

Intrabulbar, Intraorbital and Intracranial Perforating Eye Injury with Foreign Body: A Case Report

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Abstract

Ocular trauma is a significant cause of preventable blindness and visual impairment worldwide. Eye globe perforation can happen due to work with sharp tools or different particles that are spread during work with metals, wood, and other solid substances. We present the case of a 14-year-old male patient admitted as an urgent case at the Ophthalmology Department in 2014 due to a perforating eye injury with a foreign body – a 7 cm rusty metallic nail in the right eye. The X-ray of the orbit revealed that the foreign body had penetrated the eyelid, the eye eyeball, and through the orbit and its posterior wall, penetrated the skull and 2 cm in the brain. Under general anesthesia, we performed the anterior chamber lavage, excision of the prolapsed iris, and pupilloplasty. The anterior chamber was reconstructed using a saline solution (0.9% NaCl) and air. The patient was treated conservatively with antibiotics and steroids for 10 days; there were no signs of wound filtration, hypotonia, or endophthalmitis. Due to the limited resources for the posterior segment surgery, the patient was referred to another center for pars plana vitrectomy (PPV) after 10 days of hospitalization in the Department of Ophthalmology at the University Clinical Center of Kosovo. After PPV with silicon oil and cataract surgery, the patient could see the light and its projections (BCVA = L+P+). We followed up on the patient until September 2022, there were no signs of bulbus atrophy, and the visual acuity remained the same, BCVA = L+P+.

The correct diagnosis and treatment at the right time play a leading role in achieving one of the main goals of surgical treatment of perforating eye injuries, which is the preservation of the anatomical structure and the physiology of the eye. (**International Journal of Biomedicine. 2024;14(1):159-161.**)

Keywords: perforating eye injuries • foreign body • surgical treatment

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Introduction

Ocular trauma is a significant cause of preventable blindness and visual impairment worldwide, with approximately 1.6 million people being blind annually due to the condition. Despite being a mostly avoidable condition, it continues to pose a significant burden, especially in developing countries. Increasing socioeconomic burden, inadequate safety measures, lack of optimal treatment facilities, and poor education are some of the factors that contribute to the high incidence of ocular trauma in these regions. ⁽¹⁾Industrialization

and urbanization may alter or modify prevalent aetiological factors and the presentation of ocular trauma. ⁽²⁾

Eye globe (bulbus oculi) perforation can happen due to work with sharp tools or different particles that are spread during work with metals, wood, and other solid substances. Penetrating/ perforating injury could lead to lacerations of the eyelids, cornea, or sclera, which may be associated with intraocular hemorrhage, retained foreign bodies, or tractional retinal detachment. ^(3,4) We present a case of a young male patient with a perforating eye injury with a metallic foreign body.

Case Presentation and Discussion

A 14-year-old male patient was admitted as an urgent case at the Ophthalmology Department in 2014 due to a perforating eye injury with a foreign body – a metallic nail

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in the right eye (Picture 1). Firstly, a detailed patient history was taken from the parents, where the circumstances of the injury were explained. The perforating injury of the eye was caused by a metal nail. The injury happened while the patient tried experimenting with a “toy” he had built himself. This equipment comprised two plastic containers of 100 mL; the patient filled them with gas and tied the lighter switch to the containers. Afterward, he filled plastic tubes with metal nails and fixed all these parts together. While trying to see them through the tubes, he accidentally pushed the switch; the gas was lit, pushing the nail out of the tube with a very high pressure (Picture 2).



Pic. 1. The presence of the metallic foreign body in the right eye.



Pic. 2. The tool that caused the injury.

At the time of admission, the patient was conscious. The X-ray of the orbit revealed that the foreign body had penetrated the eyelid, the eye eyeball, and through the orbit and its posterior wall, penetrated the skull and 2 cm in the brain (Picture 3).

After receiving the complete laboratory results, anti-tetanic protection was administered, and surgery under general anesthesia was planned. Based on the data we obtained from the radiological finding, we identified our case as a duplicate perforating injury with a foreign body. After having a clear

idea of the penetration depth of the nail, we proceeded with the surgery. The first step was the removal of the foreign body, where a 7 cm rusty metallic nail was removed from the eye (Picture 4).



