

Outpatient treatment of retinal detachment

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Summary

Outpatient treatment of retinal detachment is a new concept. The first 20 cases treated in the Department of Ophthalmology at Tygerberg Hospital are discussed. After an inert gas has been injected into the vitreous cavity the patient is allowed to go home, where he must remain in the therapeutic position. When the patient returns the next day the retina will usually be reattached around the breaks, and laser photocoagulation or cryopexy is performed.

The success rate is high, and this procedure should be considered in all cases in which it is indicated.

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Norton¹ introduced the use of sulphur hexafluoride (SF₆) gas in retinal detachment surgery in 1973 and Lincoff *et al.*² perfluorocarbon gases in 1983.

Dr Alfredo Dominguez in Spain and Dr George Hilton in the USA later independently developed a new method of treating retinal detachment without surgery, primarily using gas. Rapidly expansive inert gases are injected into the eye to tamponade retinal holes, which are then sealed with laser photocoagulation or cryopexy.

Hilton *et al.*³ described their first 100 cases at an American Academy of Ophthalmology meeting at the end of 1986. A discussion of our first 20 cases follows.

Indications and contraindications

Indications for the procedure are retinal detachments resulting from one or more peripheral breaks, superiorly between 8 o'clock and 4 o'clock. Contraindications are: (i) detachments due to breaks more than 60° apart, because in this situation a single bubble cannot cover the tears; (ii) detachments resulting from inferior breaks between 4 o'clock and 8 o'clock; (iii) detachments in the presence of gross vitreous traction or proliferative vitreoretinopathy; and (iv) severe glaucoma.

Methods

The Honans balloon is applied to reduce intra-ocular pressure. The eye is anaesthetised with topical anaesthetic drops. With the patient in the supine position, the conjunctiva is cleaned with equal parts of povidone iodine solution and balanced salt. SF₆ is drawn into a tuberculin syringe with a 30-gauge needle. The needle is introduced infero- or superotemporally, between 3.5 and 4 mm from the limbus, through the pars plana or plana ciliaris, to a depth of about 5 mm and then withdrawn until about 2 mm of the needle remains in the vitreous cavity.

The gas is injected rapidly using 0.5 ml undiluted SF₆. The entrance wound is covered with a cotton-tipped applicator and the patient's head turned so that the gas moves away from the entrance wound. Under indirect ophthalmoscopy the head is moved so that the gas bubble covers the retinal breaks (Fig. 1), and the retinal artery is examined. Should flow cease for more than 1 minute, aspiration of gas or parasymplysis is performed.

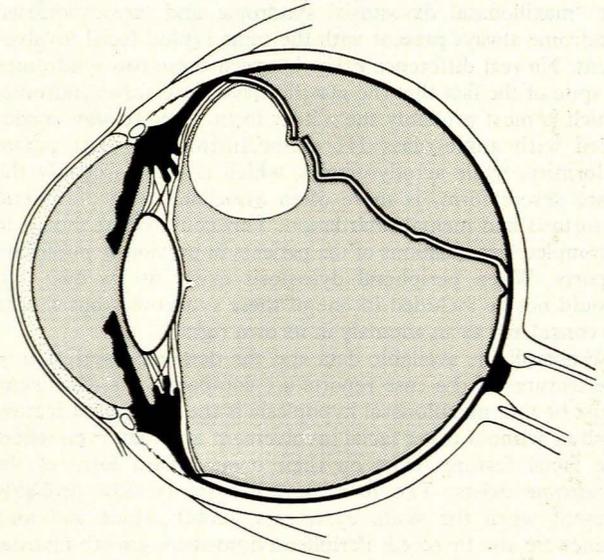


Fig. 1. Gas bubble covering retinal break (top).

The patient is instructed to hold the head in the therapeutic position, i.e. the position in which the breaks are covered by the gas bubble (Fig. 2). If multiple gas bubbles form, the patient is instructed to hold the head in a position in which the bubbles are away from the breaks. In all our cases the bubbles coalesced within 24 hours. Hilton *et al.*³ reported finding a firm tap on the eye with a cotton-tipped applicator useful for this purpose.

The patient is re-examined after 1 hour and the intra-ocular pressure is measured. He is then discharged and should remain in the therapeutic position until the next day, when he returns to the office and photocoagulation or cryopexy is performed to seal off the breaks. If photocoagulation through the gas bubble is difficult, the patient's head can be turned so that the bubble moves away from the breaks.

In some of our cases cryopexy was used instead of laser photocoagulation. These patients received a retrobulbar block.

The patient must remain in the therapeutic position for at least 23 hours per day for the first 5 days after introduction of the gas.

