Preventing Corneal Abrasion During General Anesthesia for Non-Ocular Surgery

Christa L. Swanke

University of Maryland, School of Nursing

Doctor of Nursing Practice Scholarly Project Proposal

According to a closed claims analysis by the American Society of Anesthesiologists (ASA) and a large-scale retrospective study, the most common ophthalmologic complication for patients in the perioperative period enduring general anesthesia (GA) for non-ocular surgery is corneal abrasions (Moos & Lind, 2006). Generally resulting from a trauma, corneal abrasions can be defined as a scratch or loss of the epithelial layer of the eyes cornea from the underlying basement membrane. Composing one-sixth of the sclera, a fibrous protective coating that encases the choroids and retina, the cornea is the transparent anterior portion that allows light to enter the lens and focus these rays to form a retinal image (McGoldrick, 2009). Due to the dense innervation of the tissue in the cornea, the pain resulting from the abrasion could potentially be more severe than that occurring from the surgery itself (Grixti, Sadri, & Watts, 2013). In addition, the cornea acts as a mechanical barrier to protect the eye and, when intact, blocks the penetration of pathogenic organisms, preventing sight threatening keratitis and permanent scarring (Grixti et al., 2013).

Ocular injuries account for three to eight percent of anesthesia related malpractice claims in the United States, and though the exact mechanism of its cause is unknown there are several factors that can contribute to an increased incidence (Moos & Lind, 2006). Corneal abrasions usually occur under GA due to prolonged exposure of the cornea to the atmosphere and the absence of the voluntary protective mechanisms (Moos & Lind, 2006). Factors that have been proven to have an increased incidence associated with ocular injury include operations involving the head and neck, long surgical procedures, patients of advanced age, and the lateral and prone position (Shott, 2001). Patients receiving GA are part of a vulnerable population that places them at a higher risk of acquiring a potentially prevented corneal abrasion.

Several interventions are available to aid in ameliorating the high incidence of corneal abrasions after non-ocular surgery (Grixti et al., 2013). Protection against corneal abrasions is achieved predominantly by the use of adhesive tape covering the eyelids just subsequent to the induction of GA and prior to bag-mask ventilating the patient in combination with applying an eye lubricant prior to taping (Moos & Lind, 2006). Adequate positioning and assessing the eye intermittently ensures the prevention of inadvertent eyeball compression in the lateral and prone position, and are successful in preventing the incidence of perioperative corneal abrasions (Grixti et al., 2013).

A teaching hospital on the east coast will be the focus of this scholarly project. This particular hospital has produced the most non-ocular perioperative corneal abrasions, compared per capita, to all other hospitals in its area. This high incidence is of great concern to this organization, suggesting the need for a standard of care and has warranted the need for the development of a clinical practice guideline (CPG) to aid in its amelioration. The purpose of this Doctor of Nursing Practice project is to develop and evaluate an evidence-based CPG to prevent corneal abrasions during GA for non-ocular surgery at large academic medical center. The anticipated outcome of the CPG would be a decrease the incidence of corneal abrasions and increased patient safety.

Theoretical Framework

This practice problem can be better viewed through Schreiber and MacDonald's (2010) theory, *Keeping Vigil over the Patient*. This middle range, grounded theoretical framework aims "to explore and develop a theory of nurse anesthesia practice" (Schreiber & MacDonald, 2010, p. 553), while keeping patients safe through the surgical process and producing the best outcomes. This theory is based on three concepts: engaging with the patient, finessing the human-

technology interface, and massaging the message (see Figure 1). Engaging with the patient builds the trusting relationship between the Certified Registered Nurse Anesthetist (CRNA) and the patient in order to establish the groundwork and purpose of their vigil. Finessing the human-technology interface is where the engagement shifts from the conversation to the technical aspects of practice. Finally, massaging the message refers to the refined communication skills in managing the interactions between all parties in the Operating Room (OR). These concepts utilized to improve upon the all-encompassing phenomenon of patient safety.

The three major concepts of Schreiber and MacDonald's (2010) theory will be operationalized through this project. Engaging the patient will be operationalized to aid in addressing the practice problem by including in the CPG the development of a relationship between the CRNA and the patient. In consenting the patient, the CRNA shall forewarn the patients of the risk of corneal abrasion and explain to them what the CPG instructs the CRNA to do to prevent the occurrence. Next to finesse the human-technology interface, the CRNA will abide by the developed CPG intervention by utilizing the available technology of adhesive taping, applying ointment, proper positioning, and intermittent assessment of eyeball compression through the operative experience. Finally, massaging the message can be utilized by the communication with the OR players as the patients' advocate in aiding the prevention of the occurrence of corneal abrasions by adherence to the CPG. Also, promoting accountability to adhere to the CPG across all perioperative providers can operationalize this concept. By the operationalization of the three concepts within this framework, the aim is to decrease the incidence of perioperative corneal abrasions in non-ocular surgery patients receiving GA aided by the developed CPG, while defining the role of the nurse anesthetist within nursing practice.

Literature Review

The focus of the evidence in this literature review is to determine the most effective ocular protection strategies to be included in a CPG for reducing the incidence of perioperative corneal abrasions. The review will look at interventions in the prevention of corneal abrasions for this vulnerable population (see Appendix A). The review will begin with an examination of the simplest intervention, the use of passive eyelid closure and its utility in reducing corneal abrasion. This discussion will be followed a review of ocular lubricants, comparing the different types and their effectiveness, then examining the use of a hydrogel eye dressing and its effects on reducing corneal abrasions perioperative. Next, there will be an analysis of the literature reviewing including tarsorrhaphy, eyelid taping, and protective goggles. Finally, the review will conclude with the current evidence regarding the use bio-occlusive dressings.

Grover et al. (1998) examined the method of manual eyelid closure without eye taping or lubricant. The researchers performed a RCT of 150 patients and 300 eyes under going anesthesia for greater than 90 minutes for non-ophthalmic procedures. Grover et al. (1998) compared three randomized groups, a control group with no ocular lubrication, a group where only T hypoallergern tape was applied to the eyes, and a group where chlormycetin ointment was used opthalmically. Though being an older study, the results concur with the review by Grixti et al. (2013), who discouraged the use of passive eyelid closure due to of the increased risk of corneal epithelial defects.

Due to the significant basal tear reduction during general anesthesia, the use of an ocular lubricant is a well-studied method in the prevention of corneal abrasions (Grover, Kumar, Sharma, Sethi, & Grewal, 1998; Kocatürk, Kocatürk, Kaan, & Dayanir, 2012; White & David 2010). Petroleum/paraffin based ointments and aqueous solutions such as methylcellulose-based gels were reviewed. Though it is an older study and it is limited in external validity, Bundgarrd-

Nielsen, Hammer, and Jakobsen (1981) performed a large well-structured, randomized control trial (RCT). The investigators compared the eye protection of a methylcellulose-based ointment with a paraffin-based ointment. There was evidence supporting water-based methylcellulose ointment as offering better protection. In another earlier study, Grover et al. (1998) also carried out a large RCT to evaluate the use of paraffin-based ointment. The investigators revealed the intervention as an effective approach to corneal abrasion prevention, with only 3.3% of the defects occurring versus 90% occurring in the control group with no intervention. Again, the generalizability of this data is limited due to the study being outdated.

More recent studies have examined other types of ocular lubricants. Kocatürk et al. (2012) performed a large retrospective study and reported that the maximum reduction of basal tear production was seen in the group with no ocular lubricant. They also found that the use of lubricant was a significant intervention to prevent corneal abrasions and there was no difference between the types of eye lubricant used. These findings were also supported by Grixti, Sadri, and Watts (2013), who performed an integrated literature review of eight RCTs and one historical controlled study. They concluded that aqueous-based ointments are better tolerated than paraffin ointments and they may provide additional means of corneal protection.

Overall, the studies support the use of an ocular lubricant over no lubricant (Bundgarrd-Nielsen et al., 1981; Grixti et al., 2013; Grover et al.,1998; Kocatürk et al., 2012; White and David, 2010). Although petroleum-based ointments appear to work well, their half-life on the cornea is short. Furthermore, patients may awaken with blurred vision or a foreign body sensation. In conclusion, methylcellulose-based gels are runnier, but patients may have less blurred vision than with the petroleum-based ointments.

Hydrogel dressings, a transparent non-allergenic dressing, such as Geliperm, can be used as a method to protect the eyes against corneal abrasions. Grixti et al. (2013) also reviewed the use of Geliperm during endonasal surgery when constant inspection of the eye is needed, and concluded it to be an effective method in the prevention of corneal abrasion, provided that the gel is not allowed to dry. Furthermore, So, Lee, Leung, Lim, Chan, and Yan (2008) performed a large prospective RCT and the investigators revealed that the hydrogel dressing is as equally effective when compared with lanolin eye ointment.

