

Corneal Abrasion After Radical Thyroidectomy: A Case Report

Huixian Cheng^{1†} | Liangbin Cao^{1†} | Yan Lu¹ | Yongquan Chen^{1*} | Manlin Duan²

*Correspondence: Yongquan Chen

Address: ¹Department of Anesthesiology, Yijishan Hospital, Wannan Medical College, Wuhu, China; ²Department of Anesthesiology, Jinling Hospital, School of Medicine, Nanjing University, Nanjing, China

† There authors contributed equally to this work

e-mail ✉: chenyq263@163.com

Received: 24 May 2022; Accepted: 10 June 2022

Copyright: © 2022 Cheng H. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided that the original work is properly cited.

ABSTRACT

Corneal abrasion during radical thyroidectomy is a rare complication and is infrequently addressed in the literature. Here, we present the case of a young female patient who underwent radical thyroidectomy with general anesthesia. During the operation, the eyes were being naturally closed without protection measures, and corneal abrasion of the left eye occurred after the operation. The lesion had completely resolved with no sequelae after treatment. Therefore, preventive measures and attentive care may help reduce the incidence of corneal abrasion in patients undergoing radical thyroidectomy.

Keywords: General Anesthesia, Corneal Abrasion, Eye Injury

Introduction

Corneal abrasion (CA) is the most common ocular complication in patients undergoing non-ocular surgery under general anesthesia, with a variable incidence rate of 0.01% to 0.33% (Deljou *et al.*, 2019; Porter *et al.*, 2022; Segal *et al.*, 2014). Although rare, most corneal abrasions heal without significant long-term complications. Perioperative CA accounts for a lower proportion of anesthesia claims, but the average amount of compensation is larger (Yu *et al.*, 2010). While relatively benign, CA may lead to delays in discharge from the hospital due to the need for ophthalmology consultation and further treatment. It can also result in a decrease in patient satisfaction surrounding the hospital stay. Here, we present a report of one patient who sustained perioperative CA during a radical thyroidectomy performed with general anesthesia. It is hoped that more doctors will realize that effective preventive measures and careful care can help reduce the incidence of CA after anesthesia surgery.

Case Presentation

A 33-years-old female patient, ASA I, underwent left thyroidectomy with thyroisthmectomy,

bilateral central lymph node dissection, left functional neck lymph node dissection, left thyroidectomy with thyroisthmectomy and bilateral recurrent laryngeal nerve exploration under general anesthesia. The past medical history of the patient and standard examination before the surgery were unremarkable. There were no past ocular problems noted.

The anesthesia and operation process were smooth, and the vital signs were stable during the operation. During anesthesia, the patient's double eyelids were closed naturally without relevant protective measures. The total operating time (from opening to close of the wound) was 4 hours. And almost 4 and half hours total time for anesthesia. The patient recovered well after the operation, with a Steward score of 6, and was safely returned to the ward.

Two hours after returning to her hospital room, the patient complained of obvious foreign body sensation in the left eye, and an ophthalmologist was consulted. The ophthalmologist's examination revealed obvious swelling of the left eyelid, hyperemia of the bulbar conjunctiva, exfoliation of the corneal epithelium, round pupil, sensitive light reflex, and no obvious abnormalities in eye movement. A left eye CA was documented, and levofloxacin eye drops and calf blood deproteinized extract ophthalmic gel were prescribed. The patient recovered completely after two days without sequelae.

Discussion

CA is the most common ophthalmologic complication during general anesthesia for non-ocular procedures. When the corneal epithelium is removed from the underlying basal membrane, a surface defect of the corneal epithelium can result (Malafa *et al.*, 2016). There are two main mechanisms of perioperative corneal injury: direct mechanical injury of corneal epithelium and dry injury of cornea exposed to air for a long time (Deljou *et al.*, 2019). General anesthesia diminishes the patient's normal eyelid reflexes and causes the eyelids to not close completely, resulting in dry cornea. Over the years, multiple case reports have reported CA in different surgeries, during total joint arthroplasty (Young *et al.*, 2021), after an intraoperative wake-up test during spinal surgery (Yanagidate and Dohi, 2003), and routine gastrointestinal endoscopy (Dixon *et al.*, 2019), and so on. The precise mechanism of corneal injury is unknown in most cases. There is a need for further research to better elucidate the etiology of CA during the perioperative period.

Segal, *et al.* (2014) found that the use of oxygen masks during transport was an important risk factor. Incomplete closure of the lid exposes the epithelial surface and makes the cornea prone to abrasion. In this case, the patient's double eyelids were closed naturally without relevant protective measures. During the operation, it is difficult to observe corneal exposure due to the shielding of the

sterile sheet. It is not clear whether there is CA caused by mechanical compression. Therefore, patients should have the eyelids secured in the closed position directly after anesthesia induction for protection.

