

THE ROYAL COLLEGE OF
ANAESTHETISTS
AND
THE ROYAL COLLEGE OF
OPHTHALMOLOGISTS

LOCAL ANAESTHESIA FOR
INTRAOCULAR SURGERY

2001

Summary

Recently there have been major advances in every aspect of the management of the ophthalmic surgical patient. These include the shift to day care, increased focus on the patient, and the involvement of the entire ophthalmic team in all components of the process. A working party of the Royal College of Anaesthetists and the Royal College of Ophthalmologists was convened to update the 1993 'Guidelines on Anaesthesia in Ophthalmic Surgery'.

The purpose of these guidelines is to provide information for all members of the ophthalmic team in order to promote safe and effective local anaesthesia.

General comments

- Day care ophthalmic surgery under local anaesthesia (LA) is now preferred by patients and staff and is associated with the least disruption to the patient's normal activity.
- Multiprofessional teamwork is fundamental to day care surgery. Appropriately trained nurses are increasingly performing tasks that were previously undertaken by medical staff, especially in relation to preoperative assessment and preparation.
- These guidelines may require to be fine-tuned to meet local requirements, but the following general aspects remain pertinent:

Record keeping must be comprehensive, clear and unambiguous to comply with clinical audit and governance

The results of preoperative assessment should be recorded on a checklist which is completed before the patient enters the operating theatre area

Every Trust undertaking ophthalmic surgery should identify one anaesthetist with overall responsibility for the anaesthetic services to the eye department

Good communication between members of the anaesthetic-surgical team is essential

All intraocular surgery performed should be carried out in a facility which is appropriately equipped and staffed.

Preoperative assessment

- The preoperative assessment should be conducted according to locally designed protocols which should include routes of communication about abnormalities or concerns
- Preoperative assessment should normally be undertaken by specialist nurses with medical input as required
- For the patient with no history of significant systemic disease and no abnormal findings on examination at the nurse-led assessment, no special investigations are indicated. Any patient requiring special tests may also need an opinion from a doctor
- The patient should be provided with appropriate information, thereby reducing anxiety to a minimum
- The preoperative assessment visit should take place within three months of the surgery

Day of surgery

- Final simple preoperative checks must be made on the day of surgery. Recent changes in the patient's condition or therapy that might affect the surgical event must be identified
- The LA must be administered by an appropriately trained anaesthetist, ophthalmologist or nurse

Nurses may administer topical or subconjunctival anaesthesia. In a few centres, nurses have been trained to administer sub-Tenon's blocks, but the administration by these professionals of peribulbar or retrobulbar injections is not recommended

Intravenous sedation should only be administered under the supervision of an anaesthetist, whose sole responsibility is to that list

Local staffing availability will dictate whether an anaesthetist can be provided for all ophthalmic lists. An anaesthetist is not essential when topical, subconjunctival or sub-Tenon's techniques without sedation are used

When peribulbar or retrobulbar techniques are used an anaesthetist should be available in the hospital.

- No LA technique is totally free from the risk of serious systemic adverse events, although they may not be always a consequence of the technique itself, but of other patient factors

From prior to the administration of the LA to the end of the operation, continuous monitoring of ventilation and circulation by clinical observation and pulse oximetry is essential

A suitably trained individual must have responsibility for monitoring the patient throughout anaesthesia and surgery

All theatre personnel should participate in regular Basic Life Support (BLS) training, and there should always be at least one person present who has Advanced Life Support (ALS) training or equivalent.

Discharge and aftercare

- All patients, and especially those who are frail and elderly, are advised to have a friend or relative to accompany them to surgery and at discharge
- Discharge criteria must be established for each unit
- Written instructions should be given to the patient about what to do and who to contact in the event of problems or concern.

Training

High quality care requires that all personnel dealing with ophthalmic surgery under LA have specific training.

Contents

1	Preface	
1.1	Aim of these guidelines	7
1.2	Guidelines and local practice	7
1.3	Scope of the guidelines	7
2	Methods	8
2.1	The working group	8
2.2	Gathering the evidence	8
2.2.1	Grades of recommendations	8
2.2.2	Good practice points	8
3	Background	8
3.1	Setting the scene	9
3.2	Organisation of ophthalmic anaesthetic services	10
3.3	Record keeping	10
3.3.1	General	10
4	Selection criteria for local or general anaesthesia	9
4.1	Relative contraindications to LA	10
4.2	Recommending the type of anaesthesia	10
5	Preoperative Assessment	10
5.1	The assessment	10
5.1.1	General issues	10
5.1.1.1	Suitability for day care	10
5.1.1.2	Timing	11
5.1.1.3	Record keeping	11
5.1.2	Communication	11
5.1.3	Taking a history	11
5.1.4	Examination	11
5.1.5	Investigations	12
5.1.6	Specific disorders for consideration in preoperative assessment.	12
5.1.6.1	Hypertension	12
5.1.6.2	Myocardial ischaemia	12
5.1.6.3	Diabetes mellitus	12
5.1.6.4	Anticoagulated patients	12
5.1.6.5	Chronic obstructive pulmonary disease	13
5.1.6.6	Valvular heart disease	13
5.2	Consent	13
5.3	Patient information	13
5.3.1	Preoperative information	13