Tarsorrhaphy is the complete closure of the upper and lower eyelids by suturing that can be temporary or permanent (American Academy of Ophthalmology, 2016). Earlier studies that Grixti et al. (2013) reviewed found tarsorrhaphy to prevent corneal abrasion in high-risk patients, including Grave's disease with exophthalmos to prevent lagophthalmos, which is incomplete eyelid closure. Tarsorrhaphy may also prevent chemical or mechanical eye injury. However, there are disadvantages. Specialists in ocular physiology and management, White and David (2010) describe how tarsorrhaphy can result in eye trauma, decreased compensatory proptosis, and subsequent increase in intraocular pressure (IOP). When IOP is increased with lateral or prone positioning, the inability to compensate may have devastating effects, including postoperative visual loss. In conclusion, the most current evidence does not support this method of ocular protection. (Grixti et al., 2013; White & David, 2010).

Eyelid taping is another method of ocular protection during GA. Yu et al. (2010) suggested primarily using eyelid taping to prevent corneal abrasion from commonly cited intraoperative antecedents. Grixti et al. (2013) highlighted taping as a superior or equivalent method of ocular protection across RCTs. Ganidagli, Cengiz, Becerik, Oguz, and Kilic (2004) found hypoallergenic tape to be equally effective to paraffin-based ointment, polyacrylic acid

liquid gel, and artificial tears for corneal abrasion prevention. Grover et al. (1998) reported significantly higher basal tear production and only 6.6% of the corneal abrasions with hypoallergenic tape compared to no tape accounting for 90% of the corneal abrasions. Kocatürk et al. (2012) confirmed hypoallergenic tape decreased the incidence of corneal abrasion. Overall, the literature validates the correlation between eyelid taping, preserved basal tear production, and a decreased incidence of corneal abrasion. The results of earlier studies supporting eyelid taping for assorted surgeries is confirmed by more current research (Grixti et al., 2013; Kocatürk et al., 2012; Yu et al., 2010).

Protective goggles and patches have been proposed to decrease the incidence of corneal abrasion for certain surgical procedures and positioning. Anderson, Braun, and Herlich (1995) found goggles prevent direct eye trauma from mechanical causes (i.e., robotic arms). For Robotic Prostatectomies (RP) in steep trendelenburg, Danic et al. (2007) discovered a change in ocular protection from eyelid taping to eye patches decreased the incidence of corneal abrasion from 3% to 1%, respectively. The power of this study is increased by the large sample size of 1,500 patients. However, inclusion of only one type of surgery limits the external validity. In opposition, White and David (2010) describe the potential risk of eye injury from incorrect application of the goggles and their inability to prevent corneal desiccation, which can also lead to corneal abrasion. While goggles may be preferred in certain surgeries, the evidence is not comprehensive to all surgeries and intraoperative positions while addressing the practice problem.

Bio-occlusive dressings are the emerging trend in ocular protection from corneal abrasion during GA. Anderson et al. (1995) studied the use of bio-occlusive dressings with or without ocular lubricant for head and neck surgeries, and reported an incidence of only 12 of 40,089

ocular injuries during 5.5 years of implementation. Gainsburg, Wax, Reich, Carlucci, and Samadi (2010) reported no corneal abrasions after switching from tape and ocular lubricant to a sterile, transparent dressing (i.e., Tegaderm) for RPs in steep trendelenburg. This study minimized confounding variables by matching patient demographics. Lavery, Samadi, and Gainsburg (2010) confirmed the previous findings. Grixti et al. (2013) reviewed the preceding evidence and highlighted the capability of bio-occlusive dressings to prevent both mechanical injury and corneal desiccation. In conclusion, current literature supports the use of bio-occlusive dressings for various surgeries and positions.

In summary, the evidence supports the use of methylcellulose-based gels as a significant protection method in reducing incidence of corneal abrasion (Bundgarrd-Nielsen et al., 1981; Grixti et al., 2013; Grover et al., 1998; Kocatürk et al., 2012; White and David, 2010). As a whole, the use of manual eyelid closure as a method of protection is discouraged due to it producing a high occurrence of corneal abrasions (Grixti et al., 2013; Grover et al., 1998). Due to lack of supporting evidence to prove that hydrogel dressing are superior to methylcellulose-based gels in non-ocular surgery, it is not a recommended method for corneal abrasion prevention (Grixti et al., 2013; So et al., 2008). The literature review results conclude that the CPG should include methylcellulose-based gel lubricants as a method in corneal abrasion prevention during GA for non-ocular surgery. An exhaustive analysis and synthesis of the literature shows bio-occlusive dressings to be superior to tarsorrhaphy, protective goggles, and eyelid taping for ocular protection from corneal abrasion during GA. The potential risks of tarsorrhaphy outweigh the benefits (Grixti et al., 2013; White & David, 2010). Goggles may be advantageous for RPs in steep trendelenburg, but evidence for the generalizability of goggles to prevent corneal abrasions is lacking (Grixti et al., 2013; White & David, 2010). Eyelid taping is equally as effective to bio-

occlusive dressings in corneal abrasion prevention, safety, efficacy, and comprehensive applicability for nonocular surgery (Gainsburg, 2010; Grixti et al., 2013; Lavery, 2010).

Methods

Design, Sample, and Setting

A CPG will be designed and evaluated to reduce the occurrence of corneal abrasions during general anesthesia for patients receiving non-ocular surgery (see Appendix B). This evaluation will take place in a large, academic medical center on the East Coast. The sample will vary for each of the three stages of this project. The first sample will consist of the two SRNAs designing the CPG and two volunteer key stakeholders, one CRNA and one MDA. The second sample will be volunteers from approximately 72 anesthesia staff members in the perioperative setting including CRNAs, SRNAs, and MDAs. The third sample will include the Chief Administrator and Administrators.

Procedures

The first stage of the project will begin with the recruitment of two volunteer key stakeholders to work with two DNP student project leaders as a small team to play an active role in the development of the CPG. In the first month of this project, the team will begin developing the CPG in 3-4 one-hour meetings that will be held biweekly. During the first meeting, the team member expectations, time commitments, and schedule will be explained. All meetings and discussions will remain confidential. The projects leaders will explain that the products used in the CPG are already purchased by the hospital, are readily available, and have no additional ordering or approval requirements. The team members will be provided with the necessary documents including physical copies of the preliminary draft of the CPG developed by the student project leaders, the Agree II Tool, and key evidence providing support behind CPG

(AGREE Next Steps Consortium, 2009). The expectations and utilization of the Agree II Tool will be clarified. At subsequent meetings, the key stakeholders will bring forward the results from the Agree II tool and feedback for the CPG. Based on this informatioin, amendments will be made to the CPG.

In the second month of the project, the perioperative anesthesia staff will be asked to appraise the CPG guideline using the Practitioner Feedback Questionnaire and to provide recommendations (see Appendix C). This stage will begin with the presenting the draft of the CPG and the Practitioner Feedback Questionnaire to the staff at a Thursday morning Staff Meeting. The team members will deliver a PowerPoint presentation discussing the background of perioperative corneal abrasions, the literature review examining prevention modalities, the current corneal abrasion prevention policy, barriers for implementation, improvement strategies, and the Practitioner Feedback Survey. The floor will be open to questions regarding the information discussed. All questions will be answered. A link for a SurveyMonkey containing the Demographic Survey and Practitioners Feedback Survey and a copy of the CPG will sent electronically by a third party to all Anesthesia Staff including SRNAs, CRNAs, and MDAs. The surveys were created so respondents remained anonymous. The survey will remain open for 2 weeks to allow staff members adequate time for its completion. An e-mail will be sent by a third party to remind the staff to complete the survey one week before it was closed. For full participation, two to three weeks will be given for participants to analyze and complete the tool.

Data and feedback is collected from the questionnaire and will be used to make amendments to the CPG. A meeting with the team of key stakeholders will be held to discuss the findings of the survey and to make additional final changes. The final draft of the CPG will

be sent to the Chief Administrator and Administrators to obtain their feedback with in the next two weeks.

Data Collections

In the first stage of the project, the Agree II tool will be used to collect data. The Agree II Tool is a generic tool designed to evaluate the methodological rigor and transparency in the development of a guideline including original versions and updated existing guidelines (AGREE Next Steps Consortium, 2009). The tool consists of 23 key items organized within 6 unique domains followed by 2 overall assessment items. Each of the domains captures an exclusive feature of guideline quality. All items are rated on a 7-point Likert Scale with 1= "strongly disagree to 7= "strongly agree". The score is assigned depending on the completeness and quality of reporting. This tool has face, construct, and criterion validity (Terrace, 2003). The instrument was established using at least two appraisers and preferably four because this will increase the reliability of the assessment. Reliability tests of this instrument are on going.

