European Journal of Ophthalmology / Vol. 18 no. 2, 2008 / pp. 270-277

Prognostic factors associated with outcomes after giant retinal tear management using perfluorocarbon liquids

A.M. AL-KHAIRI[1], E. AL-KAHTANI[2], D. KANGAVE[3], A.M. ABU EL-ASRAR[1]

[1]Department of Ophthalmology, College of Medicine, King Saud University
[2]King Khaled Eye Specialist Hospital
[3]Diabetes Center, College of Medicine, King Saud University, Riyadh - Saudi Arabia

PURPOSE. *To identify prognostic factors for visual acuity and anatomic outcomes associated with giant retinal tear management using intraoperative perfluorocarbon liquids.*
METHODS. *All patients with giant retinal tears without proliferative vitreoretinopathy (PVR) who underwent management with intraoperative perfluorocarbon liquids between 1994 and 2005 were reviewed.*
RESULTS. *The study included 115 patients (117 eyes), 93 (80.9%) males and 22 (19.1%) females, with a mean age of 30.3±15.2 years. Mean follow-up period was 29.7±26.7 months. Success rate with primary procedure was 78.6%, which increased to 94% with multiple surgeries. On univariate analysis, factors significantly associated with final visual acuity better than 20/200 included phakic/clear lens at presentation (p=0.0113), partial retinal detachment (p=0.0233), absence of all postoperative complications (p=0.0122), absence of recurrent retinal detachment (p=0.0406), and absence of postoperative PVR (p=0.0062). Logistic regression analysis highlighted that phakic/clear lens at presentation, unfolded flap of the giant tear, absence of postoperative cataract, and absence of postoperative PVR were associated with final visual acuity better than 20/200. On univariate analysis, use of gas tamponade was significantly associated with recurrent retinal detachment (p=0.0190). Logistic regression analysis highlighted that placement of an encircling scleral buckle and use of silicone oil tamponade were associated with anatomic reattachment with primary procedure.*
CONCLUSIONS. *Encircling scleral buckling and silicone oil tamponade decrease the risk of recurrent retinal detachment. (Eur J Ophthalmol 2008; 18: 270-7)*

KEY WORDS. *Giant retinal tear, Perfluorocarbon liquids, Silicone oil, Scleral buckle*

Accepted: October 1, 2007

INTRODUCTION

Giant retinal tear is defined as a peripheral break extending through 3 clock hours (90°) or more of the retinal circumference in which the vitreous gel is attached essentially to the anterior flap thereby allowing independent mobility of the posterior flap of the tear (1). The management of retinal detachments associated with giant retinal tears has presented challenge to vitreoretinal surgeons. The advent of vitrectomy and the use of silicone oil (1) and perfluorocarbon liquids (2) have greatly facilitated the management and improved the prognosis of giant retinal tear. Perfluorocarbon liquids have revolutionized giant retinal tear surgery. Their high specific gravity allows the surgeon to flatten the detached retina and unfold the flap of the giant tear with the patient in the supine position (2). The aim of the present study was to determine visual acuity and anatomic outcomes, as well as complications, associated with giant retinal tear without proliferative vitreoretinopathy (PVR) management using intraoperative perfluorocarbon liquids, and to determine prognostic factors associated with outcomes.

1120-6721/270-08$25.00/0

PATIENTS AND METHODS

We retrospectively reviewed the clinical charts of patients with giant retinal tears without PVR who underwent management with intraoperative perfluorocarbon liquids at King Khaled Eye Specialist Hospital and King Abdulaziz University Hospital between January 1994 and December 2005. The study included 117 eyes of 115 patients. Ninety-three (80.9%) were males and 22 (19.1%) were females. The age at presentation ranged from 3 to 68 years with a mean of 30.3 ± 15.2 years, and a median of 31 years.

Fourteen (12%) eyes had undergone previous repair of rupture globe. Of these 14 eyes, 3 had undergone pars plana vitrectomy to remove an intraocular foreign body, and one had undergone pars plana vitrectomy to treat posttraumatic endophthalmitis. Ten (8.5%) eyes had a history of blunt trauma. One eye had undergone pars plana vitrectomy to treat bleb-related endophthalmitis, and one eye with congenital glaucoma had undergone trabeculectomy and penetrating keratoplasty. Fifty-five eyes were highly myopic. Three patients had Stickler's syndrome. The giant retinal tear was diagnosed to be spontaneous in 91 (77.7%) eyes (two patients had bilateral giant retinal tears at presentation).