Pic. 4. After the foreign body was removed from the eye.

When we gained access to the eye, we managed to open the eyelid and an irregular wound with constant bleeding was present. With the examination in the operating room, we evaluated that there was a prolapse of the iris and corpus vitreous, and the anterior chamber of the eye was destructed and filled with blood.

As the first step of the surgical treatment, the anterior chamber was lavaged with a saline solution (0.9% NaCl) to remove the blood and gain a clearer view. Afterward, we performed an excision of the prolapsed iris and reconstructed the pupil by performing the pupilloplasty. Being a challenging case, our primary purpose was to reconstruct the destroyed parts of the eye to maintain its anatomical structure. After performing the pupilloplasty, we constructed the anterior chamber by using a saline solution (0.9% NaCl) and air and sutured the cornea using 10.0 Nylon sutures (Picture 5).



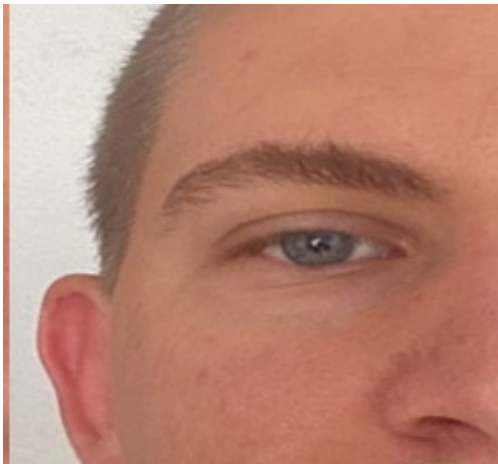
Pic. 5. Pupilloplasty.

Conservative treatment was started immediately after the surgery, and the patient remained under surveillance. We treated the patient with intravenous antibiotics (Cefazolin 2g every 12h), topical antibiotics (Cefazolin-Vancomycin

eyedrops every 1h), and topical and oral steroids. The patient was examined daily to see the recovery process; there were no signs of wound filtration, hypotonia, or endophthalmitis. Due to the limited resources for the posterior segment surgery, the patient was referred to another center for pars plana vitrectomy (PPV) after 10 days of hospitalization in the Department of Ophthalmology at the University Clinical Center of Kosovo. After PPV with silicon oil and cataract surgery, the patient could see the light and its projections (BCVA = L+P+). We followed up on the patient until September 2022, there were no signs of bulbous atrophy, and the visual acuity remained the same, BCVA = L+P+ (Pictures 6 and 7).



Pic. 6. The patient's eye in 2017.



Pic. 7. The patient's eye in 2022.

We presented a very rare case of a 14-year-old male patient admitted as an urgent case at the Ophthalmology Department in 2014 due to a perforating eye injury with a foreign body – a metallic nail in the right eye.

The treatment of intraorbital foreign bodies depends on a variety of factors. Using broad-spectrum antibiotics with or without anaerobic and antifungal coverage is recommended, as well as the timely vaccination of the patient against tetanus.

The most important procedure, and the first one in open ocular trauma, is to restore the structural integrity as soon as possible.^(6,7) Guven et al.,⁽⁷⁾ using multivariate logistic regression analysis, found that lens damage is also an essential factor affecting the final visual acuity.

Less severe injuries tend to require less surgery, whereas more severe injuries, with more subsequent complications, would require more surgery and carry a worse prognosis.⁽⁸⁻¹⁰⁾

In conclusion, the correct diagnosis and treatment at the right time play a leading role in achieving one of the main goals of surgical treatment of perforating eye injuries, which is the preservation of the anatomical structure and the physiology of the eye.

Ethical Considerations

Publication of the report was approved by the Ethics Committee at the University Clinical Centre of Kosovo. The patient's legal guardians gave informed consent for publishing the case report, including images and other clinical information, except individual details identifying the patient.

Competing Interests

The authors declare that they have no competing interests.

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