The second stage of the project collects data using the Practitioner Feedback Questionnaire (see Appendix C). This tool was developed to evaluate four variables: quality of the practice guideline and rigor of its development, acceptability of the recommendations, implementability and applicability of the recommendations, and comparative value of the recommendations relative to current practice (Brouwers, Graham, Hanna, Cameron, & Browman, 2004). The instrument consists of 23 items. One item, clinicians are asked to indicate if the guideline was relevant to their clinical practices by marking yes, no, or unsure. The remainder of the items is rated using a 3-point Likert Scale with the options ranging from "strongly agree" to "strongly disagree". A separate section at the beginning of Practitioners Feedback Questionnaire will ask a few basic demographic questions to aid in describing the

sample (see Appendix D). Content validity of the survey yielded 60% of the variance due to the four variables. The reliability for the tool was reported using Cronbach's alpha coefficient ranging from 0.75 (comparative value factor; restricted sample) to 0.85 (quality factor).

Data Analysis

Data from the Agree II tool can be analyzed by calculating an independent quality score for each of the six domains. These scores should not be aggregated into a single quality score. Domain scores are calculated by summing up all scores of the individual items in a domain and by scaling the total as a percentage of the maximum possible score for that particular domain. Since the Agree II tool and the Practitioner Feedback Questionnaire obtain ordinal data, data can be analyzed using frequency counts, percentages, and simple statistics including minimum, maximum, mean, median, and standard deviation. Demographic information can also be analyzed using simple statistics. Potential correlational statistics based on number of survey respondents could be calculated.

Methods to Protect Human Rights and Permissions

Measures that will be taken to protect human rights include that no specific identifiers will be included in the surveys, email addresses will not be requested, the survey will be sent out by a third party, and IP addresses will not be tracked with online surveying. The proposal will be submitted to the University to Maryland Baltimore (UMB) Institutional Review Board (IRB) for a Non Human Subjects Research (NHSR) determination. The proposal will also be submitted to the IRB of the organization at which the project will be implemented (see Appendix E).

Results and Discussion

Data from the AGREE II was analyzed. The four respondents included one MDA, one CRNA, and two SRNAs. According to the AGREE II scoring, only percentages from domain

scores can be calculated, not one summary percentage. The domains are independent of each other. The domains with the highest overall percentages were domain four and six.

The first domain, scope and purpose, had an overall score of 87.5%. Item 3 was the lowest scoring and members of the team decided to incorporate more specific language in the CPG to clarify the patient population to which the CPG applies. The second domain, stakeholder involvement, had an overall score of 83.3% and was the lowest scoring domain. The only item with consistently lower scores was item 5, which evaluates the extent of input from the target population. There was a discrepancy within this item, because the CRNA gave the highest positive rating for this item. When discussed further, the rationale was clear and tied into the theory of Keeping Vigil over the Patient. The concept of ocular management occurs at the discretion and best judgment of the anesthesia provider and the patient is unable to make these decisions, which under anesthesia. Even though ocular management is discussed during informed consent preoperatively, the provider has an overriding obligation to act according to the best evidence in ocular management.

The third domain, rigour of development, has an overall score of 97.8%. No items in this category scored low and collectively, the team members agreed the evidence created a strong defense for the CPG. The fourth domain, clarity of presentation, had an overall score of 100% and confirms the information in the CPG is logical and comprehensible. The fifth domain, applicability, had an overall score of 86.5%. The MDA scored item 21 low, which created a subtle discrepancy. When discussed, the reason for the low score was not reflective of the guideline, but more so recognizing that the CPG is a prevention tool and not primarily an auditing tool. No recommendations were made to add additional methods of monitoring or

auditing at this time. The sixth domain, editorial independence, had an overall score of 100%. No additional recommendations were made in this domain for revising the CPG.

The members of the team were consulted regarding the results of the AGREE II Instrument. The consensus was that with a few minor revisions, the CPG for ocular management was high quality. The results of Table 1 show that the CPG should be recommended for use.

Demographic data was collected with the Practitioner Feedback Questionnaire (PFQ) that was distributed to the anesthesia providers. The results show feedback on amendments and the implementation of a CPG for corneal abrasion prevention during non-ocular surgery. Using Excel, percentages were calculated based on respondent's replies. Table 2 summarizes demographic characteristics of the sample of anesthesia providers at the hospital of focus. The sample consisted of 19 anesthesia providers with all 19 answering each demographic question. Ages ranged from 30-59 with the majority of respondent's ages ranging from 30-39 years old (53%). The majority of the subjects were female (63%). Most respondents were CRNAs (53%), followed by MDAs (26%), and finally by SRNAs (21%). Experience ranged from less than a year to 20 years. The majority of respondents had less than 2 years of experience (37%), followed by respondents with 6-10 years of experience (26%). Due to this survey containing answers in ranges, other descriptive statistics were unable to be extrapolated. Ranges were utilized and more extensive demographic data collection was limited in efforts to protect anonymity of respondents.

Data was also collected and analyzed specifically from the PFQ. Table 3 shows the results. For scoring purposes, the questions were separated by those with reverse scoring for the negative items. On these four items, 17 respondents answered the questions. However, on the other items, only 15 respondents answered the questions. Data was omitted for item one, which

had 100% response rate and was a nominal question that could not be calculated in the statistical analysis. The four items with a mean score less than two include items 10, 13, 14, and 15 at 1.41, 1.65, 1.29, and 1.29, respectively. Item 10 states the draft CPG is too rigid to apply to individual patients. This result is not consistent with the purpose of the CPG, which is to expand the possible ocular protection strategies, which would give providers more options that are based on evidence. Item 13 describes the need for reorganization of services and staff in the practice setting if the CPG is approved. This has already been addressed and the anesthesia technicians will have the responsibility of stocking appropriate supplies in every operating room. The most concerning item is statement 14, stating that the application of the draft guideline may be technically challenging. The assessment of enablers and barriers also determined this to be an area of concern paralleling the results of the PFQ for this statement. This has been addressed by utilizing the feedback received from the PFQ and AGREE II tool to adapt the policy to one that would be most accepted by the staff for their most compliant utilization and application, while adhering to the current evidence. Follow-up and assessment will provide us with definitive information regarding the guideline's application and amendments can be made based on this information. Item 15 states that the CPG recommendations are too expensive to apply. No further budget expansions would be needed for the implementation of this guideline. All items that the CPG requires are already purchased and budgeted for at par levels that are sufficient to implement the guideline without further cost.

The three items that scored the highest means are seven, 11, and 12 all scoring a mean of 2.87, and median of 3 (SD= 0.34). Item seven states that the draft recommendations in this report are clear. This affirms the wording and instructions of the draft are clearly understood by the majority (87%). Stating that when applied, the draft recommendations will produce more

benefits for patients than harm, the results from item 11 support that the majority of the responders (87%) think that this protocol will improve patient care and the benefits outweigh the risks. Item 12 states that the draft guidelines present options that will be acceptable. Though the lowest scoring item states that application of the draft guideline may be technically challenging, the majority (87%) of the respondent's feel that there are acceptable options. The team is hopeful that the options will be acceptable enough to overcome the technicalities and barriers of applying the guideline. In addition, the majority of respondent's (mean=2.8, median=3, SD=0.4) answered that they thought the rationale for developing a guideline is clear (80%) and that there was a need for a guideline on this topic (87%). The results of Table 3 support the implementation of the guideline for corneal abrasion prevention for nonocular surgery and that it will be supported by the majority of the anesthesia staff.

Assessment of Implementation

The cultural context will determine the evidence used to formulate the CPG into practice at a specific facility. Utilizing the Context Assessment Index (CAI) instrument in order to adapt the implementation process of this evidence based scholarly project assessed the barriers and enablers present in the culture of the anesthesia department. The goal of the CAI is to allow assessment of the context of which care is provided in a clinical area of interest. This tool allows the assessor to ensure there is person-centered practice based on three elements including culture, leadership, and evaluation (McCormack, McCarthy, Wright, & Coffey, 2009). These elements are essential to producing meaningful and sustained change in a culture.