Sixty-two (53%) eyes were phakic/clear, 20 (17.1%) were phakic/cataract, 22 (18.8%) were aphakic (5, congenital cataract surgery), and 13 (11.1%) were pseudophakic with posterior chamber intraocular lens. Ninety (76.9%) eyes had giant tear that extended between 90° and 180°, and 27 (23.1%) had tears greater than 180° in circumferential extent. The posterior flap of the giant retinal tear was inverted in 47 (40.2%) eyes. Radial extension of the giant retinal tear was noticed in 8 (6.8%) eyes. The macula was detached in 77 (65.8%) eyes and attached in 40 (34.2%) eyes. The retinal detachment was total in 45 (38.5%) eyes and partial in 72 (61.5%) eyes.

All patients underwent pars plana vitrectomy. Of the 82 eyes that were phakic at the time of their surgery, a lensectomy was deemed necessary in 49 (59.7%) eyes to achieve adequate dissection of the vitreous base. Intraoperative injection of perfluorocarbon liquid was performed to flatten the retina and to unfold the flap of the giant retinal tear. When the retina was flat and opposed to the underlying retinal pigment epithelium, laser photocoagulation using an endolaser probe or laser indirect ophthalmoscope, or cryopexy, or both were applied to the edges of the giant retinal tear. Retinopexy was extended to the peripheral retina over 360° from the ora serrata to the equator in 28 (23.9%) eyes. An encircling scleral buckling procedure was performed in 97 (82.9%) eyes. Silicone oil tamponade was used in 64 (54.7%) eyes, and perfluoropropane (16%) gas was used in 53 (45.3%) eyes. Silicone oil was removed during the follow-up period in 54 of 64 (84.4%) eyes between 1.5 and 96 months after surgery with a mean of 11.3±14.4 months, and a median of 7.5 months. Macular epiretinal membranes were removed at the same time as silicone oil in 15 eyes.

Fellow eyes

Of the 89 eyes with spontaneous giant retinal tears, 34 (38.2%) fellow eyes showed retinal breaks and/or retinal detachments at presentation. Two eyes showed retinal detachment associated with giant retinal tears, 9 eyes had already undergone successful retinal reattachment surgery before presentation (giant retinal tears were documented in two of these eyes), 15 eyes had chronic unoperated retinal detachment, and 2 eyes showed peripheral asymptomatic retinal detachment. Three eyes showed retinal tears, and 11 eyes showed lattice degeneration that was associated with holes in 3 eyes. Peripheral areas of white-without-pressure were documented in 7 eyes. After excluding 9 fellow eyes that had already undergone successful retinal reattachment surgery, 15 eyes that showed chronic unoperated retinal detachment, and 2 eyes that showed giant retinal tears, 21 fellow eyes underwent 360° prophylactic treatment in the form of either laser photocoagulation or cryotherapy. Forty-two fellow eyes did not receive 360° prophylactic treatment.

Statistical methods

The statistical significance of the association between two categorical variables was investigated using either the chi-square test or Fisher exact test as appropriate. Student *t*-test was used to compare the difference between two proportions from the same sample. A p value less than 0.05 indicated statistical significance. Multivariate stepwise logistic regression analysis was conducted to identify variables that were predictors of final visual acuity of better than 20/200, and anatomic success after primary procedure after adjustment for all other confounding variables. In this analysis, all the variables from the univariate analysis that were investigated for association were included as the predictor variables. Program LR from the BMDP 2007 Statistical Package was used to conduct the logistic regression analysis.

RESULTS

Intraoperatively, the retina was reattached successfully in all 117 eyes. Overall 73 (62.4%) eyes developed at least one postoperative complication. The ocular complications encountered were recurrent retinal detachments in 25 (21.4%) eyes that was associated with PVR in 14 (12%) eyes, glaucoma that necessitated either medical or surgical intervention in 24 (20.5%) eyes, cataract in 23 (69.7%) of the 33 eyes that were left phakic, vitreous hemorrhage in 14 (12%) eyes, and severe hypotony in 1 (0.9%) eye. Cataract extraction was performed on 10 eyes during the study follow-up interval.

