Olopatadine Ophthalmic Solution And Eye Rubbing after General Anesthesia: A Pilot Study

K Wagner, S Sidhu, S Houser, C Smith

Citation

K Wagner, S Sidhu, S Houser, C Smith. *Olopatadine Ophthalmic Solution And Eye Rubbing after General Anesthesia: A Pilot Study*. The Internet Journal of Anesthesiology. 2008 Volume 19 Number 1.

Abstract

Purpose:
Patients often rub their eyes shortly after emergence from general anesthesia even though the surgery was not physically close to their eyes. Eye rubbing could theoretically result in corneal abrasion. The purpose of this prospective randomized study was to evaluate the use of olopatadine ophthalmic solution during surgery with general anesthesia.
Methods:
100 adults undergoing general anesthesia for elective non-ophthalmic surgery were randomized into 2 groups: Group 1 received 2 drops of olopatadine in each eye after induction of anesthesia, followed by taping the eyes shut. Group 2 had their eyes taped shut (controls). The number of attempts the patient made to rub their eyes after emergence in the operating room (OR) and post anesthesia care unit (PACU) was recorded. A postoperative patient interview was done.
Results:
At emergence in the OR, more patients rubbed their eyes in the control (40%) vs the olopatadine (21%) group ($p<.05$). In the PACU, there was no difference between groups in frequency of eye rubbing (42%) or eye itchiness. One patient (olopatidine group) developed a corneal abrasion. This patient did not make any observed attempts to rub her eyes after surgery.
Conclusions:
The study demonstrated that instillation of olopatadine ophthalmic drops decreased the incidence of eye rubbing after emergence from anesthesia compared to controls. This difference did not persist in the PACU as the incidence of eye rubbing was 42% in both groups.

Financial Support: The study was supported by the Chester Scholar Foundation, MetroHealth Medical Center, Cleveland, Ohio

INTRODUCTION

Patients undergoing non-ophthalmic surgery with general anesthesia (GA) are at risk of developing corneal abrasions. In a study of 60,965 patients who underwent anesthesia for non-ocular surgery, 34 patients sustained eye injuries (0.056%), the most common being corneal abrasion (n = 21). [1] The cornea of the eye and, commonly, the bulbar conjunctiva, may be affected. Minor or superficial abrasions involve only the corneal epithelium. Severe injuries also involve the deeper, thicker stromal layer. Mechanisms of corneal abrasion include direct trauma to the eye from face masks, chemicals, or foreign objects that contact the eye, drying of the corneal epithelium, and incomplete eyelid closure. [2] Symptoms of corneal abrasion include irritation, pain, burning sensation, blurred vision, grittiness, tearing, and foreign body sensation.

Mechanism (s) of corneal abrasion may not be readily apparent in the majority of patients. [2]

We have observed that patients often rub their eyes shortly after emergence from GA even though the surgery was not physically close to their eyes. On occasion, the eye rubbing can be quite vigorous which could theoretically result in corneal abrasion, especially if the patient had long fingernails. The mechanism of eye rubbing after emergence is unknown, but could possibly be related to eye itchiness due to histamine release. . For example, opioids have long been known to cause the release of histamine from mast cells, resulting in urticaria, pruritis, and other effects. The mechanism of this opioid response is non-immunological in nature. Other basic compounds may also release histamine from mast cells by directly activating G-proteins, including

endogenous opioids. [3]

Olopatadine hydrochloride ophthalmic solution (Patanol ™) is a relatively selective H_1 receptor antagonist and inhibitor of histamine release from the mast cell for topical administration to the eyes. [4, 5] The purpose of this randomized, controlled study was to evaluate the use of olopatadine ophthalmic during surgery with GA. The hypothesis was that olopatadine would reduce the frequency of eye rubbing after emergence from GA, which in turn might reduce the risk of corneal abrasion.

METHODS

After Institutional Review Board approval and written informed consent, adult patients (>18 years) undergoing elective non-ophthalmic surgery requiring GA were randomized to 1 of 2 groups: olopatadine or controls. Exclusion criteria were ophthalmologic disease such as glaucoma, conjunctivitis, and eye pain. Patients using anti-allergy medications 24 hours before surgery were excluded as were patients with Bells' Palsy and other neuropathies in which the eyelid cannot be closed voluntarily. Contact lenses and mascara were not permitted on the day of surgery. Randomization was done using a random sequence of integers from 1-100. If the integer was even, the Anesthesiologist administered 2 drops of olopatadine ophthalmic solution in each eye after induction of GA prior to surgery start, followed by taping the eyes shut with adhesive tape. If the integer was odd, no solution was administered, and the patients' eyes were taped shut as is standard practice (controls). Premedication was with midazolam, 1-2 mg IV. Induction of anesthesia was with propofol, and maintenance was with an inhaled agent. Choice of inhalation agent and airway management (endotracheal tube or laryngeal mask airway) was at the discretion of the anesthesiologist and not dictated by the study.

