

Neuroleptanalgesia and extracapsular cataract extraction

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Abstract

Peribulbar and retrobulbar anaesthesia are commonly used techniques in cataract extraction. They offer satisfactory analgesia and akinesia but serious complications although uncommon are consistently reported. Intravenous sedation combined with a facial nerve block offers an alternative method of anaesthesia. This is a retrospective study of patients who underwent extracapsular cataract extraction using this technique between 1 January 1986 and 1 September 1990. The operating conditions were judged to be very suitable with minimal perioperative complications. The postoperative ocular complication rate was low (minimum follow-up 3 months) and no serious medical complications were noted: 93.8% of patients achieved 6/12 vision or better. This study demonstrates that it is possible to achieve satisfactory ocular analgesia and akinesia during cataract extraction under local anaesthesia without the use of a periocular injection.

It has been reported that comparable ocular akinesia and analgesia are achieved using retrobulbar one-site periocular injection¹ or superior bulbar subconjunctival bupivacaine and hyaluronidase.² Other authors³ have reported retrobulbar and facial nerve block as a satisfactory technique for local anaesthesia.

Retrobulbar block for cataract surgery although relatively safe has infrequent but serious complications which have been consistently reported. These include intradural or subarachnoid injection;⁴ retrobulbar haematoma in 1-3% of cases;⁵ central retinal artery or vein occlusion;⁶ optic nerve contusion and atrophy;⁷ perforation of the globe;⁸ and rarely life-threatening apnoea.⁹

Despite these risks absolute ocular akinesia is not guaranteed. Peribulbar anaesthesia using a shorter needle outside the muscle cone was suggested to eliminate some of the complications while providing similar akinesia and analgesia.¹⁰ It does not eliminate the risk of globe perforation¹¹ although a series of 6000 cases has been reported in which no scleral perforation occurred.¹²

We describe our experience using an alternative method of local anaesthesia without periocular injection.

Patients and methods

A retrospective review of the case notes was carried out on all patients who underwent a planned extracapsular cataract extraction with implant under local anaesthesia in the South

Warwickshire District between 1 January 1986 to 1 September 1990. Those patients who underwent a combined procedure were excluded from the study.

LOCAL ANAESTHETIC TECHNIQUE

Preoperatively all patients had a full history and examination by an ophthalmic senior house officer and were subsequently assessed by the anaesthetist. Patients over 60 had a full blood count. A sickle cell test was performed on patients of African or West Indian origin. The urea and electrolytes were measured in patients on antihypertensives or diuretics. Patients over 50 years of age or those with cardiovascular disease had an ECG, and a chest x ray was taken in those with respiratory or cardiovascular disease or a history of smoking. A cervical spine x ray was also taken if clinically indicated to anticipate any problems if intubation were to be required. Patients were assessed for their ability to lie supine for 30 minutes with physiotherapy, nebulisers, and short dose steroids used where necessary to achieve this.

The majority of patients were elderly often with one or more associated diseases giving them an American Society of Anaesthetists grading of 2-5.

For patient awareness and acceptance the anaesthetic technique was fully explained by the surgeon prior to the day of surgery and then again by the anaesthetist. This helped to maximise patient understanding and cooperation whilst minimising the intraoperative sedation required.

Approximately 45 minutes preoperatively 0.75-2.0 ml of Thalamonal (50 mg fentanyl and 2.5 mg droperidol per ml) was administered intramuscularly according to size. In the anaesthetic room 5 ml of 2% lignocaine were injected as a facial nerve block and amethocaine drops applied to the eye. During the operation supplementary Thalamonal and midazolam were administered by the anaesthetist who remained present at all times. Topical amethocaine was applied if necessary. Supplementary oxygen was given by a tube adjacent to the mouth and continuous monitoring of the ECG, oxygen saturation, blood pressure, and respiration was performed.

At the end of the procedure the patient would usually be sufficiently alert to return directly to the ward.

CATARACT EXTRACTION

Using the operating microscope a superior rectus suture was positioned. A corneal or limbal incision was performed followed by a non-

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automated extracapsular cataract extraction without iridotomy. Sodium hyaluronate 1% or methylcellulose 2% was used to protect the corneal endothelium, maintain the anterior chamber, and open the capsular bag during insertion of the posterior chamber intraocular lens. The colloid was aspirated after wound closure and replaced with saline. Primary posterior capsulotomy was not performed.

