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SHORT COMMUNICATION

Macular hole following conventional repair of bullous retinal detachment using air injection (D-ACE procedure)

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PURPOSE. *Sequential drainage of subretinal fluid (D), injection of air (A), cryotherapy (C), and application of local explants (E) (D-ACE) sequence was introduced in order to overcome the problems encountered in managing superior bullous detachments from multiple large equatorial breaks. The authors recently observed the occurrence of a full-thickness macular hole in one patient developing the day after he underwent a D-ACE procedure.*

METHODS. *A 61-year-old man presented a bullous retinal detachment in the right eye extending from the 9:30 to the 2 o'clock position, and posteriorly to the vascular arcades two retinal tears were noted, at the equator at 11 o'clock, and anterior to the equator at 12 o'clock. The patient underwent a D-ACE procedure. Subretinal fluid was drained above the lateral rectus muscle at the equator. One and a half milliliters of air were injected 3.5 mm from the limbus midway between the superior and the medial rectus insertions. Cryotherapy was applied to the retinal breaks. A 240 encircling band was used in conjunction with a 276 tyre segment at the level of the tears.*

RESULTS. *One day after surgery, the retina was flat, but a full-thickness macular hole could be seen with a surrounding cuff of subretinal fluid.*

CONCLUSIONS. *The mechanisms proposed to explain the occurrence of full-thickness macular holes after D-ACE may involve the concurrence of scleral elongation and vitreofoveal traction by means of previous partial posterior vitreous detachment with persistent posterior attachments at the fovea. (Eur J Ophthalmol 2004; 14: 572-4)*

KEY WORDS. *Air injection, Macular hole, Retinal detachment, Scleral buckle*

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INTRODUCTION

Air injection into the vitreous cavity to provide temporary intraocular tamponade has been used in the management of selected retinal detachments for years (1). In 1980, D-ACE sequence was introduced in order to overcome the problems encountered in managing superior bullous detachments from multiple large equatorial breaks, namely the fish-mouthing resulting from the extensive buckling (2). This technique involves sequential drainage of subretinal fluid (D), injection of air (A), cryotherapy (C), and application of local explants (E) (2, 3).

We recently observed the occurrence of a full-thickness macular hole in one patient developing the day after he underwent a D-ACE procedure. Although macular hole formation has been reported previously both after pneumatic retinopexy (4, 5) and scleral buckling (6, 7), we are unaware of published reports of such holes complicating scleral buckling procedures with the use of air.

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Case report

A 61-year-old man presented with a 10-day history of floaters, photopsia, and an inferior visual defect in the right eye. Visual acuity was 20/25 in the right eye and 20/20 in the left. Fundus examination of the right eye showed a bullous retinal detachment extending from the 9:30 to the 2 o'clock position, and posteriorly to the vascular arcades. Two retinal tears were noted, at the equator at 11 o'clock and anterior to the equator at 12 o'clock. A lattice degeneration was noted in the inferior retina periphery. The macula was attached with normal reflexes. There was partial separation of the posterior cortical vitreous in the retina periphery. The vitreous appeared attached over the posterior pole with no evidence of a Weiss ring.

Surgery was deferred for 2 days because of the patient's general health problems. During this period the detachment extended into the central macular region, although there was no evidence of a macular hole. Visual acuity deteriorated to 20/100. Funduscopy of the left eye was normal.

The patient underwent a D-ACE procedure. Subretinal fluid was drained above the lateral rectus muscle at the equator. One and a half milliliters of air were injected 3.5 mm from the limbus midway between the superior and the medial rectus insertions. Cryotherapy was applied to the retinal breaks. A 240 encircling band was used in conjunction with a 276 tyre segment at the level of the tears.

One day after surgery, the retina was flat, but a full-thickness macular hole could be seen with a surrounding cuff of subretinal fluid (Fig. 1). A complete posterior vitreous detachment (PVD) was observed and a horseshoe tear was noted within the area of lattice degeneration, which was treated with laser photocoagulation.

The patient refused any further surgery for closing the macular hole. At the last follow-up visit, 8 months after the surgery, the retina remained flat with the open macular hole and best-corrected visual acuity of 5/200.

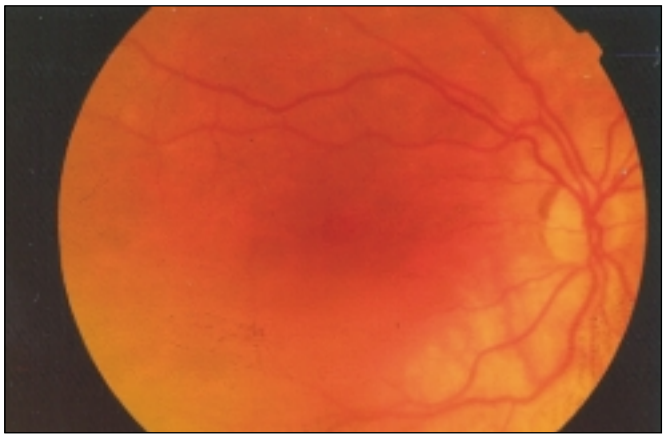

Fig. 1 - *Full-thickness stage 4 macular hole.*

DISCUSSION

The complications described with D-ACE technique are intraocular hemorrhage, retinal incarceration, serous ciliochoroidal effusion, and transient signs of anterior segment ischemia. The complication rate from the injection of air is low and does not include new breaks (8, 9).

Macular hole formation has been reported previously after pneumatic retinopexy (4, 5) and scleral buckling (6, 7). All macular holes complicating retinal detachment surgery reported so far have occurred no earlier than 5 days postoperatively, whereas the case we report appeared 1 day after surgery. In a series of 17 eyes undergoing vitrectomy for macular holes that occurred after scleral buckling for retinal detachment, time to postscleral buckling macular hole diagnosis was 5.2 months in the 13 eyes with prior macula-off retinal detachment, and 92.3 months in the 4 eyes with prior macula-on retinal detachment (10).

In the case we describe, the occurrence of the macular hole as a truly new break is suggested by the preoperative good visual acuity and normal appearance of the macula on funduscopy. Sequential breaks in association with an initial break occur in 10% of cases. Differently from our case, these are typically multiple, within 2 clock hours of the original break, and peripheral (11).

The mechanisms proposed to explain the occurrence of full-thickness macular holes after D-ACE for repair of rhegmatogenous retinal detachment may involve the concurrence of scleral elongation and vitreofoveal traction. The pre-existence of a partial PVD with persistent posterior attachments at the fovea was suggested by recent optical coherence tomography studies (12). The migration of the gas bubble into the retro-hyaloidal space might cause an acute traction on the fovea with ensuing macular hole, similarly to

what happened on the lattice causing the peripheral retinal tear. The encircling band, causing scleral elongation, might have served to increase the vitreomacular traction by lengthening the distance between the macula and the vitreous base.

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