Contents

6	The day of surgery	13
6.1	The preoperative process	14
6.1.1	Preoperative checks and procedures	14
6.2	Local anaesthesia	14
6.2.1	Goal of LA for ophthalmic surgery	14
6.2.2	LA techniques used for intraocular surgery	14
6.2.3	Choice of local anaesthetic technique	15
6.2.3.1	Patient factors	15
6.2.3.2	Surgical factors	15
6.3	Who Should Administer LA?	15
6.4	Monitoring	15
6.4.1	Methods of monitoring	15
6.4.1.1	The role of the anaesthetist	16
6.4.2	Staff and monitoring requirements for each LA technique	16
6.5	Facilities	16
6.6	Immediate postoperative period and before discharge	16
6.7	Record keeping	17
7	Sedation for ophthalmic procedures	17
7.1	Aims of conscious sedation	17
7.2	Conversion to GA	17
7.3	Unwanted effects of sedation	17
7.4	Patient selection	18
7.5	Preparing the patient	18
7.6	Administration of sedation	18
7.7	Monitoring	18
7.8	Facilities and staff	18
8	Complications	19
8.1	General principles	19
8.2	Specific complications	19
8.2.1	Orbital haemorrhage	19
8.2.2	Globe perforation	19
8.2.3	Severe systemic adverse events	19
8.2.3.1	Symptoms and signs of brain stem anaesthesia	20
8.2.3.2	Risk factors	20
8.2.3.3	Prevention	20
8.2.4	Optic nerve damage	20
8.2.5	Muscle palsy	20
8.2.6	Seventh nerve complications	20

Contents

8.2.7	Allergy	20
8.2.8	Oculocardiac reflex	20
9	Training	21
9.1	Who needs to be trained?	21
9.1.1	Anaesthetists and ophthalmologists	21
9.1.2	Theatre nurses, anaesthetic nurses and ODPs	21
9.1.3	Ophthalmic nurses	21
9.2	Training	21
9.2.1	Training for anaesthetists	21
9.2.2	Training for ophthalmologists	22
9.2.3	Training for anaesthetic assistants	22
10	References	22
11	The Process	24
11.1	Working group membership	24
11.2	Acknowledgements	24
11.3	Review of the guidelines	24

1 Preface

There have been major advances in every aspect of the management of the ophthalmic surgical patient. These include the majority shift to day care, increased focus on patient-centred outcome, and the involvement of the entire ophthalmic team in all components of the process.

Most patients presenting for ophthalmic surgery are elderly and have pre-existing medical problems. Local anaesthesia will usually be associated with the least morbidity and a day care procedure should cause the least disruption to their daily routine, and is now preferred by most patients and staff.

Ophthalmic surgery may be performed in a general hospital environment or in isolated units provided they have suitable facilities, staffing and standards.¹

1.1 Aim of these guidelines

The purpose of these guidelines is to provide information for all members of the ophthalmic team in order to promote safe and effective local anaesthesia for intraocular surgery in adults. These guidelines set minimum standards and do not guarantee a specific outcome. Some units may wish to offer a higher standard of care than the minimum.

1.2 Guidelines and local practice

Specific factors may demand that these guidelines are fine-tuned to meet local requirements, but standards should not be compromised.

1.3 Scope of the guidelines

The ophthalmic surgical scene is dominated by cataract and glaucoma. These are the most common elective surgical procedures in the UK with about 200,000 procedures being performed annually. 80% of patients undergoing cataract surgery are 70 years or older, and 70% of these operations are performed as day cases.² These guidelines are targeted therefore to meet the requirements of the elderly patient who is about to undergo day care intraocular surgery.

The following are excluded from this document:

- Patients requiring general anaesthesia, whose preoperative assessment and anaesthetic management falls within the remit of the anaesthetist
- Patients undergoing laser photocoagulation
- Children and young adults
- LA for extraocular and adnexal procedures.

2 Methods

2.1 The working group

A working group of the Royal College of Anaesthetists and the Royal College of Ophthalmologists was formed to develop these guidelines. Its membership reflects the professional groups that are directly involved with the care and management of patients having ophthalmic surgery, and the ongoing monitoring of the quality and standards of care provided by the surgical service. They included: anaesthetists, ophthalmologists and nurses, and a public health physician.

2.2 Gathering the evidence

The approach taken by members of the working group was as follows:

- a. A Medline literature search on ophthalmic anaesthesia that is considered in these guidelines was conducted. The search was confined to intraocular surgery in adults and on reports in the English language.
- b. Following this, only studies taking place within the last 20 years (1980 to 2000) were included for further review.
- c. Finally the following attributes were sought in all studies included in the review:


The characteristics of the study population should be provided.