The CAI instrument is completed by an individual and is designed to assess and predict whether the environment of the organization is receptive to development and change. The tool consists of 37 items measuring five domains, which include collaborative practice, evidence

informed practice, respect for persons, practice boundaries, and evaluation. All items are rated on a 4-point Likert Scale. These domains are collapsed into culture, leadership, and evaluation for scoring. Scores are then plotted along a continuum from weak to strong for each of the three-targeted elements. Then, an overall individual score is determined to identify characteristics of the culture that can enhance or hinder the receptiveness in the implementation of the CPG. Based on the results from the CAI, areas are identified for development.

McCormack et al (2009) assessed the usability, utility, validity, reliability, and psychometric properties of the CAI tool and aided in its amendment. The tool was found to have excellent usability, most participants provided feedback that though the tool was repetitive it was easy to understand. Feedback from focus groups indicated that is tool has practical utility. Face and content validity were tested and the tool was adapted to make the terminology clearer, less ambiguous, and better structured. The CAI has internal reliability reported using Chronbach's alpha achieving an estimated score of 0.93 for the complete questionnaire and the five factors achieving a satisfactory level of internal consistency in scores ranging from 0.78 to 0.91. Reliability is also demonstrated in the findings of the test-retest scores.

After completing the CAI tool, assessing culture of this organization, see Appendix F, results were computed as percentages graphed on a continuum for each element and as an overall total, see Appendix G. The leadership element scored the lowest at 64.3%, then culture at 68.8%, with evaluation scoring the highest at 69.4 % with an overall average of 67.5%. The results from the CAI were used to identify areas for development and then these were built upon with reflective questions, where weak and strong characteristics were determined, see Appendix H. According to the results of the CAI tool, the key barriers of this organization that must be addressed include the culture is not receptive to change, the leadership includes autocratic

decision making processes, and evaluations rely on single rather than multiple methods. Facilitators include that the culture promotes learning and leadership enables effective teamwork.

Barriers and Enablers

Barriers will lead to implementation failure if not identified and addressed. According to the CAI tool, the key barriers of this organization include the providers are not receptive to change, an autocratic process makes leadership decisions, and evaluation techniques rely on a single method rather than multiple methods. An organization that is resistant to change will lead to a failure of CPG implementation if not addressed. Hughes (2011) discovered about 70% of changes in all organizations fail. Resistance to change is an action taken by practitioners because there is a misunderstanding regarding the need for change, lack of competence, feeling connected to the old way, that change is a temporary fad, poor communication, changes their routine, change in the status quo, and that the benefits do not outweigh the rewards (Rick, 2016). Organizations have overcome resistance to change by following six methods; the two that are applicable are education and communication, and participation and involvement (Schermerhorn, Hunt, and Osborn, 2005). These can be utilized to overcome the resistance to change.

The leadership within the anesthesia department has autocratic qualities causing an oppressive workplace atmosphere where the employees feel they are assigned tasks and leaves no consideration for relative strengths and inputs of the individual. This barrier can have negative effects on compliance and business. Other autocratic led organizations have employees who demonstrate stubbornness, poor performance, and low morale. Successful organizations have adopted a transformational leadership approach to successfully ameliorate this barrier (Bass, & Riggio, 2006). Transformational leadership is an approach that aids in developing

followers into leaders who create positive and valuable change. By introducing transformational leadership into this department, the barriers of autocratic leadership could be overcome.

The anesthesia department utilizes a single evaluation approach rather than from multiple sources. They use hard, quantitative data as forms of assessment. Qualitative measures are not taken into consideration on appraisal of outcomes. Corneal abrasions may not produce quantifiably data, but subjective, qualitative data of pain and discomfort (Grixti et al., 2013). Multifaceted quality measurements in health care are a necessary step in improving health care quality (Morris and Bailey, 2014). This can aid in ameliorating other barriers such as resistance to change. When providers have an understanding of several aspects as to why a change needs to occur, they will be more likely to conform to the change (Washington and Hacker, 2005).

Despite finding barriers, there are significant enablers in each element. Facilitators include the culture promotes learning and leadership enables effective teamwork. Every Thursday morning the anesthesia department holds a mandatory "grand rounds," where topics of interest or areas that need improvement are presented to further educate the department. A learning culture is essential in organizational change for health promotion and a key leverage point to derive change (Heward, Hutchins, & Keleher, 2007). Education and training are essential for practitioners to comprehend and adapt to change (Boundless, 2016). Leverage to conduce a change can be achieved in by teaching the practitioners the significance of the perioperative corneal abrasion problem and evidence based solutions to ameliorate it.

Successful communication and teamwork is vital for the delivery of quality patient care (Leonard, Graham, & Bonacum, 2004). Despite autocratic leadership, teamwork within the anesthesia department remains. Each member of the anesthesia team works in synchrony to provide the best care. Team members can work separately and together to achieve success in

their tasks, which serve in promoting overall welfare and success (Smith, 2016). Once buy-in from the team is obtained to implement change, they can update stakeholders on strategy evolution and provide recommendations and resolutions (Smith, 2016). Leverage can be achieved once buy-in is obtained by providing proper education. The team can play an important part in identifying unforeseen barriers and encouraging other members to conform change.

Summary

Perioperative corneal abrasions are a significant problem and an evidence based CPG must be implemented to reduce their incidence. Knowledge translation on perioperative ocular management must be adapted to the local context (Straus, Tetroe, & Graham, 2013). When implementing the CPG on ocular management, the culture of the organization must be assessed for barriers and enablers so the execution can be tailored appropriately. The CAI intertwines culture, leadership, and evaluation for a comprehensive assessment of the context for change. A CPG was developed based on an inclusive review of available current evidence. A team of stakeholders, utilizing the AGREE II Instrument, appraised this guideline and based on feedback the CPG was amended. After presenting evidence supporting the developed CPG, the anesthesia staff at the hospital of focus appraised and provided feedback on the CPG utilizing the PFQ. The CPG was finalized incorporating all feedback, barriers, and enablers to ensure the best success of CPG implementation.

Future Plans

Future plans include audits of the anesthesia record by a task force as a means of increasing compliance and accountability. Also, the task force can pilot the practice change with a select division of surgery and perform pre-pilot and post-pilot data collection. The task force can collaborate on evaluation with the Performance Improvement and Risk Management

Coordinator. Data collection and accountability would be beneficial if the following was included: quality reports, patient satisfaction surveys, and chart audits of the anesthesia record. Outcomes data should then be disseminated to all anesthesia staff on a consistent, recurring basis. Due to ever changing dynamics of the anesthesia staff, including significant turn over, barriers and enablers must also be reevaluated for further education and adaptation to the CPG.

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Table 1

AGREE II Scoring

Domain 1. Scope and Purpose				
	Item 1	Item 2	Item 3	Total
MDA[a]	7	7	4	18
CRNA[b]	7	7	5	19
SRNA[c] 1	7	7	5	19
SRNA 2	7	7	5	19
Total	28	28	19	75

Domain 1. Score = 87.5%

Domain 2. Stakeholder Involvement				
	Item 4	Item 5	Item 6	Total
MDA	6	5	7	18
CRNA	7	7	7	21
SRNA 1	7	2	7	16
SRNA 2	7	3	7	17
Total	27	22	28	72

Domain 2. Score = 83.3%

Domain 3. Rigour of Development									
	Item 7	Item 8	Item 9	Item 10	Item 11	Item 12	Item 13	Item 14	Total
MDA	7	6	7	6	6	7	6	7	52
CRNA	7	7	7	7	7	7	7	7	56
SRNA 1	7	7	7	7	5	7	7	7	54
SRNA 2	7	7	7	7	6	7	7	7	55

Total	28	27	28	27	24	28	27	28	217

Domain 3. Score = 97.8%

Domain 4. Clarity of Presentation				
	Item 15	Item 16	Item 17	Total
MDA	7	7	7	21
CRNA	7	7	7	21
SRNA 1	7	7	7	21
SRNA 2	7	7	7	21
Total	28	28	28	84

Domain 4. Score = 100%

Domain 5. Applicability					
	Item 18	Item 19	Item 20	Item 21	Total
MDA	6	7	7	3	23
CRNA	7	7	7	7	28
SRNA 1	5	7	7	5	24
SRNA 2	6	7	7	4	24
Total	24	28	28	19	99

Domain 5. Applicability = 86.5%

Domain 6. Editorial Independence			
	Item 22	Item 23	Total
MDA	7	7	14
CRNA	7	7	14
SRNA 1	7	7	14

SRNA 2	7	7	14
Total	28	28	56

Domain 6. Score = 100%

Note. [a]MDA=Anesthesiologist. [b]CNRA= Certified Registered Nurse Anesthetist. [c]SRNA= Student Registered Nurse Anesthetist

