

The girl with the eyeball tattoo—what the ophthalmologist may expect? Case report and a review of literature

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Abstract

Introduction: We report a case of patient who underwent bilateral eyeball tattoo procedure for cosmetic purpose complicated with intraocular dye injection which led to ocular inflammation, secondary glaucoma, and cataract.

Case description: A 21-year-old female presented to emergency department with severe right eye pain and photophobia 21 days after conjunctival tattooing procedure. Slit-lamp examination revealed right-sided eyelid edema and black deposits of tattoo ink under the bulbar conjunctiva. Dye deposits were also present in anterior chamber, covering corneal endothelium, iris and anterior lens' capsule. Ocular inflammation and secondary glaucoma were diagnosed. The patient underwent surgical treatment to control ocular inflammation. Intraocular pressure remained stable after Nd:YAG iridotomy and on topical drugs. Moreover, during the follow-up, in contralateral eye, we observed “conjunctival lumps”—local hypersensitivity reaction to the dye, which were asymptomatic to the patient.

Conclusion: Eyeball tattooing complications are new challenges that ophthalmologist may have to face nowadays. We also reviewed for the first time possible complications of eyeball tattooing described in available literature.

Keywords

Eyeball tattoo, pigmentary glaucoma, conjunctival lumps

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Introduction

Eyeball tattooing (conjunctival, episcleral tattooing) is a new trend in body modification, which is becoming increasingly popular. During the procedure, colored dye is injected under the bulbar conjunctiva for cosmetic purposes. Such a procedure is usually performed by non-medical personnel, without professional surgical instruments nor microscope and may lead to serious ocular complications. We report a case of patient who underwent eyeball tattoo procedure complicated with inadvertent intraocular dye injection, which resulted in acute, severe ocular inflammation, secondary glaucoma, and cataract. In a follow-up, in the patient's contralateral eye, which globe was not injured during the procedure, pathological changes such as conjunctival lumps, being probably a late reaction to the injected dye, were also observed. In addition, in the “Conclusion” section, we review possible known complications of eyeball tattooing.

Case description

A 21-year-old female presented to emergency department with severe right eye pain with concomitant photophobia.

Patient's *medical history*, apart from moderate myopia (−3, 0 dioptres), was *unremarkable*. However, 21 days before the visit, patient underwent bilateral eyeball tattoo. During tattooing right eye, she reported sudden loss of vision to the tattooist, but he convinced her that this is normal reaction, dye will wash out and she will recover in a few days. A week after the procedure, right eye vision was still impaired and the eye became painful. Patient called tattooist again and was advised to take analgesics. Finally, after 21 days, she decided to seek medical attention.

Vision assessment with best-corrected visual acuity (BCVA) performed on admission revealed in right eye counting fingers and left eye 20/20. Intraocular pressure (IOP) corrected for central corneal thickness (CCT)—650 μm in right eye and 546 μm in left eye—was 39 and 14 mmHg, respectively. Slit-lamp examination revealed right-sided eyelid edema and black deposits of tattoo ink

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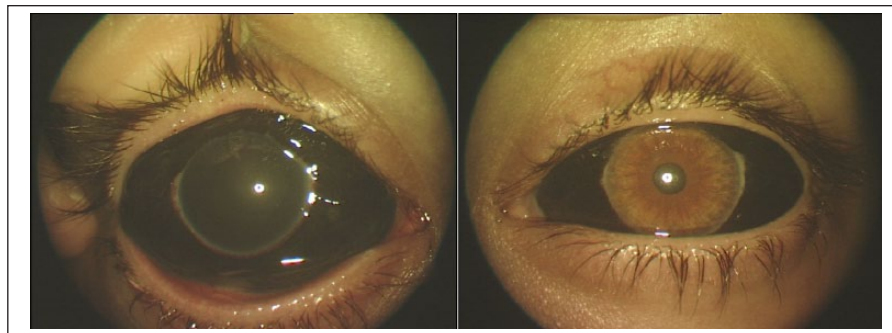


Figure 1. Picture of patient's eyes taken on admission.

