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Case report

Intraoperative choroidal detachment occurring in a case of perforating ocular injury

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ABSTRACT

Purpose: To describe an intraoperative choroidal detachment due to balanced salt solution (BSS) leakage through the exit wound in a case with perforating ocular injury.

Observations: The patient was a 22-year-old man who suffered from a left eye injury caused by a piece of wire during work. Vitrectomy was started after closure of the scleral wound, but surgical procedure could not be continued, as BSS leakage occurred into the subretinal and supra-choroidal spaces, resulting in a narrowed vitreous cavity, as we were slow to recognize the presence of the perforating ocular injury in this patient. Fluid-air exchange and air-silicone oil exchange in the vitreous cavity were performed to finish the initial surgery. Three weeks later, the reoperation was performed to remove silicone oil and insert an intraocular lens into the bag. Presently, 1 year 5 months following the second surgery, corrected visual acuity is 20/50.

Conclusions and Importance: Our findings indicate that BSS can leak through the exit wound into the subretinal and supra-choroidal spaces intraoperatively in a case of perforating ocular injury.

1. Introduction

An open globe ocular injury can be classified into 4 types; globe rupture, penetrating ocular injury, injury from intraocular foreign body, and perforating ocular injury, with the latter occurring with both an entry and exit wounds. For treatment of a perforating ocular injury, vitrectomy and additional procedures such as intravitreal tamponade should be performed after the wound is sutured. However, even with a highly skilled vitrectomy procedure used for treatment, visual prognosis is not always favorable.

We experienced a case of penetrating ocular injury for which surgical procedure could not be continued, as balanced salt solution (BSS) leakage occurred into the subretinal, supra-choroidal space and sub-Tenon’s capsule, resulting in a narrowed vitreous cavity, as we were slow to recognize the presence of the perforating ocular injury in this patient. We report here the characteristics of this case and his post-operative course.

2. Case report

The patient was a 22-year-old man who suffered from a left eye injury caused by a piece of wire during work. Left visual acuity was hand motion (non-correctable) and intraocular pressure was 3 mmHg. A scleral laceration was pointed out at the 10 o’clock position, 2 mm from the corneal limbus (Fig. 1-a). The ocular fundus could not be observed due to hyphema and vitreous hemorrhage. Orbital computed tomography and B-mode ultrasonography found no intraocular foreign body, nor evidence of retinal detachment and choroidal detachment.

For surgery, phacoemulsification and aspiration, along with a 3-port vitrectomy using a wide-viewing system were performed after scleral suture. Scleral ports were placed at 3.5mm from corneal limbus and the infusion cannula was certain to make no ectopic BSS infusion. During the process of vitreous hemorrhage removal, we observed sites of retinal injury, one on the lower side of the optic disc, and another between the optic disc and macula (Fig. 1-b). The retinal injury on the lower side...
of the optic disc was covered with coagula, which was aspirated and removed together with the vitreous body. As we continued vitrectomy, the retina and choroid were seen elevated to the vitreous cavity, while the conjunctiva and Tenon’s capsule were also found to be bulging (Fig. 1-c). Those findings were considered to be indicative of BSS leakage. Thereafter, both the retina and choroid were elevated to the vitreous cavity relatively quickly, which prevented us from continuing vitrectomy (Fig. 1-d). Fluid-air exchange and air-silicone oil exchange in the vitreous cavity were performed to finish the surgery.

The site of retinal injury on the lower side of the optic disc was an exit wound that formed a perforating ocular injury, where not only coagulation but also vitreous herniation had developed. The flow of BSS leakage might have been formed after their removal. This was considered to be a phenomenon in which BSS leaked from the vitreous cavity to outside of the globe, accumulating not only beneath the retina and Tenon’s capsule, but also flowing into the subretinal and suprachoroidal spaces, while elevated and narrowed the vitreous cavity (Fig. 2-a, 2-b, 2-c).

On the next day after surgery, subretinal and suprachoroidal fluid
disappeared, without evidence of retinal detachment or vitreous hemorrhage, while retinal hemorrhage and fibrosis in the macula caused by the injury were observed (Fig. 3-a). Three weeks after the initial surgery, the reoperation was performed to remove silicone oil from the vitreous cavity and insert an intraocular lens into the bag. The peripheral vitreous gel, which had been left during the initial surgery, was extracted and the internal limiting membrane adjacent to the macula was peeled off. Surgery was completed after photoagulation around the retinal injury and an intraocular exchange with 20% SF6 was performed. Presently, 1 year 5 months following the second surgery, corrected visual acuity is 20/50 (Fig. 3-b).

3. Discussion

We treated the present patient for a scleral laceration (entry wound) and injury to the retina. However, since surgery was performed without recognition of the presence of the exit wound, BSS leakage beneath the retina and choroid resulted in narrowing of the vitreous cavity and ultimately suspension of the initial surgical manipulation. Had the perforating ocular injury been noticed earlier, the exit wound would have been sutured so as to not allow BSS leakage and the first surgery might have been successfully completed.

A previous study reported that a perforating ocular injury was recognized because of the phenomenon of intraocular air leakage at the time of fluid-air exchange immediately prior to completion of the vitrectomy, thus we consider that such an injury may not always be preoperatively diagnosed. Therefore, when treating a penetrating ocular injury, the attending surgeon in charge of the vitrectomy should confirm the possibility of the presence of a perforating ocular injury in such cases.

4. Conclusions

Our findings indicate that BSS can leak through the exit wound into the subretinal and supra-choroidal spaces intraoperatively in the case with a perforating ocular injury.

Patient consent

This research has received ethic approval from The Research Ethics Committee in Hirosaki University Graduate School of Medicine. The research adhered to the tenets of the Declaration of Helsinki. Written informed consents were obtained from the patient for publication of this case report and any accompanying images.

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Fig. 3a. Panoramic fundus photography of the left eye at 2 weeks after the initial surgery. Silicone oil occupied approximately 70% of the vitreous cavity. Photoocoagulation was partially performed around the retinal injury exit wound on the lower nasal side of the optic disc. Retinal injury and hemorrhage were also observed in the macula.

Fig. 3b. Approximately 17 months after second surgery. Fibrosis was observed in the retinal injury on the lower nasal side of the optic disc and macula. No other complications were observed and the patient showed a stable course.
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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ajoc.2020.100643.

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