority of cases, a history and clinical examination will suffice. The main indications for ECG and blood tests are listed in Tables 2 and 3.

Key points

All patients must receive a thorough preoperative evaluation, so that difficult and high-risk cases will be identified and managed appropriately.

If the axial length is >26 mm, it is safest to avoid a sharp-needle block from the inferotemporal approach.

A raised INR is always an anaesthetic risk for sharp-needle blocks.

Building up a good rapport with the patient and positioning them carefully is time well spent.

Fasting is not necessary before ophthalmic surgery performed under regional block.

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Table 1 Concurrent medical conditions and their implications for ophthalmic surgery performed under regional anaesthesia

Problem	Importance
Cardiovascular: Hypertension (>180/>100), ischaemic heart disease, cardiac failure, orthopnoea, arrhythmias, pacemaker, valvular problems	Implications for likely reaction to stress, sensitivity to sedative drugs and positioning. Stress may provoke ischaemic ECG changes, and patients may experience angina during surgery. Patients should not have surgery within 3 months of a myocardial infarction. Antibiotic prophylaxis is not required for patients with valvular problems
Respiratory: COPD, orthopnoea, sleep apnoea, need for domiciliary oxygen	Risk of intraoperative hypoglycaemia
Diabetes	Must be well controlled. Head movement caused directly, or indirectly by transmitted movement, may preclude regional anaesthesia
Epilepsy and tremor	Risk of bleeding with a needle block. Knowledge of medication also gives an indication of the severity of concurrent disease
Medication, especially warfarin, anti-platelet drugs, cardiac, respiratory and anti-diabetic drugs	May preclude the block being placed or the operation being done under regional anaesthesia.
Allergies	

Table 2 Main indications for a preoperative ECG

Irregular pulse or history of palpitations
Pulse excessively slow or fast on repeated checking (<50 or >100 min ⁻¹)
Chest pain, especially if recent onset
Uncontrolled hypertension on repeated checking (>180 systolic, >100 diastolic, or both)
Pacemaker, particularly if the patient has symptoms reminiscent of those experienced before the pacemaker was inserted
Syncope

Table 3 Main indications for preoperative blood tests

Indication	Tests
Warfarin	An INR should be done unless the patient attends an anticoagulant clinic regularly and has a stable INR or unless the INR has been done recently and is in an acceptable range. The recommendation in the UK and the US is that, for cataract surgery, the INR should be in the therapeutic range for the condition that warfarin was given. An INR is also indicated in patients with liver disease
Diabetes mellitus	A finger-prick blood sugar is sufficient
Known haematological problems	Perform a full blood count if there is a history of anaemia (especially in the presence of cardio-respiratory disease), leukaemia, low platelet count or significant dyspnoea
Renal failure	Urea and electrolytes
Pacemaker or significant arrhythmias	Urea and electrolytes

Ophthalmic history and examination

A three-step approach is useful on the day of operation to assess the eye, identify high-risk cases (i.e. those at greater risk of

damage because of the block) and potentially problem eyes, and plan the appropriate anaesthetic.

Essential first checks

Confirm that you are assessing the correct patient, review general health (including any bleeding diatheses, e.g. anticoagulants, low platelet count) and verify which eye is to be operated on from the case notes. Some patients are not sure, especially if both eyes are diseased, and some change their mind after they have been listed for operation in the clinic. Follow the National Patient Safety Agency guidelines for marking the operation site, as there have been reports of the wrong eye being blocked. Then, note any previous ophthalmic procedures, the anaesthetic techniques used and their effectiveness, and any problems or complications that arose. Also, enquire whether the patient was happy with the technique used. For example, the needle prick felt when some anaesthetists perform a block by the transcutaneous route distresses some patients but it is easily preventable.