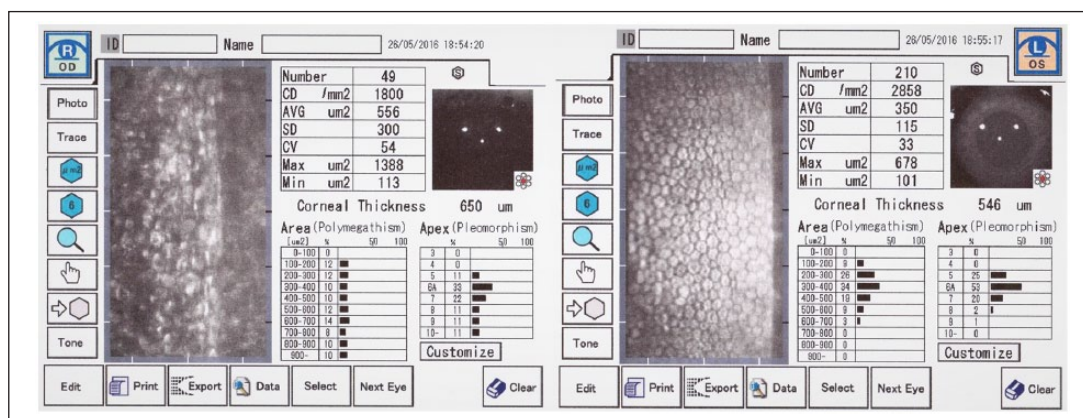


Figure 2. Specular microscopy of patient's eyes performed on admission.

under the bulbar conjunctiva (Figure 1). Dye deposits were also present in anterior chamber covering corneal endothelium, iris and anterior lens' capsule. In addition, posterior synechia were reported. Gonioscopy showed wide angle with black pigment covering the trabecular meshwork. Posterior segment view was impossible. In the left eye, apart from black pigmentation of the conjunctiva, no abnormalities were found. Specular microscopy of right eye showed lowered endothelial cell count (1800 cd/mm²), presence of dense corneal guttata, severe pleomorphism, and polymegathism. Left eye endothelium was normal (2858 cd/mm²) (Figure 2). Posterior segment ultrasonography of the right eye revealed punctiform intravitreal echoes with high reflectivity and thickened hyperreflective line of posterior vitreous detachment, which suggested incrustation with dye and inflammation. According to provided ink specification, black pigment used was a dermal tattoo dye consisted of carbon black (10%), isopropyl alcohol (10%), and acrylic resin (5%).

Patient was admitted to the ophthalmology department, and treatment to decrease IOP with 20% mannitol IV, oral acetazolamide, topical α -agonists and β -blockers was initialized. In addition, local administration of 0.1% dexamethasone, 0.1% nepafenac, 1% tropicamide, ofloxacin and oral prednisone were added for uveitis. After IOP

normalization, we decided to puncture anterior chamber of the right eye and try to wash out the ink. Though some of the pigment was removed with this procedure, there was no clinical improvement. Hence, 4 days later, patient was scheduled for 23G vitrectomy with additional removal of ink-incrusted inflammatory film covering anterior surface of the lens and liberation of posterior synechia. Despite difficulties with visualization of posterior segment and removal of the pigment from the surface of the covered tissue, BCVA in the right eye improved to 20/25 following the procedure. However, IOP without topical medications remained elevated. Therefore, topical dorzolamide, timolol, and brimonidine were added to the treatment on top of oral acetazolamide. In physical examination of the right eye at hospital discharge, BCVA was 20/25, pachymetry decreased to 591 μ m, and IOP to 14 mmHg, since stepwise reduction in oral corticosteroids and acetazolamide doses was scheduled.

One month after the surgery, all oral drugs were finally withdrawn. Same topical treatment was gradually reduced with decreasing signs of inflammation.

Nearly 2 months after the surgery, dorzolamide, timolol, and brimonidine were finally replaced by latanoprost.

IOP remained within normal limits when topical latanoprost was administered. However, compliance and drug adherence were poor—patient did not attend scheduled

appointments and administered drugs occasionally. Moreover, posterior synechia formed again; hence, we decided to perform Nd:YAG iridotomy as a prophylaxis of IOP increases. Despite technical difficulties with focusing the laser beam on black iris, satisfactorily iridotomy was finally achieved. Unfortunately, the effect of the treatment turned out to be transient and early re-medication with latanoprost, dorzolamide, and timolol was necessary.

After 8 months from the first patient's visit, cortical cataract was observed in the right eye, which caused worsening of BCVA to 20/100. Patient was advised to perform cataract surgery, but she denied. In the left eye, BCVA was preserved and slit-lamp examination revealed occurrence of conjunctival lumps, which were asymptomatic to the patient. No other abnormalities were found.