A systematic evaluation and consideration of possible confounding factors should have been undertaken during the statistical analysis, with a description and discussion of the methods used. In the absence of such systematic evaluation there should be at least some discussion of these issues and their likely influence on the findings reported. All studies reviewed were assessed using a framework based on guidance from the Scottish Intercollegiate Guidelines Network (SIGN) and recommendations made graded as follows.^{3,4}

2.2.1 Grades of recommendations

- A** *Requires at least one randomised controlled trial as part of a body of specific recommendation*
- B** *Requires the availability of well conducted clinical studies but no randomised clinical trials on the topic of recommendation*
- C** *Requires evidence obtained from expert committee reports of opinions or clinical experiences of respected authorities. Indicates absence of directly applicable clinical studies of good quality*

2.2.2 Good practice points

-  *Recommended best practice based on the clinical experience of the guidelines development group.*

3 Background

3.1 Setting the scene

There has been a dramatic change of anaesthetic practice for ophthalmic surgery over the past decade, and much of this since the first guidelines on 'Anaesthesia in Ophthalmic Surgery' were produced by the Royal College of Anaesthetists and College of Ophthalmologists in 1993.⁵ The

use of local anaesthesia (LA) has risen from around 20% in 1991⁶ to over 75% in 1996⁷ and 86% in 1997² and the use of sedation with LA has fallen from 45% in 1991 to around 6% in 1996.⁷

The 1996 National Survey of Local Anaesthesia for Ocular Surgery confirmed that serious systemic adverse events may occur with all types of LA, but are rare (3.4 per 10,000), although a degree of under-reporting was suspected.⁸

No LA technique is totally free of the risk of serious systemic adverse events. This is not necessarily a consequence of a particular local anaesthetic technique. Other factors include the pre-existing medical conditions, anxiety, and pain or stress reaction to the operation.

B *Whatever their cause, serious systemic adverse events do sometimes occur in association with intraocular surgery with all types of LA⁸*

3.2 Organisation of ophthalmic anaesthetic services

Teamwork is the key to achieving high surgical throughput while maintaining quality and patient satisfaction. Ophthalmic surgery under local anaesthesia is a joint venture between anaesthetists, surgeons, nurses and technical staff. This is particularly important, as specially trained nurses now perform many of the tasks previously undertaken by medical staff.

✓ *Multiprofessional teamwork is the key to day care surgery and is essential at every stage of the process*

✓ *Every Trust should identify one anaesthetist with overall responsibility for ophthalmic services*

3.3 Record keeping

Meticulous recording of important data is a necessary prerequisite for communication, safe practice, clinical governance and audit. There should be forms on which to record all components of the process as listed below.

3.3.1 General

For all data entry the following should be the norm:

Clarity – data should be recorded clearly and unambiguously

Accountability – all data entries should be dated and signed.

4 Selection criteria for local or general anaesthesia

The evidence for the benefit of LA above GA for most ophthalmic intraocular procedures is sparse and is generally determined by the clinical judgement of the surgical team.⁹

✓ *LA is the preferred method unless contraindicated*

Day care intraocular surgery under local anaesthesia is safe and is preferred by patients and staff alike. It has powerful economic benefits and is generally the option of choice.²

C *Maximum health economic benefit is achieved if cataract surgery is delivered on a day care basis using local anaesthesia²*

4.1 Relative contraindications to LA

These include:

- The patient who declines to have LA even after careful counselling and an explanation of the risks involved
- The patient who is confused and unable to comply with instructions, or unable to communicate and whose safety might be compromised
- The patient with a marked uncontrolled tremor
- The patient who has a medical condition severe enough to limit acceptable positioning
- The young patient – the age below which the clinician or patient prefers GA will be influenced by personal preference and culture of both parties
- The patient who has previously experienced a severe reaction, allergy or other complication to LA.

4.2 Recommending the type of anaesthesia


The surgical assessment should include recommendations on the type of anaesthetic indicated for the individual patient. This will depend on psychological aspects, the particular features of the globe and orbit, and the anticipated difficulty of the surgery.

5 Preoperative assessment

Preparation is the key to the smooth running of day care surgery, and most of this should be done at the preoperative assessment. This is essential to imbue a sense of confidence in the patient and minimise unexpected problems and late cancellation of the procedure. Preoperative assessment is increasingly being undertaken at the initial consultation – ‘one stop clinics’.¹⁰

Ophthalmic anaesthesia and surgery can be complicated by both ocular and systemic complications.⁸ Some of these may be avoided if predisposing ophthalmological (eg long eye) and medical (eg uncontrolled hypertension, diabetes or myocardial ischaemia) factors are identified and, where possible, controlled before surgery.

Preoperative assessment clinics are generally undertaken by nurses but the final responsibility rests with the anaesthetist and surgeon.

 ***Ophthalmic preoperative assessment clinics may be undertaken by nurses, without the direct presence of a doctor. Only appropriately trained specialist nurses should be responsible for such clinics.***

5.1 The assessment

5.1.1 General issues

While the focus of this section is directed at determining fitness for anaesthesia, this is inextricably linked with the surgery and some overlap is inevitable.

