A Study Of The Different Techniques For The Management Of Retinal Detachment Due To Macular Breaks

Thesis

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By

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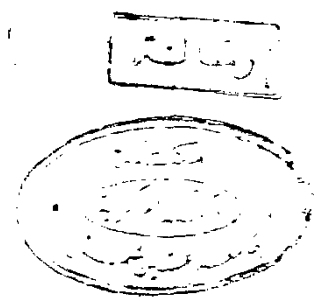

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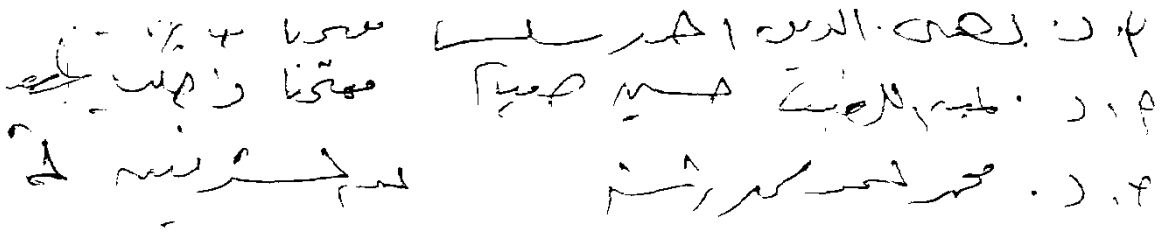

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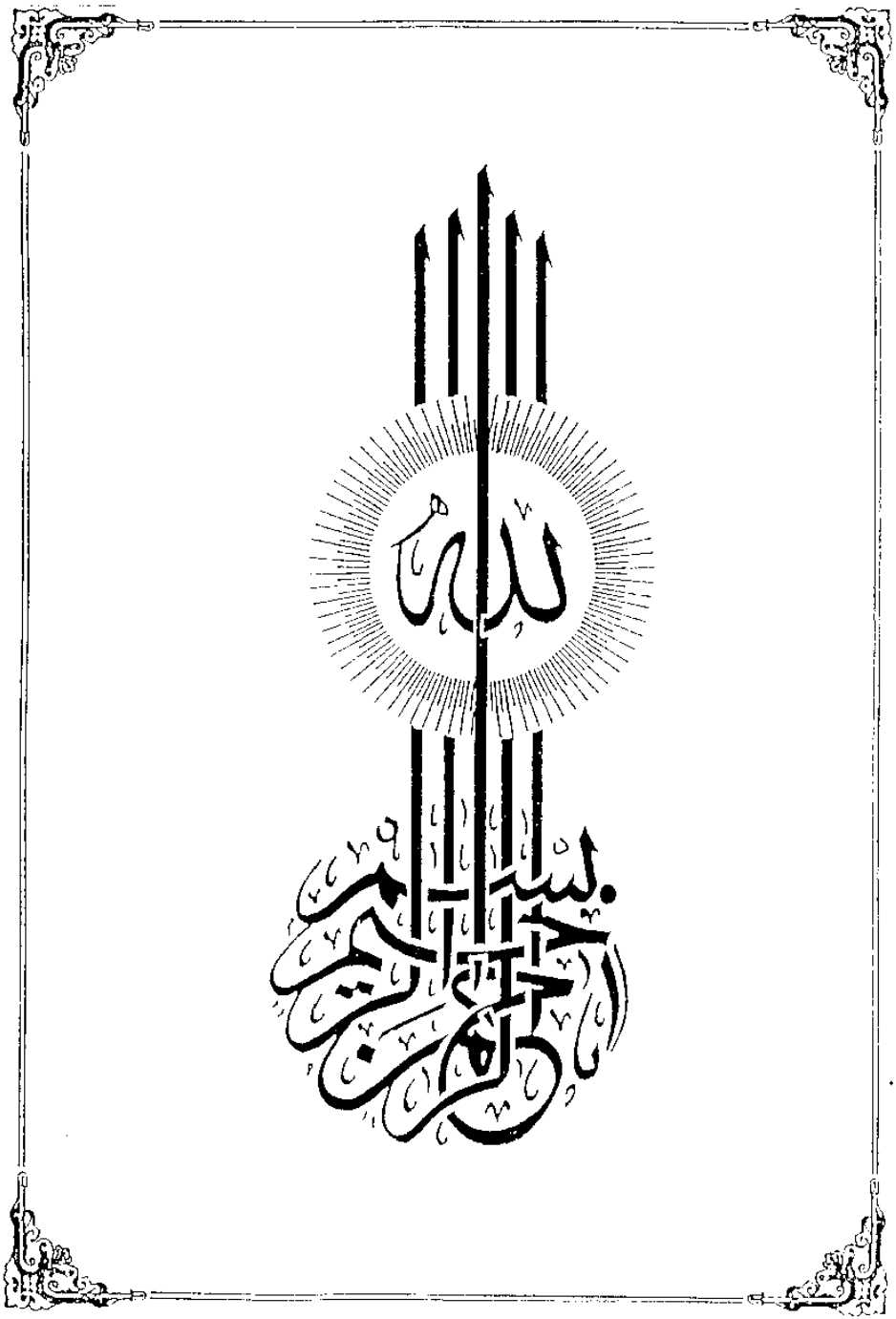

