CASE REPORT

Restoration of pretrabeculectomy visual acuity and a functioning filtering bleb in an eye with delayed suprachoroidal haemorrhage following trabeculectomy

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Accepted 19 November 2015

SUMMARY

A 35-year-old myopic man with juvenile open angle glaucoma was referred to us with fluctuating intraocular pressure (IOP) and progression in his only seeing left eye. He had systemic features suggestive of Marfan's syndrome. He underwent trabeculectomy with low dose mitomycin-C with operative precautions to prevent postoperative hypotony in view of high myopia and scleral thinning. On the second postoperative day, he had severe pain in his left eye, with vomiting, and presented with decreased vision, high IOP and a flat anterior chamber. Ultrasound B scan revealed 360° haemorrhagic choroidal detachment. He was conservatively managed and monitored over the next 1 month with appropriate medical treatment. He not only recovered his pretrabeculectomy visual acuity but also had a well functioning bleb at the end of 2 months.

BACKGROUND

Suprachoroidal haemorrhage (SCH) is a rare vision-threatening complication during or after any intraocular surgery, and remains one of the most feared complications for ophthalmic surgeons.¹ It occurs due to rupture of the short and long posterior ciliary arteries leading to accumulation of blood in the potential space between choroid and sclera in predisposed eyes with hypotony and other risk factors.² It can occur intraoperatively, where it is usually massive and causes expulsion of the intraocular contents. When it occurs hours/days after the surgery, it is termed postoperative/delayed SCH (DSCH).²⁻⁴ The risk factors for DSCH include advanced age, systemic hypertension, arteriosclerosis, use of anticoagulants, high preoperative intraocular pressure (IOP), axial myopia, severe postoperative hypotony, aphakic and vitrectomised eyes, and Valsalva manoeuvres during postsurgery.²⁻⁴

DSCH is more common after glaucoma filtration surgeries due to its inherent risk of high preoperative IOP, postoperative hypotony and inflammation. The incidence of DSCH after glaucoma filtration procedures has been reported to vary between 1.6% and 6.2%.¹⁻³

When associated with retinal complications such as vitreous haemorrhage, retinal detachment, central retinal apposition (kissing choroids) or uncontrolled IOP and intractable pain, secondary drainage is carried out (after liquefaction of the

clot). When such associations are not found, conservative management with oral steroids plays a key role in the resolution of the haemorrhage, monitored by serial B scan ultrasonography.²⁻⁸

CASE PRESENTATION

A 35-year-old man presented with decreased vision and photophobia in his left eye (LE). He had lost the vision in his right eye (RE) postretinal detachment surgery 3 years before. He was a known type II diabetic and had been on oral hypoglycaemic medications for 4 years. He had been diagnosed elsewhere as having juvenile open angle glaucoma (JOAG) 3 years earlier and was on various antiglaucoma medications (AGM). He was referred to us in view of significant disc and field progression, and fluctuating IOP ranging between 25 and 31 mm Hg on maximum medical therapy.

On general examination, he had a tall, thin stature, long arm span and a high arched palate, features suggestive of Marfan's syndrome. On ocular examination, his RE had no light perception, and was hypotonous. The LE had a visual acuity of 20/252 improving to 20/30 with myopic correction (−7.50 DS (dioptre sphere) and −3.0 DC×90° (dioptre cylinder)). Anterior segment examination showed extensive scleral thinning with staphyloma inferiorly and superiorly (figure 1), and open angles on gonioscopy; the rest of the anterior segment was normal. Fundus examination revealed a cup disc ratio of 0.8:1 with bipolar excavation and nerve fibre layer thinning superiorly. The IOP recorded was 2 mm Hg in the RE and 16 mm Hg in the LE, on four AGM (brimonidine tartrate 0.2%+timolol maleate 0.5% twice daily, dorzolamide 2%-twice daily, bimatoprost 0.01% once at bedtime). His visual field in the LE revealed an incomplete inferior arcuate scotoma, correlating with the disc damage, and showed significant progression compared to visual fields assessed elsewhere 6 months earlier. He was diagnosed as having JOAG, phthisis bulbi in the RE, status post-vitreoretinal surgery for retinal detachment and high myopia in the LE.

