Raised intraocular pressure postmaxillectomy and orbital floor reconstruction surgery

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DESCRIPTION

A 25-year-old man, case of malignant peripheral nerve sheath tumour with orbital invasion (**figure 1**), underwent right-sided extended total maxillectomy including removal of orbital floor, periorbital and part of inferior and lateral rectus muscles along with orbital floor reconstruction using temporalis-coronoid tendon transfer (**figure 2A**). A routine bedside ophthalmic evaluation was sought postoperatively for chemosis and proptosis with limited ocular movements in the right eye (RE). Vision was at least 6/60. On fundus examination (bedside indirect ophthalmoscopy) of RE, significant disc pulsations (**figure 2B** and **video 1**) were noted suggesting raised intraocular pressure (IOP) to intracranial pressure ratio.^{1 2} Left eye (LE) was normal. The patient was immediately called to ophthalmology out-patient department for detailed workup. IOP on applanation tonometry was 56 and 16 mm Hg in RE and LE, respectively. Apart from conjunctival congestion and chemosis, the slit lamp examination for the RE was normal. Gonioscopy could not be performed as patient was uncooperative. Anterior segment examination was unremarkable in LE. Patient was started on maximum antiglaucoma medications, however, IOP remained uncontrolled. CT scan imaging ruled out any space-occupying lesion in the orbit-like haematoma causing orbital compartment syndrome. Diode laser cyclophotocoagulation (DLCP) was done subsequently for IOP control. Two weeks postcyclophotocoagulation, IOP reduced to 26 mm Hg with disappearance of disc pulsations. In light of the course of events, diagnosis of post maxillectomy glaucoma was made. IOP 2 months postmaxillectomy and DLCP was found to be 18 mm Hg on topical brimonidine and timolol with visual acuity of 20/60. Proptosis had subsided by the time (**figure 2C,D**).

Compartment syndrome due to postsurgery, soft tissue swelling was our first differential diagnosis. The soft tissue swelling subsided with time, so did the compartment syndrome and the IOP pressure reduced. But had it been the only cause, the final pressure after resolution of soft tissue swelling should have been perfectly matched within normal limits. Even after suppressing aqueous production with DLCP, our patient required two topical antiglaucoma medications to maintain IOP of 18 mm Hg suggesting compartment syndrome was not the only cause for glaucoma. The other contributing factor could be extensive damage to periorbital tissue, episcleral veins and bulbar conjunctiva during tumour removal, resulting in interference with aqueous drainage. Aqueous humour drains into

Figure 1 Clinical image depicting the tumour with orbital involvement (A); axial (B) and coronal (C) Contrast enhanced magnetic resonance imaging showing a heterogeneous enhancing lesion involving the entire right maxilla, extending into the orbit and infratemporal fossa.

Schlemm's canal via trabecular meshwork. From here, it proceeds to the aqueous vein via collector channels and then to the episcleral and conjunctival veins.³ IOP is the balance between aqueous production rates and the episcleral venous pressure. Elevated episcleral pressure is thus a cause of ocular hypertension.^{4 5} Significant damage to conjunctiva

Figure 2 Postoperative clinical image depicting the congestion of cornea (A); (B) showing indirect ophthalmoscopic examination of optic disc; (C) and (D) showing 2 months postoperative picture with significant enophthalmos.

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Video 1 Significant disc pulsations as seen on indirect ophthalmoscopy in the right eye.

and tenon's tissue might have affected conjunctival and episcleral drainage, leading to increase in IOP.⁶ Gross chemosis and conjunctival congestion could be the result of either two or additive effect of the above-mentioned two causes.

Our case highlights two essential points. First, that excessive damage to orbital soft tissue and conjunctiva in any surgery (orbital, sinuses, orbital apex etc) can secondarily lead to increase in IOP, causing ischaemic damage to optic nerve and visual

decline in a previously asymptomatic eye. Second, optic disc pulsation using a direct or indirect ophthalmoscope noted on bedside evaluation may hint to ocular hypertension, warranting comprehensive ophthalmic assessment.

Learning points

- ▶ Excessive damage to orbital soft tissue and conjunctiva in any surgery (orbital, sinuses, orbital apex etc) can secondarily lead to increase in intraocular pressure, causing ischaemic damage to optic nerve and visual decline in a previously asymptomatic eye.
- ▶ Optic disc pulsation using a direct or indirect ophthalmoscope noted on bedside evaluation may hint to ocular hypertension, warranting comprehensive ophthalmic assessment.

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REFERENCES

- 1 Jacks AS, Miller NR. Spontaneous retinal venous pulsation: aetiology and significance. *J Neurol Neurosurg Psychiatry* 2003;74:7–9.
- 2 Firsching R, Schütze M, Motschmann M, et al. Venous ophthalmodynamometry: a noninvasive method for assessment of intracranial pressure. *J Neurosurg* 2000;93:33–6.
- 3 Bron AJ, Tripathi RC, Tripathi BJ, et al. *Wolff's anatomy of the eye and orbit*. 8th edn. London: Chapman & Hall Medical, 1997: 292–8.
- 4 Ruiz-Ederra J, Verkman AS. Mouse model of sustained elevation in intraocular pressure produced by episcleral vein occlusion. *Exp Eye Res* 2006;82:879–84.
- 5 Shareef SR, Garcia-Valenzuela E, Salierno A, et al. Chronic ocular hypertension following episcleral vein occlusion in rats. *Exp Eye Res* 1995;61:379–82.
- 6 Lee YR, Na JH, Kim JY, et al. Increased intraocular pressure after extensive conjunctival removal: a case report. *Korean J Ophthalmol* 2013;27:141–4.

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