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CASE REPORT

Monopolar cautery burns during chalazion surgery

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Abstract

Aim: To raise awareness of potential serious adverse effects and optimise safety precautions when utilising handheld battery-operated monopolar cautery.
Background: Incision and curettage of a chalazion is a commonly performed minor procedure.
Case Description: A 52-year-old male underwent routine chalazion surgery. During the operation, the handheld battery cautery ignited a cotton-tipped swab, causing ignition of the eyelashes and eyebrow, as well as first degree burns to the patient's eyelids. The flame was thought secondary to the combination of heat from the cautery tip igniting a dry swab, 40% oxygen from the face mask and oil from meibomian gland dysfunction.
Conclusion: Routine incision and curettage with monopolar cautery are not without risk. Patient safety and precautionary measures need to be optimised for any procedure using handheld cautery to minimise risk.
Clinical Significance: Medical professionals need to be aware of the potential to cause burns to the patient during minor and routine procedures that utilise electrocautery and optimise safety precautions.

Introduction

Chalazia may form secondary to meibomian gland dysfunction. If conservative management fails, incision and curettage is performed. It is a seemingly minor procedure that may be achieved in the clinic or operating theatre setting. The use of handheld monopolar cautery during the procedure is standard to cauterize bleeding blood vessels. Electrocautery is typically a safe tool, however, rare reports of ignition and subsequent iatrogenic injury to patients may occur.

Case Report

A 52-year-old male farmer was referred with a 1-month history of bilateral chalazia, not resolving with medical management. On examination, best-corrected visual acuity was 6/5 in the right eye and 6/6 in the left eye. There were three chalazia, located in the right lower lid, left upper lid and left lower lid. The patient was consented for chalazion incision and drainage under local anaesthetic with sedation at a day procedure unit.

During the surgical procedure, whilst performing hemostasis following incision and curettage of the final left upper eyelid chalazion, the handheld monopolar battery cautery ignited the cotton-tipped swab, with the light blue flame quickly spreading to the patient's upper and lower eyelids, lashes, and medial eyebrow. The surgeon immediately extinguished the flame with a moist gauze and removed the sterile drapes. Loss of the upper and lower eyelashes and part of the medial eyebrow with blanching of the underlying skin was noted. There was no evidence of thermal injury on slit-lamp examination. A double eye pad and chloramphenicol ointment was applied to the eye with cool compresses overnight.

On day 1 post-operative review, the patient reported the left eye feeling irritable and scratchy. The best-corrected visual acuity was 6/5 in the right eye and 6/6 in the left eye. The left upper and lower lid margins demonstrated first degree burns with loss of the eyelashes [Figure 1]. On slit-lamp examination, there was mild conjunctival injection and no ocular surface staining with topical fluorescein. Chloramphenicol ointment QID for 2 weeks was prescribed for the lid margins and eyebrow. The patient was followed over the next 7 weeks, with regrowth of the lashes and eyebrow with healing of the skin [Figure 2].

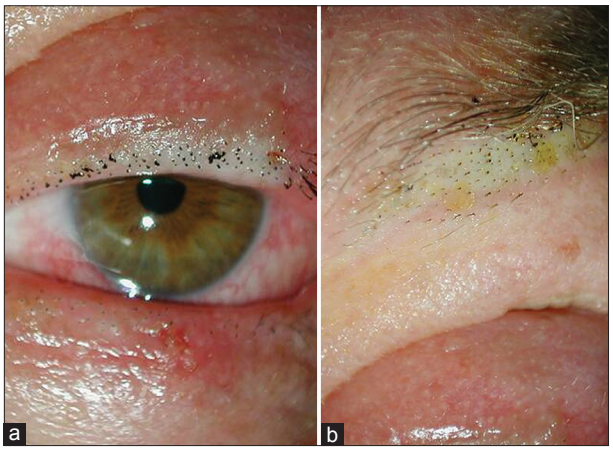

Figure 1: (a) Clinical photograph on day 1 following eyelid/brow burn, showing upper and lower lid eyelash stumps and blanching of the lid margin from first degree burn and (b) First degree burns to skin and loss of medial eyebrow