The incidence of the development of all complications was 54.7% in eyes that had silicone oil tamponade compared to 71.7% in eyes that had gas tamponade. However, the difference between the two percentages was not statistically significant (p=0.0893). In addition, recurrent retinal detachment occurred in 12.5% of the eyes that had silicone oil tamponade compared to 32.1% of the eyes that had gas tamponade. The difference between the two percentages was significant (p=0.0190) (Tab. I).

Recurrent retinal detachment occurred within 1 to 47 months of the initial surgery with a mean of 7.6±11.2 months, and a median of 2 months. In one eye, the retina redetached after removal of silicone oil. Anatomic reattachment with primary procedure was achieved in 92 (78.6%) eyes. Sixteen retinas were reattached after a second procedure, and two retinas were successfully reattached with a third procedure. Seven eyes had persistent retinal detachment even after multiple surgeries. The retina was anatomically attached in 110 (94%) eyes on their last postoperative visit.

The follow-up period ranged from 3 to 144 months with a mean of 29.7±26.7 months, and a median of 25 months. The distribution of initial and final visual acuity is illustrated in Table II. Of the 117 eyes, 61 (52.1%) achieved visual acuity of better than 20/200. The frequencies above the left to right diagonal line represent eyes that had improvement in visual acuity, those below the line experienced worsened vision, and those along the diagonal line had no change in visual acuity. Therefore, 44 (37.6%) eyes had improved vision, 20 (17.1%) had worsened vision, and there was no change in vision in 53 (45.3%) eyes. Eighty-seven (72.6%) eyes had visual acuity of 20/200 or worse at presentation, and only 56 (47.9%) eyes had final visual acuity of 20/200 or worse. The difference between the two percentages was statistically significant (p=0.0139). In addition, only 32 (27.4%) eyes had visual acuity of better than 20/200 at presentation compared with 61 (52.1%) eyes that had final visual acuity of better than 20/200. The difference between the two percentages was statistically

TABLE I - POSTOPERATIVE COMPLICATIONS ASSOCIATED WITH THE USE OF SILICONE OIL TAMPONADE VERSUS GAS TAMPONADE

Complication	Silicone oil tamponade (n=64) (%)	Gas tamponade (n=53) (%)	p value
All complications	35 (54.7)	38 (71.7)	0.0893
Recurrent detachment	8 (12.5)	17 (32.1)	0.0190*
Proliferative vitreoretinopathy	6 (9.4)	8 (15.1)	0.508
Glaucoma	11 (17.2)	13 (24.5)	0.454
Cataract†	11/19 (57.9)	12/14 (85.7)	0.1312

*Statistically significant at 5% level of significance; †Thirty-three eyes were left phakic

TABLE II - RELATIONSHIP BETWEEN INITIAL VISUAL ACUITY AND FINAL VISUAL ACUITY FOR 117 EYES

	Initial visual acuity			
Final visual acuity	**20/200 or worse**	**20/160–20/50**	**20/40–20/20**	**Total**
20/20–20/40	8	3	4	15
20/50–20/160	33	5	8	46
20/200 or worse	44	3	9	56
Total	85	11	21	117