Results

During the stipulated period 2026 patients underwent cataract surgery. The case notes were available for 1858 cases. A minimum period of 3 months documented follow-up was specified which eliminated 41 patients leaving 1817 for further analysis; 10% of patients were therefore unavailable for follow-up and this must be considered in the interpretation of the results. The average period of follow-up for which notes were available was 12.7 months with a maximum of 53 and a minimum of 3 months; 1173 (65%) of the patients were female. The age of the group ranged from 33 to 102 years with an average of 73.2 years (see Table 1).

The preoperative corrected visual acuity was 6/24 or less in 76% of patients (see Table 2). A subgroup of 24% of patients had vision of 6/18 or better – all had focal posterior cataracts or advancing nuclear sclerosis producing a significant visual handicap. Following surgery the corrected visual acuity of these patients improved to 6/12 or better in 93.8% of cases. Of those patients achieving less than 6/18 vision 102 patients were noted to have pre-existing ocular conditions unrelated to the surgery contributing to their poor visual outcome (see Table 3). In six patients poor visual outcome was secondary to complications related to surgery – one case of endophthalmitis, one choroidal haemorrhage, four patients with refractive errors. In three patients no reason for the reduced visual acuity had been recorded in the notes.

Table 1 Age and sex distribution of patients

	Female	Male	Total
Number of cases	1173	644	1817
Mean age (years)	74.7	70.4	73.2
Age range (years)	33–102	42–93	33–102

Table 2 Pre- and postoperative corrected visual acuity

	>6/6	6/9–6/18	6/24–6/60	<6/60
Pre	0%	24.3%	58.6%	17.1%
Post	12.8%	82.9%	3.8%	0.5%

Table 3 Aetiology of cases with a final visual acuity <6/18

	No of eyes
Pre-existing ocular conditions	
Diabetic retinopathy	13
Age-related macular degeneration	33
Myopia	31
Glaucoma	12
Amblyopia	5
Previous retinal detachment repair	5
Complications following surgery	
Choroidal haemorrhage	1
Endophthalmitis	1
Vein occlusion	1
Refractive error	4
No diagnosis recorded	3

Table 4 Complications associated with surgery in 1817 eyes

	No of eyes
Intraoperative	
Expulsive choroidal haemorrhage	1
Posterior capsule rupture with vitreous loss requiring an anterior chamber lens	31
Immediate postoperative	
Endophthalmitis	3
Iris prolapse	11
Residual soft lens matter	43
Residual soft lens matter requiring secondary washout	4
Long-term postoperative	
Retinal detachment	3
Cystoid macular oedema	5
Posterior capsule thickening requiring Nd:YAG laser capsulotomy	278

COMPLICATIONS

Intraoperative complications (see Table 4)

These included 31 cases of posterior capsule rupture with vitreous loss necessitating an anterior chamber lens. Cases in which there was a small posterior capsule break without significant vitreous loss received a posterior chamber lens. All the patients in this study received a primary intraocular lens implant. Twenty two (71%) of the cases in which vitreous loss occurred were performed by a junior surgeon (SHO or clinical assistant). In one patient vitreous loss occurred when the patient made a large head movement as someone unexpectedly entered the theatre.

One expulsive haemorrhage occurred as the anterior chamber was entered. The patient had a normal preoperative intraocular pressure and was calm throughout the procedure allowing closure of the section without loss of intraocular contents.

Immediate postoperative complications

These included three cases of endophthalmitis of which two eventually achieved better than 6/18 vision, the third patient remaining at 6/36+2 following treatment with intensive topical and systemic antibiotics. Eleven cases presented with an iris prolapse 1 to 15 days following surgery. All had iris reposition and resuturing of the section performed successfully under local anaesthesia; 43 patients were noted to have residual soft lens matter and in four of these cases an anterior chamber washout was subsequently required. All cases of iris prolapse and residual lens matter subsequently achieved visions of 6/12 or better.

Long-term ocular complications

These included three cases of retinal detachment one of whom had vitreous loss at the time of surgery. All three patients had successful detachment surgery with two patients achieving a final visual acuity of 6/18 and the other 6/9. Five patients were noted to have cystoid macular oedema postoperatively, in each case rupture of the posterior capsule had occurred at the time of surgery. The diagnosis of macular oedema was made on clinical grounds – no patient in this survey was felt to require investigation with fundus fluorescein angiography. The onset occurred 1–4 months following surgery with a

reduction in visual acuity from 6/12 (or better) to 6/36 (or worse). All five cases subsequently achieved visions of 6/18 or better: 278 eyes (15.3%) developed opacification of the posterior capsular sufficient to require a Nd:YAG laser capsulotomy.