5.1.1.1 Suitability for day care

The purpose of preoperative assessment is to identify abnormalities that might interfere with the safe performance and outcome of the operation. The vast majority of patients are suitable for day care surgery^{2,11,12} and neither age nor weight need be an issue in this respect.

Living alone, either with or without a telephone, and distance from the hospital do not contraindicate day care surgery under local anaesthesia without sedation,¹² provided there is adequate support.

✓ *All patients, but especially those who are frail and elderly, should have a friend or relative to accompany them to surgery and at discharge*

5.1.1.2 Timing

The assessment should be within a period not exceeding three months of the operation. A telephone call to see that nothing has changed may be done in the week preceding surgery. Final checks must be made on the day of surgery.

5.1.1.3 Record keeping

Medical records should be to hand at the assessment. If the patient has significant systemic or ocular disease and no information is available the General Practitioner or relevant hospital should be contacted.

✓ *There should be a form for recording the history, examination, results of investigations and any actions to be taken.*

5.1.2 Communication

It is recommended that each unit defines actions to be taken when issues are identified that will influence the operation or require communication with another medical practitioner.

✓ *Factors identified at the preoperative assessment that affect any part of the surgical episode, or its follow-up, must be identified and communicated to relevant members of the surgical and anaesthetic team*

✓ *The results of preoperative assessment should be recorded on a checklist which is completed before the patient enters the operating theatre area.*

5.1.3 Taking a history

Taking a history enables most abnormalities that would be detected on special testing to be identified.

The following should be noted:

- Patient's age
- Medication (including aspirin). Generic names to be recorded
- Allergies, idiosyncrasies and sensitivities noting the presumed causative agent and the effect of exposure
- Past illness(es)
- Past surgery and anaesthesia, including any complications of the latter
- Present illnesses and any abnormal symptoms, determined by system e.g. cardiovascular, respiratory (including orthopnoea), nervous system
- Psychosocial matters including anxiety, confusion, panic attacks and claustrophobia
- Communication issues.

5.1.4 Examination

The following minimum should be included in the examination:

- Pulse rate and rhythm

- Blood pressure (to be repeated if abnormal)
- Respiratory distress or breathlessness, if these are present the respiratory rate should then be measured
- Ability to lie in an appropriate position for the operation. Oximetry should be used if there is a history of orthopnoea
- Hearing, comprehension and co-operation
- Tremor and abnormal body movements
- Musculoskeletal abnormalities which might affect the patient's ability to lie still in the appropriate position for the duration of the operation
- Ophthalmic factors which might affect the operation or anaesthetic eg orbicularis spasm, proptosis, deep set eye, small palpebral fissure, or long axial length
- Of particular importance is the assessment of the patient's ability to tolerate manipulation around the eye without blepharospasm.

5.1.5 Investigations

Tests should only be considered when the history or a finding on physical examination would have indicated the need for an investigation even if surgery had not been planned.^{13,14} Most abnormalities that would be detected on special testing (eg ECG, CXR, FBC, clotting studies, urea and electrolytes) can be predicted from taking a careful history and performing a physical examination. Special tests do not reduce morbidity in this context and are not required unless specifically indicated.¹⁴

A *For the patient with no history of significant systemic disease and no abnormal findings on examination at the nurse-led assessment, no special investigations are indicated. Any patient requiring special tests may need a medical opinion.*¹³⁻¹⁵

5.1.6 Specific disorders for consideration in preoperative assessment.

5.1.6.1 Hypertension

Defined in this context as a systolic blood pressure at or above 180 mm Hg or a diastolic above 100 mm Hg. Hypertension should be controlled preoperatively and the patient should continue their drugs up to and including the day of surgery. Rapidly lowering blood pressure immediately prior to surgery is not advised.

5.1.6.2 Myocardial ischaemia

Stress may provoke ECG changes similar to those provoked by exercise and patients may experience angina during surgery. Every effort should be made to reduce anxiety and patients should have their usual angina medication available in theatre. Generally patients should not have surgery within three months of a myocardial infarct.

5.1.6.3 Diabetes mellitus

Diabetic patients should have their blood sugar controlled. If surgery is planned under LA diabetic patients should have their usual medication and oral intake.

5.1.6.4 Anticoagulated patients

In procedures involving sharp needles or sub-Tenon's block, it is important that the international normalised ratio (INR) is known. The level should be within the recommended therapeutic ratio, which is determined by the condition for which the patient is being anticoagulated.

5.1.6.5 Chronic obstructive pulmonary disease

Although patients with high arterial CO₂ in air may be at risk if given indiscriminate oxygen therapy, it is unusual for oxygen supplementation over a short period of time to cause respiratory depression. Hypoxaemia can occur in the elderly purely by adopting the supine position therefore oxygen supplementation is recommended particularly in the presence of IV sedation. Accumulation of carbon dioxide occurs with several types of draping systems¹⁶ and this can lead to hypertension and increased choroidal blood flow. An open draping system or a simple venturi high flow oxygen enriched air system below the drapes is recommended.