After completion of surgery and removal of the airway tube, patients were continuously monitored for 20 minutes by a single observer who was unaware of patient group. The number of attempts the patient made to rub their eyes was recorded before leaving the operating room (after emergence), and in the post anesthesia care unit (PACU). An eye rubbing severity scale was used according to frequency of rubbing: none, mild, moderate, and severe, corresponding to 0, 1-3, 4-7, and >7 attempts to rub the eyes. In addition, patients were interviewed in the PACU prior to discharge to determine if their eyes were itchy (yes/no) and to describe the severity of eye itchiness (mild, moderate, or severe).

Data were analyzed using Fisher's exact and Student's t tests. A P value < 0.05 was considered significant.

RESULTS

A total of 100 patients were enrolled in this pilot study, 52 in the control and 48 in the experimental group. The majority (86%) of patients underwent orthopedic, gynecologic, and general surgery (Table 1).

Figure 1

Table 1: Patient data

	Control, n=52	Olopatadine, n= 48
Age, yrs	46 ± 15	46 ± 14
Weight, kg	90± 21	84 ± 18
Height, cm	171± 10	168 ± 10
Gender: M/F	20/32	16/32
ASA Physical Status		
1	5 (10%)	9 (19%)
2	32 (62%)	31 (65%)
3	14 (27%)	8 (16%)
4	1 (2%)	0
Surgical Service		
Gynecology	21 (40%)	15 (31%)
General	13 (25%)	13 (27%)
Orthopedics	11 (21%)	14 (29%)
Other	7 (14%)	6 (13%)
Propofol (mg)	210± 140	200± 100
Intraoperative Opioids		
Fentanyl, mcg	220± 140	260± 170
Morphine, mg	5± 3 (n=3)	7± 4 (n=5)
Duration of Surgery (min)	92± 74	97± 75

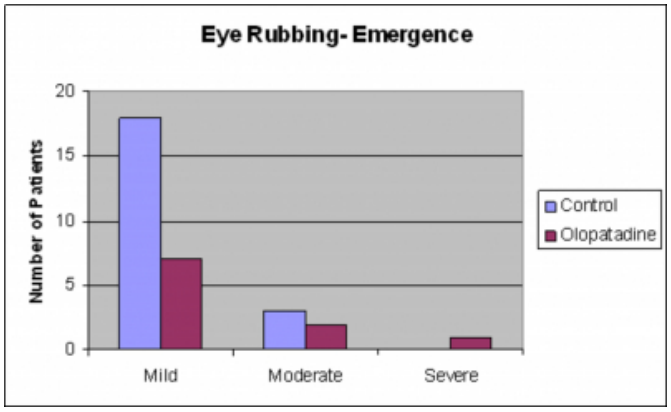
Data are means ± SD or numbers of patients (%). There were no significant intergroup differences.

The groups were similar with respect to age, gender, weight, height, and ASA physical status. One patient (olopatadine group, moderately itchy eyes) developed a corneal abrasion. This patient did not make any observed attempts to rub her eyes after surgery and the providers involved with the case did not report any obvious source for the occurrence.

At emergence, more patients rubbed their eyes in the control (21/52, 40%) vs the olopatadine (10/48, 21%) group (P < 0.05, Figure 1).

Figure 2

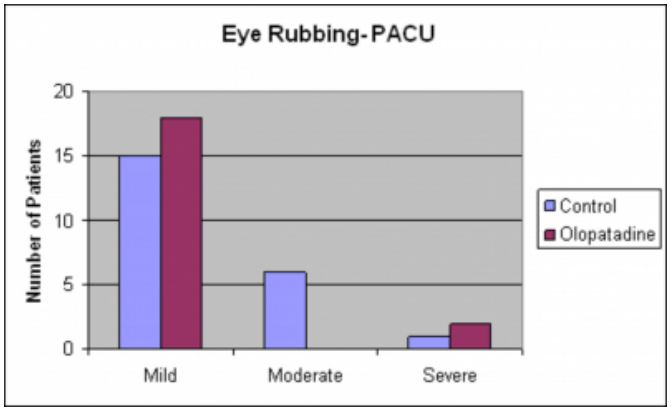
Figure 1: Number of patients rubbing their eyes in the operating room after emergence. More patients rubbed their eyes in the control (21/52, 40%) vs the olopatadine (10/48, 21%) group ($P < 0.05$). Mild =1-3 attempts, moderate= 4-7, severe = >7.