Table 2

Demographic Data from Practitioner Feedback Questionnaire (n=19)

	n	%
Age (years)	19	
30-39	10	52.6
40-49	4	29.0
50-59	5	26.3
Gender	19	
Male	7	36.8
Female	12	63.2
Title	19	
Anesthesiologist	5	26.3
CRNA	10	52.6
SRNA	4	21.1
Years of Experience	19	
Less than or equal to 2	7	36.8
3-5	2	10.5
6-10	5	26.3
11-15	1	5.3
16-20	3	15.8
Greater than 20	1	5.3

Table 3

Practitioner Feedback Questionnaire Results (n=17)

	n	Minimum	Maximum	Median	Mean	Standard Deviation	Strongly Disagree (%)	Neither Agree /Disagree (%)	Strongly Agree (%)
2.	15	2.00	3.00	3.00	2.80	0.40	0.00	20.00	80.00
3.	15	1.00	3.00	3.00	2.80	0.54	6.67	6.67	86.67
4.	15	2.00	3.00	3.00	2.67	0.47	0.00	33.33	66.67
5.	15	2.00	3.00	3.00	2.73	0.44	0.00	26.67	73.33
6.	15	2.00	3.00	3.00	2.67	0.47	0.00	33.33	66.67
7.	15	2.00	3.00	3.00	2.87	0.34	0.00	13.33	86.67
8.	15	1.00	3.00	3.00	2.60	0.61	6.67	26.67	66.67
9.	15	1.00	3.00	3.00	2.67	0.60	6.67	20.00	73.33
10.	17	1.00	3.00	1.00	1.41	0.69	70.59	17.65	11.76
11.	15	2.00	3.00	3.00	2.87	0.34	0.00	13.33	86.67
12.	15	2.00	3.00	3.00	2.87	0.34	0.00	13.33	86.67
13.	17	1.00	3.00	1.00	1.65	0.76	52.94	29.41	17.65
14.	17	1.00	3.00	1.00	1.29	0.57	76.47	17.65	5.88
15.	17	1.00	3.00	1.00	1.29	0.57	76.47	17.65	5.88
16.	15	1.00	3.00	3.00	2.60	0.71	13.33	13.33	73.33
17.	15	2.00	3.00	3.00	2.53	0.50	0.00	46.67	53.33
18.	15	1.00	3.00	3.00	2.53	0.62	6.67	33.33	60.00
19.	15	2.00	3.00	3.00	2.60	0.49	0.00	40.00	60.00
20.	15	2.00	3.00	3.00	2.73	0.44	0.00	26.67	73.33
21.	15	1.00	3.00	3.00	2.60	0.61	6.67	26.67	66.67
22.	15	2.00	3.00	3.00	2.67	0.47	0.00	33.33	66.67
23.	15	1.00	3.00	3.00	2.67	0.60	6.67	20.00	73.33

Note. Item numbers correspond to item numbers from Practitioner Feedback Questionnaire. Data omitted for item number one, which had a 100% response of “yes” (n=17).

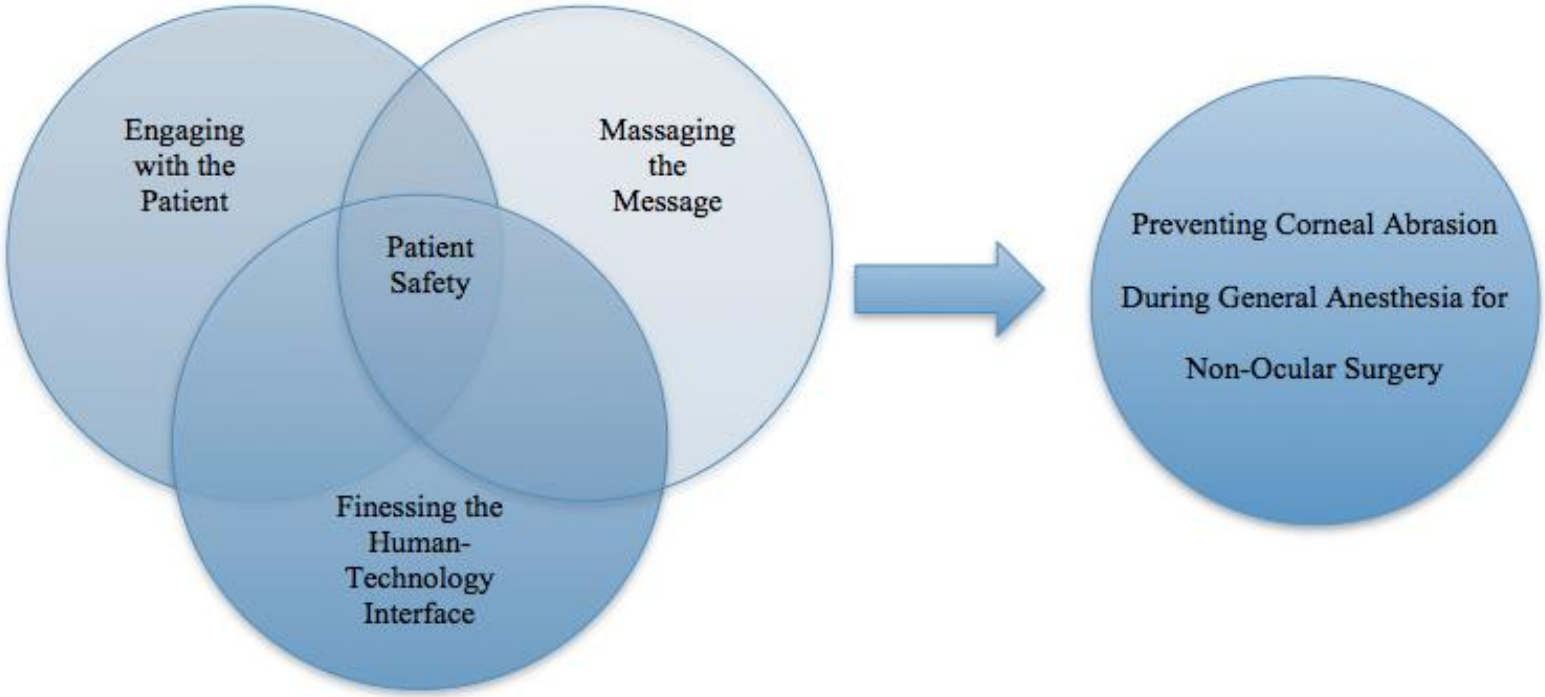


Figure 1. Model for Keeping the Vigil over the Patient Addressing the Prevention of Corneal Abrasions

Appendix A

Literature Review for Methods to Prevent Perioperative Corneal Abrasions

Author, year	Study objective/intervention or exposures compared	Design	Sample (N)	Outcomes studied (how measured)	Results	*Level and Quality Rating
Anderson et al., 1995	To synthesize the literature and discuss the etiology of ocular injury during GA[a] for oral and maxillofacial surgeries with various ocular protection strategies.	Expert Opinion	Not Applicable.	Recommendations on ocular protection strategies based on the etiology of corneal injury from evidence-based research.	Protective goggles are optimal to prevent against direct eye trauma, but do not prevent corneal drying, which is another major risk for corneal abrasion. Incorrect placement of the goggles may increase the intraocular pressure and the risk for other ocular injuries, including postoperative visual loss.	7 B
Danic et al., 2007	To evaluate the anesthetic management for inauguration of Robotic Prostatectomy (RP) at a single institution.	Retrospective Review	A consecutive schedule of adult male patients at a single institution for elective RP in steep trendelenburg under GA was reviewed (N = 1500).	Documentation of corneal abrasion in the medical record.	Corneal abrasions were the most common anesthesia-related complication at 3% of the cases and eyelid tape was used. A change in practice to the use of eye patches has decreased the incidence to 1%.	5 B
Gainsburg et al., 2010	To demonstrate the safety and efficacy of RP compared to open radical retropubic prostatectomy in	Retrospective Study	A urology surgery database was used to gather data on open radical retropubic prostatectomy	Documentation of corneal abrasion in the medical record.	For RPs, corneal abrasions occurred in multiple patients (quantity unspecified) with eyelid taping, but after a change	4 C

