The Surgical Treatment of Retinal Detachment Caused By Giant Tears By Using Liouid Silicone Oil in 48 Eyes

Yusuf ÖZERTÜRK
John D.SCOTT

48 GÖZDE DEV YIRTIKLI RETINA DEKOLMANIN SIVI SİLİKON İLE CERRAHİ TEDAVİSİ

Addenbrooke's Hospital in Cambridge

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SUMMARY

We have retrospectively reviewed 48 cases with retinal detachment caused by giant tears. All cases were treated by using cryotherapy, vitrectomy, scleral buckle and intraocular liquid silicone oil injection, between 1980 and 1985 at the Addenbrooke's Hospital in Cambridge. Five eyes had giant tears measuring 30 to GO degrees. 5 eyes had 60 to 90 degrees, 6 eyes had 90 to 120 degress, 10 eyes had ¡20 to 150 degrees. 6 eyes had 150 to ¡80 degrees, 9 eyes had ¡80 to 210 degrees, 4 eyes had 210 to 240 degrees, one eye had 240 to 270 degree, 2 eyes had 270+degrees. The retina was successfully reattached in 45 eyes (93%) of 48 eyes postoperatively. In 37(77.08%) of 48 eyes, retinal reattachment was obtained at the end of the mean period of two years follow-up. A visual acuity of 1/60 or better only 8 eyes (16.16%) of 48 eyes had preoperatively. We believe that use of liquid silicone combining with vitrectomy plays an important role in the treatment of retinal detachment caused by giant tears.

Key **Words: Retinal detachmet, giant tear, liquid silicone.**

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ÖZKİ

Dev yırtıkların sebep olduğu retina dekolmantı 48 vakayı retrospektif olarak inceledik

Bütün vakalar 1980-1985 yılları arasında Addenbrooke hastanesinde (Cambridge-lngiltere) kriyo tatbiki, vitrektomi, skleral çökertme, sıvı silikon injeksiyanu ile tedavi edildi.

5 gözde 30-60 derece arasında değişen, 5 gözde 60-90, 6 gözde 90-120, 10 gözde ¡20-150, 6 gözde 15-180, 9 gözde ¡80-210. 4 gözde 210-240. bir gözde 240-270, 2 gözde de 270 dereceden fazla dev yırtık vardı.

Post operalif olarak 48 gözün 45 inde retina yatıştı. Ortalama iki yıllık takip sonunda yapılan muayenede 48 gözün 37 inde (%77.Q8) retina yatıştk olarak bulundu. Ameliyattan önce 48 gözün sadece 8 inde (%16.1G(1/60 veya daha iyi bir görme varken, ortalama iki yıllık takip sonunda 48 gözün 37 sinde (% 77.08) 1/60 veya daha iyi bir görme elde edildi.

Dev yırtıkların sebep olduğu retina dekolmantarının tedavisinde vitrektomi ile beraber sıvı silikon kullanımının önemli bir rol oynadığına inanıyoruz.

Anahtar Kelimeler: Retina dckolmanı. dev yırtık, sıvı silikon

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INTRODUCTION

Liquid silicone oil or polydimethylsiloxane, is an inert, clear fluid with a specific gravity of 0.97 and surface tension of approximately 50 with respect to water. Clinically useful viscosities have for the most part, ranged between 1000 and 12,500 centistokes. Silicone oil has a refractive index of 1.4 and therefore relatively mild refractive shifts result from silicone filling the posterior segment. A specific gravity of less than 1,0 causes silicone to float on the surface of an aqueous solution. The major therapeutic effect from silicone oil is, to a large part, dependent on the relatively high surface tension between silicone oil and water. It is the surface tension, not the viscosity, which explains why silicone serves to close retinal breaks and why internal drainage of subretinal fluid/ silicone exchange is possible. Unlike a gas, the volume of silicone oil remains constant after intraocular injections, and indefinite -mechanical retinal tamponade is therefore possible (1,2). Giant retinal tears are difficult and put the retinal surgeons to challange this

Table - I

Delivery of Patients Regarding to Sex

SEX	Number of Patient	%
Male	36	75
Female	12	25
Total	48	

Table - II

Delivery of Patients Related to Eye

EYE	Number of Patient	%
Right	18	37,5
Left	30	62.5
Total	48	

Table III

Delivery of Patients With Regard to Age

AGE	Number of Patient	%
0-10	1	2,08
11-20	12	25
21-30	4	8,33
31-40	7	14,58
41-50	7	14,58
51-60	11	22,92
61-70	6	12,5
Total	48	