5.1.6.6 Valvular heart disease

There is no need for antibiotic prophylaxis for intraocular surgery.

5.2 Consent

Consent must be obtained in the full knowledge of both general and special risks relevant to the operation and anaesthesia.¹⁷ It is the responsibility of the individual administering the anaesthetic to discuss possible complications of the anaesthetic. A separate consent form for the anaesthetic *per se* is not required.

5.3 Patient information

The surgical episode is a partnership involving the patient who wants a good outcome, and will want to co-operate with the team. The preoperative assessment is an important opportunity for providing information to the patient and their family, discussing their concerns and expectations, and clarifying any points of uncertainty.

5.3.1 Preoperative information

Prepare the patient for the day of surgery by discussing what will happen on the day and during the operation. In particular, transport, what to wear, time of arrival and discharge, food and drink, the wearing of dentures and hearing aids during the operation, concerns about being able to lie still, etc.

- ✓ *The preoperative assessment is the time to establish rapport with the patient and to discuss procedures in the detail that the patient wishes or needs.*
- ✓ *Give reassurance that a trained person will be exclusively assigned to look after the patient throughout the operation. Ideally this should be the nurse who has pre-assessed the patient, or at least an individual who has met the patient before entering the operating theatre.*

6 The day of surgery

The preoperative process

The patient should be invited to arrive at the unit in sufficient time to complete formalities, but not so far in advance as to inconvenience the patient, escort and staff alike.

Formal hospital admission is unnecessary and the patient should be allowed to remain in their own clean and loose fitting clothing.

- ✓ *Do not repeat the preoperative assessment. Check that nothing has changed and prepare the patient for the operation.*

- ✓ *Find out if there has been any **RECENT** change in the patient's condition or therapy, particularly one that might affect the surgical event. Any change should be brought to the attention of a doctor.*

6.1.1 Preoperative checks and procedures.

Patient identity is confirmed and name tags are attached to the patient's wrist. Confirmation of the eye to be operated on should be made when checking the consent form. Although this will normally be checked by the nurse responsible for the immediate preoperative assessment and at arrival at the operating facility, the surgeon has a primary responsibility to check that he/she is operating on the correct eye.

Although there are theoretical reasons for believing that a period of fasting prior to local anaesthesia might be appropriate, Maltby and Hamilton¹⁸ reported no cases of aspiration in over 30,000 cataract operations under local anaesthesia.

A recent survey of members of the British Society of Ophthalmic Anaesthesia¹⁹ has shown that almost 65% of its members did not restrict fluid or food intake. Indeed many cited the undesirable effects of thirst, nausea and the possibility of hypoglycaemia as reasons for allowing oral intake.

- ✓ *There are differences in the clinical practices of individual anaesthetists. However the majority do not consider that it is necessary for patients to be fasted prior to local anaesthesia for eye surgery.*

- Check that the patient has taken their regular medication. Any change should be brought to the attention of the medical members of the team
- Confirm that the patient has been well since the preoperative assessment visit and does not have any acute illness such as an upper respiratory tract infection or influenza
- Check that the consent form has been completed
- See that the patient has provision for safe return home
- Blood pressure should be rechecked if indicated by preoperative assessment
- The eye is checked for the absence of acute inflammation
- Preoperative eye drops are instilled
- The patient should void urine before going to theatre.

- ✓ *The results of preoperative assessment should be recorded on a checklist which is completed before the patient enters the operating theatre.*

6.2 Local anaesthesia

6.2.1 Goal of LA for ophthalmic surgery

The goal of anaesthesia for intraocular surgery is:

- To provide pain-free surgery and to minimise the risk of systemic complications
- To facilitate the surgical procedure
- To reduce the risk of surgical complications.

6.2.2 LA techniques used for intraocular surgery

- Topical anaesthesia, alone, or in conjunction with preservative-free intracameral local anaesthetic
- Subconjunctival anaesthesia

- Sub-Tenon's anaesthesia
- Peribulbar (extracone) anaesthesia
- Retrobulbar (intracone) anaesthesia.

The pros and cons of each LA technique have long been debated.²⁰⁻²⁹ The situation is made more complex by comparing historical instruments and techniques with those in current usage.

It is the opinion of the working group that there are two critical issues in the debate about minimising complications associated with LA injection: needle length and technique. Absolute distinction between peribulbar and retrobulbar injection cannot always be made, but complications of both are reduced by using a short, 25-31 mm, needle.²⁴ A separate VIIth nerve block is not generally recommended.

 **Complications of LA injections are reduced by using a short needle (25-31 mm).**

6.2.3 Choice of local anaesthetic technique

In deciding which type of anaesthesia to use, the following may be considered.

6.2.3.1 Patient factors

Cataract surgery with all forms of local anaesthesia requires significant patient co-operation throughout the procedure. Thus, patient preference, anxiety and ability to co-operate should all be taken into account.

- LA is the procedure of choice for the majority of patients, even those with impaired hearing or who do not speak English
- The patient's ability to tolerate manipulation around the eye without blepharospasm should have been gauged at the preoperative assessment.