Medical complications

These included 19 men with urinary retention requiring catheterisation (3% of the male patients, 1% of all patients), but no other serious medical sequelae were encountered. One adverse psychological effect of the sedation which has apparently been encountered in other applications of these drugs was a state of heightened anxiety coupled with an inability to express these fears. Patients' descriptions of this phenomenon were quite specific and we estimate the incidence as being less than 1%. This is by far the commonest cause of patient dissatisfaction with the technique.

No cases of significant respiratory depression were noted with this dose of fentanyl. No patient in this series required intubation and no case needed transfer to either a medical ward or ITU postoperatively. The occasional patient in whom the oxygen saturation fell below 90% was relieved by the anaesthetist supporting the jaw – the surgeon being able to continue without interruption and with no apparent delay in the patient's recovery.

Discussion

In this study cataract surgery was performed under intravenous sedation combined with a facial nerve block and topical anaesthesia. Ocular akinesia and anaesthesia were judged by the surgeon to be very suitable for operating without the inherent risks and unpleasantness of a periocular injection. The anticipated difficulties due to excessive eye movement did not materialise. Any residual movement was slight and in the horizontal plane so the surgeon was easily able to compensate for it. One patient sustained a posterior capsule rupture with vitreous loss after making a large head movement when he was startled by someone entering the theatre. Head movements are a risk in all cases performed under local anaesthesia¹³ including retrobulbar anaesthesia. We believe however that there is a lower incidence of such problems when intravenous sedation is used.

The combination of droperidol and fentanyl induces a state of 'neuroleptanalgesia' with the emetic effect of fentanyl a powerful analgesic being offset by the anti-emetic effect of the tranquilliser droperidol. There is a relative insensitivity to pain and the patients stay motionless quite indifferent to their surroundings. Nevertheless they retain consciousness and respond to commands (albeit a little sluggishly).

It became clear to us that with adequate topical anaesthesia a cataract procedure is not in essence a painful procedure. The sedation does not render the patient unable to respond to pain – if a painful procedure such as a peripheral iridectomy was carried out the patient would respond and express discomfort. Increasing the degree of

sedation does not counter discomfort, but merely tends to produce patient confusion and detracts from the patient's ability to comply with commands.

There was a very low incidence of medical complications even in this elderly age group, with no major medical problems documented. The recovery period was rapid without nausea and the majority of patients were able to drink within 30 minutes of returning to the ward.

The 3% incidence of urinary retention among male patients compares with reports of 6% of patients developing urinary retention following general surgical procedures.¹⁴ In the latter study it was noted that urinary retention was more common following opiate analgesia and it is possible that the use of fentanyl for neuroleptanalgesia may contribute to the problem of urinary retention either by causing a diminished awareness of bladder sensation or by reducing parasympathetic tone in the bladder.

In our department unless a relief anaesthetist is present who is unfamiliar with the technique a general anaesthetic is given for the following indications: mental subnormality; language difficulties; extreme agitation; age less than 50; or a strong patient preference.

A satisfactory general anaesthetic does guarantee absolute ocular akinesia and usually allows the eye to be kept soft. It has been reported that there is no difference in major morbidity or mortality when comparing general anaesthesia to regional anaesthesia in patients over 90 years old.¹⁵ However a general anaesthetic does leave the patient more drowsy; diabetics often require an intravenous infusion and confusion is probably more common following a general anaesthetic in the elderly. Endotracheal intubation carries a small but significant risk of serious complications which are eliminated with the local anaesthesia/intravenous sedation technique.

There were drawbacks to the technique. The idiosyncratic psychological reactions – probably caused by droperidol – were unpleasant for a small minority of patients. In addition if the dose of Thalamonal is to be kept to a reasonable level this limits the length of the surgery and the technique is therefore less suitable for teaching inexperienced surgeons.

Despite these difficulties the results of surgery are comparable with those obtained using other techniques of anaesthesia. The visual outcome of cataract surgery with intraocular lens implantation in this series was 6/12 or better in 93.8% of cases. These figures compare favourably with results reported by other authors.¹⁶⁻¹⁸ The low incidence of operative complications is also notable – the complication rate using local anaesthesia/intravenous sedation comparing favourably with other techniques of anaesthesia.¹⁹⁻²²

The lack of medical problems and the speed of recovery make this technique an acceptable method of anaesthesia without retrobulbar injection possibly for use in day case surgery. Patients who had a general anaesthetic for the first eye (prior to the introduction of the technique) usually strongly preferred the local anaesthetic/intravenous sedation technique when this was used for the second eye.

