

Local anaesthesia for 1221 vitreoretinal procedures

R S B Newsom, A C Wainwright, C R Canning

Abstract

Background—Vitreoretinal (VR) surgery has been increasingly performed under local anaesthesia (LA) in this unit. The results of an audit monitoring this change are presented.

Methods—Data were collected on 1497 patients including type, volume, and position of the anaesthetic block, type of surgery, complications, and patient reactions.

Results—1221/1479 (82%) patients had LA. They were older than those having general anaesthesia (GA) 63.5 years *v* 45.9 years; 146 (10.6%) blocks were intracone, 130 (10.6%) peribulbar, and 927 (75.9%) combined. Operations included 436 vitrectomies, 545 retinopexy with or without vitrectomy, and 238 buckling procedures. Some pain was felt by 9.4%, 8.8%, and 19.7% of patients during vitrectomy, retinopexy with or without vitrectomy, and buckling surgery respectively.

Conclusion—Local anaesthesia for VR surgery is well tolerated by patients, being effective throughout longer and more stimulating ocular surgery.

(Br J Ophthalmol 2001;85:225–227)

For many ophthalmic surgeons local anaesthesia (LA) has become the preferred option over general anaesthesia (GA) because of quicker patient rehabilitation and the avoidance of possible complications from general anaesthesia.^{1–3}

Several methods of LA for vitreoretinal (VR) cases have been described, including retrobulbar,^{4–9} peribulbar,^{8–11} sub-Tenon's,^{12–13} and even topical anaesthesia in some cases.^{14–15} In several countries 85–90% of VR surgery is carried out under LA. However, this is not the case for VR surgery in the UK.⁴ Reluctance to use LA for VR surgery may stem from the longer, more unpredictable and uncomfortable nature of VR surgery.

In our unit LA has been introduced over the past 6 years and has increased in use from 12% to 96% in January to 1 February 2000. An audit of LA for VR surgery was performed over this transition period and the data presented in this paper are a summary of this experience.

Methods

Data were collected prospectively on 1497 consecutive patients undergoing VR surgery, over a 6 year period. All patients were anaesthetised by a single anaesthetist (ACW). The patient's age, previous surgery, type of anaesthetic, anaesthetic agents, and volumes were noted.

Akinesia was assessed on a range of 0–4 (0 no movement, 1 flicker, 2 some movement, 3 moderate movement, 4 full movement). Reaction to the LA block was graded from 1–4 (1 being no pain felt, 2 no comment, 3 moderate discomfort, and 4 severe pain).

Surgery was divided into vitrectomy, retinopexy with or without vitrectomy, and scleral buckling surgery. Patients' reaction to surgery was graded 1–4 (1 minor discomfort—for example, to subconjunctival injection, 2 mild, 3 moderate, 4 severe—would not like LA again). Anaesthetic complications affecting surgery were noted and use of perioperative sedation.

Data were analysed using STATVIEW software. Non-parametric data are presented as proportions with percentage and 95% confidence intervals (95% CI). These were analysed using χ^2 test. Parametric data were analysed using the unpaired two tail *t* test. Confidence intervals omitted from the text are shown in Table 1.

Results

In all, 1221/1479 (82%) patients had local anaesthesia for VR surgery (Table 1). Operations under LA included 436/1221 (35.7%) vitrectomies, 545/1221 (44.7%) retinopexies with or without vitrectomy, and 240/1221 (19.5%) buckling procedures. LA was used in 203/258 redo procedures (79%; 95% CI 76.5–81.3%).

Patients under 35 years (younger) were more likely to have a general anaesthetic, 87/147 (59.1%; 95% CI 54.0–64.5%), those over 35 years (older) were more likely to have LA, 1161/1332 (87.1%; 95% CI 86.1–88.1; *p*<0.01) (Fig 1). There was no difference in perioperative pain (10.6% *v* 11.0%) or need for sedation (10.4% *v* 7.6%) in younger or older patients, respectively. However, younger patients were more likely to feel discomfort during the local block (31.9% *v* 14.9%; *p*<0.01) and have more akinesia (17.0% *v* 6.3%; *p*<0.01).