Table - IV

Delivery of Patients Regarding to degree of Gianttear

Degr« of Gianltear	SO 60	60 90	90 120	120 150	150 180	180 210	210 240	240 270	270 +	Total
NumJPatient	5	5	6	10	6	9	4	1	2	48
%	10.41	10,41	12,5	20.8 3	12,5	18.75	8,33	2,08	4,16	

Table - V

Delivery of Patients Related to the Volume of injected Silicone

ml	Number of Patient	%
3	7	14,58
4-5	19	39,60
6-7	17	35,41
7+	5	10,41
Total	48	

Table - VI

(a)

Peropetative Retinal State

Retinal state	Number of Patient	%
Partially detach	10	20,8
Totally detach	38	79,19
Total	48	

(b)

Postoperative Retinal State

Retinal state	Number of Patient	%
Flat	45	93,76
Partially detach	1	2,08
Totally detach	2	4,16
Total	48	

(c)

Retinal State During Final Examination

Retinal state	Number of Patient	%
Flat	37	77,08
Partially detach	6	12.05
Totally detach	5	10,42
Total	48	

problem which gives the worst surgical consequences. Although newly advancements in vitreo-retinal surgical techniques have enabled to the retinal surgeons to gain the successful results (3,9), treatment of giant retinal tears still does not succeed in a high percentage of cases, primarily because of the development of the proliferative vitreo-retinopathy (3,5,7,8,10),

MATERIALS AND METHODS

We reviewed the records of 48 patients with retinal detachment caused by giant tears, were operated between 1980 and 1985 at Addenbrooke's hospital in Cambridge. The informations of each patient has been gotten from the foldersof the patients, in which comprised the ocular history of the patients, visual acuity, intraocular pressure, anterior and posterior segment findings, detailed fundus drawings and notes of operations. Of the 48 patiens, 36 were male and 12 were female (Table I). 18 of 48 eyes, were right eyes, 30 were left eyes (Table II). In 9 (18.75%) of eyes, high degree of myopia, in 18 eyes (37.5%) mild degree of myopia had been found. 12 eyes had trauma (25%), 42 were phakic (87.5%), 6 (12.5%) were aphakic. The ages of the patients ranged from 6 years to 70 years (Table III). In each case there was partial or complete inversion of the retinal tear flap.

In 5 eyes, the degree of giant tears were between 30 and 60 (1041%), 5 eyes 60 to 90 (10.41%), in 6 eyes (12.5%) 90 to 120, in 10 eyes (20.83%) 120 to 150, in 6 eyes (12.5%) 150 to 180, in 9 eyes (18. 75%) 180 to 210, in 4 eyes (8.33%) 210 to 240, in one eye (2.08%) 240 to 270, in two eyes (4.16%) was 270+ (Table IV).

After cryotherapy applied around the tears, vitrectomy was performed and intraocular silicone oil was injected by being used in the eyes had a viscosity of 2,000 centistokes and the volume ranged from 3 to 8 ml. The average volume was 4 ml. (Table V). In 29 (60.41%) of the operated cases, an additional operation was performed. Of the 29 additional operations, 17 had retinal surgery plus silicone oil top up, 7 had retinal surgery in 5 cases, silicone oil was removed from the eye.

RESULTS

Of the 48 eyes with retinal detachment caused by giant tears, in 45 (93.76%) complete retinal reattachment was obtained. 8 of which redetached during a mean period of two years follow-up. In one eye, retina was partially detached, in two eyes, retina was totally detached Table Via, in the postoperative period. At the end of the two years follow-up, while in 37 cases (77.08%), retina remained attached, 6(12.5%) were partially detached, 5(10.41%) were totally detached (Table VIb). In four cases (8.33%) silicone oil was found in the subretinal space.

Visual Function

A visual acuity of 1/60 or better was achieved in 45 eyes (93.76%) post operatively, a visual acuity of 1/60 or better was found in 37 eyes (77.08%) at the end of the two years follow-up (Table VIIabc). Corneal decompensation occurred in 10 eyes (20.83%), 8 of which were corneal oedema, 2 were corneal dystrophy. Of the 48 eyes, in 14(29.16%) silicone oil was found in the anterior chamber (8 of which were silicone bubble, 6 were emulsified silicone).