TABLE III - FACTORS AFFECTING FINAL VISUAL ACUITY

Variable	Final visual acuity of better than 20/200 (%)	p value
Sex		
Male	46/94 (48.9)	0.2427
Female	15/23 (65.2)	
Age, yr		
<20	16/32 (50)	0.9392
≥20	45/85 (52.9)	
Initial visual acuity		
≤20/200	41/85 (48.2)	0.242
>20/200	20/32 (62.5)	
Penetrating trauma		
Yes	4/14 (28.6)	0.1105
No	57/103 (55.3)	
Lens status at presentation		
Phakic/clear	39/62 (62.9)	0.0113*
Pseudophakic/aphakic	17/35 (48.6)	
Phakic/cataract	5/20 (25)	
Status of macula		
Detached	36/77 (48.6)	0.1550
Attached	25/40 (62.5)	
Extent of giant tear		
90–180°	49/90 (54.4)	0.4885
>180°	12/27 (44.4)	
Extent of retinal detachment		
Partial	44/72 (61.1)	0.0233*
Total	17/45 (37.8)	
Posterior flap inverted		
Yes	20/47 (42.6)	0.1306
No	41/70 (58.6)	
Radial extension		
Yes	3/8 (37.5)	0.4771
No	58/109 (53.2)	
Encircling scleral buckle		
Yes	53/97 (54.6)	0.3434
No	8/20 (40)	
360° Retinopexy		
Yes	17/28 (60.7)	0.4094
No	44/89 (49.4)	
Postoperative tamponade		
Silicone oil	34/64 (53.1)	0.9607
Long-acting gas	27/53 (50.9)	
All postoperative complications		
Yes	31/73 (42.5)	0.0122*
No	30/44 (68.2)	
Recurrent detachment		
Yes	8/25 (32)	0.0406*
No	53/92 (57.6)	
Proliferative vitreoretinopathy		
Yes	2/14 (14.3)	0.0062*
No	59/103 (57.3)	
Postoperative cataract		
Yes	10/23 (43.5)	0.4873
No	51/94 (54.3)	
Postoperative glaucoma		
Yes	13/24 (54.2)	0.9953
No	48/93 (51.6)	

*Statistically significant at 5% level of significance

significant (p=0.0023).

The large size of this series permitted meaningful statistical evaluation of factors that were predictive of outcome. Univariate analysis demonstrated a significant association between final visual acuity of better than 20/200 and phakic/clear lens at presentation (p=0.0113), partial retinal detachment (p=0.0233), absence of all postoperative complications (p=0.0122), absence of recurrent retinal detachment (p=0.0406), and absence of postoperative PVR (p=0.0062) (Tab. III). Use of gas tamponade was significantly associated with recurrent retinal detachment (p=0.0190). The incidence of recurrent retinal detachment was 25.8% in eyes that did not receive 360° peripheral retinopexy compared to 7.1% in eyes that had 360° peripheral retinopexy. However, the difference between the two percentages was not statistically significant (p=0.0656) (Tab. IV).

Multivariate stepwise logistic regression analysis was conducted to identify the variables that tended to be associated with final visual acuity of better than 20/200, and anatomic reattachment with primary procedure after adjustment for all other confounding variables. Results from the analysis highlighted that final visual acuity of better than 20/200 was associated with phakic/clear lens at presentation (odds ratio = 7.93; 95% confidence interval [CI] = 2.57–24.5), unfolded flap of the giant retinal tear (odds ratio = 2.66; 95% CI = 1.09–6.51), absence of postoperative cataract (odds ratio = 9.39; 95% CI = 2.49–35.4), and absence of postoperative PVR (odds ratio = 23; 95 CI = 3.76–14). Anatomic reattachment with primary procedure was associated with the use of an encircling scleral buckle (odds ratio = 3.125; 95% CI = 0.905–10.9) and the use of silicone oil tamponade (odds ratio = 3.59; 95% CI = 1.14–11.4).

The predictive quality of the above two sets of predictor variables was examined by requesting, in program LR, for the computation of the area under the receiver operator characteristic curve generated by using each set of variables to predict the probability of occurrence of the outcome of interest for the dependent variable. For predictors of final visual acuity of better than 20/200, the area was equal to 0.7654, and for predictors of anatomic reattachment with primary procedure, the area was equal to 0.8193. This area should be close to 1.0 for a reliable set of predictor variables. Therefore, these sets of predictor variables from logistic regression analysis were of reasonably respectable credibility as predictors for the outcomes that were investigated.

During the follow-up period, 6 fellow eyes of spontaneous giant retinal tears experienced retinal detachment (2 of