- 1 Weiss JL, Charles B, Deichman M. A comparison of retrobulbar and periocular anaesthetic for local anaesthetic cataract surgery. *Arch Ophthalmol* 1989; **107**: 96-7.
- 2 Redmond RM, Dallas NL. Extracapsular cataract surgery under local anaesthetic with no retrobulbar block. *Br J Ophthalmol* 1990; **74**: 203-4.
- 3 Rassam S, Thomas HF. Local anaesthesia for cataract surgery. *Lancet* 1989; **i**: 110-1.
- 4 Ahn JC, Stanley JA. Subarachnoid injection as a complication of retrobulbar anaesthesia. *Am J Ophthalmol* 1987; **103**: 225-30.
- 5 Morgan CM, Schatz H, Vine AK, et al. Ocular complications with retrobulbar injection. *Ophthalmology* 1988; **95**: 660-5.
- 6 Klein NL, Jampol LM, Condon PI, Rice TA, Sergeant GR. Central retinal artery occlusion without retrobulbar haemorrhage after retrobulbar anaesthesia. *Am J Ophthalmol* 1982; **93**: 573-7.
- 7 Pautler SE, Grizzard WS, Thomosin LN, Wing GL. Blindness from retrobulbar injection into the optic nerve. *Ophthalmic Surg* 1986; **17**: 334-7.
- 8 Ramsey RC, Knobloch WH. Ocular perforation following retrobulbar anaesthetic for retinal detachment surgery. *Am J Ophthalmol* 1978; **86**: 61-4.
- 9 Brookshire GL, Glietsman K, Schenk EC. Life threatening complication of retrobulbar block: a hypothesis. *Ophthalmology* 1986; **93**: 1476-8.
- 10 Whiskett JC, Bayleat HD, McClure B. Comparison of one site peribulbar anaesthesia and retrobulbar anaesthesia. *J Cataract Refract Surg* 1990; **16**: 243-5.
- 11 Kimbile JA, Morris PE, Witherspoon CD, Fiest RM. Globe perforation from peribulbar injection. *Arch Ophthalmol* 1987; **105**: 749.
- 12 Hamilton RC, Gimbel HV, Strunin L. Regional anaesthesia for 12 000 cataract extractions and intra-ocular lens implantation procedures. *Can J Anaesth* 1988; **35**: 615-23.
- 13 Smith RJ. Cataract extraction without retrobulbar anaesthetic injection. *Br J Ophthalmol* 1990; **74**: 205-7.
- 14 Stallard S, Prescott S. Postoperative urinary retention in general surgical patients. *Br J Surg* 1988; **75**: 1141-3.
- 15 Hosking MP, Lobdell CM, Warren MA, Offord KP, Melton LJ. Anaesthesia for patients over 90 years of age. *Anaesthesia* 1989; **44**: 142-7.
- 16 Kratz RP, Nazzoc TB, Davidson D, Colvard DM. The shearing intra-ocular lens: a report of 1000 cases. *Am Intra-Ocular Implant Soc J* 1981; **7**: 55-7.
- 17 Roper-Hall MJ. Sophistication in intra-ocular lens surgery (Rayner lecture 1984). *Trans Ophthalmol Soc UK* 1985; **104**: 500-11.
- 18 Percival SPD. Long-term complications from extracapsular cataract surgery. *Trans Ophthalmol Soc UK* 1985; **104**: 915-8.
- 19 Chamberless W. Incidence of anterior and posterior segment complications in over 3000 cases of extracapsular cataract extraction: intact and open capsules. *Am Intra-ocular Implant Soc J* 1985; **11**: 146-8.
- 20 Allen AW, Hiu-Rung Z. Extracapsular cataract extraction: Prognosis and complications with and without posterior chamber implant. *Ann Ophthalmol* 1987; **19**: 329-33.
- 21 Coonan P, Fung W, Webster R, Allen A, Abbott R. The incidence of retinal detachment following extracapsular cataract extraction - a ten year study. *Ophthalmology* 1985; **92**: 1096-101.
- 22 Wilhelmus KR, Emery JM. Posterior capsule opacification following phacoemulsification. *Ophthalmic Surg* 1980; **11**: 264-7.