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Review Of Literature

REVIEW OF LITERATURE

By the early seventies of this century the concept deciding the strategy in managing retinal detachment associated with a full-thickness macular break was established. This strategy was based upon the available techniques of retinal detachment surgery known at that time. These techniques varied as regards the methods used for coagulation at the macular break and the counteraction of the traction existing at the break area. For the latter step many methods have been proposed, including special techniques of episcleral buckling of the posterior pole, either with plombs (*Pannarale, 1957, Hager, 1968* and *Margherio & Schepens, 1972*) a silver clip *(Klöti, 1964, 1966, 1970 and 1974*) or a scleral pocket (*Paufique & Bonnet, 1968; & Bonnet, 1971*). Other methods used for the same purpose were macular buckling, scleral resection at the equator (*Meyer-Schwickerath, 1968; Aaberg, Blair & Gass, 1970*), encircling or hemi-encircling procedures *(Oliver,*

1969; & Liesenhoff, 1970).

The strategy in managing the condition as settled by Schepens and Margherio in 1972 avoided the prophylactic treatment of a macular break that has not developed a retinal detachment. They reached this conclusion because of two facts. first; that the available methods of coagulation would damage the still functioning visual elements at the edges of the break, second; that the diagnosis of full thickness macular break without detachment was never certain. They started active treatment when the break started to be surrounded by localized retinal detachment. When no vitreo-macular attachments or signs of pre-retinal membranes were detected they considered photocoagulation after bed rest. to help distribution of fluid and thus make the fluid in break area minimal, an effective treatment. But if the retina was too much elevated to use photocoagulation successfully they planned retinopexy using transscleral diathermy together with trans-scleral drainage of the

subretinal fluid. To this step they added an intravitreal air bubble injection to tamponade the retina against the choroid when the patient was placed in the prone position postoperatively. However, when they were faced with a retinal detachment caused by a relatively large macular break or associated with moderate vitreous traction or a small preretinal membrane, though the macular break was small or moderate in size, they applied external diathermy over the break and then supported it by the vertical No. 40 silicone band that overlied a grooved No. 219, eight mm-long band, and the first was sutured to the sclera under the superior and inferior recti muscles respectively. This was followed by transscleral release of the subretinal fluid *(Margherio & Schepens, 1972)*.

No matter which of these transscleral methods of traction release or external cryopexy or diathermy was used, the problems faced were numerous and serious. These problems included inaccurate localization of the break and

subsequently extensive damage to unnecessarily treated parafoveal receptors in the retina. Added to this disadvantage were problems due to limited external exposure with the increased risk of intraocular penetration during placement of scleral sutures (thin sclera at macular area), failure of the break to settle on the buckle, damage to the short posterior ciliary vessels, and increased risk of damaging the optic nerve during treatment with diathermy or cryopexy. Not only these, but there were problems of migration of an exoplant or posterior silicone sling that may fail to support the retinal break or may even damage the optic nerve or macula *(Michels, 1981)*. Moreover were the difficult manipulations during the location of the hole and the high risk of haemorrhage during the drainage of subretinal fluid *(Binder & Riss, 1983)*. Still the chief disadvantage of such transscleral, or so called conventional methods was the permanent destruction of the macular area by coagulation with loss of macular function, which have

already been reduced by the development of the macular break *(Aaberg, 1970 & Scott, 1974)*.

To avoid this damage to the macular area, Cockerham, Schepens and Freeman started in 1969 to use an intraocular injection of silicone oil, in order to tamponade the macular hole from its inner surface. They used vitreous aspiration and or trans-scleral drainage of subretinal fluid to decrease the intraocular pressure and to give a space for a large oil bubble to be injected. However, They were faced with intra-operative and post-operative complications. Intra-operatively; retinal , subretinal and vitreous haemorrhage occurred and also iatrogenic retinal breaks. Post-operatively; shallowing of the anterior chamber and development of angle-closure glaucoma occurred commonly after over-filling the eye with the oil. Partial and total lens opacification and subretinal oil were common complications. Visually troublesome for the patient was the breaking of the single bubble into multiple small bubbles.

