Prevention of Ophthalmic Complications During General Anesthesia

P. A. Siffing, M.D.,* T. J. Poulton, M.D., F.A.A.P., F.C.C.P.†

Ocular injury may occur when general anesthesia causes loss of pain perception, obtundation of protective corneal reflexes, and decreased tear production. Chemical solutions and secretions may drip into the eyes, and surgical drapes or equipment may brush against the eyes unnoticed.

Because of these risks, intraoperative eye protection is recommended to reduce the frequency of ocular complications. Simple manual closure of the eyelids, taping the eyelids closed, using protective goggles, and the instillation of petroleum-based ointments into the conjunctival sac have been suggested as appropriate means of eye protection. Simple closure of the eyelids, however, requires the constant attention of the anesthesiologist which may distract him or her from other responsibilities. Tape on the eyelids may injure the cornea if placed improperly and, with taping, an important source of information regarding the level of anesthesia is hidden. Although ointments have been suggested as a better means of protecting the eyes (because they reduce the drying of exposed epithelium), they do produce blurred vision and occasional local allergic reactions. Also, Krupin et al. have stated that ointments must be replaced every 90 min during anesthesia. Lastly, ointments are flammable, which may make their use undesirable during surgery about the face.

Because of these uncertainties, we questioned whether conventional protective techniques are appropriate. We compared the efficacy of conventionally accepted eye protection strategies in preventing corneal abrasions and assessed the frequency and duration of various ocular complaints associated with each technique.

MATERIALS AND METHODS

This investigation was approved by the institutional human research committee. We obtained informed consent from and studied 127 adult patients scheduled for elective surgery under general anesthesia. The anticipated length of the operative procedure of each patient was between 30 and 180 min. Patients whose operative procedures involved the face or head, or who would be in the prone position during surgery, were excluded from this study. Also excluded were: patients with previous corneal pathology; those with an ocular prosthesis or other ocular abnormality resulting in an uncorrected visual acuity worse than 20/100; those with conjunctivitis at the time of their procedure; pregnant patients; those with known hypersensitivity to adhesive tape or ophthalmic ointments; and those unable to communicate clearly with the investigator.

Subjects were divided randomly into four groups of equal size. Group A received intraocular Lacri-Lube ointment (Allergan; Irvine, CA) and tape closure; Group B, Duratears ointment (Alcon; Fort Worth, TX) and tape; Group C, IsoptoAlkaline (methcellulose) drops (Alcon; Fort Worth, TX) and tape; and Group D, hypoallergenic paper tape (3M; St. Paul, MN) alone as eye protection.

One to sixteen hours preoperatively, baseline visual acuity was documented for each patient, using a Snellen eye chart. Patients wearing glasses were tested with their glasses on. No attempt was made to standardize the type of pre-medication, airway management, or the anesthetics used during each patient's operative procedure. All patients were in a neutral position on their backs with the head midline for the duration of the procedure. The anesthesia care provider initiated the designated means of eye protection immediately after induction of anesthesia. When the eyes were to be closed with adhesive tape, the tape was applied to each eye diagonally from the bridge of the nose across the upper lid to the lateral canthus. If ointment was used, it was applied as a linear bead along the inner surface of the lower lid of each eye.

Three to six hours postoperatively, we examined the eyes of each patient. Edema of the eyelids and conjunctival erythema were noted if present. Visual acuity was re-evaluated as before. Patients were asked specifically if they had any ocular complaints (itching, tearing, blurred vision, pain, dryness, photophobia, or foreign body sensation) postoperatively. Subjective complaints and objective signs were reassessed daily until they were no longer present. The eyes were examined for evidence of corneal abrasion using fluorescein and ultraviolet light. Patients' estimates...
of the duration of blurred vision were used to compute the mean durations of symptoms.

Differences between group means were assessed using analysis of variance. P values less than 0.05 were considered significant.

RESULTS

No evidence of corneal abrasion was detected in any of the 127 patients studied. Blurred vision was present in 75% of group A and 55% of group B patients (both of whom received petroleum-based ointments) for an average of 7.4 and 4.5 h postoperatively, respectively. The changes in visual acuity for groups A and B were −1.9 (20/25−1 to 20/40) and −1.3 (20/30+2 to 20/40) lines, respectively, on the Snellen eye chart at 3.5 h (mean) postoperatively (P < 0.05 compared to groups C and D). In addition, 62.5% of group A and 42% of group B patients had complaints of foreign body sensation for an average of 5.2 and 3.5 h postoperatively, respectively (P < 0.05 compared to groups C and D). In groups C and D, which were treated with methylcellulose drops/tape or tape only, respectively, one or less patients respectively complained of blurred vision or foreign body sensation. There was no loss of visual acuity in group D and an insignificant loss (20/25+1 to 20/25) in group C. In group B, 20% of patients (treated with Duratears® ointment which contains methylparaben, a known allergen) were noted to have scleral erythema. Patient age, duration of procedures, and time of postoperative evaluation were not significantly different among groups. The duration of procedure did not appear to influence the percentage of patients with postoperative complaints.

DISCUSSION

Postoperative visual impairment was significantly greater in the groups treated with ophthalmic ointments. In light of the increasing number of outpatient surgical procedures, rapid recovery of vision is important to the safety, security, and satisfaction of the patient. In addition, with the increasing cost of health care, the elimination of all but demonstrably worthwhile interventions seems appropriate. A department administering 6000 anesthetics yearly would save approximately $6,000 annually by eliminating the routine use of unit-dose ointments, apparently without compromising safety. We did not study situations in which trauma to the eyes may be more likely (e.g., procedures involving the head, the prone position, or very lengthy procedures); extra eye protection (ointments) may be appropriate for such procedures. During general anesthesia of short duration (<180 min) for procedures distant from the head and neck in the supine position, closure of the eyelids with tape with or without the use of methylcellulose drops appears to be effective and sufficient for most patients undergoing anesthesia.

REFERENCES