Patients (Table I)

The average age of our patients was 53 years. Five were female and 15 male. Nine patients had total detachments; 13 detachments were bullous in nature, while 7 were shallow. Twelve patients were phakic and 8 aphakic. Traction bands were present in 9 cases. Laser photocoagulation was performed in

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TABLE I. PATIENT CHARACTERISTICS AND RESULTS

Patient No.	Age (yrs)	Sex	Detachment	Retinal breaks	Special features	Laser/cryo.	Result	Visual acuity	
								Pre-op.	Post-op.
1	72	M	Superior bullous, 180°. Macula attached	Round hole 11h30	Aphakic, traction bands	Laser	Attached day 5	6/6	6/6
2	62	M	Total, bullous	3 horseshoe tears 10h00 - 12h00	Phakic, traction bands	Laser	Attached day 3	PL	6/5
3	64	F	Superior bullous 180°. Macula detached	Horseshoe tear 11h30	Phakic, lattice degeneration, traction bands	Laser	Attached day 3	HM	6/6
4	36	F	Superotemporal, shallow	Horseshoe tear 11h00 - 12h00	Phakic, high myope, lattice degeneration	Laser	Attached day 2	6/6	6/5
5	60	M	Total, bullous	3 horseshoe tears 14h00 - 16h00	Aphakic, traction bands	Cryo.	Detached. Still detached after vitrectomy and external tamponade	PL	Lost to follow-up
6	22	M	Temporal 160°, shallow. Macula detached	Detachment surgery 5 yrs previously. Multiple small holes at 09h00 behind band	Phakic, blunt trauma	Cryo.	Attached day 4	HM	6/20
7	65	M	Superior bullous, 120°	Round hole 12h00. External tamponade. Still detached day 5. SF6 injected	Aphakic	Cryo.	Attached day 10	6/20	Lost to follow-up
8	70	M	Bullous, temporal half. Macula detached	Small round hole 10h30	Aphakic	Laser	Attached day 5	HM	Lost to follow-up
9	36	M	Bullous temporal half. Macula detached	Small hole 11h30	High myope, myopic degeneration, aphakic	Cryo.	Attached day 5	HM	6/60
10	45	M	Superonasal, shallow	Round hole 12h30	Phakic, traction bands	Laser	Attached day 2	6/6	6/6
11	40	M	Total, bullous	4 small round holes 09h00 - 12h00	Aphakic, blunt trauma. Detached day 5. External tamponade and cryo.	Cryo.	Attached day 10	PL	6/30
12	70	M	Total, bullous	3 round holes 10h00 - 14h00	Phakic, traction bands. External tamponade, cryo. Detached day 4. SF6 injected followed by laser	Cryo.	Attached day 6	HM	6/12
13	46	F	Bullous, nasal 180°	Large horseshoe tear 12h00 - 15h00	Phakic, traction bands	Laser and Cryo.	Attached day 6	6/12	6/9
14	60	M	Total, shallow	Horseshoe tear 11h00 - 12h00	Phakic, traction bands	Laser	Attached day 2	HM	6/9
15	70	M	Total, bullous	2 horseshoe tears 11h00 - 12h00	Phakic, traction bands	Laser	Attached day 3	PL	6/12
16	52	F	Superior, shallow. Macula attached	2 small round holes 11h00 - 12h00	Myope, phakic, lattice degeneration	Laser	Attached day 2	6/6	6/6
17	40	M	Total, bullous	Oblique tear, peripheral 10h00 - 12h00	Phakic, blunt trauma	Laser	Attached day 5	PL	6/20
18	34	F	Total, shallow	Small horseshoe tear 11h00	Phakic, blunt trauma	Cryo.	Attached day 3	HM	6/20
19	69	M	Inferotemporal, shallow. Macula attached	Small horseshoe tear 10h00	Aphakic, penetrating injury 2 mo. previously	Cryo.	Attached day 6	6/12	6/6
20	51	M	Total, bullous	3 horseshoe tears 10h00 - 13h00 and 1	Aphakic, penetrating injury 6 mo. previously	Cryo.	Shallow detachment	HM	Lost to follow-up

Laser = laser photocoagulation; cryo. = cryopexy; PL = perception of light; HM = hand movements

