CLINICAL PRACTICE GUIDELINE: Emergency Department

Retrobulbar Haemorrhage

Disclaimer: This Clinical Practice Guideline ('CPG') was written for use in The Royal Victorian Eye and Ear Hospital Emergency Department. It should be used under the guidance of an Ophthalmology or ENT registrar. If clinical advice is required, please contact the Eye and Ear Admitting Officer for assistance: EYE: +61 3 9929 8033; ENT: +61 3 9929 8032. Links to internal Eye and Ear documents cannot be accessed from the website CPG.

Description:

Haemorrhage within the orbit posterior to the orbital septum. Retrobulbar haemorrhages can cause an orbital compartment syndrome, characterised by an an acute rise in intraorbital pressure, thereby compressing the central retinal artery and other vessels with resultant optic nerve and retinal ischaemia and permanent loss of vision. Immediate assessment and management is necessary to reduce the risk of vision loss.

Red Flags:

- Painful, proptosis with a visual deficit and/or a relative afferent pupillary defect (RAPD) is an indication for an immediate lateral canthotomy and cantholysis
- Do not let detailed history/investigations interfere with immediate management if diagnosis clear
- Irreversible visual loss can occur within 1.5 to 2 hours time from onset of haemorrhage
- There may be a delay in the signs of a retrobulbar haemorrhage after the initial presentation
- Consider possible association of traumatic optic neuropathy in the setting of orbital trauma
- If contacted by another hospital's emergency department for advice for treatment, discuss the indications for and execution of immediate canthotomy/cantholysis.
- In trauma cases, establish mechanism of injury to exclude other injuries which may require management at a general hospital eg. head injury

How to Assess:

History:

- Acute visual loss, diplopia, proptosis, pain
- Risk factors: orbital/lid/sinus surgery, retrobulbar/peribulbar injections, facial trauma, anticoagulants, antiplatelet agents, blood dyscrasias

Examination:

In cases of trauma, immediate Advanced Life Support (ATLS) assessment: Airway, Breathing, Circulation, Disability, Exposure (ABCDE), examining to exclude cervical spine and head injury.

Examine for associated injuries, e.g. ruptured globe or penetrating eye injury.

The following signs suggest orbital compartment syndrome:

- Optic nerve dysfunction:
    - Decreased visual acuity
    - Reduced light or red desaturation, or colour vision
    - RAPD
- Painful proptosis with limitation of eye movements
- Tense orbit/resistance to retropulsion
- Marked subconjunctival haemorrhage
- Intraocular pressure (IOP) > 40mmHg
- Fundoscopy: optic disc swelling, venous congestion, central retinal vein occlusion, retinal oedema, cherry red spot if associated central retinal artery occlusion

When performing a dilated fundus examination, it is recommended to dilate the pupil only on the affected side, so an afferent pupillary defect can still be assessed (reverse RAPD).

Investigations:

- Orbital compartment syndrome secondary to retrobulbar haemorrhage is a clinical diagnosis. Investigations should not delay the immediate management of a clinically diagnosed retrobulbar haemorrhage with visual compromise.
- Platelet count, coagulation profile if a coagulopathy is suspected or if on an anticoagulant.
- CT orbit (contrast not required) – may reveal fracture or post-surgical bony defect, intraorbital blood, proptosis, 'globe tenting' (posterior globe angle $<130^0$) and the aetiology of the orbital compartment syndrome.

Acute Management:

- If no signs of visual compromise, manage conservatively with close observation, rest, head elevation, ice packs. Monitor visual acuity, pupils and IOP.
- Treatment of a retrobulbar haemorrhage with visual compromise requires an emergency lateral canthotomy and cantholysis. Medical management can be commenced concurrently.
- Lateral canthotomy and cantholysis:
    - Betadine® prep and drape
    - Local anaesthetic (2% lignocaine with 1:100,000 adrenaline) into lateral canthus, needle orientated away from globe.
    - Diathermy equipment is advised (eg bipolar / monopolar cautery machine from operating theatre; battery loop monopolar eg 'Bovie'); consider suction.
    - Clamp the lateral canthus with artery forceps for ~1min. Pass one tip of the forceps posterior and one anterior to the lateral canthus all the way to the bony orbit. This helps reduce bleeding and displaces oedema for your incision.

