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CLINICAL STUDY

Efficacy and safety of sedation with propofol in peribulbar anaesthesia

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Abstract

Purpose **To evaluate the efficacy and safety of a sub-anaesthetic dose of propofol for reducing patient recall of peribulbar block in eye surgery.**

Methods **A retrospective analysis of patients scheduled for elective cataract extraction or trabeculectomy using peribulbar anaesthesia with an intravenous bolus of propofol to provide sedation during the administration of the block. The dose of propofol was based on age and body weight. Patients' vital signs were monitored with continuous pulse oximetry and blood pressure measurements. Efficacy of sedation was assessed by recording patient's recall of the anaesthetic block after 8–10 min.**

Results **Data from 2043 patients were analysed. The dose of propofol used ranged from 15–75 mg. Propofol was effective in abolishing recall in 87.5% of the patients studied. Only four patients required airway support but no major systemic side effects were encountered.**

Conclusions **A single sub-anaesthetic dose of propofol prior to administering peribulbar block is effective in reducing recall of the injection and safe without major systemic side effects.**

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Introduction

Local anaesthesia is frequently used for most types of ocular surgery in the United Kingdom[1,2] and other countries,[3] as it is generally felt to be safer than general anaesthesia.[4,5] Since 1986, peribulbar anaesthesia has become more popular in eye surgery and has been advocated to reduce the risk of respiratory arrest and other systemic complications of retrobulbar anaesthesia.[6]

Patients are often concerned about the injection,[7] and therefore many methods of sedation have been tried to reduce patient anxiety and improve acceptance of the technique.[8,9] We have been using a sub-anaesthetic dose of propofol prior to administering the eye block to reduce patient recall of the injection for many years. We retrospectively analysed the results of our technique over the last 3 years to demonstrate the efficacy and safety of our methods.

Methods

All patients undergoing cataract, trabeculectomy or combined surgery under local anaesthesia using peribulbar block between January 1998 and December 2000 at a single hospital were included in this retrospective study. Sedation and anaesthesia were administered by or under the direct supervision of a single experienced anaesthetist. All patients were un-premedicated and signed a written informed consent for the procedure. Monitoring consisted of continuous pulse oximetry and non-invasive blood pressure measurements at the beginning and conclusion of the procedure.

Intravenous access was obtained and topical anaesthetic eye drops were instilled in the conjunctival sac. Patients were then given an intravenous dose of propofol determined by the formula:

$$\text{Propofol dose (mg)} = 56\ \text{mg} + (\text{Weight} \times 0.25) - (\text{Age} \times 0.53)$$

where weight is expressed in kilograms and age in years. The formula was arrived at by

multiple regression analysis of age and weight data of adequately sedated patients collected at a previous departmental audit in 1997.[10]

After 2–3 min, a standard transcutaneous inferotemporal, and transconjunctival nasal, two sites peribulbar block was performed over 90–120 s. Gentle support of patient hands by an assistant was always available to prevent any inadvertent movements that might interfere with administering the block. Oxygen saturation prior to sedation and the lowest level reached during the block were routinely recorded. After 8–10 min from administering propofol, assessment of the block was undertaken and the patient was asked the question: '*Do you remember me putting a needle into you?*'. If the answer was '*yes*', then the patient was asked '*where did I put it?*' The commonest reply was '*in my hand*' recalling venous cannulation rather than the eye block. Patients were divided into a Recall group (recall of the injection around the eye), No Recall group (including venous cannulation recall), or Excessive Sedation group (no recall, but some form of airway support required). Any other systemic complications were also recorded.

Results

A total of 2065 patients underwent surgery using a peribulbar block after sedation with propofol between January 1998 and December 2000. The data of 22 patients were incomplete and were therefore excluded from analysis. Mean age of the 2043 patients with complete records was 75.7 years old (SD 11.6, range 23–105). Males were 757 patients (mean age 74 years, SD 11.5) and females were 1286 (mean age 76.7, SD 11.6). The mean dose of propofol used was 36.4 mg (SD 7.3, range 15–75).

The main outcome measure in this study was whether the patients were able to recall an injection in the eye region on questioning at 8–10 minutes following administration of propofol. Two hundred and fifty-two patients (12.3%) answered affirmatively and were able to remember an injection to the eye region. This represented failure of our method in abolishing recall of the injection in the eye region.

One thousand seven hundred and eighty-seven patients (87.5%) were either not able to remember any needle injection, or were able to recall cannulation in the hand or arm region, without any systemic side effects. In four patients (0.2%), airway support (chin lift) and supplemental oxygen were required representing excessive sedation. However, none of these four patients developed reduced oxygen saturation compared to pre-sedation levels. The demographic details and dose of propofol used in each of the three groups is described in Table 1.

Transient oxygen desaturation (<90% for less than 60 s) was noted in a total of 49 patients, 46 of whom were in the No Recall group and only three were in the Recall group. Only 10 patients in total had a reduction in oxygen saturation of greater than 8% from pre-sedation values, four of these occurred when pre-sedation values were already below 92% and all except one were in the No Recall group.

Discussion

When performing ophthalmic surgery under local anaesthesia, patients are often concerned about the peribulbar block and the proximity of the needle used to the eye,[7] and it is therefore not uncommon to use some form of sedation. Midazolam,[11] ketamine,[12] alfentanil,[13,14] methohexital[11,13,15] and propofol[11,16] have all been used for this purpose with little to choose between them in terms of patient recall, sedation and postoperative amnesia.[11] With the exception of propofol, which has a clean sedative endpoint, they all have a long sedative tail which can lead to patients falling asleep during surgery and sudden movement upon wakening.

In this retrospective analysis of 2065 patients over 3 years, we have demonstrated the efficacy of a sub-anaesthetic dose of propofol administered intravenously 2–3 min prior to the peribulbar block in abolishing recall in 87.5% of patients. In 12.3% of the population studied, patients remembered the injection in the eye region, this however, does not necessarily equate to reporting undue discomfort from the injection should they have not received any form of sedation. On the contrary, it is our experience that patients were comfortable and satisfied with the technique even if they were able to recall the injection, although this was not formally evaluated in this study.

The safety profile of our method is excellent in spite of the age group managed; this is possibly due to the small dose of propofol used. Only four patients were considered to have been excessively sedated in this

Table 1 Demographic data and propofol dose in the three outcome groups

	Number of patients	*Male: female (%)*	*Age*[a] *(years)*	*Propofol dose*[a] *(mg)*
Recall	252	44:56	70.2 (12)	39.7 (10)
No recall	1787	36:64	75.5 (11)	35.5 (9)
Excessive sedation	4	25:75	68 (10)	38.8 (5)

[a] Data are expressed as mean (standard deviation).

large group, and management was simple through maintaining chin support to establish open airways and supplemental oxygen. Significant reduction in oxygen saturation of greater than 8% from pre-sedation values was uncommon. We suggest supplemental oxygen by nasal cannula be used for patients with pre-sedation oxygen saturation of 92% or less to avoid further significant drop in saturation.

We suggest that a single dose of propofol prior to administering the peribulbar block can achieve the goal of improving patient acceptance through reduced recall. This is particularly important when patients are likely to need to return for surgery to the other eye.

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