



Perioperative Corneal Abrasion: An Exploration of Certified Registered Nurse Anesthetists' Preferences for Corneal Abrasion Prevention

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INTRODUCTION

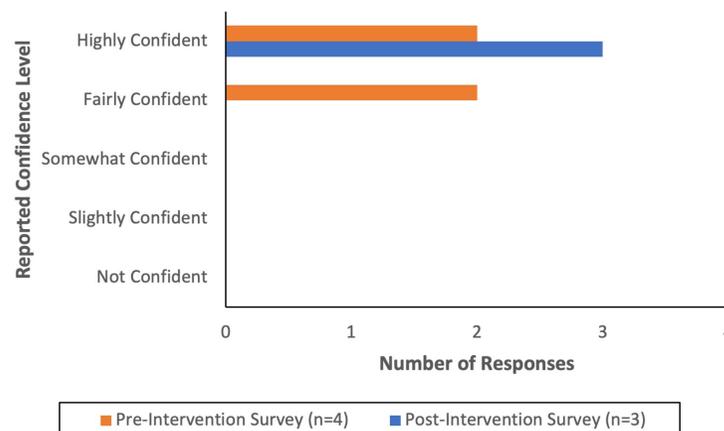
- Perioperative ocular injuries account for nearly 2% of all anesthesia related malpractice suits and range from mild, irritating injuries to permanent ocular loss (O'Driscoll & White, 2016).
- Liability claims associated with ocular injuries exhibit 4% higher awards compared to other anesthesia claims (Papp et. al., 2019).
- No professional anesthesia organization has promulgated national standards for the prevention of ocular injuries in the perioperative period and there are no prospective studies clearly demonstrating that any specific protocol is best at preventing corneal abrasions (CAs).
- The purpose of this quality improvement project was to assess CRNAs' preferences and practices regarding perioperative eye care and corneal abrasion prevention and their perceptions of a corneal abrasion quick reference guide as a useful tool to prevent corneal abrasions.

METHODS

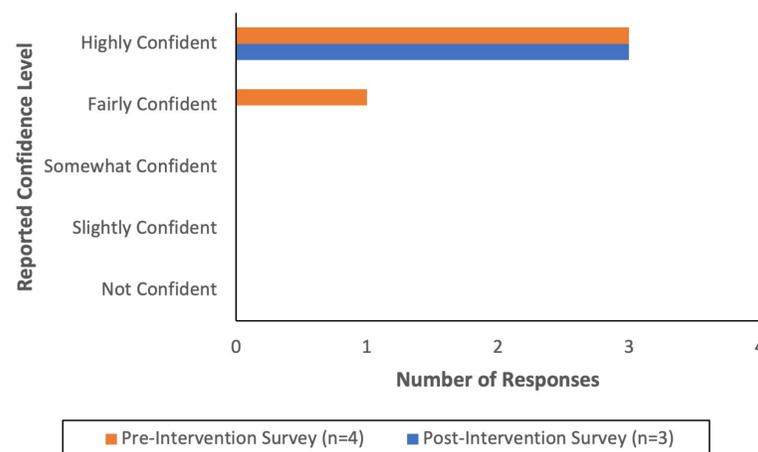
- A single Plan, Do, Study, Act cycle was completed utilizing pre- and post-survey design (Taylor et. al., 2014)
- Participants emailed pre-intervention survey using Qualtrics
- Quick-reference guide introduced to participants via PowerPoint presentation
- Quick-reference guide utilized for a two-week period
- Post-intervention survey using Qualtrics emailed to participants
- Data analyzed utilizing Microsoft Excel