In view of the fluctuating IOP and visual field progression noted in the patient's LE, an 8 h office diurnal test was performed, showing 14 mm IOP fluctuation (from 16–32 mm Hg) in the LE. The location and extent of staphyloma allowed a superotemporal location for trabeculectomy. A valved

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To cite: Senthil S, Gupta S, Balijepalli P. *BMJ Case Rep* Published online: [please include Day Month Year] doi:10.1136/bcr-2015-211846

Figure 1 Diffuse illumination showing scleral thinning, most prominent in the superotemporal and inferotemporal quadrants (arrow).

implant was also considered, however, as the staphyloma was over 5–6 mm posterior to the limbus, this was not an option. The patient underwent a fornix based trabeculectomy supero-temporally using 0.02% mitomycin C for 30 s. In view of his high myopia, thin sclera and JOAG, measures to prevent post-operative hypotony were taken, namely, slow decompression with paracentesis, preplaced suture to the scleral flaps before making the deep ostium, and maintenance of anterior chamber during and immediately after surgery. Appropriate apposition of the scleral flaps was performed using three 10/0 nylon sutures to avoid over filtration.

On postoperative day 1, visual acuity was 20/80 and the patient had a well formed bleb with deep anterior chamber (AC), with an air bubble filling 1/4th of the anterior chamber and IOP of 14 mm Hg. He was started on topical steroids, antibiotics and cycloplegics, and advised to follow-up after 3 days.

However, he reported to the emergency room the next day, with sudden onset of pain, diminished vision and redness in his LE, with two bouts of vomiting. On examination, vision was hand motions with accurate projection of rays. The anterior chamber was flat with a small air bubble superiorly, a shallow bleb, patent iridectomy and IOP of 40 mm Hg. There was no view of the fundus.

INVESTIGATIONS

A gentle B-scan ultrasound (USG) revealed haemorrhagic choroidal detachment 360° (figure 2).

DIFFERENTIAL DIAGNOSIS

In view of high IOP and flat AC, the following three differentials were considered.

- ▶ Pupillary block
- ▶ Malignant glaucoma
- ▶ SCH

The presence of patent iridectomy ruled out a pupillary block, and the finding of haemorrhagic choroidals on USG B scan led to a diagnosis of SCH.

TREATMENT

Treatment was initiated within 6 h of the complication. Intravenous 20% mannitol, 250 mL, was given over 45 min, as the patient's IOP was 40 mm Hg. He was started on topical

Figure 2 Four quadrant B scan ultrasonography of left eye showing suprachoroidal haemorrhage in all quadrants (arrow).

prednisolone acetate 1% eye drops one hourly, atropine 1% eye drops three times and moxifloxacin 0.3% eye drops four times a day. Oral prednisolone 60 mg/day (1 mg/kg body weight) was also started and his blood sugars were monitored. Oral and topical steroids helped in decreasing the inflammation and cycloplegics helped to deepen the anterior chamber.

OUTCOME AND FOLLOW-UP

On day 2, with treatment, the patient's vision improved to counting fingers at 3 m; the AC was shallow but formed centrally. At 1 week, there was improvement in his vision (20/200), the AC was formed, IOP improved to 8 mm Hg, with a well formed diffuse bleb, and USG B scan showed liquefaction of the SCH (figure 3). The oral and topical steroids were tapered over the next 6 weeks and the DSCH resolved completely by 8 weeks. At a 2-month postoperative visit, the patient's visual acuity was 20/25 with −11.25 DS/−1.00 DC×40°, with an IOP of 19 mm Hg, the AC was well formed with clear central lens

Figure 3 B scan ultrasonography of left eye showing liquefaction of the suprachoroidal haemorrhage.

Figure 4 Slit lamp photograph of left eye showing well formed anterior chamber and central clear lens (arrow).

(figure 4) and there was a diffuse filtering bleb (figure 5). Fundus and B scan showed resolved SCH (figure 6A, B).

