Total Traumatic Expulsive Iridodialysis with an Orbital-Floor Fracture

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Abstract
The objective of this report was to describe a case of total traumatic iridodialysis in the context of blunt trauma with an orbital-floor fracture. A 76-year-old female presented post-fall with right-eye blunt trauma. She underwent canthotomy and cantholysis due to concern of orbital compartment syndrome in a regional hospital with emergency physicians clearing dark tissue near the lateral canthus at the time of canthotomy cantholysis. She had a traumatic expulsive iridodialysis with 360° loss of iris through the previous phacoemulsification wound in the clear cornea. The patient also had an orbital-floor fracture, which together with internal decompression through the previous phacoemulsification wound possibly prevented further damage to intraocular structures. There was good visual recovery. Herein, we propose that the combination of the orbital-floor fracture in tandem with the reopening of the previous phaco wound served as a decompressing mechanism to prevent further intraocular injury above that of total iridodialysis.

Introduction

The phenomenon of traumatic expulsive iridodialysis has been described now with the advent of sutureless phacoemulsification cataract surgery. It is thought that blunt trauma-related pressure differentials between the intraocular compartment and the extraocular surface may reopen previous surgical incisions [1].
Case Report

A 76-year-old female presented to a regional Victorian hospital following a fall from a standing height, wherein she sustained right-eye blunt trauma with a rock. She presented with a swollen tense eye, and a lateral canthotomy was performed due to clinical suspicion of orbital compartment syndrome. During the time of canthotomy and cantholysis, the physician performing the procedure noted dark tissue around the site of canthotomy cantholysis which was cleared. She proceeded to have a CT scan which demonstrated a depressed fracture through the orbital floor with prolapse of orbital fat into the maxillary sinus (Fig. 1a).

She was then transferred to the Royal Victorian Eye and Ear Hospital which is a tertiary eye hospital for further management. Relevant ophthalmic history was significant for previous right-eye cataract surgery. On examination in the emergency department, her visual acuities were right eye 6/36-2 and left eye 6/6. Intraocular pressures were right eye 15-mm Hg and left eye 12-mm Hg. The right anterior segment exam was significant for corneal Descemet membrane folds and endothelial pigment dusting; there was a previous temporal phacoemulsification wound in the clear cornea with pigmentation noted within the wound. There was 4+ microhyphaema, a formed anterior chamber, and a posterior-chamber intraocular lens with stable and intact capsular complex with no IOL decentration. There was a 360° loss of the iris with some iris remnant temporally and inferotemporally (Fig. 1b). The Seidel test was significant for a very slow leak from the temporal corneal phacoemulsification wound. Her left eye was unremarkable. There was a full range of extraocular movements with no diplopia. The patient underwent an examination under anaesthesia which confirmed the above findings; a 10-0 nylon interrupted suture was used to close the phacoemulsification wound. At 7 weeks post-injury, this patient achieved a visual acuity of 6/9.6.

Discussion

In the first described case in the literature [2], Ball and coauthors propose the mechanism suggesting that smaller corneal incisions naturally have a high-pressure gradient across the intraocular to extraocular space that results in a propagative iridodialysis from impact as the iris is lost through the corneal wound. In this case, the patient had a 4.0-mm corneal incision.
Similarly, other cases describe total traumatic expulsive iridodialysis with previous clear corneal incisions ranging from 2.75 mm to 4.0 mm [3, 4].

The presence of simple microhyphaema in the context of traumatic iris disinsertion is unusual given the extent of traumatic injury, this is unique as all other case reports have described initial presentations of total or partial macrohyphaema [1–9] and with presenting visual acuities of less than 6/120 [1–3, 5–9]. Only one report described a bilateral case with better presenting visual acuities of right eye 6/12 and left eye 6/15 [4] in comparison to our case. The patient was assessed within a few hours of injury after transfer from a regional hospital. We propose that the smaller 2.7-mm corneal incision may have resulted in greater pressure gradients between the intra and extraocular spaces occurring during the decompressive episode resulting in the loss of blood as well as iris, leaving a relatively good view at the initial eye examination with no macrohyphaema. This is in context with the orbital-floor fracture which would have mitigated the force transmitted to the globe.

Additionally, our report uniquely describes a co-existent orbital-floor fracture as confirmed on CT. We propose a synergistic mechanism between the orbital decompression from the fracture and anterior chamber decompression through the previous phacoemulsification wound to protect against further damage to intraocular structures, thus maintaining a good visual outcome.

All reports have also described elevated presenting intraocular pressures [1–9], most of which necessitated IOP lowering therapy. In our case, the slow leak noted on the Seidel test from the phacoemulsification wound is likely to have self-regulated possible high intraocular pressure.

Our patient had good vision on follow-up. This is similar to other reports which describe visual acuities of 6/6 [1, 3, 9], 6/7.5 [4], 6/9 [5], and 6/18 [7]. While iris implants or coloured contact lenses may be offered to patients who suffer intractable glare as a result of aniridia [9], not all patients require intervention as highlighted in a bilateral case with good vision and no symptoms of glare. As such follow-up and expectant management may be all that is required.

It is unclear the significance of the dark tissue noted and cleared at the time of canthotomy and cantholysis. While it is possible that this may have been iris tissue, it is uncertain the proportion of tissue that was mechanically externalized as a result of the cleaning process. Additionally, the process of performing a canthotomy and cantholysis could have placed severe pressure temporally allowing the phaco wound to open. This emphasizes the need to perform this procedure very carefully to avoid pressure on the globe and should be performed by practitioners with expertise in this procedure in eyes with previous cataract surgery. This aspect of the case also reiterates good practice in avoiding manipulation of possible iris tissue in cases of eye injury both for frontline emergency staff and for eye speciality staff providing remote support for peripheral emergency centres.

**Statement of Ethics**

Written informed consent was obtained from the patient for publication of the details of their medical case and any accompanying images. The research was conducted ethically in accordance with the Declaration of Helsinki. This retrospective review of patient data did not require ethical approval in accordance with local guidelines.

**Conflict of Interest Statement**

The authors have no conflicts of interest to declare.
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Author Contributions

Dr. Jeremy Mathan and Dr. Varun Chandra were involved in patient assessment, management, and case write-up.

Data Availability Statement

All data that support the findings of this study are included in this article. Further enquiries can be directed to the corresponding author.

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