Of our series of 48 eyes, in 15 eyes (31.25%) several types of lens opacities have developed at the end of two years follow-up.

DISCUSSION

Interest in the treatment of complex retinal detechment by using liquid silicone injection into the vitreous cavity and it was suggested that, it might be used as a vitreous replacement in complicated retinal problems (12). A property unigue to liquid silicone is its high surface tension with complete transparency. Mention has already been made of the need to close all retinal tears as far as possible. However, in massive vitreo-retinal retraction, distortion of tears may be so great as to prevent the smooth flattening of tears on to a buckle. This is the main reason why saline and gas injections fail in this condition, the latter, because gas does not last long enouh. Liquid silicone is able to press the tear on to a buckle against the distorting forces of peripheral membranes long enough for a cryotherapy reaction to be effective (12). The major problem in detachments caused by giant tears is to provide an adequete buckle to prevent leakage through the tear post operatively. Previous studies have indicated that giant tears greater than 180 degree, as well as those with an immobile posteriorly everted flap, had a poor prognosis (3,13, 14,15). Patients with radial tears extending from a circumferential giant tear to the disk also have poor prognosis (15). In such cases, liquid silicone plays an important role to close giant tears with the help of its high surface tension.

Table — 7 a, b, c

Delivery of Patients With Regard to Visual Acuity

Preoperative

Visual acuity	Number of Patient	%
LP	9	18,75
HM	33	68,75
1/60	4	8,33
6/36	2	4,16
Total	48	

L LP: Light perception
HM: Hand movement

Postoperative

Visual acuity	Number of Patient	%
LP	1	2,08
HM	2	4,16
1/60	6	12,5
3/60	10	20,83
6/60	11	22,91
6/36	14	29,16
6/24	4	8,33
Total	48	

f"inal Examination

Visual Acuity	Number of Patient	%
LP	5	10,41
HM	6	12,5
1/60	18	37,5
3/60	11	22,91
6/60	7	14,58
6,36	1	2,08
Total	48	

The anatomic results of our series were favorable compared to those of earlier reports (3,5,7,8). Probably because of the refinement of surgical techniques combining vitreous surgery and scleral buckling methods with an intraocular liquid silicone injection, to assist in unfolding the inverted retinal flap. Using a broad zone of chorioretinal adhesion seems to prevent recurrent retinal detachment if the retinal flap can be unfolded and properly positioned at the time of the initial operation (7,8,9). In this study, 77.08% of detachments with giant tear has been found successfully reattached at the end of two years follow-up. These results compare favorably with those reported by other (3,4,6,7,8). Success rate in other series followed for six months, ranged from 51% to 65% (3-4). Whenever the use of the liquid silicone is discussed the question of undesirable effects inevitably arises, so that this problem needs to be dealt with in a little detailed explanations. Early workers in this field were troubled by a very high incidence of emulsification of the silicone, and Cibis was the first to report this highly undesirable problem. The common feature of all these early reports wast the small amount of silicone which was injected. It Was rarely more than 2 ml. and therefore unlikely to separate membranes (11,15). It was used as a vitreous replacement without reference to membranes and the silicone was therefore mobile within the eye. The method which we have described uses a minimum of 3 ml. and the problem of emulsification has only very rarely been seen. The use of as much silicone as possible togetker with encircling bands reduces the movement of the material within the eye and therefore the likelyhood of small bubbles mecanically breaking off from the main bubbles is also reduced (16). Cataracts certainly occurs in these eyes, and it is possible that liquid silicone interferes with metabolism across the posterior surface of the lens in a manner similar to the effects of gas. Corneal effects also certainly occur. In experimental animals liquid silicone injected into the anterior chamber produced corneal opacification and the same happens in the human eye. In the rabbit a bullous keratopathy occurs, but in the human a peculiar brown or white staining of Bowman's membrane occurs and the cornea becomes slightly thinner over the effected area (17,18,20). The evidence of this is based on the pathology of eyes in which the silicone had emulsified on late failure in eyes treated by early techniques involving the injection of very small quantities of silicone and on electroretinographic observations. Finally, the electroretinographic evidence can be completely discounted because liquid silicone is a perfect insulater and in the vitreous will effectively offer a very high resistance to the passage of current (19). In outcome, liquid silicone will continue to play an important role in the treatment of complex retinal situations.

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