TABLE IV - FACTORS PREDICTING THE OCCURRENCE OF RECURRENT RETINAL DETACHMENT

Variable	Recurrent retinal detachment (%)	p value
Sex		
Male	18/94 (19.1)	0.2614
Female	7/23 (30.4)	
Age, yr		
<20	8/32 (25)	0.7375
≥20	17/85 (20)	
Initial visual acuity		
≤20/200	22/85 (25.9)	0.0913
>20/200	3/32 (9.4)	
Penetrating trauma		
Yes	3/14 (21.4)	0.9999
No	22/103 (21.4)	
Lens status at presentation		
Phakic/clear	14/62 (22.6)	0.7471
Pseudophakic/aphakic	8/35 (22.9)	
Phakic/cataract	3/20 (15)	
Status of macula		
Detached	19/77 (24.7)	0.33
Attached	6/40 (15)	
Extent of giant tear		
90–180°	20/90 (22.2)	0.8854
>180°	5/27 (18.5)	
Extent of retinal detachment		
Partial	13/72 (18.1)	0.3823
Total	12/45 (26.7)	
Posterior flap inverted		
Yes	9/47 (19.1)	0.8028
No	16/70 (22.9)	
Radial extension		
Yes	1/8 (12.5)	0.9999
No	24/109 (22)	
Encircling scleral buckle		
Yes	18/97 (18.6)	0.1332
No	7/20 (35)	
360° Retinopexy		
Yes	2/28 (7.1)	0.0656
No	23/89 (25.8)	
Postoperative tamponade		
Silicone oil	8/64 (12.5)	0.0190*
Long-acting gas	17/53 (32.1)	

*Statistically significant at 5% level of significance

these were due to giant retinal tears). One (4.8%) of the 21 eyes that underwent 360° prophylactic treatment experienced retinal detachment compared to 5 (11.9%) of the 42 eyes that did not undergo such treatment. The difference between the two percentages did not attain statistical significance (p=0.34).

DISCUSSION

In this study of 117 eyes with giant retinal tears without PVR treated with vitrectomy and intraoperative perfluorocarbon liquids, the success rate with primary procedure was 78.6%, which increased to 94% with multiple surgeries. Our success rates compare favorably to those of other series in which perfluorocarbon liquids were used in the management of giant retinal tears (2-8) (Tab. V). The adjunctive use of perfluorocarbon liquids in the management of giant retinal tears offers considerable advantages. These heavier-than-water temporary vitreous substitutes allow the surgeon to flatten the detached retina and unfold the flap of a giant retinal tear with the patient in the supine position (2). The retina is positioned close to its original location, and retinopexy is performed under optimal visual conditions. In addition, perfluorocarbon liquids largely prevent the problem of posterior slippage of the retinal flap. Ghosh et al (9) reported recurrent retinal detachment rate of 50% in eyes where perfluorocarbon liquids were not used, and only 17% in eyes where perfluorocarbon liquids were used.

Two previous studies reported prognostic factors associated with outcomes after management of giant retinal tears using intraoperative perfluorocarbon liquids. Kertes et al (7) reported that factors significantly associated with a poor visual outcome included hypotony, macular detachment, history of cataract extraction, poor preoperative visual acuity, giant retinal tear greater than 180°, and a higher grade of PVR. Scott et al (8) reported that factors significantly associated with visual outcome of 20/200 or better included male gender, no prior vitrectomy, better preoperative vision, and no need for a relaxing retinotomy. Factors significantly associated with recurrent retinal detachment included female gender, younger age, preoperative PVR, prior vitrectomy, larger size of giant retinal tear, lack of scleral buckle placement, and creation of a relaxing retinotomy. The current study has identified a significant association between final visual acuity of better than 20/200 and partial retinal detachment, absence of all postoperative complications, absence of recurrent retinal detachment, and absence of postoperative PVR. Using logistic regression analysis, factors associated with visual outcome of better than 20/200 included preoperative phakic/clear lens, unfolded retinal flap of the giant tear, absence of postoperative

TABLE V - SUCCESS RATES AFTER MANAGEMENT OF GIANT RETINAL TEARS USING INTRAOPERATIVE PERFLUOROCARBON LIQUIDS

Author	Year	No. of eyes	Success rate with primary procedure (%)	Success rate with multiple surgeries (%)
Chang et al (2)	1989	17	47	94
Mathis et al (3)	1992	24	91.7	95.8
Kreiger and Lewis (4)	1992	11	81.8	100
Ie et al (5)	1994	25	88	100
Verstraeten et al (6)	1995	34	67.6	100
Kertes et al (7)	1997	162	50.6	90.7
Scott et al (8)	2002	212	70	79
Current study	2007	117	78.6	94

cataract complication, and absence of postoperative PVR. Recurrent retinal detachment was significantly associated with the use of postoperative gas tamponade. Using logistic regression analysis, use of postoperative silicone oil tamponade and placement of an encircling scleral buckle predicted anatomic success after primary procedure.

