Case 2014-11: Proper Eye Protection

A 40-year-old obese female with a history of obstructive sleep apnea (OSA) presented for a scheduled robotic colectomy. The patient was induced, the trachea was intubated and the patient was placed in Trendelenburg position. The eyes were taped closed. The colectomy took approximately 180 minutes and was uncomplicated. Postoperatively the patient remained in the post-anesthesia care unit (PACU), receiving oxygen via nasal cannula, for an extended period of time. Approximately 2 hours post-emergence, the patient began to complain of itchiness, pain and blurriness in her left eye. Examination by PACU anesthesiology staff found the eye to be red and sensitive to light. An ophthalmologist was consulted and a corneal abrasion was diagnosed by Woods Lamp examination with fluorescein dye.

Discussion

Corneal injury (CI) is the most common ophthalmic complication during the perioperative period, specifically for patients undergoing general anesthesia.1-5 Two types of corneal injury can occur: corneal abrasion and exposure keratopathies due to inadequate closure of the eyelids during anesthesia.4 However, the true incidence of either event is not known, as many cases likely go undiagnosed or unrecorded.1-3,6 A patient with CI will present with blurry vision, tearing, redness, photophobia and a sensation of a foreign body in the eye.7 Damage to the corneal surface may facilitate penetration of pathogens, leading to long-term visual deficits;8 however, due to the self-regenerative nature of corneal epithelial cells and simplicity of treatment options, long-term complications are uncommon.4,5 Treatment is generally symptomatic: topical anesthesia drops to reduce pain and a patch to keep the eye closed and thus moist. If further injury is avoided, symptoms will typically resolve within hours to days.

Although unlikely to produce long-term morbidity, corneal injuries decrease patient satisfaction with anesthesia and tax limited PACU resources.7 Therefore, precautions should be taken to prevent CIs. This AIRS case report identified several risk factors previously reported in the literature, including general anesthesia, Trendelenburg position, long patient fingernails, prolonged PACU stay with oxygen administration and oximeter probe placement on the dominant hand, where it is most likely to scratch the eye.3-5,8,9

General anesthesia has been consistently cited as a risk factor for CIs,1-5,8 especially with prolonged surgical procedures. This is due to suppression of the autonomic nerve supply to the lacrimal gland, reducing tear secretion.10,11 Additionally, general anesthesia suppresses the blink reflex, inhibiting the redistribution of lubricant over the ocular surface.12,13 The delivery of oxygen through nasal cannula or facemask may also play a role in drying the ocular surface.4,8,9,14 Patient position also plays a role. Recently, Trendelenburg position has been identified as a risk factor for CI.5 Trendelenburg position may lead to increased corneal thickness due to elevated intravascular, episcleral venous and intraocular pressure. The longer the patient is in this position, the greater the risk of ocular dehydration.5,15 Corneal injury is also possible during endoscopic procedures in the lateral position, when the patient may be too deeply sedated to react to incidental trauma during the procedure.

In addition, the administration of oxygen in the PACU and increased length of postoperative recovery have been identified as risk factors.5 Similarly, patients may irritate their own eyes by rubbing them to clear secretions or lubricant while emerging from general anesthesia. Fingernail-induced CIs have been identified as the most frequent cause of injury in patients presenting to the emergency room,16 and long fingernails are also a potential risk factor in the perioperative setting.9

Although CIs may be difficult to prevent completely, because some risk factors are beyond the control of the anesthesiologist, protective methods should be implemented to reduce patient risk. Anesthesiologists should consider eyelid taping over unprotected passive eyelid closure. A study by Grover et al7 of 150 patients identified a higher incidence of corneal epithelial defects among those with unprotected passive eyelid closure when compared to patients receiving lid taping. Although found...
to be beneficial to manual closing of the lid, anesthesiologists should be vigilant with the methods utilized to tape the lid. Horizontal lid taping is advised over vertical taping and should be performed immediately after the induction of anesthesia as soon as the eyelid reflex disappears and before airway management, unless rapid-sequence induction is performed. This will reduce the risk of mechanical corneal trauma. In addition to lid taping, ocular lubricants can be used to prevent dehydration. While lubricants reduce one risk, they may create another when the patient awakens and attempts to rub the lubricant away.

Although taping the lid provides ocular surface protection from chemical injury and trauma and prevents dehydration, anesthesiologists should be prudent in their taping method and remain vigilant in the performance of eye checks intraoperatively. If the tape is placed improperly, the ocular surface may come into contact with the adhesive, the tape may become displaced, or trauma to the eyelid and lashes may occur. The premature waking of a patient before the tape has been removed may also occur, potentially leading to further trauma. Additionally, there is the possibility of an allergic reaction to the taping material. Finally, taping may not be ideal for certain procedures (i.e., endonasal surgeries), and other methods should be explored, such as transparent dressings or even temporary suture closure.

Anesthesiologists should be mindful that additional risk factors exist, including advanced age, operations on the head or neck, types of positioning, ASA Physical Status, and anesthesia provided by a trainee. CIs rarely lead to long-term sequelae, but anesthesiologists should remain mindful that these events may lead to unnecessary pain and stress on patients and require an increase in recovery time and resource expenditure. Although all perioperative CIs may not be preventable, precautions should be taken to limit the patient’s risk. These preventative methods include properly protecting the ocular surface through correctly taping a patient’s eyes shut during the procedure, using ocular lubricants, performing periodic intraoperative checks to ensure the eyes remain protected, and removing adhesives prior to emergence from anesthesia.

References: