Case report

A case of the blues: Inadvertent ocular injury from accidental instillation of blue ink

Alexander D. Port, Ashley R. Brissette, Kimberly C. Sippel *

Department of Ophthalmology, Weill Cornell Medical College, 1305 York Avenue, New York, NY, 10021, USA

ARTICLE INFO

Keywords:
Ocular chemical injury
Corneal abrasion
Alkali corneal burn
Eye trauma

ABSTRACT

Purpose: Many consumer products and non-ophthalmic medications are packaged in plastic “eye dropper” bottles, posing a risk of accidental ocular chemical injury when these substances are mistaken for eye drops.

Observations: We present the case of an elderly glaucoma patient who mistook blue stamper ink for the glaucoma medication Combigan®, and suffered ocular injury as a result.

Conclusions and importance: The packaging of non-ophthalmic products in plastic “eye dropper” bottles poses a significant risk of accidental ocular chemical injury. Elderly individuals with low vision and/or cognitive deficits may be at particular risk of accidental injury. Ophthalmologists have been calling for a greater distinction between the packaging of ophthalmic and non-ophthalmic products for over 35 years, but to date little progress has been made in this regard.

1. Introduction

Since the 1980s, the widespread packaging of consumer products and non-ophthalmic medications in plastic “eye dropper” bottles has resulted in numerous cases of inadvertent ocular injury, often by persons who mistake these products for eye drops. Despite over 35 years of ophthalmologists calling for common-sense safety regulations, little progress has been made towards minimizing the risk of ocular injury from similarly packaged products.

We present the case of an elderly glaucoma patient who mistook blue stamper ink for the glaucoma medication Combigan® and suffered an ocular injury as a result.

2. Case report

An 85-year-old man was brought to the Emergency Department by his son after experiencing severe burning pain and inability to open both eyes after instilling eye drops. The patient has a history of primary open angle glaucoma for which he was being treated with Combigan® (brimonidine 0.2%/timolol 0.5%, Allergan, Dublin, Ireland). The patient had accidently instilled blue “Offistamp®” refill ink (Cosco Industries, Harwood Heights, IL) into each eye, mistaking the ink bottle for the near-identical packaging of Combigan® (Fig. 1).

On arrival to the Emergency Department, the patient’s eyes and periorcular skin were noted to be stained bright blue (Fig. 2); the eyes were immediately irrigated with copious amounts of saline. An attempt was made to check the pH of the ocular surface, but the litmus paper ended up being stained dark blue as well and could not be interpreted. Tetracaine 0.5% (Bausch & Lomb, Bridgewater, New Jersey) was administered, a Morgan lens (MorTan, Inc., Missoula, Montana) placed on each eye, and each eye irrigated with an additional 2 L of normal saline. The ocular surface pH was checked again, and was found to be 8.5 in each eye. The fornices were swept with a cotton-tipped applicator. Irrigation was performed with an additional 2 L of normal saline, with subsequent normalization of the pH in each eye.

At this point, visual acuity was 20/100 in the right eye and 20/200 in the left. Intraocular pressure was within normal limits in each eye. Slit lamp examination demonstrated residual blue staining of the conjunctiva. Fluorescein staining demonstrated bilateral corneal abrasions involving the visual axis.

The patient was started on Vigamox™ (moxifloxacin 0.5%, Alcon, Fort Worth, Texas) and PredFortë™ (prednisolone acetate 1.0%, Allergan, Dublin, Ireland) in both eyes. He was seen in follow-up the next day and repeat examination demonstrated return of his visual acuity to baseline and interval resolution of the bilateral corneal abrasions. The patient was discharged to follow-up with his primary ophthalmologist.

* Corresponding author. 1305 York Avenue, 12th Floor, New York, NY, 10021, USA.
E-mail address: kcs20002@med.cornell.edu (K.C. Sippel).

https://doi.org/10.1016/j.ajo.2020.100773
Received 8 July 2018; Received in revised form 17 April 2020; Accepted 5 June 2020
Available online 10 June 2020
2451-9936/© 2020 Published by Elsevier Inc. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).
3. Discussion

Accidental ocular chemical instillations represent a well-known but preventable hazard. Since their introduction, plastic dropper bottles have been widely used for both ophthalmic and non-ophthalmic medications, as well as consumer products and chemicals, owing to their simplicity and ease of use. However, often, the plastic dropper bottles used for various chemical solutions are indistinguishable from bottles of ophthalmic medications, and in some cases are even produced by the same manufacturers. Furthermore, very few, if any, plastic dropper bottles with hazardous substances such as a strong alkali or acid have a "child-safe" top. The similar packaging of ophthalmic preparations and potentially harmful substances poses an unnecessary hazard to the public. Elderly individuals, such as the gentleman presented in this Case Report, as well as those with low vision appear to be at particular risk of injury.

The ophthalmic literature in the past 35 years is replete with reports of ocular chemical injuries resulting from the accidental instillation of consumer and chemical products, including cyanoacrylate glues, Hemocult® developer, sodium hydroxide aquarium solution, hydrogen peroxide contact lens cleaning solution, and fiberglass resin catalyst, all of which were packaged in plastic dropper bottles. This Case Report adds blue stamper ink to this unfortunate list. In addition, ocular injury resulting from accidental instillation of non-ophthalmic medications has also been frequently reported, with dermatologic preparations (including 20% salicylic acid wart remover, salicylic acid ayurvedic medication, and mometasone steroid scalp lotion) representing the most common source of accidental instillation.