Check the axial length (normal approximately 23 mm). This is the distance between the cornea and the retina directly behind it, not the length of the globe. It is used by the surgeon to calculate the power of the lens to be implanted and is measured using either an ultrasound probe placed on the anaesthetized cornea or by partial coherence interferometry, a laser Doppler technique. If biometry is unavailable, expect a long eye (axial length ≥ 26 mm) if the patient has been myopic since childhood. Such eyes may have a staphyloma, an out-pouching of the globe resulting from pathological thinning of the sclera, choroid and retina. This usually occurs inferior to the posterior pole but can be at the equator. The incidence of staphyloma increases from about 15% of eyes with an axial length 27–29 mm to about 60% with an axial length >31 mm. They may be unilateral or bilateral. Needle damage to the globe is about 30 times more common if the block is administered via the inferotemporal approach.⁴ Blocks done at the medial canthus⁵ or sub-Tenon's are safe.

Identify ophthalmic conditions that have special requirements or features that necessitate extra care with the anaesthetic

It is unwise to place large volumes of local anaesthetic in the orbit if there is a history of raised intraocular pressure, especially if this is not well controlled. A sub-Tenon's block is potentially safer, as excess fluid can drain out of the conjunctival opening. If a toric lens is to be inserted for severe astigmatism, the surgeon will want to mark the axes on the cornea under topical anaesthesia with the patient sitting up, before the block is placed. In addition, identify operations that will take longer than an uncomplicated cataract extraction and those ocular features that increase the chances of the surgeon having difficulties (Table 4). These have implications for the duration

Table 4 Procedures taking longer than an uncomplicated cataract extraction, and conditions that increase the risk of intraoperative surgical complications

Glaucoma operations, for example trabeculectomy
Limbal relaxing incisions (LRI) to reduce mild astigmatism
Problem lenses, for example pseudoexfoliation (PXF), brunescant cataract, posterior pole cataract. These make phacoemulsification more difficult and have a higher incidence of surgical complications
Some patients taking tamsulosin display the 'floppy iris syndrome', which causes problems dilating the pupil and difficulties performing phacoemulsification
Exchange of an intraocular lens can be a short procedure, but there is an incidence of capsular tears
Elective anterior vitrectomy
Inexperienced/slow surgeon

of surgery, the quality of the anaesthetic needed, and the length of time the patient will have to lie supine.

Examine the eye and orbit

Inspect the eye and orbit to identify those features that can make safe needle placement more difficult. These include a narrow palpebral fissure, a skin fold covering the medial canthus (for a medial peribulbar block), nystagmus and a restrictive squint (which keeps the eye fixed in one position, e.g. because of paralysis of a rectus muscle). If the patient has only one eye, or only one effective eye, it is essential to avoid any technique with a risk of globe injury. If planning to do an inferotemporal approach, check the space between the orbit and the globe (Finger Index) at the lower outer corner of the orbit. The closer the two are together, the harder it will be to insert the needle atraumatically from this direction. Where the globe lies tightly against the orbital rim, consider an alternative block.⁶ Identify enophthalmos by noting the position of the globe relative to the lateral wall of the orbit. There is an increased incidence of needle damage to the globe from the inferotemporal approach if it is set well back in the orbit.

Is general anaesthesia more appropriate?

Patient factors

The following patient factors may suggest that general anaesthesia is more appropriate:

- Previous adverse reaction or serious problem with a regional anaesthetic.
- Patient preference is important. There is no published evidence of increased mortality with a general anaesthesia. However, there may be increased morbidity in patients with significant cardiovascular or respiratory disease, and there is the possibility of postoperative confusion in older patients and postoperative nausea and vomiting.
- Patients who cannot lie flat, either because of cardio-respiratory disease, or because of positioning problems. This is particularly important if a long operation is planned.

- Patients who cannot lie still, for example those with a Parkinsonian tremor, poorly controlled epilepsy, or unpredictable cough not controlled by light sedation.
- Deafness (unless the patient can communicate very well).
- Uncooperative patients, especially those with confusion or dementia.
- Children.