Author, year	Study objective/intervention or exposures compared	Design	Sample (N)	Outcomes studied (how measured)	Results	*Level and Quality Rating
	terms of postoperative complications.		patients (N = 106) from 2002 to 2007 and RP patients (N = 575) from 2007 to 2008. Baseline demographic data was matched between the two groups.		in ocular management to use of a transparent occlusive dressing, the incidence was zero. Statistical significance was not reported.	
Ganidagli et al., 2004	To compare four eye protection methods including hypoallergenic tape, paraffin-based ointment, polyacrylic acid liquid gel, and artificial tears for corneal abrasion prevention during GA for elective, non-ophthalmic surgery.	Single-Blinded, Randomized Controlled Trial (RCT)	Adult patients classified at ASA I-II[b] for elective non-ophthalmic surgery under GA (N = 200) were divided into the following four groups: hypoallergenic tape (N=50), paraffin-based ointment (N=50), polyacrylic acid liquid gel (N=50), and artificial tears (N=50). A standardized anesthesia technique was used.	Cornea and conjunctiva were assessed with pre- and postoperative fluorescein staining (12 and 24 hours after surgery) by an ophthalmologist blinded to the protection methods.	The group protected with polyacrylic acid liquid gel had a higher incidence of corneal abrasions and hyperaemia both 12 and 24 hours postoperatively, but it was not statistically significant. All four methods of ocular protection had similar rates and severity of corneal abrasion.	3 B
Grixti et al., 2013	To review various ocular protective	Integrated literature	Initially 107 articles were selected and	The outcome measured across	In five RCTs, taping alone was superior or equivalent	4 A

Author, year	Study objective/intervention or exposures compared	Design	Sample (N)	Outcomes studied (how measured)	Results	*Level and Quality Rating
	strategies across studies to identify the best method of preventing corneal abrasion during GA.	review of eight RCTs and one Historical Controlled Study	reviewed. Etiology and prevention of corneal abrasion perioperatively, higher level of evidence, and elective nonophthalmic surgery were inclusion criteria. After exclusions, the literature from eight RCTs and one Historical Controlled Study were reviewed. Sample sizes varied across studies.	studies was the incidence of corneal abrasion, but various methods of ocular protection were implemented causing heterogeneity and inability to perform meta-analysis of the results. Corneal abrasions were measured by various methods across studies including fluorescein staining.	to other methods of corneal abrasion prevention. In the Historical Controlled Study, a sterile, transparent dressing (i.e., Tegaderm) was superior to ocular ointment and eyelid taping in corneal abrasion prevention.	
Grover et al., 1998	To compare the efficacy of eye ointment versus adhesive tape for eye protection during elective, non-ophthalmic surgery with GA.	RCT	Adult patients classified as ASA I-II undergoing non-ophthalmic surgery greater than 90 minutes (N=150) were randomly divided into three groups: control group	Visual acuity with the Snellen chart, the Schirmer-1 test for basal tear production, a cornea examination, and fluorescein staining were	Compared to the preoperative values, the postoperative basal tear production had a statistically significant decrease ($p < 0.0001$). The greatest decrease in basal tear production was in the unprotected eyes, followed	2 A

Author, year	Study objective/intervention or exposures compared	Design	Sample (N)	Outcomes studied (how measured)	Results	*Level and Quality Rating
			with no eye protection (N=50), hypoallergenic tape (N=50), and chloromycetin ointment (N=50).	assessed before surgery and one hour after surgery.	by tape then ointment ($p < 0.0008$). Postoperatively, there were 30 corneal epithelial defects, meaning an overall incidence of 10%, of which 90% occurred in the control group, 6.6% in the hypoallergenic tape group, and 3.3% in the chloromycetin ointment group. Whether the difference between tape and ointment was statistically significant was not mentioned. When relating the corneal defects to surgical positioning, 24 were supine and six were lateral. All six corneal defects in the lateral position were in the dependent eye. During GA, eye protection with either tape or ointment is necessary.	
Kocatürk et al., 2012	To compare the efficacy of four eye protection methods	RCT	Adult patients classified as ASA I undergoing spinal	An ophthalmologist blinded to the	Compared to the preoperative values, the postoperative basal tear	2 A

Author, year	Study objective/intervention or exposures compared	Design	Sample (N)	Outcomes studied (how measured)	Results	*Level and Quality Rating
	including hypoallergen tape, antibiotic ointment, polyacrylic acid liquid gel, and ocular lubricant pomade for preventing corneal abrasion during GA in the prone position.		surgery greater than 90 minutes in the prone position (N=184) were randomly divided into four groups: hypoallergen tape (N=46), antibiotic ointment (N=46), polyacrylic acid liquid gel (N=46), and ocular lubricant pomade (N=46). Patients were matched on sex, weight, age, and duration of anesthesia. A standardized anesthesia technique was used.	protection methods assessed visual acuity and the cornea and conjunctiva with fluorescein and Rose-Bengal staining and Schirmer-1 test. Testing was done one day preoperatively and then 12 and 24 hours postoperatively. The corneal injury was scored based on the intensity of the staining. Postoperatively the patient was evaluated by a questionnaire of potential symptoms of ocular injury.	production had a statistically significant decrease for all four groups ($p < 0.001$) and the maximum decrease was the hypoallergen tape group, although not statistically significant. Visual acuity did not change postoperatively. Postoperatively, there were 47 corneal epithelial defects, which is 12.77% overall incidence. Divided by protection method, the incidence was 2.72% in the hypoallergen tape group, 2.72% in the antibiotic ointment group, 5.16% in the polyacrylic acid liquid gel group, and 2.17% in the ocular lubricant pomade group. The polyacrylic acid liquid gel group had a statistically significant higher frequency of moderate to severe conjunctival hyperemia ($p < 0.05$) and	

Author, year	Study objective/intervention or exposures compared	Design	Sample (N)	Outcomes studied (how measured)	Results	*Level and Quality Rating
					the highest scores of corneal lesion.	
Lavery et al., 2010	To compare the incidence of corneal abrasion during RP in steep trendelenburg with a standardized eye protection of tape and ocular lubricant versus a sterile, transparent dressing (i.e., Tegaderm) without ocular lubricant.	Historical Controlled Study	At a single institution by a single surgeon intraoperative application of tape and ocular lubricant were used for the first group (N=214) and then a sterile, transparent dressing (i.e., Tegaderm) was used for the second group (N=814).	Suspected corneal abrasions were examined by an ophthalmologist and confirmed with postoperative fluorescein staining.	The incidence of corneal abrasion in the first group was 2.3% (N=5), but zero in the second group. The difference was statistically significant ($p < 0.001$). A sterile, transparent dressing (i.e., Tegaderm) was more effective in reducing the incidence of corneal abrasion during GA for RPs in steep trendelenburg.	4 A
White & David, 2010	To evaluate the advantages and disadvantages of various eye protection strategies to prevent corneal abrasion and postoperative visual loss in relation to ocular physiology.	Expert Opinion	Not applicable.	Corneal abrasion and postoperative visual loss were examined in context of physiology and etiology from evidence-based research.	Corneal abrasion is the most common eye injury during GA. The most frequent etiology is exposure keratopathy, chemical injury, or direct trauma. Tarsorrhaphy is a method of eye protection during GA that introduces increased risk for eye injury by direct trauma or increased intraocular pressure that can result in postoperative visual loss.	7 A

Author, year	Study objective/intervention or exposures compared	Design	Sample (N)	Outcomes studied (how measured)	Results	*Level and Quality Rating
Yu et al., 2010	To examine the incidence perioperative eye injuries and related risk factors.	Retrospective Study	All patients who received anesthesia for nonocular surgeries at Chang Gung Memorial Hospital from 2006 to 2008 were included in the study (N = 75,120). Primarily eyelid taping without ocular ointment was the method used. Tegaderm was used for prolonged surgeries, prone and lateral positioning, or head and neck surgeries.	Based on initial postoperative assessments and a preformed questionnaire completed by each patient the day after surgery. Any suspected eye injury was recorded in the quality assurance database.	Out of the total 24 eyes that were injured, corneal abrasion was the most common eye injury (N = 10). Tailoring the eye prevention strategy based on risk factors is effective for decreasing the risk of perioperative corneal abrasion. No statistical analysis was provided comparing risk and incidence between the different interventions.	4 C

Note. Rating System for the hierarchy of evidence (Melnyk & Fineout-Overholt, 2011):

I(1). Evidence from systematic review, meta-analysis of all relevant randomized controlled trials (RTC's), or practice-guidelines based on systematic review of RCT's
II(2). Evidence obtained from well-designed RCT
III(3). Evidence obtained from well-designed controlled trials with out randomization
IV(4). Evidence from well-designed case-control and cohort studies
V(5). Evidence from systematic reviews of descriptive and qualitative studies
VI(6). Evidence from a single descriptive or qualitative study
VII(7) Evidence from the opinion of authorities and/or repots of expert committees

Quality Rating Scheme (Newhouse et al, 2007):

A: High – consistent results with sufficient sample, adequate control, and definitive conclusions; consistent recommendations based on extensive literature review that includes thoughtful reference to scientific literature

B: Good – reasonably consistent results; sufficient sample, some control, with fairly definitive conclusions; reasonably consistent recommendations based on fairly comprehensive literature review that includes some reference to scientific evidence

C: Low/major flaw – Little evidence with inconsistent results; insufficient sample size; conclusions cannot be drawn

Appendix B

Clinical Practice Guideline for Ocular Management During General Anesthesia

Overview: Corneal abrasion is the most common type of intraoperative ocular injury under general anesthesia for nonocular surgery. The incidence of corneal abrasion can be decreased by intraoperative ocular protection. Corneal abrasions account for approximately 3-8% of anesthesia-related malpractice claims.

