Novel treatment (new drug/intervention; established drug/procedure in new situation)

Pneumatic retinopexy for treatment of posterior pole detachment following vitreoretinal surgery for diabetic tractional retinal detachment threatening the fovea

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Summary

To describe the usage of 100% perfluoropropane and subsequent laser retinopexy for the repair of posterior pole retinal detachment in a previously vitrectomised patient with diabetic tractional detachment.

BACKGROUND

I hope to share with my colleagues the successful management of a redetachment involving the posterior pole utilising gas, posture and laser retinopexy which obviates the

need for revision vitrectomy and silicone oil in a patient with history of tractional retinal detachment threatening the fovea.

Figure 1 Fundus photograph of the right eye prior to first surgery showing tractional retinal detachment in a lasered eye with proliferative diabetic retinopathy. Arrows showing location of small full thickness retinal breaks in the tractional membranes.

CASE PRESENTATION

A 45-year-old Malay lady presented with cataract and tractional retinal detachment in association with full thickness retinal holes at the temporal arcades (figure 1). The time-domain (Stratus, Zeiss) optical coherence tomography (OCT) scan confirmed the fovea was threatened (figure 2). Visual acuity was 6/9, N6 OU with nuclear sclerotic cataract of 1+. She elected to undergo 23G pars planar vitrectomy, membrane peeling, drainage retinotomy, barricade laser and intraocular sulphur hexafluoride (SF₆) gas after informed consent. She reported an initial improvement in her visual acuity postoperatively following partial resorption of the gas bubble. During the 4th week, at her follow-up visit, she complained of sudden onset of decreased vision commencing 1 week prior.

On examination, it was noted she had a posterior pole detachment due to the open drainage retinotomy (figure 3). This was well demonstrated on OCT (figure 4). There was

Figure 2 Stratus optical coherence tomography of the right eye showing tractional retinal detachment threatening the fovea at presentation.

Figure 3 Fundus photograph of the right eye showing macular detachment following vitrectomy surgery. The arrow shows the location of open drainage retinotomy.

no residual vitreous traction noted. Visual acuity was 4/60, 6/36, N-OD.

INVESTIGATIONS

- Ocular coherence tomography.

DIFFERENTIAL DIAGNOSIS

- Proliferative vitreoretinopathy.

TREATMENT

Informed consent was obtained for right pneumatic retinopexy. About 0.6 ml of 100% carbon perfluoropropane (C₃F₈) gas was injected to globe firmness under aseptic technique. The patient was required to posture face down continuously for 48 h.

OUTCOME AND FOLLOW-UP

A gas bubble of 40% was noted in the vitreous (figure 5). The macula had flattened and argon laser retinopexy was promptly performed on day 2 postgas injection to the retinotomy. The patient continued to posture face down for 1 week. The retina was reattached. Her best corrected visual acuity was 6/60, N48 at 6 months postoperatively with no redetachment and nuclear sclerotic cataract of 2+

Figure 5 Fundus photograph of the right eye showing 40% gas fill with attached posterior pole after pneumatic retinopexy.

Figure 6 Fundus photograph of the right eye showing attached posterior pole 6 months following pneumatic retinopexy. The location of the sealed drainage retinotomy is just visible (arrow).

(figure 6). OCT confirmed restoration of anatomy of the fovea (figure 7).

DISCUSSION

Pneumatic retinopexy (PR) is a simple, minimally invasive procedure for the treatment of rhegmatogenous retinal detachments (RRD). The Collaborative Pneumatic

Figure 4 Stratus optical coherence tomography showing macula detachment of the right eye 1 month postoperatively.

Figure 7 Optical coherence tomography of the right eye showing a normal macular anatomy 6 months after pneumatic retinopexy.

Retinopexy Study evaluated RRDs secondary to one break or group of breaks no larger than one clock hour located within the superior eight clock hours of the fundus and found successful rates of retinal reattachment.¹ PR has slightly lower initial success rate compared to scleral buckle (SB) but similar final reattachment rates.¹ In fact, PR had better postoperative visual acuity and less morbidity.¹ In this case, SB is not an option due to the posterior position of the break in a previously vitrectomised eye.

Expanded indications for PR include eyes with multiple breaks in multiple quadrants, large tears of up to 2.5 clock hours in size, and retinal detachments associated with a moderate degree of proliferative vitreoretinopathy.² Inferior breaks treated with PR have a high rate of failure.² Less conventional usage of PR includes the management of superior giant retinal dialyses³ and selected giant retinal tears.⁴ There is no previous literature on the usage of PR in surgical management of diabetic tractional retinal detachment to the best of my knowledge.

This article therefore, further expands the indications for pneumatic retinopexy to vitrectomised eyes with limited posterior pole detachments. The principles remain the same: injection of a 100% expansile gas to achieve at least 1.2 ml gas bubble with strict posturing followed by laser retinopexy. The advantages are substantial. PR has distinct advantages over a three-port pars planar revision vitrectomy and silicone oil, in that the surgery is shorter, is of lower cost and has a faster rehabilitation.

The choice of C3F8 gas was that a smaller bubble can be injected (0.3 ml) to achieve a final bubble size of 1.2 ml. About 0.6 ml of C3F8 gas was injected in this case to compensate for gas leakage and to achieve as large a bubble as possible in the absence of vitreous. This is better than SF6 which needs a much larger injected gas volume to achieve a good fill. This larger volume often leads to higher immediate postinjection intraocular pressures. C3F8 gas also lasts longer which permits longer posturing in motivated patients to prevent a

redetachment. However, large studies show no difference between SF6 and C3F8 in terms of success rate.⁵

The poor visual acuity outcome in this case is due to the duration of macula detachment and could have been avoided with a closer follow-up.

Learning points

- ▶ Optical coherence tomography has dramatically changed the indications for vitrectomy in diabetic tractional retinal detachments as it is able to diagnose macular threatening detachments early in the disease.
- ▶ Drainage retinotomy for tractional retinal detachments in lasered proliferative diabetic retinopathy (PDR) may lead to posterior pole detachments and loss of vision after vitrectomy.
- ▶ Pneumatic retinopexy utilising injection of 100% C3F8 gas in combination with face-down posturing is an option for reattachment of detached posterior pole in lasered PDR after vitrectomy.

Competing interests None.

Patient consent Obtained.

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