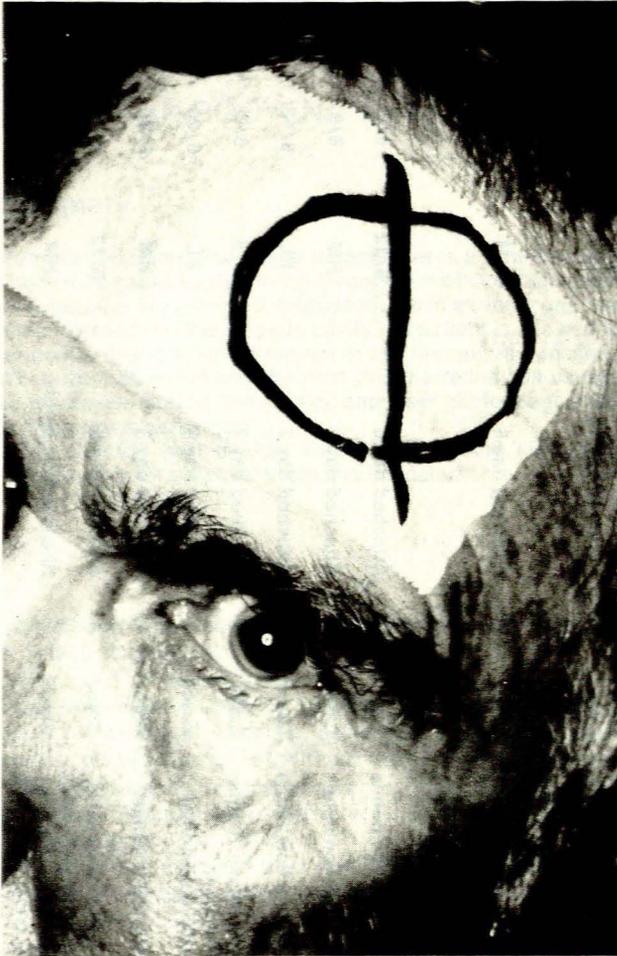


Fig. 2. Therapeutic position.

10 cases, laser photocoagulation and cryopexy in 1 and cryopexy only in 9.

Results

The retina reattached without further interference in 17 cases. One patient required additional external tamponade, and in 2 cases the retina remained detached. The procedure therefore had a success rate of 85%. No recurrences were encountered among the patients whose retinas reattached.

The first procedure was done 24 months ago and the last 1 month ago; the mean duration of follow-up at the time of writing was 12 months.

Two of our patients in whom the procedure failed had inferior breaks which could have been missed originally or could have formed after the gas was injected, and the third had strong vitreous bands.

No macular detachments were encountered after introduction of the gas.

Discussion

SF₆ expands 2,5 times in 48 hours, i.e. 0,5 ml expands to 1,25 ml, and is absorbed in 7 - 10 days. Perfluoropropane (C₃F₈) expands 4 times in 48 hours, i.e. 0,3 ml expands to

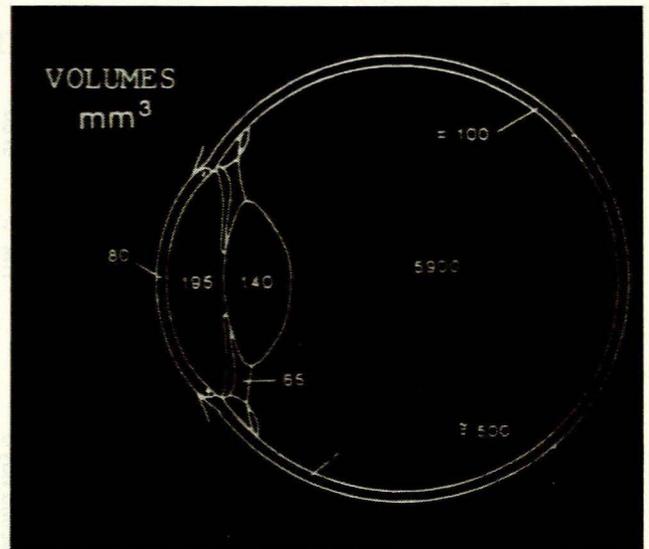


Fig. 3. Volumes of the posterior chamber and vitreous cavity.

1,2 ml, and is absorbed in about 30 days. The total volume of the posterior chamber and vitreous cavity is approximately 5,9 ml (Fig. 3).

The gas bubble tamponades the tear or tears so that fluid cannot enter the subretinal space through the retinal holes, resulting in absorption of the fluid by the pigment epithelium. The retina is attached around the breaks when the patient returns the next day, allowing photocoagulation or cryopexy. The bubble will tamponade almost a quadrant.

Hilton *et al.*³ use the method only for breaks smaller than 30°, i.e. 1 clock hour. These workers prefer to use perfluoropropane, because only a minute volume needs to be introduced and there is less danger to the central retinal artery. Dominguez⁶ prefers to use SF₆, because it is more rapidly absorbed and sufficient reaction to seal off the breaks would be present within 7 - 10 days. Should this method fail and the patient require surgery to reattach the retina, the gas is removed pre-operatively.

