Inadvertent corneal pigmentation following cosmetic blepharopigmentation

Hila Goldberg*, Yoav Berger, Iris Ben Bassat, Irina Barequet

Goldschleger Eye Institute, Sheba Medical Center, Sackler Faculty of Medicine Tel Aviv University, Ramat Gan, Israel

ARTICLE INFO

Keywords:
Blepharopigmentation
Eyeliner tattoo
Keratopigmentation
Permanent makeup

ABSTRACT

Purpose: To present a case of inadvertent corneal pigmentation as a complication of cosmetic eyelid tattooing.

Observations: A 63 year old woman presented with left eye redness and irritation 3 days after undergoing permanent eyeliner tattooing of her upper and lower eyelids. On ocular examination a black pigmentation of the nasal cornea in her left eye was observed, with associated conjunctival injection. Initial slit lamp attempts of pigment removal were unsuccessful. A surgical attempt to scrape the pigment in the stroma was only partially successful due to the penetration of pigment particles in between stromal lamellae. Microanalysis spectroscopy was performed on a specimen of pigment taken from the eyelashes in order to attain the chemical properties of the material and assist with further therapeutic strategy. The analysis revealed an organic inert nature of the material (mostly carbon and oxygen) and ruled out presence of dangerous components such as copper and lead. Due to minimal inflammatory reaction and the non-central location of the corneal pigmentation, the patient remained under close observation, treated with lubrication and no further interventions, until complete resolution by 6 weeks.

Conclusions and importance: While the procedure of cosmetic blepharopigmentation is considered relatively safe, it bares many possible complications, ranging from mild dermal irritation to vision-threatening conditions. Our case of inadvertent keratopigmentation demonstrates the potential dangers of this procedure, and the importance of medical supervision and intervention in cases of complications. Vision preservation in this case was enabled by the midperipheral location of the pigment penetration.

1. Introduction

The cosmetic procedure of permanent eyeliner tattooing, known as blepharopigmentation, is a very popular periocular procedure. During blepharopigmentation, pigment is inserted into the superficial dermis layer via a tattoo needle, to create the appearance of permanent eyeliner makeup. Although the pigments are considered relatively inert, they can sometimes cause side effects, ranging from mild inflammatory or allergic reactions, pigment misapplication, to serious functional eyelid compromise.

To our knowledge, no cases of intrastromal pigmentation as a complication of blepharopigmentation have been reported. Our aim is to present a case of an immediate, potentially vision impairing, complication following blepharopigmentation procedure, of inadvertent deep stromal pigmentation.

2. Case report

A 63 year old woman presented to the ophthalmology emergency room with complaints of redness and irritation in her left eye for the past two days. She had no previous medical or ocular history. Her visual acuity was 6/7.5 in both eyes. On initial examination of both eyes a thick black pigmentation line of both upper and lower lash lines was evident. In the left eye there was conjunctival injection and on the nasal part of the cornea there was a large black pigmented stain (1.5*0.5mm) with small satellite stains surrounding (Fig. 1). There were no signs of epithelial erosion, stromal inflammation, or infection of the cornea, nor any signs of perforation. The anterior chamber was deep and quiet with no signs of intraocular inflammatory response. The examination of the right eye was unremarkable, and the fundus examination of both eyes was normal.

Additional history evaluation revealed that three days prior to her examination in the emergency room she had undergone a cosmetic procedure of permanent eyeliner tattooing on the upper and lower eyelids of both eyes. The patient was not aware of any complications during the tattooing. On the following day she started feeling progressive irritation in the left eye, therefore seeking ophthalmologic examination.

A first attempt of removing the pigment was performed at the slit lamp in the emergency room, with a 23G needle that is usually used for...
removing metallic corneal foreign bodies. The pigment was only partially removed, with most of it still remaining in the stroma. She was treated with topical antibiotic ointment. The next day a second attempt to remove the material with a surgical blade was again only minimally beneficial and she was scheduled for surgical corneal scraping. Two days later, in the operating room, the epithelium above the pigment was scraped, after which a burr drill was used to try to remove the pigment particles in the stroma. Most of the pigment was successfully removed, yet deeper pigment particles remained, which could not be reached safely without risking a deep stromal scar or even perforation. A specimen of the pigment material was taken from the eyelashes and sent for spectroscopy microanalysis. A therapeutic contact lens was placed on the cornea, and the patient was released with topical prophylactic antibiotic eye drops.

On examination the next day, there were deep stromal remnants of pigment, with no signs of infection, and minimal conjunctival irritation (Fig. 2).

After 10 days, the laboratory results returned, specifying the chemical properties of the pigment. The material contained mainly carbon, oxygen and potassium, and small amounts of calcium, sulfur, chlorine and phosphorus. The presence of lead or copper was ruled out.

Due to the inert nature of the material contents, the minimal inflammatory reaction, and the non-central location of the staining - after discussing with the patient the possible risks, benefits and alternatives - no further interventions were performed and the patient remained under close follow-up. No further complications occurred.

3. Discussion

While blepharopigmentation is considered a low risk cosmetic procedure, its location bares risks of severe harm to the eyelids and ocular surface.

Previous reports have described various possible adverse events and complications of blepharopigmentation. Vagefi et al.6 reported on four patients with inflammatory granulomatous eyelid reactions, in the first days and up to 1 month following blepharopigmentation procedure. Moshirfar et al.5 described a case of a 54 year old woman with inadvertent conjunctival limbal pigmentation, treated with surgical excision. Monya De et.al7 presented a case of iatrogenic full thickness eyelid penetration and inadvertent bulbar conjunctival pigmentation during eyelid tattooing. Lee et al.8 examined the effects of permanent eyelid tattoo on meibomian glands function and anatomy, showing a significantly lower tear break-up time and higher meibomian gland dysfunction in patients after eyelid tattooing compared to a control group.

