ORBITAL COMPARTMENT SYNDROME IN THE PRONE POSITION

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INTRODUCTION

The COVID-19 pandemic has resulted in a worldwide surge of admissions to intensive care units (ICU), with unprecedented numbers of patients being nursed in a prone position to reduce mortality. The long-term morbidity of these patients is currently unknown. Visual loss is a disastrous complication of prone positioning that increases the morbidity of patients surviving COVID-19 ICU admission.

AIM

We report a case of orbital compartment syndrome (OCS) in a proned ICU patient. We consider the aetiological factors of this condition and suggest strategies to address modifiable risk factors to reduce the incidence of visual loss.

CASE

A 50-year-old Afro-Caribbean female was admitted to ICU with COVID-19. Her past medical history included hypertension, type 2 diabetes mellitus and an estimated BMI of >35.

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Due to worsening oxygenation, she was nursed in a prone position. Whilst manoeuvring her from the left lateral to the prone position, ICU staff reported blunt trauma to her right eye.

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On de-proning 48 hours later, the patient had the following signs in the right eye: periorbital oedema, proptosis, a tense orbit with resistance to retropulsion, 360° subconjunctival haemorrhage, lagophthalmos, conjunctival chemosis with necrosis, corneal oedema, a right relative afferent pupillary defect and raised intraocular pressure (IOP).

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A diagnosis of orbital compartment syndrome (OCS) was made. A lateral canthotomy and cantholysis were performed with a noted release of tissue tension and reduction in IOP. The local ICU eye care protocol was followed with chloramphenicol, regular lubricants and a dressing to be applied over the right eye to close the lid. The patient was started on pressure lowering eye drops.

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The patient developed intraocular inflammation with a pupillary membrane secondary to sustained raised IOP. A 6-13 MHz ultrasound probe typically used for arterial line insertion was used to perform a B scan and showed an exudative retinal detachment.

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Once the pupillary membrane resorbed, dilated fundus examination revealed no vitritis, retinitis or vasculitis, with a flat retina and unremarkable optic disc and macula. The patient went on to develop a ventilator associated pneumonia and died one month following admission.

FIGURE 1. Manoeuvring a patient from the lateral to the prone position[1]

ICU RELATED RISK FACTORS FOR OCS

- Increased orbital venous pressure and periorbital oedema from positive pressure ventilation
- Tight endotracheal tube taping
- Gravitational effects of being in the prone position
- Direct eye compression

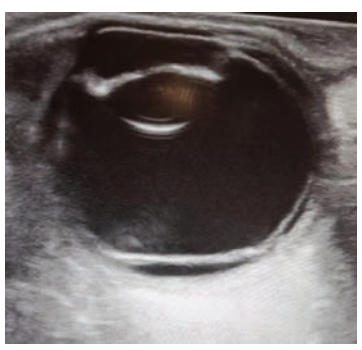

FIGURE 2. B scan: exudative retinal detachment

Prevalent risk factors in COVID-19 ICU patients that increase the risk of a retrobulbar haemorrhage which may cause OCS:

- Hypertension
- Diabetes
- Use of anti-coagulants

KEY LEARNING POINTS

- Maintain patient head position above heart level in the prone position
- Routinely use a 3-pin head holder to avoid eye compression and maintain a neutral neck position which reduces the risk of jugular vein or carotid artery compromise
- Ultrasound scan can be performed at the bedside when CT is not possible to evaluate a wide variety of ocular pathologies, even when used by non-eye specialists with adequate training
- Awareness of OCS in a critical care setting is often limited, preventing timely decompression
- There are reports of visual recovery after delayed decompression at 5 days[2] and therefore decompression is worth considering even if diagnosis is delayed.

To confirm proper protection of the eyes in the prone position the following have been trialled in clinical settings:

- Mirror attachment to the patient headrest[3]
- Computer video streaming system to monitor eye position[4]
- Use of the front camera or "selfie mode" image captured from a smartphone[5]

CONCLUSION

- The wide spectrum of aetiologies which may cause OCS highlights the importance of being alert to the possibility of OCS in any proned patient with periorbital oedema and proptosis
- Given the number of patients at risk globally, critical care staff should be aware of how to mitigate this risk and when to seek urgent ophthalmic review
- Interventions such as staff training, correct patient positioning, and novel use of technology to facilitate more effective eye assessments, will ensure safe visual outcomes for proned ICU patients with COVID-19

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