RESULTS

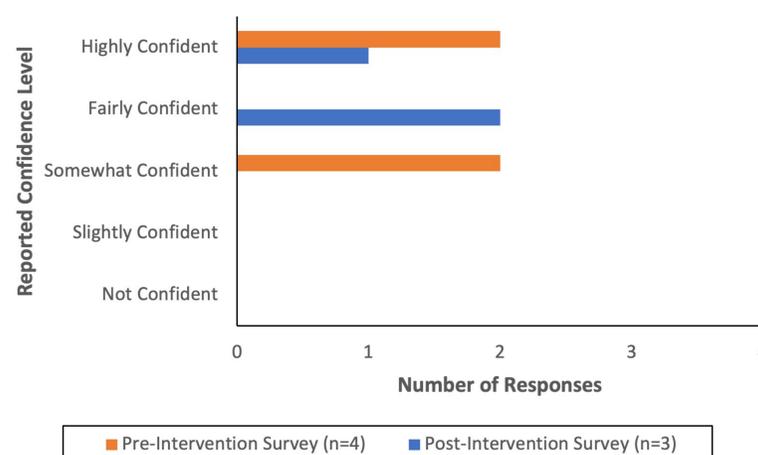
CRNA Confidence to Identify Patients at High Risk for Corneal Abrasions Figure 1



CRNA Confidence to Take Appropriate Measures to Prevent Corneal Abrasions Figure 2



CRNA Confidence to Assess, Diagnose, and Treat Corneal Abrasions Figure 3



DISCUSSION

- Four CRNAs completed the pre-intervention survey while only three completed the post intervention survey
- One CRNA reported ever being involved with a patient diagnosed with a CA
- All CRNAs reported adhering to most suggestions/guidelines described in current literature prior to intervention
- CRNAs reported being more confident in their ability to identify high risk patients and take appropriate measures to prevent CAs than assessing, diagnosing and treating.

CONCLUSIONS

- Practice preferences did not appear to be affected by the intervention
- CRNAs reported they are unlikely to use the quick-reference guide moving forward
- Intervention slightly increased CRNA reported confidence in their ability to:
 - Identify patients at high risk for CAs
 - Take appropriate measures to prevent CAs
 - Assess, diagnose, and treat CAs
- Changes in the electronic charting system resulting from this project will be useful in future practice
- Recommendations for future projects
 - Larger sample size
 - More tailored quick-reference guide
 - Potentially incorporating a guide in electronic format to anesthesia work-stations for reference

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Risk Factors:

- Advanced Age^{1,2,3,6}
- SRNA as provider^{1,5}
- Head and neck surgery^{2,5}
- Graves' disease/exophthalmos^{2,5}
- Lateral/prone/trendelenburg position^{1,2}
- Prolonged surgery duration > 3.5 hours⁶
- Robotic surgery cases⁶
- Diabetes¹
- Low ASA status¹

Incidence/Litigation

- 2% of all malpractice claims^{2,4}
- Incidence of CAs 0.64% overall⁶
- CAs account for 35% of all ocular injury claims and awards for ocular injuries are 4% higher than any other claim⁶

Sources of CAs:

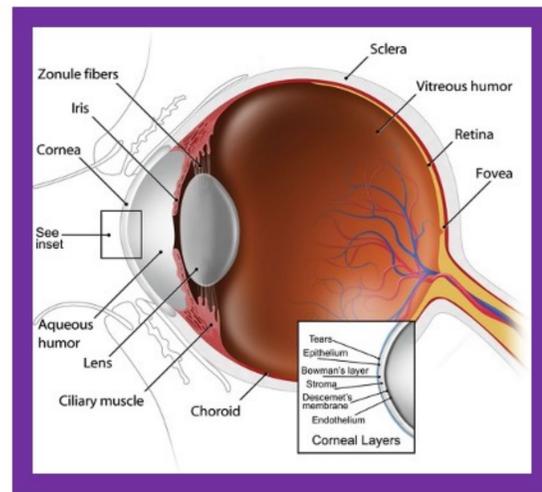
- Identification badges^{1,4}
- Stethoscopes¹
- Laryngoscopes^{1,4}
- Oxygen facemasks^{1,2,4}
- Pulse oximeter probe on dominant hand^{1,2,4}
- Watch band^{2,4}
- Surgical drapes^{2,4}
- Bair hugger²

Pathophysiology

- Corneal abrasions are superficial injuries to the epithelial layer of the cornea that cause pain, photophobia, excessive tearing, headache, and blurry vision.
- They normally heal within 72 hours but cause patients extensive, unanticipated discomfort in addition to their post-operative pain^{2,4}
- One fifth of these injuries occur from mechanical trauma such as scratching the eyes post-surgery or from objects such as oxygen masks, badges, and surgical drapes as well as chemical injuries from substances such as antiseptics². Other factors that add to the risk of corneal abrasions are foreign bodies, contact lens, and dry eyes².
- During general anesthesia, contraction of the orbicularis oculi muscle is inhibited therefore putting patients at increased risk for corneal abrasions due to insufficient closing of the eyelid and subsequent drying of the cornea².
- General anesthesia also inhibits blink reflexes, tear production, and what is known as Bell's phenomenon.
 - Bell's phenomenon is the upward and outward movement of the globe when the eyes close. The cornea stays more exposed during a threat without this reflex intact, contributing to injury.

