

Vision Eye clear Corneal Cataract Surgery with Topical Anesthesia: A Systematic Review

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Abstract

Aim: To assess patient recall of intraoperative pain, anxiety, fear, and sensory perceptions during second eye clear corneal cataract surgery are using assisted topical anaesthesia (ATA), in comparison with first eye cataract surgery using the same technique.

Methods: This prospective, consecutive, observational study was conducted in a free-standing dedicated ophthalmic day surgery centre. A voluntary questionnaire was distributed to 129 consecutive patients who underwent clear corneal cataract surgery using ATA. Two patients had to be converted to block anaesthesia, and were excluded.

Patients were asked to rate intraoperative pain, anxiety, and fear using a visual analogue scale (VAS), and recollection of intraoperative visual and auditory perceptions. Results were analyzed using the Mann–Whitney U and Spearman correlation tests.

Results: There were 70/127 (55%) patients undergoing first eye cataract surgery and 57/127 undergoing second eye surgery. There was no significant difference in mean pain, anxiety, and fear scores between those undergoing the second eye operation compared with those undergoing their first eye operation. Similarly, there was no significant difference in sensory perceptions between the two cohorts. Overall, there was a small but significant positive correlation between recall of visual and auditory perceptions and combined pain, fear, and anxiety scores.

Conclusion: There was no significant difference in levels of intraoperative pain, anxiety, fear, and sensory perceptions experienced by patients between the first eye and second eye surgeries. We recommend that preoperative counselling for a patient's second eye be as comprehensive as for the first eye surgery.

Introduction

Uncomplicated cataract extraction is usually conducted under topical anesthesia. Perioperative pain management not only reduces the patient's anxiety before and after cataract surgery, but also improves the patient's intraoperative cooperation. Therefore, pain management is particularly important when performing cataract surgery. Currently, phacoemulsification plus implantation of an intraocular lens under topical anesthesia is the main surgical approach to treat cataract. Topical anesthesia significantly reduces the perceived pain at the time of making the clear corneal incision and small incision, as compared with historical techniques [1]. Previous studies, including our clinical practice, have revealed that patients experience more painful sensations during second-eye surgery. Although an earlier study found no significant difference in the mean pain scores between patients undergoing second cataract extraction compared with patients undergoing first cataract extraction. Several studies have examined the possible causes of the increased pain during second-eye surgery [2].

Perioperative blood pressure and heart rate were objectively measured as possible markers of the patients' anxiety levels. Therefore, we used subjective and objective measures in the perioperative period, with the following aims: (1) to compare the anxiety and pain scores between first-eye and second-eye cataract surgery, (2) to identify factors correlated with the severity of pain during cataract surgery, and (3) to help surgeons evaluate and manage perceived pain during cataract surgery [3].

Materials and Method

This was a prospective, consecutive, observational, single-centre study. A voluntary questionnaire was distributed to 129 consecutive patients who fulfilled the inclusion criteria. The inclusion criteria were patients undergoing first eye clear corneal cataract surgery using ATA, and those patients undergoing second eye surgery using ATA

where the first eye had also been operated on using ATA [4]. Those patients who needed to be converted to ALA or who required general anaesthesia were excluded.

Patient Collection

The Ethics Committee of the Eye and Ear, Nose, and Throat Hospital, Fudan University, approved our study. Patients with bilateral age-related cataract were considered eligible for this study. Exclusion criteria included baseline eye pain, deafness, poor compliance to cataract surgery under topical anesthesia, involuntary movement, history of allergy to topical anesthetics, posterior capsule organization, or other complicated cataracts. Patients were enrolled between April 2013 and July 2013. Written informed consent was obtained from all patients after they were informed of the nature and possible consequences of the study. The consent procedure was approved by the hospital's ethics committee [5].

Surgical Technique

The preoperative examination and surgery were strictly performed

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according to established outpatient surgical procedures in all patients. The same operating room was used for all procedures with the same surgical equipment and instruments. Tropic amide was administered 30 min before surgery to fully dilate the pupil. The conjunctival sac was rinsed with povidone iodine (0.02%) 5 min before surgery. Topical anesthesia consisted of 3 applications of 2% lidocaine before surgery, 1-2 drops per time, with the first application 5 min before surgery, the second application at 1 min before surgery, and the final application after placing the eyelid retractor. Oral and intravenous sedatives or analgesics were not permitted [6]. All procedures were performed by the same right-handed surgeon. After topical anesthesia, a 2.6 mm temporal clear corneal incision was created, followed by viscoelastic injection and 5.5 mm continuous curvilinear capsulorhexis. Hydrodissection, chopping, nucleus rotation, and phacoemulsification were then performed. A foldable intraocular lens was implanted using a dedicated injector. After aspiration of residual viscoelastic, the incision was hydrated with balanced salt solution and checked for water tightness.

Results

These 167 patients were administered the questionnaires, of which 159 provided valid responses and were analyzed in this study. The valid patients were divided into two groups, as follows: 106 patients underwent first-eye surgery and 53 underwent second-eye surgery. There were no significant differences between the two groups in terms of age and proportions of males/females.

In this consecutive series, questionnaires were distributed preoperatively to 129 patients undergoing clear corneal cataract surgery using ATA. Two patients were converted to ALA, and were excluded from this study. This resulted in a total of 127 eligible participants [7].