The characteristics associated with the injury were longer duration of anesthesia and non-supine surgical position, both of which have been previously described (Deljou *et al.*, 2019; Malafa *et al.*, 2016). Other risk factors associated with CA include advanced age of the patient, head/neck procedures, Trendelenburg position, prolonged surgery (>60 minutes), perioperative anemia, and intraoperative hypotension (Malafa *et al.*, 2016; Moos and Lind, 2006). A case-control study results suggest that the extended period of time that patients are anaesthetised for longer surgical procedures predisposes to perioperative CA. When patients are anaesthetised for longer surgeries, they are at higher risk for tear film deficiency, mechanical corneal exposure and subsequent CA (Carniciu *et al.*, 2017). In this case, there are several risk factors, including neck surgery, longer surgery and anesthesia time, special surgical posture (to fully expose the thyroid gland, raise the patient's shoulder, equivalent to Trendelenburg position) and unfixed eyelids during operation, which increase the risk of CA. It is essential surgeons and anesthesiologists work as a team to limit the operative time, optimize intraoperative conditions, and ensure patient safety, to impact patient outcomes positively.

Long-term adverse effects of CA are uncommon, but it is a major cause of postoperative distress. Symptoms include pain, blurry vision, tearing, redness, photophobia, and sensation of a foreign body (Kaye *et al.*, 2019). Given the known risk factors associated with perioperative CA, eye protection is necessary to reduce the number of ocular adverse events. Methods of protecting the eyes during general anesthesia include manual eye closure, adhesive tape on the eyelids, and the use of ointment or eye drops (Kaye *et al.*, 2019). Nevertheless, no single prevention method is 100% effective.

Prevention of CA is crucial and is optimized when all perioperative providers are adequately educated in eye care. In a study by Martin, *et al.* (2009) increased awareness of perioperative corneal injury among anesthesiologists, combined with improved educational measures, was associated with a significant reduction in the incidence of CA. In 2022, Porter, *et al.* that the use of simple, standardized perioperative and perioperative CA prevention, diagnosis, and treatment protocols can consistently reduce perioperative CA occurrence. Moreover, the decreased number of CA cases was sustained for 2 consecutive years (Porter *et al.*, 2022). Surgeons and anesthesiologists should recognize this avoidable complication and take precautions to protect the eyes during surgery.

Conclusion

CA during radical thyroidectomy is a rare complication and is infrequently addressed in the

literature. Preventive measures and attentive care may help reduce the incidence of CA in patients undergoing radical thyroidectomy.

Consent: The patient has given permission for publication of her clinical details.

Conflict of Interest: The author declares that there are no conflicts of interest regarding the publication of this article.

References

Carniciu AL, Fazzari MJ, Tabibian P, Batta P, Gentile RC, Grendell JH, Brathwaite CE, Barzideh N. Corneal abrasion following anaesthesia for non-ocular surgical procedures: A case-controlled study. *J Perioper Pract* 2017; 27: 247-253.

Deljou A, Weingarten TN, Mahr MA, Sprung J, Martin DP. Postoperative Corneal Injuries: Incidence and Risk Factors. *Anesth Analg* 2019; 129: 737-742.

Dixon R, Adler DG, Sossenheimer M, Taylor LJ, Fang JC. Corneal injury after routine gastrointestinal endoscopy with moderate sedation. *Ann Gastroenterol* 2019; 32: 419-421.

Kaye AD, Renschler JS, Cramer KD, Anyama BO, Anyama EC, Gayle JA, Armstead-Williams CM, Mosieri CN, Saus JA, Cornett EM. Postoperative Management of Corneal Abrasions and Clinical Implications: a Comprehensive Review. *Curr Pain Headache Rep* 2019; 23: 1-9.

Malafa MM, Coleman JE, Bowman RW, Rohrich RJ. Perioperative Corneal Abrasion: Updated Guidelines for Prevention and Management. *Plast Reconstr Surg* 2016; 137: 790e-798e.

Martin DP, Weingarten TN, Gunn PW, Lee K, Mahr MA, Schroeder DR, Sprung J. Performance improvement system and postoperative corneal injuries: incidence and risk factors. *Anesthesiology* 2009; 111: 320-326.

Moos DD and Lind DM. Detection and treatment of perioperative corneal abrasions. *J Perianesth Nurs* 2006; 21: 332-328.

Porter SB, Chamorro-Pareja N, Boles KS, Rodgers IL, Rodrigues ES. A Quality Improvement Project to Decrease Perioperative and Periprocedural Corneal Abrasions. *J Perianesth Nurs* 2022.

Segal KL, Fleischut PM, Kim C, Levine B, Faggiani SL, Banerjee S, Gadalla F, Lelli GJ. Evaluation and treatment of perioperative corneal abrasions. *J Ophthalmol* 2014; 901901.

Yanagitate F and Dohi S. Corneal abrasion after the wake-up test in spinal surgery. *J Anesth* 2003; 17: 211-212.

Young ME, Mears SC, Sallam AB, Sanders RN, Barnes CL, Stambough JB. Corneal Abrasions in Total Joint Arthroplasty. *Geriatr Orthop Surg Rehabil* 2021; 12: 21514593211060101.

Yu HD, Chou AH, Yang MW, Chang CJ. An analysis of perioperative eye injuries after nonocular surgery. *Acta Anaesthesiol Taiwan* 2010; 48: 122-129.