Of the 1221 LA blocks 164 (13.4%) were intraconal only, 130 (10.6%) were peribulbar only, and 927 (75.9%) were a combination of both. The volumes of LA used for inferotemporal, medial, and top up injections were: 5.3 ml (SD 0.53), 3.14 ml (1.31), 0.7 ml (1.78), respectively. The total volumes given for vitrectomy, retinopexy with or without vitrectomy, and buckling surgery were 7.94 ml (1.6), 8.52 ml (1.8), and 12.58 ml (2.98), respectively (*p*<0.001). The proportion of patients feeling pain (score 3–4) from the anaesthetic injection was significantly lower when bicarbonate was added, falling from 94/408 (23.0%; 95% CI 21.0–25.1%) to 178/1813 (11.6%; 95% CI 10.33–12.9, *p*<0.01). More patients having redo surgery following buckling felt pain

Southampton Eye Unit, Southampton General Hospital and Shackleton Department of Anaesthesia, Southampton General Hospital, Southampton, UK
R S B Newsom
A C Wainwright
C R Canning

Correspondence to:
Mr R S B Newsom,
Vitreoretinal Unit,
Moorfields Eye Hospital,
City Road, London
EC1V 2PD, UK
rbnewsom@dircon.co.uk

Accepted for publication
28 August 2000

Table 1 Demographic data

	No	%	95% CI (%)
Patients	1479	100	
Type of anaesthetic			
GA	258	17.4	15.1–19.8
LA	1221	82.6	81.7–83.5
Previous VR surgery			
LA	1221	16.6	15.5–17.7
GA	259	21.2	18.6–23.7
Local anaesthetic data			
Type of LA			
Intracone	164	13.4	10.7–16.1
Peribulbar	130	10.5	7.9–13.3
Combination	927	75.9	74.5–77.3
Anaesthetic agents used			
Lignocaine + bupivacaine	408	33.4	32.1–34.8
Lignocaine + HCO	92	7.5	6.8–8.3
Lignocaine + bupivacaine + HCO	620	50.8	49.3–52.2
Lignocaine + ripovcaine	101	8.3	7.5–9.1
Type of operation			
Vitrectomy	436	35.7	33.4–38.0
Retinopexy +/- vitrectomy	545	44.7	42.5–46.7
Scleral buckling	238	19.5	16.9–22.1
Pain on injection			
No pain	129	10.5	7.8–13.2
No response	901	73.7	72.3–75.7
Mild	174	14.2	11.6–16.9
Severe	17	1.3	-1.4–4.2
Pain of operation			
No pain	1085	88.9	88.0–89.8
Sensation	69	5.7	5.0–6.3
Mild pain	57	4.8	4.1–5.3
Moderate pain	7	0.57	0.36–0.79
Severe pain	2	0.2	0–0.3
Sedation			
No sedation	1126	92.2	91.4–93.0
Sedation	95	7.8	5.0–10.5
Any kinesis	87	7.1	6.4–7.9
Chemosis	61	5.0	2.2–7.8
Additional LA	188	16.9	15.8–19.3
Mean age of patients (years)			
All	63.5	Range 10–103	
LA	63.5	Range 19–103	
GA	45.9*	Range 10–87	
			p<0.01

during the anaesthetic (41/203; 20.14%; 95% CI 16.1–23.1% *v* 153/1081; 15.03%; 95% CI 13.9–16.1, $p<0.05$). Perioperative top up anaesthesia was given in 193/1221 (15.8% 95% CI 14.8–16.8%); this rose to 159/240 (66.2% 95% CI 63.2–69.2%) patients having buckling surgery.

Complete akinesia was noted in 1134 patients (92.8% 95% CI 92.1–93.6), slight twitch in 79 (6.74%: 95% CI 5.8–7.2), moderate kinesis in seven (0.6%: 95% CI 0.4–0.8%), and full movement in one (0.08%: 95% CI 0–0.2%).