Much controversy exists as to the need, impact, and importance of scleral buckling in giant retinal tear surgery (2, 4, 6, 7, 10). Encircling scleral buckling is useful to support the horns of the giant retinal tear, and the vitreous base in these patients who are prone to develop PVR even if it is not present preoperatively. Thus, they may decrease the risk of redetachment secondary to extension of the giant tear, formation of new retinal breaks, or reopening of tears from PVR (5, 11). The current study has identified an association between successful retinal reattachment after the primary procedure and the use of primary encircling scleral buckling. In our series, 97 of 117 eyes underwent primary encircling scleral buckling. Only 18 (18.6%) of these eyes developed recurrent retinal detachment. In the 20 eyes without primary scleral buckling, 7 (35%) developed recurrent retinal detachment. These results are consistent with those of previous studies that demonstrated a beneficial effect of scleral buckles in managing giant retinal tears. In a series of 34 spontaneous giant retinal tears without PVR treated with vitrectomy, intraoperative perfluorocarbon liquids, endolaser, and gas tamponade, with or without encircling scleral buckling, Verstraeten et al (6) observed 2 (14%) recurrences in 14 eyes treated with additional scleral buckle, and 9 (45%) recurrences in 20 eyes treated without additional scleral buckle. Similarly, Scott et al (8) demonstrated a significant association between recurrent retinal detachment and lack of scleral buckle placement.

Two previous smaller series (4, 10) have introduced 360° photocoagulation of the peripheral retina as a new concept in the treatment of giant retinal tears. It was thought that this type of photocoagulation was as important as intensive dissection of the vitreous base to decrease the risk of recurrent retinal detachment due to new tears at the posterior margin of the vitreous base secondary to the contracture of the peripheral remaining vitreous. In the current series, 360° retinopexy of the peripheral retina reduced the rate of recurrent retinal detachment. Our results, therefore, support the beneficial effect of retinopexy of the peripheral retina over 360° in decreasing the risk of recurrent retinal detachment.

Several reports suggested that the use of silicone oil as the means of intraocular tamponade may be more effective than gases in the management of giant retinal tears (1, 3, 9, 10, 12). In the current study, the rate of recurrent retinal detachment in eyes that had internal tamponade with gas was significantly higher than that in eyes that had internal tamponade with silicone oil. Using logistic regression analysis, internal tamponade with silicone oil was an independent significant predictor for anatomic success after the primary procedure. Internal tamponade with silicone oil after intraoperative use of perfluorocarbon liquids may offer some advantages. During perfluorocarbon liquid–air exchange, the displacement of the aqueous posteriorly can cause slippage of the posterior edge of the giant tear and

this could be avoided by performing a direct perfluorocarbon liquid–silicone oil exchange (13). Mathis et al (3) reported no case of slippage of the posterior edge of the giant tear during perfluorocarbon liquid–silicone oil exchange. Removal of perfluorocarbon liquid is performed easily as the perfluorocarbon liquid forms a well-defined bubble at the end of the exchange. Furthermore, silicone oil allows visualization of fundus details throughout the course of the exchange even in the phakic eyes and manipulation of instruments within and behind the silicone oil globule is thereby facilitated.

The natural history of fellow eyes of nontraumatic giant retinal tears is characterized by a very high combined incidence of retinal breaks and retinal detachments. In one study of 226 patients, 51% developed retinal breaks in the fellow eye, including 29 (13%) eyes with giant retinal tears. Other retinal breaks included tears due to vitreoretinal traction in 27 (12%) eyes, retinal holes in 23 (10%) eyes, and a retinal dialysis in 1 (0.4%) eye. Retinal detachment not caused by a giant retinal break occurred in 36 (16%) of the 226 fellow eyes (14). In the current study, 44.9% of fellow eyes of patients with spontaneous giant retinal tears developed retinal breaks and/or retinal detachments at presentation and during follow-up. Prophylactic measures therefore have been advocated to reduce the incidence of retinal detachment (15). In the present series, the rate of retinal detachment was 4.8% in fellow eyes of patients with spontaneous giant retinal tears that underwent prophylactic 360° treatment of the peripheral retina, and 11.9% in fellow eyes without 360° prophylactic treatment. Our observations are consistent with a previous report showing a significant reduction of the incidence of retinal tears and retinal detachments in the fellow eyes of patients with spontaneous giant retinal tears that underwent prophylactic 360° peripheral retinal cryotherapy (16). These findings suggest that prophylactic 360° treatment of the peripheral retina in fellow eyes of patients with spontaneous giant retinal tears may have a beneficial effect by reducing the incidence of retinal detachment.