6.2.3.2 Surgical factors

- The type and size of incision
- The risk of complications
- Duration of operation. Longer procedures are not necessarily a contraindication to LA
- The experience of the surgeon.

6.3 Who should administer LA?

Local anaesthetic injections should only be performed by an anaesthetist or ophthalmologist who has been trained appropriately. Nurses may administer topical or subconjunctival anaesthesia. In a few centres, nurses have been trained to administer sub-Tenon's blocks, but, the administration by these professionals of peribulbar or retrobulbar injections is not recommended.

6.4 Monitoring

Severe systemic complications are recognised but rare complications of day care surgery and have been associated with all LA techniques. The patient should be assured that they will be carefully monitored.

6.4.1 Methods of monitoring


- *Communication with attendant* - Probably the single most important monitor, an individual whose sole responsibility is to remain in contact with the patient and who is trained to detect and act (or alert someone more senior) on any adverse event

- *Clinical observations* - Monitor the patient's colour, responses to surgical stimuli, respiratory movements and palpation of the pulse
- *Pulse oximetry* - To detect cardiac and respiratory problems promptly
- *IV access* - Essential if peribulbar or retrobulbar techniques are employed or intravenous sedation is used.

Continuous monitoring of ventilation and circulation is essential, both by clinical observation and by pulse oximetry.

Monitoring should commence just prior to the administration of local anaesthesia and continue until the surgical procedure is ended. The level of monitoring required during local anaesthesia will depend on the anaesthetic technique and the medical condition of the patient. There will be occasions when additional monitoring is desirable such as ECG or BP measurement.³⁰

Monitoring should be the role of a member of the staff who remains with the patient throughout the monitoring period and whose sole responsibility is to the patient. This person must be trained to detect and act on any adverse events, and may be an anaesthetist, nurse, operating department practitioner (ODP), assistant (ODA) or anaesthetic nurse as long as they are trained in basic life support (BLS)

 ***All theatre personnel should have regular training in Basic Life Support (BLS), and there should be at least one person present with Advanced Life Support (ALS) or equivalent qualification.***

6.4.1.1 The role of the anaesthetist

The role of the anaesthetist in ophthalmic surgery performed under LA includes the awareness of all non surgical factors that promote the smooth running of the list. They may also be involved in administering the local anaesthetic, monitoring, the prevention of adverse events and management of the effects should they occur. Method of anaesthesia and local staffing availability will dictate whether an anaesthetist may be provided for all ophthalmic lists.

- *IV sedation* - Should only be administered under the supervision of an anaesthetist - see sedation
- *Immediate postoperative period* - Appropriate facilities for monitoring in the postoperative period must be available.¹

6.4.2 Staff and monitoring requirements for each LA technique

If an anaesthetist is not present, topical, subconjunctival or sub-Tenon's block techniques are recommended.

- When peribulbar or retrobulbar techniques are used an anaesthetist should be available.

 ***If an anaesthetist is not available, peribulbar or retrobulbar LA techniques should not be used.***

6.5 Facilities

- All intraocular surgery performed under LA should be carried out in a facility which is appropriately equipped, and staffed, for resuscitation. Oxygen and suction must be available. Patients should be on a tipping trolley or equivalent chair.

6.6 Immediate postoperative period and before discharge

After the operation, and before discharge, the patient should feel well and have stable vital signs. A drink should be offered.

- ✔ *Discharge criteria should be established.*

There should be provision for safe return home and written instructions should be provided about what to do and who to contact in the event of problems.

- ✔ *Written instructions should be given to the patient about what to do and who to contact in the event of any problem or concern.*

6.7 Record keeping

Operative records are required and the minimum data set to be recorded should include: name of person performing the block, a record of the exact technique employed, the entry sites, length and type of needle or cannula, volume and concentration of local anaesthetic agent employed, and any complications encountered. The quality of anaesthesia should be recorded. Monitoring techniques and recordings should be noted.

Critical incident recording and audit are requirements of clinical governance.

7 Sedation for ophthalmic procedures

Ideally, the patient undergoing ophthalmic surgical procedures should be fully conscious, responsive, and free of anxiety, discomfort and pain.

For most this can be achieved by sensitive and personalised assessment and counselling, with support throughout the operation and verbal reassurance. This is greatly facilitated by continuity of staff care at all preoperative stages. Less than 10% of patients require sedation.⁷

- ✔ *Good rapport, counselling, support and the use of relatively painless techniques all reduce the need for sedation.*

7.1 Aims of conscious sedation

The aim of sedation is to minimise anxiety while providing the maximum degree of safety. The effects of the sedation should be easily controlled, with smooth onset and rapid recovery.