We describe here the first case, to the best of our knowledge, of inadvertent stromal keratopigmentation following blepharopigmentation. The advertent use of keratopigmentation has been applied in ophthalmology for many years. Typically it is used for cosmetic restorations in cases of unacceptable corneal opacities and scars.9-11 In the past decades it has also been increasingly used to correct visual disturbances such as glare and diplopia due to iris defects.1

In our case the cornea was pigmented as a complication of cosmetic eyeliner tattooing. We do not know whether this occurred during the procedure or afterwards, as a consequence of the patient rubbing her eyes. The corneal pigment was imbedded deep in the stromal layer, as is intentionally done during keratopigmentation, which made it difficult to completely remove the pigment without risking deep scarring of the cornea.

The inks being commonly used in permanent makeup tattooing today contain iron oxide pigments which are insoluble in water and mostly organic solvents. These materials used widely in cosmetics are relatively inert and usually well tolerated by skin contact.1 Of course, they are not intended or tested for ocular surface reactions. The chemical properties of the pigment sent for analysis from our patient indeed revealed mostly organic components, without presence of lead or copper which may be harmful to the cornea and cause local irritation and permanent opacities.13
It thus appears to us that the main dangers from such complications of blepharopigmentation are of ocular surface penetration and dis-coloration as well as a local inflammatory reaction. In this case, due to the inert, non-toxic features of the material and the non-central location of the staining, which did not affect the visual acuity or comfort of the patient, it was decided to continue with conservative treatment and close follow-up. No further complications occurred.

4. Conclusions

We report a case which demonstrates the possible complications of blepharopigmentation, risking damage to the corneal surface and visual axis compromise. This case, as well as other possible complications mentioned above, emphasize the importance for professionalism of those performing the cosmetic procedure, and medical supervision in case of complications.

Patient consent

A written informed consent was obtained from the patient for publication of the relevant data and accompanying images.

Acknowledgments and disclosures

Funding

No funding or grant support.

Conflicts of interest

The following authors have no financial disclosures: HG, YB, IBB, IB.

Authorship

All authors attest that they meet the current ICMJE criteria for

Acknowledgements

None.

References

1. De Cuyper C. Permanent makeup: indications and complications. Clin Dermatol. 2008;26(1):30–34.
2. Schwarze HP, Giordan-Labadie F, Loche F, Gorguet MB, Bazex J. Delayed hypersensitivity granulomatous reaction induced by blepharopigmentation with aluminum-silicate. J Am Acad Dermatol. 2000;42(5 Pt 2):888–891.
3. Kojima T, Dogru M, Matsumoto Y, Goto E, Tsunoda K. Tear film and ocular surface abnormalities after eyelid tattooing. Ophthal Mic Plast Reconstr Surg. 2005;21(1):69–71. https://doi.org/10.1097/01.iop.0000196713.94608.29.
4. Lee YB, Kim JJ, Hoon JY, Wee WR, Shin YJ. Eyelid tattooing induces meibomian gland loss and tear film instability. Cornea. 2015;34(7):750–755. https://doi.org/10.1097/ICO.0000000000000452.
5. Mosheif M, Espanadar L, Kurz C, Mamalis N. Inadvertent pigmentation of the limbus during cosmetic blepharopigmentation. Cornea. 2009;28(6):712–713. https://doi.org/10.1097/ICO.0b013e318190737b.
6. Vagefi MR, Dragan I, Hughes SM, Kippenstein KA, Seiff SR, Woog JJ. Adverse reactions to permanent eyeliner tattoo. Ophthal Mic Plast Reconstr Surg. 2006;22(1):48–51. https://doi.org/10.1097/01.iop.0000196713.94608.29.
7. De M, Marshak H, Uzcategui N, Chang E. Full-thickness eyelid penetration during cosmetic blepharopigmentation causing eye injury. J Cosmet Dermatol. 2008;7(1):35–38. https://doi.org/10.1111/j.1473-2165.2008.00340.x.
8. Lee YB, Kim JJ, Hoon JY, Wee WR, Shin YJ. Eyelid tattooing induces meibomian gland loss and tear film instability. Cornea. 2015;34(7):750–755.
9. Alio J, Al-Shymali O, Amesty MA, Rodriguez AE. Keratopigmentation with micronized mineral pigments: complications and outcomes in a series of 234 eyes. Br J Ophthalmol. 2017(0):1–6.
10. Pitz S, Jahn R, Frisch L, Duij A, Pfeiffer N. Corneal tattooing: an alternative treatment for disfiguring corneal scars. Br J Ophthalmol. 2002;86(4):397–399.
11. Kim J, Lee D, Hahn T, Choi S. New surgical strategy for corneal tattooing using a femtosecond laser. Cornea. 2009;28:80–84.
12. Alio JL, Rodriguez AE, Toftaha BT. Keratopigmentation (corneal tattooing) for the management of visual disabilities of the eye related to iris defects. Br J Ophthalmol. 2011;95(10):1397–1401.
13. Grant WM, Thomas CC. Toxicology of the Eye. third ed. Cutan Ocul Toxicol; 1987. https://doi.org/10.3109/15569528709052171.