High-risk eye

An absolute indication for general anaesthesia is patients who have undergone previous surgery for retinal detachment or choroidal melanoma, unless the operation can be done under topical anaesthesia. After retinal detachment surgery, the globe shape will be altered significantly if an encircling band has been attached. It is therefore impossible to know where an inferotemporal needle is in relation to the globe. Sub-Tenon's is also not an option in these cases because of the band. Previous surgery for some intraocular melanomas can leave the sclera very thin. A needle and some sub-Tenon's cannulae could easily puncture this. Infection around the eye is also a contraindication to regional block, though it is unlikely that the surgeon will wish to proceed with an intraocular operation in the presence of infection.

Possible indications for general anaesthesia include high intraocular pressure (all regional techniques can raise intraocular pressure because of the volume of injectate); only one eye, or effective eye; operations where the eye will be 'open' (e.g. phacotrabeculectomy), possibility of staphyloma, and a raised INR. Although the surgery can proceed in the presence of a raised INR, any bleeding will be more difficult to control in an anticoagulated patient and it would be wiser to avoid sharp-needle blocks in these patients.

Plan the anaesthetic technique

Be aware of patient preferences and be prepared to discuss the options with the surgeon. Then decide on the most appropriate technique. It is wise to identify special arrangements before the patient arrives in theatre, such as the need for anxiolysis and/or a "hand-holder", the need for extra pillows to help with positioning, the availability of nasal cannulae for patients on domiciliary oxygen.

Pre-operative instructions

The patient should take their normal medication pre-operatively, including warfarin. NSAID's have been shown not to increase the incidence of retrobulbar haemorrhage. It is acceptable for the patient to have a light breakfast or a midday snack before operation.

Indications for postponing surgery

Most ophthalmic cases that can be performed under regional anaesthesia are not urgent and therefore surgery can be postponed until the patient's status is optimal. The commonest reason for postponing surgery is poor control of chronic disease

that is either life threatening or could compromise the success of the operation. Any such patient should be referred appropriately. Examples include exacerbation of COPD; poorly controlled angina or within 3 months of a myocardial infarction; hypertension (rapidly reducing blood pressure immediately before surgery is not recommended); inappropriately low blood pressure (e.g. excessive anti-hypertensive medication); tachycardia (e.g. uncontrolled AF); bradycardia (e.g. excessive β -blockade, previously undiagnosed complete heart block); decompensated cardiac failure; pacemaker failure or imminent check-up; inappropriately high INR; poorly controlled diabetes or epilepsy; and sepsis elsewhere (e.g. leg ulcers infected with MRSA).

Further Reading

1. Feldman MA. Pre-operative assessment and evaluation. In: Kumar C, Dodds C, Fanning G, eds. *Ophthalmic Anaesthesia*. Netherlands: Swets and Zeitlinger, 2002; pages 51–60

2. Royal College of Anaesthetists and the Royal College of Ophthalmologists. *Local anaesthesia for intraocular surgery*. 2001

Key References

1. Desai P, Reidy A, Minassian DC. Profile of patients presenting for cataract surgery: National data collection. *Br J Ophthalmol* 1999; **83**: 893–6
2. Hamilton RC. Complications of ophthalmic regional anaesthesia. In: Finucane BT (ed.) *Complications of Regional Anesthesia*. London: Churchill Livingstone, 1999; 39–55
3. Partial loss of vision following local anaesthetic. In: Panting G (ed.) *Medical Protection Society UK Casebook, Medical Protection Society*. 2002; 16–17
4. Duker JS, Belmont JB, Benson WE, et al. Inadvertent globe perforation during retrobulbar and peribulbar anaesthesia. *Ophthalmology* 1991; **98**: 519–26
5. Vohra SB, Good PA. Altered globe dimensions of axial myopia as risk factors for penetrating ocular injury during peribulbar anaesthesia. *Br J Anaesth* 2000; **85**: 242–5
6. Kallio H, Rosenberg PH. Advances in ophthalmic regional anaesthesia. *Best Pract Res Clin Anaesthesiol, Elsevier* 2005; **19**: 215–27

Please see multiple choice questions 23–26.