- **Lateral canthotomy**: take blunt tipped scissors and cut the lateral canthus skin all the way to the bony orbit, with the blades straddling the lateral canthus.

- **Lateral cantholysis** (inferior crus): use forceps to pull the lower lid margin anteriorly to expose the lateral canthal tendon. Then identify the inferior crus of the lateral canthal tendon inferolaterally (can usually strum the fibrous band with closed scissors as it will be taut). Using blunt tipped scissors place one blade on either side of the inferior crus of the lateral canthal tendon and cut just below the tarsal plate (approx. 5-6mm below the lid margin). When it is cut the lower lid should become more lax. Confirm by attempting to strum the canthal tendon again. A cantholysis is usually adequate to decompress the orbit. If not, consider whether you have properly cut the inferior crus or if you need to cut the superior crus.
- Apply gentle pressure to the wound as required for haemostasis.
- Apply chloramphenicol ointment several times per day until wound is healed.
- Lateral canthotomy and cantholysis may be left to spontaneously granulate and heal or may be electively repaired.

Medical management:

- Medical management may be considered in conjunction with immediate surgical management. It should not delay surgical treatment if there is visual loss.
- Acetazolamide:
  - Adult, oral/IV, initial dose of 250 to 500mg. Maintenance, 250mg every 4 hours as required, to a maximum of 1g daily (see Acetazolamide Prescribing and Administration Guideline)
  - Used to reduce intraocular pressure.
- Mannitol
  - Adult 1-2g/kg (5-10mL/kg of 20% solution) intravenously over 30 to 60 mins (see Mannitol Infusion Procedure). Administer with caution to patients with renal/heart disease or severe dehydration.
  - Used to reduce the volume of vitreous
- Methylprednisolone
  - Adult 1g IV stat. Consider dose reduction if co-morbidities (see Methylprednisolone Procedure).
  - Used to provide neuroprotection against ischaemia, reduce spasm and oedema of the microcirculation and reduce intra-orbital pressure.
- Other measures:
  - Admit patient
  - Position in a head up position
  - Monitor visual acuity, IOP and RAPD every 15 minutes for 2 hours, then 30 minutes for the next 4 hours, then hourly.

Contact Oculoplastics fellow. Failure of improvement with lateral canthotomy and cantholysis may require formal orbital decompression or surgery to evacuate the haematoma.

Evidence Table

Author(s)	Title	Source	Level of Evidence (I – VII)
Popat H, Doyle PT, Davies SJ	Blindness following retrobulbar haemorrhage--it can be prevented	The British journal of oral & maxillofacial surgery 2007;45:163-4.	VI
Rowh AD, Ufberg JW, Chan TC, Vilke GM, Harrigan RA	Lateral Canthotomy and Cantholysis: Emergency Management of Orbital Compartment Syndrome.	The Journal of emergency medicine 2014	VI
Chen YA, Singhal D, Chen YR, Chen CT	Management of acute traumatic retrobulbar haematomas: a 10-year retrospective review.	Journal of plastic, reconstructive & aesthetic surgery : JPRAS 2012;65:1325-30.	V
Winterton JV, Patel K, Mizen KD	Review of management options for a retrobulbar hemorrhage.	Journal of oral and maxillofacial surgery 2007;65:296-9.	V
C. M. Wood	The Medical Management of Retrobulbar Haemorrhage Complicating Facial Fractures: A Case Report	The British journal of oral & maxillofacial surgery 1989;27:291-5.	VI

The Hierarchy of Evidence

The Hierarchy of evidence is based on summaries from the National Health and Medical Research Council (2009), the Oxford Centre for Evidence-based Medicine Levels of Evidence (2011) and Melynk and Fineout-Overholt (2011).

I) Evidence obtained from a systematic review of all relevant randomised control trials.

II) Evidence obtained from at least one well designed randomised control trial.

III) Evidence obtained from well-designed controlled trials without randomisation.

IV) Evidence obtained from well-designed cohort studies, case control studies, interrupted time series with a control group, historically controlled studies, interrupted time series without a control group or with case series.

V) Evidence obtained from systematic reviews of descriptive and qualitative studies.

VI) Evidence obtained from single descriptive and qualitative studies.

VII) Expert opinion from clinician, authorities and/or reports of expert committees or based on physiology.

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