- ✔ *Sedation should only be used to allay anxiety and not to cover inadequate blocks, which must be corrected by the administration of more LA.*

7.2 Conversion to GA

- ✔ *It is not considered safe to convert to a GA, but if necessary, to postpone the surgery until the patient is prepared for a GA.*

7.3 Unwanted effects of sedation

All sedative drugs depress the CNS, and patients can become unresponsive to command and mild stimulation. When loss of consciousness (defined as a failure to respond to verbal command) occurs, the state of sedation has been lost and anaesthesia has been induced, with all its attendant risks. The complications of sedation include excessive restlessness, sudden movement, and airway obstruction which may jeopardise the operation.¹

7.4 Patient selection

The effect achieved from a given dose of sedative can vary markedly between different patients, and it should be used only with caution in the elderly and infirm, low weight individuals, and those with respiratory disease.

7.5 Preparing the patient

Starvation is not necessary for conscious sedation. However in view of the risk of unexpectedly deeper sedation, it is desirable to develop local protocols in conjunction with the department of anaesthesia.³¹

A dependable intravenous line should be securely in place to allow sedative drugs to be administered reliably during the procedure and also for emergency medication

7.6 Administration of sedation

Because of the delay in achieving sedation following its administration, the drug will need to be given by the anaesthetist prior to the onset of the procedure.

7.7 Monitoring

Safety depends on maintaining respiratory function which will ensure adequate oxygenation and the removal of carbon dioxide. Supplementary oxygen should be administered. Cardiovascular depression consequent upon the sedation is not likely provided that consciousness and adequate respiratory function are maintained.

A decrease in SpO₂ indicates the onset of respiratory complications. A similar level of continuous monitoring should be used during sedation as that used during general anaesthesia. Lack of response to command and mild physical stimulation indicates that sedation is excessive and steps must be taken to ensure adequate cardiorespiratory function and consideration given to reducing the level of sedation by administering an antagonist.

7.8 Facilities and staff

The minimum requirements for caring for patients who are sedated are:

- An anaesthetist
- An ODP/ODA/anaesthetic nurse
- IV access
- Pulse oximetry
- Non-invasive blood pressure monitoring - the cuff is put on before the block
- ECG, depending on the requirements of the anaesthetist.³¹



Intravenous sedation should only be administered under the supervision of an anaesthetist whose sole responsibility is to that list.

8 Complications

Because of the multiprofessional management of the patient undergoing local anaesthesia for ophthalmic surgery, some information is included here on complications of anaesthesia.^{33,34}

8.1 General principles

The individual administering the regional anaesthetic block should understand the relevant anatomy and the pharmacological agents in common usage.

8.2 Specific complications

8.2.1 Orbital haemorrhage

Orbital haemorrhage is a rare complication.²⁴ The risk may be minimised by avoiding injecting into the highly vascular orbital apex and using fine (not more than 25 swg) and short needles (usually not longer than 25 mm), and certainly not larger than 31 mm.

Inject into the less vascular orbital compartments such as the inferotemporal, nasal, and superotemporal sites with the eye in the straight-ahead position.^{35,36} The superonasal compartment, with its rich vascular supply, should be avoided if possible.

For patients on warfarin, the INR should be within the therapeutic ratio which is determined by the condition for which the patient is being anticoagulated.

8.2.2 Globe perforation

The incidence of globe perforation has been reported as 1 in 874,³⁷ 1 in 12,000²⁰ or 1 in 16,224.²⁴ The needle may enter the globe (penetration) or pass right through it (perforation). 50% are not recognised at time of occurrence and so a high index of suspicion is required.³⁸⁻⁴¹

Symptoms and signs of perforation include some or all of the following: pain, hypotony, poor red reflex, and vitreous haemorrhage. Serious sight threatening vitreoretinal complications may result.

The risks of globe perforation can be reduced by:

- Correct insertion of the needle according to anatomical principles
- Awareness that ocular anatomy may be disturbed by pre-existing ocular pathology and surgery
- Good patient co-operation
- Peribulbar may be safer than retrobulbar blocks, and some authorities believe that blunt are superior to sharp needles. However blunt needles may cause more damage to the globe if penetration occurs.^{40,41}

8.2.3 Severe systemic adverse events

These are defined as 'life-threatening events', eg an epileptic fit, a patient requiring transfer to an intensive therapy unit, or subsequent death attributed to the adverse event. Their incidence is reported as 3.4/10,000.⁸ Some are due to spread of local anaesthetic along the optic nerve sheath, causing brain stem anaesthesia.^{25,33,42} The technique most likely to cause severe systemic complications is retrobulbar injection, using long needles, with a prevalence around 0.1% to 0.3%. Large studies^{22,25} have shown that peribulbar injection, especially if administered through a needle less than 31 mm, is extremely rarely associated with severe

systemic events. However it is pertinent to note that the difference between peri- and retrobulbar techniques in some instances is difficult to define.

8.2.3.1 Symptoms and signs of brain stem anaesthesia

Symptoms and signs range from drowsiness, lightheadness, confusion, loss of verbal contact, to cranial nerve palsies, convulsions, respiratory depression or respiratory arrest, and even cardiac arrest. The onset of symptoms is within 10 minutes of the LA injection and the respiratory depression and cardiovascular events may require assisted ventilation and cardiopulmonary resuscitation. Symptoms and signs may last for up to two to three hours.