Ocular chemical injuries represent a common cause of Emergency Department visits. In a United States study of 640 patients with chemical eye injuries, 6% of injuries derived from accidental instillation of chemicals that were mistaken for eye medications. The most commonly identified agents were non-ophthalmic medications (44%), glues (25%), and personal care products (20.5%). An Australian study examining calls made to an Australian Poisons Information Center from 2004 to 2011 identified approximately 1290 cases that involved accidental eye instillation of non-ophthalmic medications, 27% of which necessitated medical treatment.

The most common pharmacologic agent accidentally instilled was a mometasone steroid scalp lotion, with other products consisting of antiseptic, antifungal, antibacterial, and ear wax removal preparations, the majority of which were packaged in plastic dropper bottles.

Common-sense changes in the packaging and labeling of non-
ophthalmic products in plastic dropper bottles are essential in minimizing the risk of these types of injuries. Suggestions for packaging of non-ophthalmic substances in plastic dropper bottles includes 1) the use of bottles or bottle caps with a distinct color not used for any ophthalmic medication (for example, a black-colored top or a bright orange-colored bottle), 2) the use of bottles with a distinct shape or with ridges along the side, and 3) the addition of a “child-safe” cap with a locking mechanism. For cyanoacrylate preparations, the addition of a distinctive odor to the preparation has been proposed. However, currently there are no governmental or industry regulations in place mandating these types of safety features. The United States Food and Drug Administration has recommended that medications intended for topical use be packaged in containers that differ from medications intended for ophthalmic use – but has referred to these recommendations as “non binding.”

Ophthalmologists have been calling for changes for over 35 years. Hopefully the time has come for government and industry to respond and help keep these potentially needless ocular injuries to a minimum.

Patient Consent

Consent to publish the case report was not obtained. This report does not contain any personal information that could lead to the identification of the patient.

Funding

This research was supported in part by an unrestricted grant to the Weill Cornell Department of Ophthalmology from the Research to Prevent Blindness (RPB).

Authorship

All authors attest that they meet the current ICMJE criteria for Authorship.

Declaration of competing interest

The following authors have no relevant conflicts of interest to disclose: ADP, ARB, KCS.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ajoc.2020.100773.

References

1. Blackburn J, Levitan EB, MacLennan PA, Owsley C, McGwin Jr G. The epidemiology of chemical eye injuries. Curr Eye Res. 2012;37(9):787–793.
2. Mauger T. Sodium hydroxide masquerading as a contact lens solution. Case Rep. Arch Ophthalmol. 1988;106(8):1037.
3. Morgan SJ, Astbury NJ. Inadvertent self administration of superglue: a consumer hazard. Br Med J. 1984;289(4439):226–227.
4. Naughton M, Nor K, Bartholomaeus A, Thomas J, Kosari S. Case report of a medication error: in the eye of the beholder. Medicine (Baltim). 2016;95(28), e4186.
5. Needham AD, Natha S, Kaye S. Similarities in the packaging of cyanoacrylate nail glue and ophthalmic preparations: an ongoing problem. Br J Ophthalmol. 2001;85(4):496–497.

6. Shalyl TA. Ocular acid burn due to 20% concentrated salicylic acid. Cutan Ocul Toxicol. 2011;30(1):84–86.
7. Silverman CM. Corneal abrasion from accidental instillation of cyanoacrylate into the eye. Arch Ophthalmol. 1988;106(8):1029–1030.
8. Yusuf IH, Patel CK. A sticky sight: cyanoacrylate ‘superglue’ injuries of the eye. BMJ Case Rep. 2010;2010.
9. Brown JA. Medicinal mishap: incorrectly dropped in the eye. Aust Prescr. 2013;36:56–57.
10. Good AM, McCabe SE. Superglue accidents and the eye–causes and prevention. Br J Ophthalmol. 1994;78(10):802.
11. Jiragul J, Gupta PC, Gupta G, Sahu KK, Ram J. Ocular chemical burns from accidental exposure to topical dermatological medicinal agent. Indian J Ophthalmol. 2018;66(10):1476–1477.
12. Murphy C, Ho WO. Accidental self-induced chemical eye injury in patients with low vision. Eye (London, England). 2011;25(1):119.
13. Parker RT, McCall DP, Samarawickrama C. Eye injury from toxic chemical mistaken for eye drops. Med J Aust. 2018;208(8):369.
14. Bruder SP, Leahy AB. Accidental instillation of cyanoacrylate adhesive in the eye. J Am Board Fam Pract. 1995;8(5):486–490.
15. McLean CJ. Ocular superglue injury. J Accid Emerg Med. 1997;14(1):40–41.
16. Denai SP, Tegdahl BC, Ihbola R. Super glue mistaken for eye drops. Arch Dis Child. 2005;90(11):1193.
17. Knight LJ. Mistaken eye drops and subsequent instillation of superglue. Eye (London, England). 2001;15(Pt 5):5663.
18. Ling RF, Villalobos R, Latina M. Inadvertent instillation of Hemoccult developer in the eye: case report. Arch Ophthalmol. 1998;106(8):1033–1034.
19. Spencer TJ, Clark B. Self-inflicted superglue injuries. Med J Aust. 2004;181(6):341–342.
20. Tabatabaei SA, Modanloos S, Ghiyavand AM, et al. Epidemiological aspects of ocular superglue injuries. Int J Ophthalmal. 2016;9(2):278–281.
21. Ling RT, Villalobos R, Latina M. Inadequacy of current labeling of nonophthalmic drops. N Engl J Med. 1989;320(1):62.
22. Haring RS, Canner JK, Haider AH, Schneider EB. Ocular injury in the United States: Emergency department visits from 2006-2011. Injury. 2016;47(1):104–108.
23. United States Food and Drug Administration: Center for Drug Evaluation and Research. Safety Considerations for Product Design to Minimize Medication Errors: Guidance for Industry; 2016. www.fda.gov/April.