There were 70/127 (55%) patients undergoing first eye cataract surgery and 57/127 (45%) undergoing second eye surgery using ATA. There were 82/127 (65%) female patients and 45/127 (35%) male patients.

The mean pain score for the first surgery cohort was 0.80, compared with 0.74 for the second surgery cohort. There was no statistical difference between the two cohorts.

The mean anxiety score for the first eye cohort was 1.10, compared with 1.05 for the second eye cohort. There was no statistical difference for intraoperative anxiety between the two cohorts. The mean fear score was lower in the second surgery cohort compared with the first surgery cohort, with scores of 0.42 and 0.63, respectively, but the difference again was not statistically significant [8].

Recall of intraoperative sensory perceptions showed no difference between the first and second surgery cohorts. Of a total of eight sensory perceptions studied, a mean of 3.6 was recalled in the first eye cohort compared with a mean of 3.4 in the second eye cohort. There was no statistical difference between the two cohorts [9].

There was no significant difference in pain, anxiety, or fear between male and female patients, for either the first or second eye surgery.

There was an overall small but highly statistically significant positive correlation between recall of intraoperative sensory perceptions and the combined fear, anxiety, and pain score.

Discussion

For many years, cataract surgery was mainly performed under retro bulbar and nerve-block anaesthesia. Now, most of these ophthalmic

procedures are carried out under topical anesthesia. This change in the anesthetic method is clinically significant because topical anesthesia reduces the rate of postoperative complications and reduces the postoperative rehabilitation time. However, patients may experience greater anxiety and pain during surgery. Our study revealed that a significantly greater proportion of patients undergoing second-eye surgery reported surgical pain compared with patients undergoing first-eye surgery, and the former group of patients also reported significantly greater VAS and Wong Baker pain scores. Because there were no significant differences in age, proportions of males/females, type of cataract, and surgical time, our findings indicate that patients were more likely to experience pain during second-eye surgery and reported more severe pain compared with first-eye surgery, which was consistent with the patients' chief complaint. The greater pain scores in second-eye surgery were correlated with lower preoperative anxiety scores [10]. Moreover, our findings demonstrate the clinical significance of monitoring perioperative MAP and heart rate to evaluate and predict the levels of anxiety and perceived pain during cataract surgery under topical anesthesia.

Despite our empirical observation that patients experienced more pain and sensory awareness during their second eye surgery, and which in fact led us to conduct this study, we were unable to demonstrate a statistical difference between the two cohorts. Recall of sensory perceptions during the surgery demonstrated no significant difference between the first and second eye.

We observed a small but highly statistically significant positive correlation between recall of intraoperative visual and auditory perceptions and the combined fear, anxiety, and pain score, for both first eye surgery and second eye surgery cohorts. This suggests that the ophthalmic surgeon should inform patients that they may have these sensory perceptions during surgery, whether first or second eye, and reassure them that these are normal phenomena for some patients during ATA [11].

Psychologists distinguish fear from anxiety. Fear is recognised as having an obvious cause and generally subsides when the stimulus is removed. By contrast, anxiety relates less clearly to a specific event and can overwhelm the patient with a chronic mindset. We expected that having previous experience of cataract surgery under ATA would have helped to reassure the patients and reduce their levels of fear and anxiety. Contrary to our expectations, patients in the second eye cohort did not demonstrate a statistically significant reduction in their self-reported scores for fear and anxiety.

We note that sedatives may have amnesic properties, perhaps making patient to recall intraoperative pain, fear, and anxiety less accurately. However, all the patients in the study had small titrated doses of intravenous agents to achieve similar levels of sedation, and sedation was used in both the first and second surgery cohorts.

The possible reasons for our patients demonstrating no significant difference between perceptions in their first and second eye are speculative. We expected that having been through the experience once, the patient may become more aware of some of the sensory events perceived at the first surgery. However, our study demonstrated that patients were equally aware at the second surgery [12]. It has been suggested previously that reassurance by experienced staff may diminish anxiety in patients undergoing cataract surgery using topical anaesthesia. The surgeon, anaesthetist, and nursing staff may feel that the patient needs less explanation and reassurance for the second eye surgery. Our study suggests that the patient needs just as much

counselling and reassurance for the second eye surgery as for the first eye.

The demonstrable lack of difference between first and second eye surgery suggests strongly that patients should be refamiliarised with the whole surgical event of their second eye. The surgeon should not presume that the patient will experience less pain, anxiety, and fear during the second operation [13].

Conclusions

The results of the subjective and objective measures in this study indicate that cataract patients were more sensitive to pain during second-eye surgery than during first-eye surgery. There was a subtle increase in the severity of pain in second eye cataract surgery relative to first-eye surgery. This increase in pain appears to be associated with decreased preoperative anxiety scores. Preoperative blood pressure and heart rate could reflect the patient's anxiety level, while perioperative MAP and changes in heart rate could reflect the patient's perceived pain level. Therefore, despite considering subjective factors, such as preoperative anxiety monitoring, our findings indicate that perioperative MAP and changes in heart rate may be significant markers for preoperative anxiety and could predict the severity of perceived pain during cataract surgery

Conflict of Interest

The authors declare that there is no conflict of interests regarding the publication of this paper.

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