8.2.3.2 Risk factors

No LA technique is entirely free of the association with severe systemic adverse events, and they cannot be reliably predicted. Some of these severe events may be due to the LA itself, and this is most likely when long needles are used. Other factors include: the stress of the day's event, other agents used in the eye or ocular manipulation, or causes entirely unrelated to the anaesthesia or surgery.

8.2.3.2 Prevention

The risk is minimised by the use of short, fine (not more than 31 mm) needles while the eye is looking straight ahead, thus avoiding nerve rotation towards the needle.³⁶

8.2.4 Optic nerve damage

This may result from injections deep into the orbit, and is less likely if at the time of injection the eye is in the primary position. Occlusion of the central retinal artery by high pressure has been reported.⁴³

8.2.5 Muscle palsy

Diplopia and ptosis are common after blocks if long acting local anaesthetic agents are used by injection. They usually persist for up to 24 hours and sometimes longer.

Muscle palsy can be prevented by the use of conventional local anaesthetic concentrations, i.e. 2% lignocaine, 0.75% bupivacaine or levobupivacaine, or 1% ropivacaine. Higher concentrations may be neurotoxic as well as myotoxic and should be avoided. Avoid direct injection into a muscle by using a suitable needle entry site.

8.2.6 Seventh nerve complications

Block of the proximal facial nerve may lead to dysphagia, or even respiratory obstruction due to spread to the glossopharyngeal, vagus and spinal accessory nerves.

8.2.7 Allergy

Allergy to local anaesthetics or hyaluronidase are very rare. A history should be sought in all cases, and the relevant drugs avoided as necessary.

8.2.8 Oculocardiac reflex

The oculocardiac reflex is very rare with local anaesthesia, although vasovagal reactions may occasionally arise.

9 Training

High quality care requires that all personnel dealing with ophthalmic surgery under LA have specific training.

9.1 Who needs to be trained?

9.1.1 Anaesthetists and ophthalmologists

- To preoperatively assess and manage the ophthalmic patient, and to be able to seek consent for the anaesthetic procedure
- To understand the relevant ophthalmic pharmacology, physiology and anatomy
- To understand the different types of eye anatomy and surgical pathology and their relevance to local anaesthesia
- To be able to perform the local anaesthetic safely and efficiently
- To understand the prevention and management of complications of orbital regional anaesthesia, including the management of resuscitation.

In addition anaesthetists must be able to:

- Monitor and if necessary resuscitate the patient
- Provide intravenous sedation if necessary.

9.1.2 Theatre nurses, anaesthetic nurses and ODPs

- To have a basic understanding of ophthalmic anatomy and pathology and its relevance to local anaesthesia
- To understand the complications of orbital regional anaesthesia
- To monitor the patient, be able to detect abnormal parameters and understand their significance and when to seek assistance in the management of the patient
- To have up to date basic life support training (BLS)
- To know where resuscitation drugs are kept and how to operate equipment.

9.1.3 Ophthalmic nurses

- To be aware of the relevant criteria for selection of patients for local anaesthesia
- To be aware of the relevance of existing medical and ophthalmic conditions which may affect the patient's suitability for surgery under local anaesthesia, and the local guidelines to be followed if an abnormality is detected
- To be familiar with the preoperative assessment process in their unit and the lines of communication when dealing with problem cases
- To be trained in cardiopulmonary resuscitation.

9.2 Training

9.2.1 Training for anaesthetists

Each anaesthetic department should have a consultant with nominated responsibility for ophthalmic anaesthesia. There should be a number of consultants who regularly perform regional anaesthetic techniques.

There should be an agreed training programme provided by experienced consultants, and ongoing audit of complications and adverse events.

It is not intended that these guidelines should contain detailed instructions on how to teach the practical skills of regional orbital anaesthesia, but some general recommendations are appropriate:-

- The practical training should be structured and modular ie there should be an agreed system of training which allows the trainee to become proficient at each part of the procedure before embarking on a complete one
- The training should be supervised by an EXPERT, not someone who has only just learnt the technique themselves
- Most importantly the safety and comfort of the patient should be paramount. The training process should be calm and discreet such that the patient is not put under any undue stress.

9.2.2 Training for ophthalmologists

Ophthalmic surgeons wishing to perform orbital regional anaesthesia should undergo the same training as anaesthetists (see above). Trainee ophthalmologists can be taught surgical techniques on awake patients but this may be done in a modular fashion to prevent the patient being subjected to an unacceptably long operation.

9.2.3 Training for anaesthetic assistants

The appropriate qualification for ODPs is the NVQ level three in operating department practice. Skills in BLS must be maintained.

Qualified nurses are already registered professionals but require additional training before taking on the duties of anaesthesia assistant. There are a number of operating department ENB courses available or 'Fast Track' NVQ. Skills in BLS should be maintained.

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11 The process

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11.3 Review of the guidelines

These guidelines were produced in 2001 and will be reviewed in 2003, or sooner if new evidence becomes available.