In conclusion, the anatomic and visual outcomes are favorable in most eyes with giant retinal tears without PVR that underwent management with intraoperative perfluorocarbon liquids. Retinopexy of the peripheral retina over 360°, encircling scleral buckling, and silicone oil tamponade decrease the risk of recurrent retinal detachment.

ACKNOWLEDGEMENTS

The authors thank Connie B. Unisa-Marfil for secretarial work.

Proprietary interest: None.

Reprint requests to:
Ahmed M. Abu El-Asrar, MD, PhD
Department of Ophthalmology
King Abdulaziz University Hospital
Airport Road, P.O. Box 245
Riyadh 11411, Saudi Arabia
abuasrar@ksu.edu.sa

REFERENCES

1. Scott JD. Giant tear of the retina. Trans Ophthalmol Soc UK 1975; 95:142-4.
2. Chang S, Lingcoff H, Zimmerman NJ, Fuchs W. Giant retinal tears: surgical techniques and results using perfluorocarbon liquids. Arch Ophthalmol 1989; 107: 761-6.
3. Mathis A, Pagot V, Gazagne C, Malecaze F. Giant retinal tears: surgical techniques and results using perfluorodecalin and silicone oil tamponade. Retina 1992; 12: S7-S10.
4. Kreiger AE, Lewis H. Management of giant retinal tears without scleral buckling: use of radical dissection of the vitreous base and perfluoro-octane and intraocular tamponade. Ophthalmology 1992; 99: 491-7.
5. Ie D, Glaser BM, Sjaarda RN, Thompson JT, Steinberg LE, Gordon LW. The use of perfluoro-octane in the management of giant retinal tears without proliferative vitreoretinopathy. Retina 1994; 14: 323-8.
6. Verstraeten T, Williams GA, Chang S, et al. Lens-sparing vitrectomy with perfluorocarbon liquid for the primary treatment of giant retinal tears. Ophthalmology 1995; 102: 17-20.
7. Kertes PJ, Wafapoor H, Peyman GA, Calixto N Jr, Thompson H, Vitreon Collaborative Study Group. The management of giant retinal tears using perfluoroperhydrophenanthrene. A multicenter case series. Ophthal-

mology 1997; 104: 1159-65.
8. Scott IU, Murray TG, Flynn HW Jr, Feuer WJ, Schiffman JC, Perfluoron Study Group. Outcomes and complications associated with giant retinal tear management using perfluoro-n-octane. Ophthalmology 2002; 109: 1828-33.
9. Ghosh YK, Banerjee S, Savant V, et al. Surgical treatment and outcome of patients with giant retinal tears. Eye 2004; 18: 996-1000.
10. Ambresin A, Wolfensberger TJ, Bovey EH. Management of giant retinal tears with vitrectomy, internal tamponade, and peripheral 360° retinal photocoagulation. Retina 2003; 23: 622-8.
11. LoRusso FJ, Diaz-Rohena R, Lambert HM. Management of giant retinal tears. Semin Ophthalmol 1995; 10: 42-8.
12. Leaver PK, Cooling RJ, Feretis EB, Lean JS, McLeod D. Vitrectomy and fluid/silicone-oil exchange for giant retinal tears: results at six months. Br J Ophthalmol 1984; 68: 432-8.
13. Wong D, Williams RL, German MJ. Exchange of perfluorodecalin for gas or oil: a model for avoiding slippage. Graefes Arch Clin Exp Ophthalmol 1998; 236: 234-7.
14. Freeman HM. Fellow eyes of giant retinal breaks. Trans Am Ophthalmol Soc 1978; 76: 343-82.
15. Freeman HM. Current management of giant retinal breaks and fellow eyes. In: Ryan SJ, Glaser BM, Michels RG, eds. Retina, Vol. 3. St. Louis: Mosby: 1989; 431-54.
16. Wolfensberger TJ, Aylward GW, Leaver PK. Prophylactic 360° cryotherapy in fellow eyes of patients with spontaneous giant retinal tears. Ophthalmology 2003; 110: 1175-7