# Do adult patients (P) undergoing surgery that receive a prophylactic eye lubricant (I) compared to those who do not (C) experience less corneal abrasions (O)

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## Abstract

General anesthesia inhibits the eyelid reflex, as well as the natural pain response, and prevents full eyelid closure, resulting in decreased tear production and drying of the cornea (Young et al., 2021).Constant rubbing of a dry and exposed cornea contributes to the development of corneal abrasions, which account for 35% of ocular injuries, making them the most common type reported during the perioperative period (Moos & Lind, 2006). To decrease the occurrence of corneal abrasions, artificial eye lubrication and manual eyelid closure with adhesive dressings have been recommended during general anesthesia. This project was created to encourage the use of prophylactic eye lubrication during the induction of general anesthesia and is focused on the following PICO question: do adult patients (P) undergoing surgery that received a prophylactic eye lubricant (I) compared to those who do not (C), experience less corneal abrasions (O)?

## Introduction

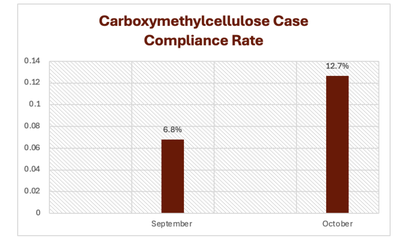
Corneal abrasions occur when the epithelial layer of the cornea is separated from the underlying membrane, resulting in unanticipated intense pain, tearing, blurry vision, and photophobia. Injuries lead to prolonged recovery time, discharge delays, and decreased patient satisfaction (Young et al., 2021). During the perioperative period, corneal abrasions potentially occur due to direct trauma from surgical drapes, equipment, personal provider belongings (stethoscope, hospital ID badge), or from the general anesthetic itself (Papp et al., 2019). Anesthesia providers must take steps to protect patients' eyes and prevent injury. Prophylactic preservative-free methylcellulose-based ointments protect the eyes by creating a closure between the eyelids and increasing moisture (Malafa et al., 2016).
This project continues a project previously explored by Florida State University doctoral students, with the aim of reinforcing the importance of using eye lubricant as part of every anesthesia provider's practice. This project aims to provide education to anesthesia providers on the research proven value of prophylactic eye lubrication, aiming to increase its inclusion in the providers induction sequence of general anesthesia.

## Evidence

- A systematic review by Papp et al. (2019) reviewed 16 articles that were focused on corneal abrasions. A randomized controlled trial in the review looked at different corneal prevention methods and determined that only 10% of corneal abrasions were linked to the groups assigned eye tape and ointment, whereas 90% of corneal abrasions presented in the control group that did not receive eye tape or ointment. Papp et al. (2019) also referenced another systematic review in which they determined that corneal abrasions were reduced from 59% to 0.2% by adding eye ointment and tape to close the eyelids instead of manual closure of the eyelids alone.
- In a systematic review performed by Grixti et al. (2013) a prominent topic was the significance of general anesthesia greatly reducing tear production. The use of artificial tears was highly recommended to replace the deficient film of tears that naturally lubricate the eye. The lowest corneal abrasion rate reviewed involved the use of water-based methylcellulose solutions by prolonging tear film breakup time.
- Yoo et al. (2015) conducted a randomized controlled trial to assess the effectiveness of corneal abrasion prevention and the maintenance of corneal epithelial health during general anesthesia. One of three eye lubricants were applied before sealing the eyes with tape and compared to a control group that sealed the eyes with tape alone. The study included 148 subjects (296 eyes) and found that corneal erosion was more significant in the control group (tape alone) and vanillin oil-based group compared to water-based groups, leading Yoo et al. (2015) to conclude that water-based ointments combined with eye taping are more effective at protecting corneas than oil-based ointments or taping alone.
- Li et al. (2022) conducted a double-blind randomized clinical trial to measure the effectiveness of water-based Vitamin A palmitate eye gel in protecting the ocular surface during general anesthesia. The participants were divided into two groups: Group A, which received the Vitamin A eye gel followed by taping, and Group B, which received taping alone. Li et al. (2022) concluded that Vitamin A eye gel can offer additional protection against corneal damage and could be particularly beneficial for patients with dry eyes.

## Results and Discussion

Data was collected using the electronic hospital system and the Epic software splicer application. The population included procedures involving a general anesthetic. A second search was performed, incorporating the administration of eye lubricant regardless of whether the provider charted one or two drops per eye. Data searches were executed for September, the control group, and October, the experimental group following the educational intervention. There were 50 reported instances of carboxymethylcellulose use out of 736 cases conducted in September. In October, there were 90 reported instances out of 711 total cases.




The results are promising, with a significant increase in the use of the prophylactic eye lubricant, carboxymethylcellulose. The average use of prophylactic eye lubricant for general anesthesia cases in September was 6.8%. Following a series of targeted interventions including provider education, the placement of education posters in the breakroom and laminated reminders in the operating areas, the usage rate nearly doubled to 12.7% in October.

Anesthesia providers can contribute to continuing the use of prophylactic eye drops by committing to the practice change. The institution is dedicated to enhancing quality outcomes and reducing the incidence of corneal abrasions. While anesthesia providers were exposed to the educational materials, further efforts are required to make the practice routine.

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