PEROPERATIVE PAIN

Pain scores of 0, 1, 2, 3, 4 were reported by 1085/1221 (88.9%; 95% CI 88.0–89.8%) 69/1221 (5.7%; 95% CI 5.0–6.3%), 57/1221 (4.79%; 95% CI 4.1–5.3%), 7/1221 (0.57% 95% CI 0.36–0.79), and 2/1221 (0.2%; 95% CI 0–0.3%) patients, respectively.

The percentage of patients with any pain during surgery varied with operation and were 17/435 (3.9%; 95% CI 2.9–4.8), 25/543 (4.6%; 95% CI 3.7–5.5), and 24/240 (10.0% 95% CI 8.1–11.9) for vitrectomy, retinopexy with or without vitrectomy, and buckling surgery respectively. Buckling surgery was more painful ($p=0.002$) and more sedation was required in 28/240 (11.67%, 95% CI 9.6–13.7), compared with vitrectomy 26/436 (5.9%, 95% CI 4.8–7.1), ($p=0.016$) (Table 1).

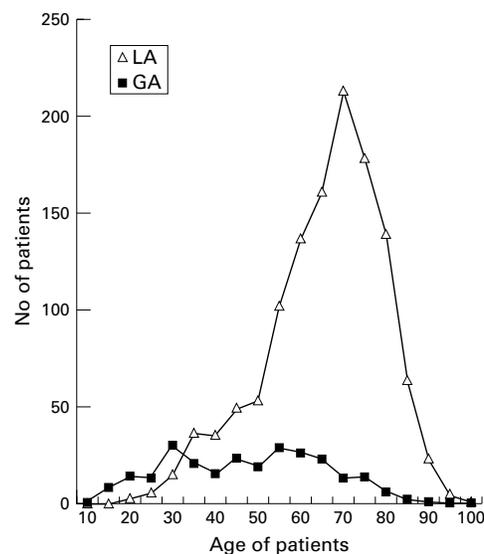


Figure 1 Histogram of patients' age versus type of anaesthesia used for vitreoretinal surgery. 59.1% of patients aged <35 years had general anaesthesia (GA); 87% of patients aged >35 years had local anaesthesia (LA).

There was also no difference in pain between primary (51/1081; 5.0% 95% CI 4.3–5.69) and redo surgery (16/203; 7.9% 95% CI 5.9–9.7%).

SEDATION

Sedation was given to 95/1121 (7.8%, 95% CI 5.0–10.5%) of patients. Sedation was used in 41/545 (5.96%; 95% CI 4.8–7.1%) of vitrectomies, in 26/436 (7.52%; 95% CI 6.3–8.7%) patients with retinopexy with or without vitrectomy and in 28/240 (11.67%; 95% CI 9.6–13.7%) patients needing buckling surgery ($p<0.01$). Sedation was required in 16/203 (7.9%; 95% CI 6.0–9.8%) patients under going redo surgery, compared with 79/1018 (7.8%; 95% CI 6.9–8.6%) of those undergoing primary surgery ($p>0.1$). Patients needing sedation were given more LA 9.8 ml (SD 3.03) compared with those not needing sedation 9.05 ml (2.6, $p<0.005$) (Table 1).

COMPLICATIONS

No patient suffered a retrobulbar haemorrhage or ocular perforation in this series: 64/1221 (5.24%; 95% CI 4.6–5.8%) patients had moderate to severe chemosis, none of which prevented surgery taking place, 4/1221 (0.33%; 95% CI 0.2–0.5%) patients had significant bradycardia, 9/1221 (0.74%; 95% CI 0.4–0.9%) had moderate claustrophobia, 1/1221 (0.08%; 95% CI 0–0.016%) severe claustrophobia and was given propofol, and one operation was cancelled (0.08%; 95% CI 0–0.016%) (Table 1).

Discussion

In this series we have been able to assess the results of LA for VR surgery in 1221 cases given by a single anaesthetist (ACW) and have found it to be a well accepted and useful technique. The high levels of patient satisfaction in this study are similar to the study of Rao *et al*¹ with 93.1% of patients happy to have LA again.