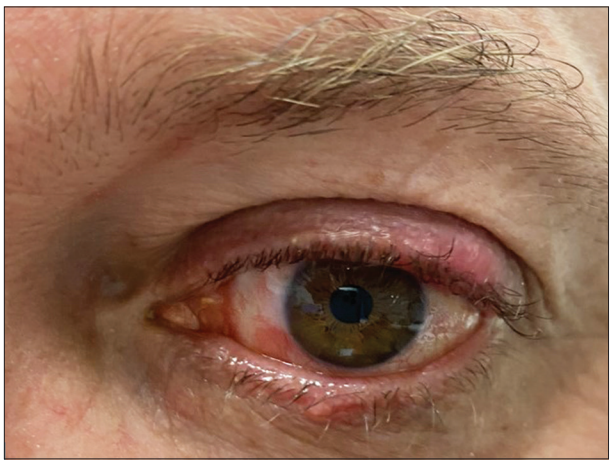

Figure 2: Clinical photograph at week 7 following eyelid/brow burn, showing regrowth of eyelashes and eyebrow, with mild residual erythema of lid margin skin

Discussion

Iatrogenic burns in ophthalmic surgery have rarely been reported in the literature.[1-3] It is likely the occurrence is under-reported and the risk is not insignificant.[4] Incision and curettage of chalazia are regarded as a minor procedure, often performed in a clinic procedure room under local anesthesia. Uncommonly it is performed in a day surgery setting for patients requiring sedation or in combination with other procedures. There is the benefit of an anesthetist present as well as the theatre support team.

The scenario in this patient's case was the cotton-tipped swab ignited from the hot tip of the handheld cautery [Figure 3] and likely leakage of 40% oxygen from the face mask provided fuel for the flame, known as a fire oxidizer.[5] In addition, the patient exhibited multiple chalazia due to meibomian gland

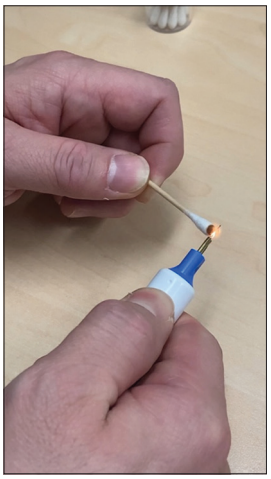

Figure 3: Image of cotton-tipped swab ignited by battery-powered electrocautery tip

dysfunction, with excessive oil on the eyelashes within the surgical field. There have been prior reports in the literature of iatrogenic flame burns during facial surgery, notably during routine blepharoplasty.[1-3] The known triggers identified include oxygen-rich environments, flammable substances such as alcohol-based skin preps, rubber catheters or cables and wet surgical environments.[4]

A case study by Eustis *et al.* described a 4-year-old female undergoing chalazion removal, where the use of battery-operated cautery resulted combustion of the eyelashes and third-degree burns to the malar region.[3] In this article, an experiment using a battery-powered hot cautery in the presence of 40% oxygen, showed the flame jumped to hair several millimetres away from the cautery tip. Of note, this did not occur in room air or when using a bipolar cautery. Fortunately, in our case, the patient had only first degree burns and no thermal injury to the ocular surface, aided by the rapid extinguishing of the flame.

Importantly, this case demonstrates the need for any surgeon utilising electrocautery to recognize the potential risk of iatrogenic burn injury even in the setting of a "minor" procedure. Precautions to minimize this risk include instructing the anaesthetist to use air rather than oxygen via the face mask (or remove the face mask), use of wetfield bipolar cautery, moist gauze to protect the eyelashes and eyelid skin and non-flammable skin preparation and drapes.[3] In the event of a fire, an aware surgeon can immediately extinguish the almost colorless blue flame with moist gauze and remove the drapes.

Conclusion

Electrocautery is commonly used for ophthalmic procedures and in other surgical specialities. It is rarely reported to cause ignition of patients, however, this case demonstrates the adverse outcomes and potential severity of burns from cautery. Its use is not without

risk and takes the collaboration of the theatre staff, surgeon and anaesthetist to minimise risk and optimise patient safety.

Clinical Significance

Electrocautery burns and adverse events are likely under-reported. The aim of this case report is to raise awareness of the potential for serious complications in an otherwise routine minor procedure and optimise safety precautions.

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