There was no difference between groups in frequency of eye rubbing in the PACU (Figure 2).

Figure 3

Figure 2: Number of patients rubbing their eyes in the PACU in the control and olopatadine groups. The number of patients rubbing their eyes was similar between groups. Mild =1-3 attempts, moderate= 4-7, severe = >7.



In the control group, 7 patients had itchy eyes (mild=6, moderate =1). In the olopatadine group, 4 patients had itchy eyes (mild =2, moderate =2). These differences were not significant.

DISCUSSION

Corneal abrasions during the perioperative period may occur due to absence of pain perception and diminution of the protective corneal reflexes. Decreased tear production may also play a role. [6] Corneal abrasions after emergence from GA may possibly occur due to vigorous eye rubbing. The study demonstrated that instillation of olopatadine drops decreased the incidence of eye rubbing after emergence from anesthesia compared to controls. This difference did not persist in the PACU as the incidence of eye rubbing was similar between groups (42%).

Mast cell stabilizers such as olopatadine are both safe and effective and are commonly used in ocular allergy. [6,7] Olopatadine inhibits the release of histamine from the mast cell and inhibits the in vivo and in vitro type 1 immediate hypersensitivity reaction including inhibition of histamine induced effects on conjunctival cells. There is no effect on alpha-adrenergic , dopamine and muscarinic type 1 and 2 receptors. [6] Duration of action is 6 to 8 hours. Olopatadine may be useful in the surgical setting to inhibit mast cell release, reduce ocular itching and reduce the rate of corneal abrasion.

Only 1 patient (olopatadine group) had a documented corneal abrasion in the current study. This low incidence of corneal abrasion was likely due to taping the eyes shut which has previously been shown to reduce the incidence of abrasions. [3,8] We did not examine the eyes or perform fluorescein staining slit-lamp examination to detect corneal epithelial defects. A previous study of 150 patients (300 eyes) undergoing general anesthesia for non ophthalmic surgery demonstrated corneal epithelial defects in 6.6% of taped and 90% of untaped eyes. [8] Future studies may be done using saline eye drops as the control solution and performing eye examinations postoperatively.

ACKNOWLEDGEMENTS

Olopatadine Ophthalmic Solution generously donated by Alcon Laboratories, Inc.

CORRESPONDENCE TO

Name: Karl Wagner, MD Address: Department of Anesthesia MetroHealth Medical Center 2500 MetroHealth Drive Cleveland, OH 44109 Telephone: (216) 778-4801 Fax: (216) 778-5378 Email: karlwagner3@yahoo.com

References

1. Roth S, Thisted RA, Erickson JP, Black S, Schreider BD. Eye injuries after nonocular surgery. A study of 60,965 anesthetics from 1988 to 1992. Anesthesiology 1996; 85:1020-7
2. Orlin SE, Kurata FK, Krupin T, Scheider M, Glenrange RR. Ocular lubricants and corneal injury during anesthesia. Anesth Analg 1989;69:384-5
3. Barke KE, Hough LB. Opiates, mast cells and histamine release. Life Sci 1993;53:1391-9
4. Patanol Product Information. Physicians' Desk Reference. PDR 62 Edition 2008. Thompson Healthcare Inc., Montvale, NJ. Page 533.

5. Abelson MB. A review of olopatadine for the treatment of ocular allergy. Expert Opin Pharmacother 2004 Sep;5:1979-94.

6. Grover VK, Kumar KVM, Sharma S, Sethi N, Grewal SPS. Comparison of methods of eye protection under general anaesthesia. Can J Anesth 1998; 45: 575-7

Author Information

Karl Wagner, MD
Senior Instructor, Dept of Anesthesia, MetroHealth Medical Center

Sanbir Sidhu, BA
Chester Scholar, Dept of Anesthesia, MetroHealth Medical Center

Steven Houser, MD
Assistant Professor, MetroHealth Medical Center

Charles E. Smith, MD, FRCPC
Professor, Dept of Anesthesia, MetroHealth Medical Center