Purpose: Develop a Clinical Practice Guideline (CPG) based on an exhaustive and systematic review of the evidence on ocular management and protection during general anesthesia.

Target Users: All anesthesia providers in any perioperative setting providing general anesthesia to patients for nonocular surgery. Collaboration among the care team is essential to timely implementation of ocular protection during general anesthesia.

Common Antecedents: Patients will be screened by the Anesthesia Care Team for ophthalmology risk factors. Patients will be asked about potential risk factors which increase the risk of corneal abrasion.

1. Positioning:
    - Prone
    - Trendelenburg
    - Lateral
2. Comorbidities:
    - Grave's Disease
    - Hypertension
    - Obesity
    - Smoking
    - Coronary Artery Disease
    - Diabetes
    - Sjogren-Larsson Syndrome
    - History of Prior/Recurrent Corneal Abrasion(s)
    - Dry Eyes
3. General Anesthesia:
    - Volatile Agents
    - Loss of Eyelash Reflex
    - Lagophthalmos
    - Bell's Phenomenon
4. Foreign Objects include, but are not limited, to the following:
    - Face Mask
    - Surgical Drapes
    - Long-Sleeve Jackets
    - Watches
    - Identification Badges
    - Stethoscopes

- Laryngoscopes
- Pulse Oximetry Probe

Evidence-Based Intraoperative Ocular Management for all patients undergoing general anesthesia for nonocular surgery:

I. Immediately after induction and prior to laryngoscopy, it is recommended Thera Tear Liquid gel drop(s) will be administered into the conjunctiva without contact of the dropper to both eyes.
II. Sequentially and prior to laryngoscopy, Bio-occlusive dressings (i.e., Tegaderm) or tape **MUST** be applied to both eyes. Ensure that the eye is taped from the upper to the lower eyelid and the eyelid is opposed completely, leaving no space for the exposure of the cornea.
III. For patients with high risk of eye pressure or trauma during surgery (i.e., prone patients) goggles are recommended after placing drops and taping eyes.
IV. For patients undergoing procedures with a high risk of eye swelling, like steep Trendelenburg position or fluid shifts, it is imperative that the eyes should be regularly checked for any compression and for complete opposition of eyelids.

Documentation:

I. All ocular management must be documented in the anesthesia record.
II. Documentation must indicate all interventions applied including Thera Tear Liquid gel drops, Tegaderm/tape, and goggles and that application was completed prior to laryngoscopy or rationale for the lack of use.

Appendix C

Practitioner Feedback Questionnaire

For each item, please check off the box that most adequately reflects your opinion.

1. Are you responsible for the care of patients for whom this draft guideline report is relevant? This may include the referral, diagnosis, treatment, or follow-up of patients.	Yes ☐	No ☐	Unsure ☐
If you answered "*No*" or "*Unsure*", there is no need to answer or return this questionnaire. If you answered "*Yes*", please answer the questions below and return to **[enter expected destination of surveys]**.			
	Strongly agree	Neither agree or disagree	Strongly disagree
2. The rationale for developing a guideline is clear.	☐	☐	☐
3. There is a need for a guideline on this topic.	☐	☐	☐
4. The literature search is relevant and complete (e.g., no key evidence was missed nor any included that should not have been) in this draft guideline.	☐	☐	☐
5. I agree with the methodology used to summarize the evidence included in this draft guideline.	☐	☐	☐
6. The results of the evidence described in this draft guideline are interpreted according to my understanding of the evidence.	☐	☐	☐
7. The draft recommendations in this report are clear.	☐	☐	☐
8. I agree with the draft recommendations as stated.	☐	☐	☐
9. The draft recommendations are suitable for the patients for whom they are intended.	☐	☐	☐
10. The draft recommendations are too rigid to apply to individual patients.	☐	☐	☐
11. When applied, the draft recommendations will produce more benefits for patients than harms.	☐	☐	☐
12. The draft guideline presents options that will be acceptable to patients.	☐	☐	☐
13. To apply the draft recommendations will require reorganization of services/care in my practice setting.	☐	☐	☐
14. To apply the draft guideline recommendations will be technically challenging.	☐	☐	☐
15. The draft guideline recommendations are too expensive to apply.	☐	☐	☐
16. The draft guideline recommendations are likely to be supported by a majority of my colleagues.	☐	☐	☐
17. If I follow the draft guideline recommendations, the expected effects on patient outcomes will be obvious.	☐	☐	☐
18. The draft guideline recommendations reflect a more effective approach for improving patient outcomes than is current usual practice. (If they are the same as current practice, please tick NA). *NA* ☐	☐	☐	☐
19. When applied, the draft guideline recommendations will result in better use of resources than current usual practice. (If they are the same as current practice, please tick NA). *NA* ☐	☐	☐	☐
20. I would feel comfortable if my patients received the care recommended in the draft guideline.	☐	☐	☐
21. This draft guideline should be approved as a practice guideline.	☐	☐	☐
22. If this draft guideline were to be approved as a practice guideline, I would use it in my own practice.	☐	☐	☐
23. If this draft guideline were to be approved as a practice guideline, I would apply the recommendations to my patients.	☐	☐	☐

Appendix D

Demographics Survey

Age:

< 30 _____

30-40 _____

40-50 _____

50-60 _____

>60 _____

Sex:

Female _____

Male _____

Title:

MDA _____

CRNA _____

SRNA _____

Years of Experience:

<5 _____

5-10 _____

10-15 _____

15-20 _____

20-25 _____

Appendix E

Timeline for Scholarly Project

- Submit Proposal to committee members by April, 2016.
- Present Proposal to committee members on May, 2016.
- Submit project proposal to UMB and hospital Institutional Review Boards (IRBs) by May, 2016.
- Implement project from June, 2016 to August, 2016.
- Analyze, synthesize and evaluate data by December, 2017.
- Submit final scholarly project manuscript to committee for review by January, 2017.
- Present final scholarly project report to Committee by February, 2017.

Appendix F

Context Assessment Index Evaluation (University of Ulster & University of College Cork, 2008)

The Context Assessment Index (CAI)

For each of the following statements, please put a cross in one box only.
A – Strongly agree; A – Agree; D – Disagree; SD – Strongly disagree
HCPs= Healthcare professionals

		SA	A	D	SD
01	Personal and professional boundaries between HCPs are maintained	☐	X	☐	☐
02	Decisions on care and management are clearly documented by all staff	☐	☐	X	☐
03	A proactive approach to care is taken	☐	X	☐	☐
04	All aspects of care/treatment are based on evidence of best practice	☐	X	☐	☐
05	The nurse leader acts as a role model of good practice	X	☐	☐	☐
06	HCPs provide opportunities for patients to participate in decisions about their own care	☐	X	☐	☐
07	Education is a priority	☐	X	☐	☐
08	There are good working relations between clinical and non-clinical staff	☐	X	☐	☐
09	Staff receive feedback on the outcomes of complaints	☐	X	☐	☐
10	HCPs in the MDT have equal authority in decision making	☐	☐	X	☐
11	Audit and/or research findings are used to develop practice	☐	X	☐	☐
12	A staff performance review process is in place which enables reflection on practice, goal setting and is regularly reviewed	☐	☐	X	☐
13	Staff have explicit understanding of their own attitudes and beliefs towards the provision of care	☐	☐	X	☐
14	Patients are encouraged to be active participants in their own care	☐	☐	X	☐
15	There is high regard for patients privacy and dignity	X	☐	☐	☐
16	HCPs and healthcare support workers understand each others role	☐	X	☐	☐
17	The management structure is democratic and inclusive	☐	X	☐	☐
18	Appropriate information (large written print, tapes, etc) is accessible to patients	☐	☐	X	☐
19	HCPs and patients work as partners providing individual patient care	☐	☐	X	☐