Assessment and Diagnosis

- Initial assessment and treatments can be completed by an anesthesiologist
- Abrupt onset of eye pain, blurry vision, photophobia, excessive tearing, foreign body sensation within 2 hours of procedure^{2,4}
- R/o foreign body: evert eyelids to assess for any foreign body. If foreign body present irrigate with topical anesthetic^{2,4}
- Assess visual acuity, EOMs, pupil reactivity⁴
- Definitive diagnosis: fluorescein staining reveals yellow green staining of basement membrane in presence of corneal abrasion^{2,4}

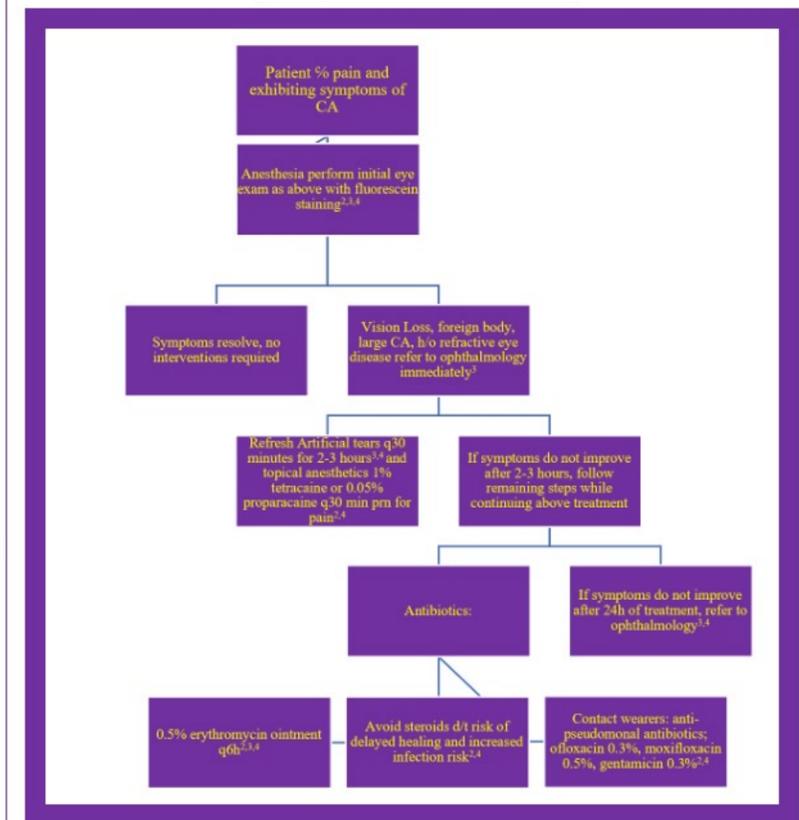


How do you tape your patients' eyes shut? Horizontal vs Vertical?

Interventions

- Secure eyelids with tape immediately after loss of lid reflex on induction and prior to securing the airway⁷
 - The tape should be placed horizontally across the entire lid line.^{1,7}
 - Use of Tegaderm to secure eyes in high risk cases^{1,4} Tegaderm is water-tight and can prevent chemical injury with surgical prep solutions on the face²
- Use preservative-free 4% methylcellulose-based ointment to lubricate the eyes when taping is undesirable^{1,4}
- Paraffin based lubricant can absorb highly soluble anesthetics like Halothane and cause irritation¹
- Petroleum ointments are flammable - avoid with high FiO2 and electrocautery near the face²
- Remove tape from upper to lower lid to reduce risk of mechanical trauma²

Stepwise Treatment Protocol



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