DISCUSSION

DSCH is a rare sight-threatening complication after intraocular surgery, more so following glaucoma surgery. Givens and Shields,¹ Jeganathan *et al*,² and Tuli *et al*,³ looked at postglaucoma surgery SCH and reported incidence, risk factors and outcomes. The incidence varies from 1.6–6.2% and is higher in eyes with predisposing risk factors. The risk factors reported are aphakia, anticoagulant use, severe postoperative hypotony, high myopia, prior intraocular surgery and systemic hypertension.^{2–4} The incidence is higher following glaucoma drainage implantation compared to trabeculectomy, especially with non-valved implants.^{2–3} Large series have reported poor visual outcomes after DSCH.^{2–3}

The possible risk factors for SCH in our patient were high preoperative IOP, thin sclera and possible postoperative hypotony. High myopia in a Marfan's syndrome case is reported to be associated with SCH due to large intraocular volume and abnormally low scleral rigidity.⁵ Although our patient was highly myopic, his LE axial length was only 24.6 mm. There was no subluxation of the lens and no cataractous changes were noted. However, the keratometry readings were steep (50.67 @ 101° and 52.16 @ 11°), and this would have contributed to the high myopia. The pachymetry was 461 microns and there was no clinical evidence of keratoconus.

Figure 5 Slit lamp photograph of left eye showing diffuse bleb (arrow) at 2 months postoperatively.

Figure 6 (A) Montage of colour fundus showing resolved suprachoroidal haemorrhage. (B) Four-quadrant B scan ultrasonography showing resolution of the suprachoroidal haemorrhage (minimal choroidal thickening still present).

Although the AC was deep and IOP was 14 mm Hg on postoperative day 1, possible hypotony due to a sudden gush of aqueous from the AC could have caused hypotony. This hypotony could have precipitated to SCH, either spontaneously or secondary to the Valsalva manoeuvre (during vomiting) in a hypotonous eye. The patient presented with severe pain and decreased vision following two bouts of vomiting. Whether the vomiting precipitated the SCH or vomiting was secondary to rise in IOP following a spontaneous SCH is debatable. Ruderman *et al*⁴ and Gressel *et al*⁶ reported one case each of SCH after Valsalva manoeuvre. With this manoeuvre, there is a rapid increase in intrathoracic and intra-abdominal pressure, which leads to increase in the venous pressure in the eye, further leading to rupture of the choroidal vessel wall, and haemorrhage.

Although the visual outcomes are poor in eyes with SCH, a few have been shown to regain prehaemorrhagic visual acuity with either early drainage or conservative management.^{4–6–7} An alternative approach for the management of DSCH was proposed by Pakravan *et al*,⁸ suggesting early choroidal drainage

with anterior chamber reformation, with improved IOP control and visual acuity.

When SCH is limited and not associated with retinal complications such as retinal detachment, vitreous haemorrhage, kissing choroidals and uncontrolled IOP, conservative management can help resolve this condition. During this period, serial B scan USG plays a crucial role in monitoring the retinal status, liquefaction of the clot and resolution. If the clot is associated with complications mentioned above, secondary drainage can be considered after the liquefaction of the clot, which usually takes 7–14 days, or at the earliest.⁸ Topical steroids and strong cycloplegics play a crucial role in decreasing the inflammation and deepening the anterior chamber. Systemic steroids may help control the inflammation due to the breakdown of haemoglobin and its by-products in the presence of massive SCH. Monitoring the bleb and appropriate medical management is also critical to determine for long-term IOP control.

Learning points

- ▶ Suprachoroidal haemorrhage is a rare vision threatening complication during or after intraocular surgery.
- ▶ Understanding the risk factors and taking prophylactic preoperative and intraoperative measures can help prevent this complication.
- ▶ Early recognition of the complication and appropriate management with close follow-up is critical in salvaging the eye.
- ▶ Conservative management has a role to play and helps to restore prehaemorrhagic visual acuity in cases not associated with retinal complications.

Although rare, DSCH is a serious complication following glaucoma filtering surgery. In those with high risk for SCH, appropriate precautions intraoperatively and postoperatively are crucial to avoid this complication. Conservative management with close observation plays a key role in the resolution of DSCH in those with no retinal complications. In our patient, appropriate conservative management helped resolve SCH in 8 weeks, and the patient not only regained prehaemorrhagic visual acuity in 2 months, but he also had a diffuse filtering bleb with well controlled IOP.

Contributors SS, SG and PB contributed to conception, design, acquisition and interpretation of data. SS, SG and PB contributed to drafting the article and revising it critically for important intellectual.

Competing interests None declared.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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