



FOCUS ON: OPHTHALMIC ANAESTHESIA

Loco-regional anaesthesia for ocular surgery: Anticoagulant and antiplatelet drugs

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S U M M A R Y

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Many patients undergoing ophthalmic surgery have significant co-morbidity. Many take anticoagulant or antiplatelet drugs. Stopping these drugs in patients with heart or vascular disease may result in death from a thromboembolic episode. The risk of this must be balanced against the risk of bleeding. In general, the risks of stopping these drugs outweigh the risks of ophthalmic surgery, which is in most cases confined to the eye. The majority of eye surgery is now performed under local anaesthesia (LA). There is no strong evidence currently to favour blunt cannula techniques such as sub-Tenon's block over traditional sharp needle peribulbar block in patients on anticoagulant or antiplatelet therapy. Most studies are too small to detect a significant difference when comparing patients on anticoagulant or antiplatelet medication with those that are not, but the incidence of significant sight threatening haemorrhagic complications appears to be very low for cataract surgery, of the order of 3 per 10,000 operations.

There is some concern that drug and food interactions may affect anticoagulation with warfarin and it is recommended that the International Normalized Ratio (INR) be measured as close to the time of operation as possible.

Conclusions reached for ambulatory cataract surgery may not apply to more invasive and complex operations.

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1. Cataract surgery

The most commonly performed adult ophthalmic surgical procedure by far is that of cataract extraction, usually by phacemulsification. In the UK the number of cataract operations performed annually has increased from 105,000 in 1990 to 287,000 in 2005–2006.^{1,2} The vast majority of these patients are elderly with a higher incidence of associated systemic disease such as coronary artery disease and are often on anticoagulants or antiplatelet medication. At the same time there has been a steady increase in the use of local anaesthetic (LA) techniques for cataract surgery and this had grown from 46% in 1990¹ to 96% in 2003.³

2. Review of the literature

2.1. Local anaesthetic techniques and complications

Recently there has been a move away from sharp needle techniques towards sub-Tenon's and, to a lesser extent, topical alone or

topical – intracameral LA. Only a small number of LA cataract operations in the late 1990's were performed using sub-Tenon's block (6.7% reported in 1999).⁴ Ten years on this has increased to become the preferred technique in many hospitals although there is a wide variation of anaesthetic technique amongst ophthalmology centres with some centres almost exclusively favouring one anaesthetic technique or another. There are, however, still reports of life threatening and sight threatening complications, estimated at 3.4 per 10,000 in 1996.⁵ This was probably an under estimate due to under-reporting. The recent trend towards sub-Tenon's block rather than sharp needle techniques is probably because it is *perceived* to be safer in terms of serious complications although the evidence for this is not conclusive. A study of 6000 sub-Tenon's blocks in New Zealand found a very low complication rate, and the technique replaced sharp needle blocks in Auckland.⁶ Certainly retrobulbar, *intraconal* block is now very rarely used in the UK (3.5% of all LA in 2007),³ but peribulbar block with a 25 mm (1 inch) needle can place the needle retrobulbar although still *extraconal*: a so-called "peri-cone" block. The optic nerve may be at less risk but the risk of damage to blood vessels and extraocular muscles remains.

It must be emphasized that there have been no large randomized controlled trials to compare these LA techniques. Most reports are based on the examination of historical data recording complications.

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In a study by Kallio et al.,⁷ 1383 patients had medial peribulbar or inferolateral retrobulbar blocks. 482 (35%) were on aspirin, 76 (5.5%) on warfarin, and 260 (19%) on non-steroidal anti-inflammatory drugs. In total, 55 (4.0%) patients had lid haemorrhages (grades 1–3). In 33 of these patients the haemorrhages were spot – like (grade 1). No grade 4 haemorrhages (defined as retrobulbar haemorrhage with increased intraocular pressure) occurred. The preoperative use of aspirin, non-steroidal anti-inflammatory drugs or warfarin, whether or not they had been discontinued, did not predispose to haemorrhage associated with retrobulbar/peribulbar block.

Kumar et al. studied the frequency of haemorrhagic complications with sub-Tenon's anaesthesia in patients on aspirin, warfarin or clopidogrel.⁸

Seventy-five patients were on aspirin, 65 were on warfarin, and 40 were on clopidogrel. Seventy-five patients on no anticoagulants were used as the control group. Subconjunctival haemorrhage occurred in 19% in the control group, 40% in the clopidogrel group, 35% in the warfarin group, and 21% in the aspirin group. The warfarin and clopidogrel groups had the highest incidence of subconjunctival haemorrhage ($P < 0.05$).

The Cataract National Dataset Electronic Multicentre Audit⁹ attempted to record data about the operation, including minor and major complications and also the technique of anaesthesia. There were limitations in this study in that the accuracy of the data entry relating to anaesthesia could not be ensured. A further limitation of the Cataract National Dataset Electronic Multicentre audit is that the data are derived from a limited number (12) of participating United Kingdom National Health Service Trusts and may not therefore be representative of the practice and experience from the rest of the country. To get truly meaningful comparative data an extremely large number of subjects would be required. Thus we are left with observational studies rather than a randomized controlled trial.