Using a combined peribulbar and intraocular technique, good analgesia and good akinesia were obtained in 87.9% and 98.0% respectively. When bicarbonate was added to the LA solution the proportion of patients with discomfort during anaesthesia fell to 11.6%. These high levels of akinesia and anaesthesia are comparable with other methods of anaesthesia.¹²⁻¹⁶ A top up rate of 32% has been reported with peribulbar and retrobulbar techniques,⁸ in our series it was 16% rising to 66% in buckling surgery.

Redo operations may be a contraindication to LA. However, in this series we performed 79% of second procedures under LA, a higher proportion of those with previous buckling surgery felt some pain during the LA (11.6% v 10.5%); however, perioperative pain was similar in both groups (7.8% v 5.1%). Midazolam was used in 95 patients; in our experience sedation was useful in controlling claustrophobia (10/1221).

Kirkby *et al*⁵ commented that a oculocardiac response and retrobulbar haemorrhage may prevent surgery on urgent cases. In this series, no cases of retrobulbar haemorrhage or globe perforation occurred, significant bradycardia was noted in four patients, chemosis occurred in 61 of our patients but this was never sufficient to prevent surgery.

In this department LA was originally used for postoperative analgesia; this led to its use for high risk patients and shorter procedures. Now careful patient selection and counselling

have enabled the use of LA for 96% of VR procedures with high rates of surgeon and patient satisfaction.

- 1 Hamilton R, Gimble H, Strunin L. Regional anaesthesia for 12 000 cataract extraction and intraocular lens implantation procedures. *J Can Anaesth* 1988;35:615-23.
- 2 Hodgkins P, Luff A, Morrell A, *et al*. Current practice of cataract extraction and anaesthesia. *Br J Ophthalmol* 1992;76:323-6.
- 3 Eke T, Thompson J. The national survey of local anaesthesia for ocular surgery. II. Survey methodology and current practice. *Eye* 1999;13:196-204.
- 4 Rao P, Wong D, Groenewald C, *et al*. Local anaesthesia for vitreoretinal surgery: a case control study of 200 cases. *Eye* 1998;12:407-11.
- 5 Kirkby G, Benson M, Callear A, *et al*. Local anaesthesia for vitreoretinal surgery: a case control study of 200 cases. *Eye* 1999;13:122.
- 6 Javitt J, Addiego R, Friedberg H, *et al*. Brain stem anaesthesia after retrobulbar block. *Ophthalmology* 1987;94:718-23.
- 7 Duker J, Belmont J, Benson W, *et al*. Inadvertent globe perforation during retrobulbar and peribulbar anaesthesia. *Ophthalmology* 1991;98:519-26.
- 8 Demediuk O, Dhaliwal R, Papworth D, *et al*. A comparison of peribulbar and retrobulbar anaesthesia for vitreoretinal surgical procedures. *Arch Ophthalmol* 1995;113:908-13.
- 9 Davis DB 2nd, Mandel M. Posterior peribulbar anaesthesia, an alternative to retrobulbar anaesthesia. *J Cataract Refract Surg* 1986;12:182-4.
- 10 Benedetti S, Agostini A. Peribulbar anaesthesia for vitreoretinal surgery. *Retina* 1994;14:277-80.
- 11 Batterbury M, Wong D, Williams R, *et al*. Peribulbar anaesthesia: failure to abolish the oculocardiac reflex. *Eye* 1992;6:293-5.
- 12 Stevens J, Franks W, Orr G, *et al*. Four-quadrant local anaesthesia technique for vitreoretinal surgery. *Eye* 1992;6:583-6.
- 13 Kwok A, Van Newkirk M, Lam D, *et al*. Subtenons anaesthesia in vitreoretinal surgery. *Retina* 1999;19:291-6.
- 14 Yildirim R, Aras C, Ozdamar A, *et al*. Silicone oil removal using self-sealing corneal incision under topical anaesthetic. *Ophthalmic Surg Lasers* 1999;30:24-6.
- 15 Yepez J, Yepez J, Arevalo J. Topical anaesthesia in posterior vitrectomy. *Retina* 2000;20:41-5.
- 16 Mein C, Woodcock M. Local anaesthesia for vitreoretinal surgery. *Retina* 1990;10:47-9.