When it passed into the anterior chamber the oil bubble caused contact tissue damage to the cornea. This list of short-term and long-term complications have led to much controversy and increased the limitations on its rationale *(Lee, Donvan, Mukai, Schepens & Freeman, 1969; Mukai, Lee & Schepens, 1972; Scott, 1978; Leaver, Grey & Garner, 1979; and Haut, Ullern, Chermet & Van Effertere, 1980).*

Meanwhile closed pars plana vitrectomy was developing, and by the early eighties, Machemer and Gonvers started in 1980 to direct the continuously modifying vitreous surgery instrumentation towards treating the problem of retinal detachment arising from a macular break, directly from the inside of the eye.They developed a surgical technique for treating macular breaks with retinal detachment that basically consisted of a vitrectomy and air injection. They considered the technique to be an easy one, and avoided all treatment to the macular area, thus preserving whatever retinal function remaining near the break. Their approach

was based on the concept that vitreous traction played a major role in the development of many of these detachments. This was why when vitrectomy was finished with, they did not attempt to drain all the subretinal fluid through the break internally, but they injected two ccs. of air into the vitreous cavity. They made use of this air bubble to tamponade the hole when the patient was placed in the prone position post-operatively for 12 to 18 hours. The bubble thus closed off the macular break until the retinal pigment epithelial pump has dried up the subretinal space of the remaining fluid. Observing their results in six cases, they achieved a 100% anatomical success. The greater success was the functional results as regards visual acuity which varied between 3/60 and 6/30 (≈ 6/36) as shown in the next table *(Gonvers & Machemer, 1982)*.

Clinical data	P1	P2	P3	P4	P5	P6
Cause of hole:	Id.	Id.	Id.	Id.	Tr.	Id.
Preop. error:	-7.5	-19	-16	-14	Zero	-12
Postop. V.A.:	5/60	6/60	6/60	4/60	3/60	6/30

P = patient, Id. = idiopathic,
Tr = traumatic, V.A. = visual acuity.

(Gonvers and Machemer, 1982).

In a relatively fair trial to compare between conventional methods and vitrectomy techniques used in treating detachments due to macular breaks. Binder and Riss in 1983 published the results of two groups of cases managed by both methods. The first group consisted of 27 consecutive cases of retinal detachment due to macular breaks operated upon during the years 1972-7 by various conventional techniques as encircling, hemiencircling procedures, scleral resection, scleral pocket, and silver clip. The second group consisted of 18 consecutive cases, with the same condition, operated upon in the years 1978-81 by pars plana vitrectomy to release vitreous traction or make intraocular manoeuvres possible. In all cases of the second group an intraocular

gas bubble was used to tamponade the macular break, and the break was coagulated only if necessary. Not only a significantly better anatomical result in the second group was achieved, but the functional results were more favourable. In numbers, two thirds of the eyes of the second group reached a visual acuity between 6/12 and 6/48 (≈ 6/60), while in the first group none of the eyes gained vision better than 6/60. The reading vision in two thirds of the first group was negligible, while nearly one half of the cases of the second group reached useful acuity between Jaeger three and ten.

In 1984, Harris; De Bustros; and Michels published the results of a study on seven cases of retinal detachment due to macular break that they treated using vitrectomy, an intravitreal bubble of air, and postoperative prone positioning. The visual results postoperatively ranged from 6/60 to 6/18 with an exception of one case which only reached 3/60. In trial to get the best anatomical success

together with least damage to the edges of the macular break, they considered it sufficient to relieve the vitreoretinal adhesions in cases with partial posterior vitreous detachment, drain the subretinal fluid through the break, and exchange the vitreous cavity fluid with gas (air or air - sulfur hexafluoride mixture) and post-operative prone positioning. They observed that in cases where the vitreous was completely detached posteriorly the retina redetached soon after the gas bubble lost its tamponading effect. In such instance they reoperated to flatten the retina by fluid/gas exchange but applied postoperative photocoagulation to the edges of the macular break by either argon laser or Xenon. This helped the retina to remain flat for the long periods of follow up. Still this did not affect the visual outcome in comparing photocoagulated and unphotocoagulated cases.