In a survey of 55,567 cataract operations between November 2001 and July 2006,¹⁰ local anaesthesia was used in 95.5% of cases. 46.9% were sub-Tenon's, 19.5% peribulbar and only 0.5% were retrobulbar blocks (presumably intracanal). Excluding topical and topical – intracameral, no complications occurred in 95.6% of cases ($n = 38,058$). 4.3% of the patients ($n = 1635$) suffered a 'minor complication' (not sight or life threatening) and 0.066% ($n = 25$) suffered a 'serious' complication (sight or life threatening).

Subconjunctival haemorrhage occurred in 76 of 1635 eyes (1.99%) and eyelid bruising in 85 (0.22%). Of the 'serious' complications, 13 occurred with needle block and 12 with sub-Tenon's. Peribulbar or retrobulbar haemorrhage occurred in 12 (0.032%) and suprachoroidal haemorrhage in 2 (0.005%). Of the 12 peribulbar or retrobulbar haemorrhages, 8 were the result of needle blocks and 4 the consequence of sub-Tenon's. This is a statistically significant difference ($P = 0.009$ – Fishers Exact Test). 'Minor' complications were significantly more common after sub-Tenon's block.

2.2. Grade of anaesthetist/person performing the block

In the electronic multicentre audit by El Hindy et al.,¹⁰ the data showed that anaesthesia was delivered by a consultant in 62.1% of cases (presuming the data to be robust, which in this record field is open to question, since the consultant may have only been supervising a more junior person or be the person responsible for "distant" supervision). Data recorded on the professional group administering the anaesthetic showed 56.7% surgeons, 42.1% anaesthetists (including 4.5% cases of general anaesthesia with or without LA block). Complication rates were similar for the various professional groups and grades of doctors delivering LA.

2.3. Anticoagulants and antiplatelet drugs

An unpublished study by the Audit Sub-Committee of the Royal College of Ophthalmologists (using Eke and Thompson's data from the National Survey of Local Anaesthesia for Ocular Surgery) examined 54,500 local anaesthetics given in UK hospitals over a 3-month period in the 1990's. They estimated that 990 patients used warfarin and 5000 used aspirin, (comprehensive data being collected for 1 week and extrapolated to the complications data collected over 3 months).

'Severe' orbital haemorrhage occurred 26 times. This was defined as haemorrhage causing proptosis. 6 of these patients (23%) were on aspirin, none on warfarin. Aspirin was associated in this study with a small increase in risk for ocular haemorrhage.

Aspirin use is widespread with less patients taking warfarin, clopidogrel or dipyridamole. In a UK national survey of 48,862 cataract operations¹¹ 28.1% of patients were using aspirin, 5.1% warfarin, 1.9% clopidogrel and 1% dipyridamole. Although any complications of sharp needle or sub-Tenon's block were more common in patients taking clopidogrel (8%) and warfarin (6.2%) as compared to non-users (4.3%), no increase in potentially sight threatening complications was found.

This study also found an increase in operative complications in the clopidogrel group but its use was not associated with choroidal/suprachoroidal haemorrhage or hyphaema. An unexpected finding was an increase in posterior capsular rupture in those taking clopidogrel (3.2% vs. non-users 1.77%).

The same paper reports 94 patients taking a combination of warfarin and aspirin, 190 taking both aspirin and clopidogrel and 317 using aspirin and dipyridamole together. No information was recorded with respect to dose, particularly of aspirin, when it could be postulated that 300 mg may have a different effect from 75 mg.

It is well established that long-term use of anticoagulants and antiplatelet drugs reduces the risk of thromboembolic events in patients with atrial fibrillation and those with atherosclerotic vascular disease, e.g., recent ischaemic stroke, recent myocardial infarction or symptomatic peripheral vascular disease.^{12–16} A dilemma arises when these patients present for cataract surgery under LA as their anticoagulant and antiplatelet medications may predispose to the risk of haemorrhagic complications either during administration of the LA or during surgery itself. However, there has been no randomized controlled trial comparing the thromboembolic events rate and the haemorrhagic anaesthetic and surgical complications rate in cataract surgery patients who continued or stopped their anticoagulant and antiplatelet drugs. Such a study would require a prohibitively large sample size of anticoagulant and antiplatelet users.

In a study of cardiac patients with prosthetic heart valves¹⁷ undergoing non-cardiac surgery, patients were converted from warfarin to heparin ('seamless anticoagulation') or had their warfarin stopped and re-instituted post-operatively. There were no ophthalmic operations in this study but out of 235 patients (mean age 63 years), thromboembolic and haemorrhagic events following other types of surgery included 5 patients with cerebrovascular accident (CVA), 11 with peripheral emboli, 10 with wound haematoma and 8 with increased bleeding.

More problems were seen in patients who had mitral valve disease and atrial fibrillation. Most complications occurred *after* surgery within 10 days of re-instituting oral anticoagulant therapy. This paper concluded that minor surgical procedures can be performed safely without discontinuing anticoagulation and stresses that thromboembolism may occur up to 1 month following surgery despite a 'therapeutic' International Normalized Ratio (INR).

A large study of 19,283 cataract operations at nine centres in the United States and Canada¹⁸ examined the risks and benefits associated with continuation of anticoagulants or antiplatelet medication. All patients were over 50 years of age.

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