Our experience is still limited. We have used this method in the following situations: (i) detachments with peripheral superior holes; (ii) insufficient implant indentation where vitreous traction is present; (iii) insufficient plompage and plombe not accurately placed; (iv) failed tear sealing owing to insufficient reaction; (v) tracking of fluid over a previously placed band; (vi) not physically fit for surgery (2 of our patients had had recent myocardial infarctions); (vii) when an operating theatre is not immediately available and the macula is threatened; and (viii) when there is uncertainty whether a macular hole is partially or fully formed and a superior break is present, settling of the detachment after superior tamponade and sealing of breaks would confirm that the macular hole is a partial one.

Conclusions

The procedure can be carried out immediately the diagnosis of retinal detachment is made, and no time is lost waiting for an operating theatre. This improves the prognosis. It is less time-consuming than surgical reattachment of the retina, is less distressing to the patient, and is less traumatic. There is a high success rate. Our success rate of 85% compares favourably with the success rate of surgical reattachment of the retina.

REFERENCES

1. Norton WED. Intra-ocular gas in the management of selected retinal detachments. *Trans Pa Acad Ophthalmol Otolaryngol* 1973; 77: OP85-OP98.
2. Lincoff H, Coleman J, Kreissig I, Richard G, Changs S, Wilcox LM. The perfluorocarbon gases in the treatment of retinal detachment. *Ophthalmology* 1983; 90: 546-551.
3. Hilton GF, Kelly NE, Salzano TC, Tornambe PE, Wells JW, Wendel RT. Pneumatic retinopexy: a collaborative report on the first 100 cases. *Ophthalmology* 1987; 94: 307-314.
4. Boyd BF. *Highlights of Ophthalmology Letter*. Vol. 14, No. 5. Panama: Boyd, 1986: 12.

First trimester prenatal diagnosis by chorionic villus sampling

The Johannesburg experience with 48 cases

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Summary

Chorionic villus sampling (CVS) is a first trimester alternative to amniocentesis for the prenatal detection of genetic disorders. Initial experience in 48 patients, in whom transcervical CVS was utilised for the diagnosis of chromosomal, biochemical or molecular disorders, is reported. An adequate villus sample was obtained in all cases and a diagnostic result was achieved in 90% of cases. In this series, the miscarriage rate was 4,2%. It is concluded that CVS appears to be a relatively safe and reliable procedure, but the risk of miscarriage can only be accurately assessed after further investigation.

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Over the past decade and a half, amniocentesis has emerged as the mainstay of diagnostic procedures for the detection of genetic disorders and other birth defects. A number of studies have proved the safety and reliability of this technique.^{1,2} However, amniocentesis is not possible until the second trimester of pregnancy, necessitating a long anxious wait before investigations can begin and a further delay of up to 4-5

weeks until results are available. Furthermore, in the event of an affected fetus being detected, elective termination of pregnancy at approximately 20 weeks gestation is frequently accompanied by serious psychological stress and mid-trimester induced abortion is not free from medical risks and complications. It follows that the possibility of early diagnosis in the first trimester is much more acceptable to a couple 'at risk' for a genetic disorder; this explains the current widespread interest in developing first trimester diagnosis by chorionic villus sampling (CVS), and the increasing demand world-wide for this prenatal test.³

First trimester CVS has a number of advantages: (i) the chorion is fetal in origin and is genetically identical to the fetus; (ii) the chorion is easily accessible during the first trimester of pregnancy either by a transcervical or a trans-abdominal approach; (iii) CVS offers several advantages to the parents (less delay in obtaining results; if necessary, simple aspiration termination of pregnancy; avoidance of the hazards of second trimester termination; and less bonding between fetus and mother at this early stage of gestation); and (iv) if inconclusive results are obtained on CVS, the patient still has the option of having an amniocentesis at 16 weeks' gestation.

Although CVS was first proposed by Mohr⁴ in 1968, it was not until relatively recently that the feasibility of this technique was illustrated.⁵⁻⁷ Since interest in CVS was reawakened some 4 years ago, there has been dramatic and rapid progress in the establishment of CVS as a routine technique for the monitoring of pregnancies at high risk of biochemical disorders, chromosomal abnormalities and disorders detected by DNA analysis.

Up to March 1988, more than 45 000 chorionic villus sampling experiences had been recorded world-wide.³ The associated mean miscarriage rate in the latter series of cases was 3,5%, compared with the 0,5-1% risk of miscarriage associated with amniocentesis between 15 and 17 weeks' gestation.

The first South African attempt at prenatal diagnosis by CVS was reported in 1985.⁸ Subsequent experience is now reported.

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