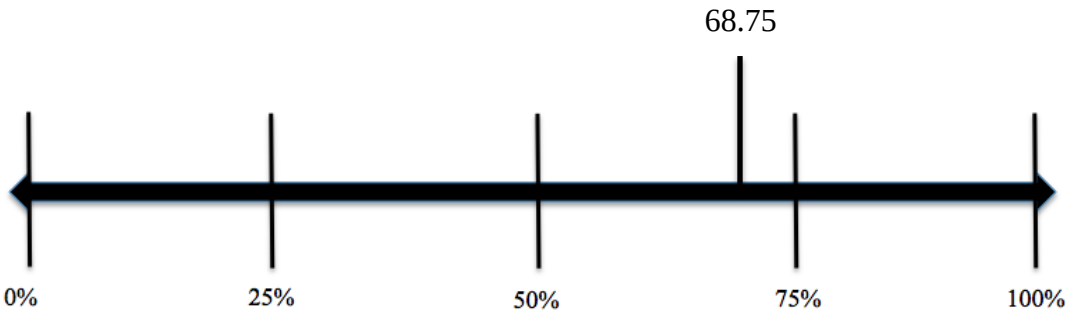
20	Care is based on comprehensive assessment	☐	☒	☐	☐
21	Challenges to practice are supported and encouraged by nurse leaders and nurse managers	☐	☒	☐	☐
22	Discussions are planned between HCPs and patients	☐	☐	☒	☐
23	The development of staff expertise is viewed as a priority by nurse leaders	☐	☒	☐	☐
24	Staff use reflective processes (e.g. action learning, clinical supervision or reflective diaries) to evaluate and develop practice	☐	☐	☒	☐
25	Organisational management has high regard for staff autonomy	☒	☐	☐	☐
26	Staff welcome and accept cultural diversity	☒	☐	☐	☐
27	Evidenced-based knowledge on care is available to staff	☐	☒	☐	☐
28	Patients have choice in assessing, planning and evaluating their care and treatment	☐	☒	☐	☐
29	HCPs have the opportunity to consult with specialists	☐	☒	☐	☐
30	HCPs feel empowered to develop practice	☐	☐	☒	☐
31	Clinical nurse leaders create an environment conducive to the development and sharing of ideas	☐	☐	☒	☐
32	Guidelines and protocols based on evidence of best practice (patient experience, clinical experience, research) are available	☐	☒	☐	☐
33	Patients are encouraged to participate in feedback on care, culture and systems	☐	☐	☒	☐
34	Resources are available to provide evidence-based care	☐	☒	☐	☐
35	The organisation is non-hierarchical	☐	☐	☐	☒
36	HCPs share common goals and objectives about patient care	☐	☒	☐	☐
37	Structured programmes of education are available to all HCPs	☐	☒	☐	☐

Appendix G

Interpretation of the CAI Results (University of Ulster & University of College Cork, 2008)

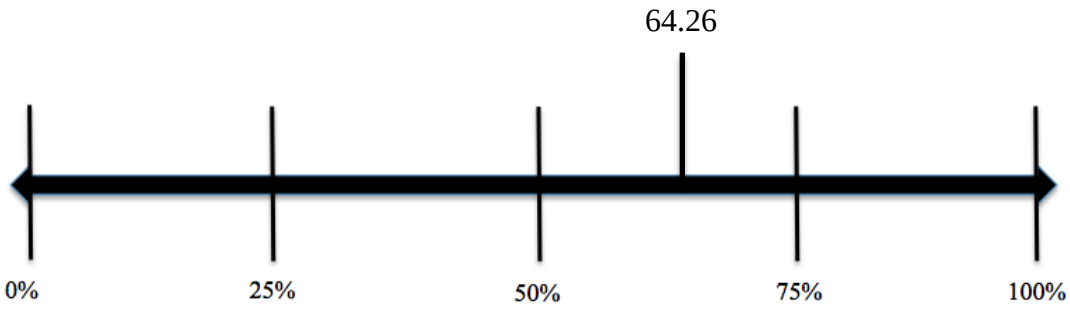
Culture

Statement Numbers	1	3	7	9	12	15	16	18	21	23	24	28	31	33	34	36	Total x 1.5625
Scores	3	3	3	3	2	4	3	2	3	3	2	3	2	2	3	3	68.75



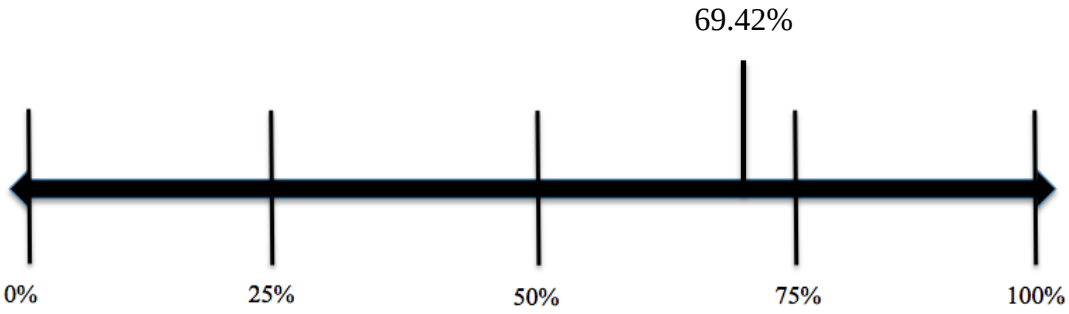
Leadership

Statement Numbers	2	6	10	17	22	27	29	Total x 3.57
Scores	2	3	2	3	2	3	3	64.26



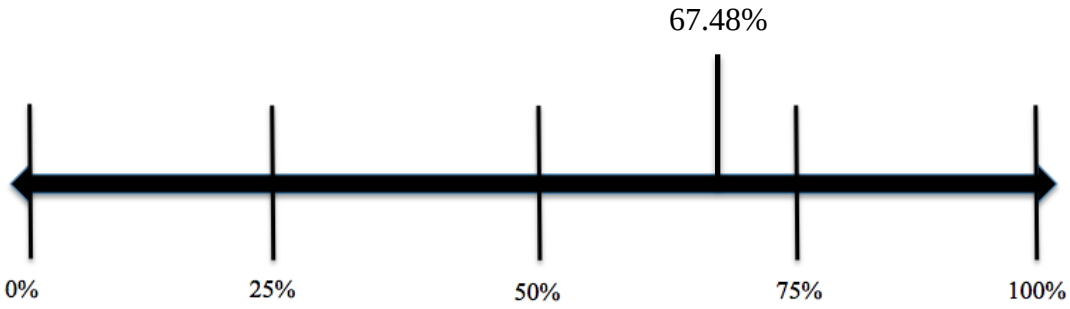
Evaluation

Statement Numbers	4	5	8	11	13	14	19	20	25	26	30	32	35	37	Total x 1.78
Scores	3	4	3	3	2	2	2	3	4	4	2	3	1	3	69.42



Overall Context

Element	Culture	Leadership	Evaluation	Total/3
Scores	68.75	64.26	69.42	67.47666667



Appendix H

Identifying Areas for Development (University of Ulster & University of College Cork, 2008)

Option 1

	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
C	3	2	3	3	4	3	3	3	3	2	3	2	2	2	4	3	3	2	2	3	3	2	3	2	4	4	3	3	3	2	2	3	2	3	1	3	3

Questions 2, 10, 12, 13, 14, 18, 19, 22, 24, 30, 31, 33, 35

2 Decisions on care and management are clearly documented by all staff
10 HCPs in the MDT have equal authority in decision-making
12 A staff performance review process is in place, which enables reflection on practice, goal setting and is regularly reviewed
13 Staff have explicit understanding of their own attitudes and beliefs toward the provision of care
14 Patients are encouraged to be active participants in their own care
18 Appropriate information is accessible to patients
19 HCPs and patients work as partners providing individual patient care
22 Discussions are planned between HCPs and patients
24 Staff use reflective processes to evaluate and develop practice
30 HCPs feel empowered to develop practice
31 Clinical nurse leaders create an environment conductive to the development and sharing ideas
33 Patients are encouraged to participate in feedback on care, culture, and systems
35 The organization is non-hierarchical

Option 2: Reflective Questions

Table 1: Barriers and Enablers for Implementation of Perioperative Corneal Abrasion Prevention Clinical Practice Guideline

Element	*Barriers*	*Enablers*
Culture	Lack of clarity of boundaries Task driven organization Low regard to individual Lack of consistency **Not receptive to change**	Able to define culture in terms of prevailing values/beliefs **Promotes learning organization**
Leadership	Traditional, command, and control leadership Didactic approaches to teaching/learning/managing Lack of appropriateness and transparency	Role clarity **Effective teamwork** Power and authority understood
Evaluation	Narrow use of performance information sources **Evaluation rely on single rather than multiple methods**	Feedback on individual, team and systems Effective organizational structure

(University of Ulster & University of College Cork, 2008)