Currently, almost 2 years after the tattoo, patient remains under our care, but her compliance is still poor. IOP in the right eye remains stable, although requires constant topical treatment. Right eye BCVA dropped to light perception with projection. Patient still denies to perform cataract or glaucoma surgery.

Conclusion

Due to increasing popularity of eyeball tattoos, its ophthalmological complications are becoming new medical challenge. Since only a few cases of such complications were reported so far, the knowledge how to proceed in such clinical scenarios is insufficient. As even correctly performed eyeball tattoo may be complicated with hypersensitivity reaction to the pigment used, we propose to divide tattoo-related adverse events into two groups: procedure-related and ink-related. Case presented here is particularly interesting, since almost all possible consequences of eyeball tattooing were found in one patient. Moreover, we present comprehensive treatment of the subject with almost 2 years follow-up.

Procedure-related complications of eyeball tattoo are subsequent to globe penetration with the needle and inadvertent intraocular pigment injection. Eyeball wall perforation during tattooing, even without dye injection, may lead to complications similar to these observed after intravitreal injections including vitreous or subretinal hemorrhage, retinal detachment or endophthalmitis.¹ There is also a risk of traumatic cataract. Situation is much more serious when dye is injected intraocularly, what had happened in the case presented here. Ink particles circulate covering parts of the globe including corneal endothelium, lens, trabecular meshwork, and retina. This, except from obvious translucency loss, leads to clog of trabecular meshwork causing secondary pigmentary glaucoma.² Surgical treatment of such a case should focus on early pigment removal from the eye. First, careful physical examination and ultrasound of the globe should be performed to localize ink deposits. When the pigment is found

only in anterior chamber, its lavage will be sufficient. Otherwise, when the deposits are localized in vitreous cavity, vitrectomy should be carried out. In cases like ours, when ink particles were found in anterior and posterior segments of the eyeball, both procedures need to be performed. Intensive anti-inflammatory treatment should also be initiated as soon as possible to avoid late complications of endophthalmitis. In the case presented here, such an early approach was impossible due to delayed patient's presentation.

The second group of possible eyeball tattoo's complications—ink-related—are caused by immune reaction to the dye. To our knowledge, there are no pigments specifically tested for sub-conjunctival application, since dyes used for eyeball tattooing are the same as the ones used for skin tattooing. Both local and systemic immune hypersensitivity reactions following skin tattooing have been widely reported in literature. From histological point of view, among local hypersensitivity eczematous, lymphohistiocytic, granulomatous, lichenoid, and pseudo-lymphomatous reactions can be found.^{3,4} Clinical presentation of these complications is non-specific including swelling, tenderness, nodules, redness, and pruritus.⁴ Such reactions, but engaging conjunctiva, were found in our patient (conjunctival nodes in the right eye) and in other cases found in literature—presence of conjunctival lumps,^{5,6} orbital cellulitis, posterior scleritis,⁶ and conjunctival swelling.^{6,7} Systemic reactions to the skin tattoo are less common and include sarcoidosis-like reactions and uveitis (from iridocyclitis to panuveitis).⁸ Worth noticing is that sub-conjunctival pigment injection may induce the latter even more likely. The treatment of hypersensitivity reactions to the skin tattoo is limited to oral and topical glucocorticosteroids, as well as oral anti-histaminergic drug administration.³ In some of the cases reported, removal of subcutaneous pigment deposits was also necessary.³ Since complete removal of sub-conjunctival dye deposits is technically almost impossible, this treatment approach is limited in patients with eyeball tattoos.

Another ink-related complication is chronic induction of immune response, which can lead to malignancy development⁹ and scleral thinning. Furthermore, modified color of conjunctiva makes melanoma screening more difficult, which may postpone the diagnosis and appropriate treatment of the disease.

Moreover, since spontaneous migration of tattoo ink components into the eyelid was observed in our case and in other cases reported,⁶ the transfer of dye, even through intact eyeball wall, to the suprachoroidal space and aqueous outflow apparatus cannot be ruled out.¹⁰

Eyeball tattooing is potentially harmful and may even lead to blindness. Hence, subjects undergoing this procedure should be aware of its possible complications and informed to seek medical attention as soon as possible when the complications occur.

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