Primary Vitrectomy for Pseudophakic Rhegmatogenous Retinal Detachment Uncomplicated by Proliferative Vitreoretinopathy (PVR)

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Introduction

The primary aim of a retinal reattachment procedure is to close all responsible retinal breaks and relieve any vitreoretinal traction. This can be achieved by an external scleral buckle, placed after localization and retinopexy of the break, to mechanically close it. The same effect can also be achieved by pars plana vitrectomy.

Since its introduction in 1970 by Dr. Robert Machemer, pars plana vitrectomy has played an important role in the management of complicated retinal detachments. To date several indications have been identified:

(1) presence of various grades of proliferative vitreoretinopathy (PVR) (2) Giant retinal tear, (3) complex arrangement of retinal breaks such as large posterior tears, (4) macular holes (5) multiple breaks at different levels (6) presence of media opacities. However the precise role of vitrectomy in the management of uncomplicated rhegmatogenous retinal detachment is still controversial.

Pseudophakic Retinal Detachments \(^1,2\) have presented unique and difficult problems to vitreoretinal surgeons since it was initially described by Tasman and Annesely in 1960. The clinical features of retinal detachment after cataract surgery \(^3,4\) are different from those in phakic eyes: (1) the responsible tears are small located anteriorly at the insertion of vitreous base. (2) the detachments are more extensive and macular involvement is very common. (3) signs of PVR are common. (4) the incidence of ‘no break found’ is more common as there is difficulty in visualizing the ora due to the glare and reflexes produced by the IOL, the presence of posterior capsular opacification as well as poor pupillary dilatation. Significant predispositions include intraoperative posterior capsular rent with vitreous disturbances, Yag laser capsulotomy, myopia with axial length > 25 mm, h/o retinal detachment in the fellow eye or a family history of retinal detachment \(^5,6,7,8,9\).

The basic surgical principles of scleral buckling and vitrectomy applies to pseudophakic retinal detachment (RD) also. However they present certain unique difficulties during surgery. The greatest problems \(^10,11\) are

(1) Difficult visualization of periphery and hence a higher incidence of “no break found” necessitating larger buckle placement, more extensive cryopexy both of which stimulates a greater degree of post operative inflammation and PVR formation.
The location of the IOL presents problem during scleral buckling and vitrectomy. Anterior movement of the anterior chamber intraocular lens (caused by hypotony) during subretinal fluid drainage or during fluid - air exchange can damage the cornea or press against the angle causing hyphema intraoperatively.

Presence of PC rent causes problems for visualization after fluid air exchange due to moisture condensation on the IOL intraoperatively. So also silicone IOL-silicone oil interaction leaves behind a firmly adherent layer of silicone oil, impairing intraoperative visualization as well as the postoperative visual recovery.

Previous reports on the management of retinal detachment has shown a poor rate of anatomic success in the presence of trans-sclerally sutured posterior chamber intraocular lens and have speculated the existence of certain risk factors which were associated with poor prognosis for surgical repair. These includes presence of vitreous in front of the intraocular lens, poor pupillary dilatation, difficulty in visualization during fluid- air exchange due to air gushing into anterior chamber and persistent tractional forces at the vitreous base due to the haptic of the IOL or the fixation sutures.

In this paper we analyze the results of primary vitrectomy in 50 eyes with uncomplicated pseudophakic rhegmatogenous retinal detachment.

Materials and Methods

We performed a prospective study on the efficacy of primary pars plana vitrectomy in the management of uncomplicated pseudophakic rhegmatogenous retinal detachment in 50 consecutive patients attending our tertiary care referral centre between 2004 and 2007.

The patient’s age ranged from 7 yrs – 64 yrs, the M: F ratio was 2:1. All patients had a detachment less than a month old and the macula was off in all the cases. There was no evidence of PVR. All patients were pseudophakic and included 36 eyes with posterior chamber intraocular lens implants, 11 eyes with anterior chamber intraocular lens and 3 eyes with transclerally sutured posterior chamber intraocular lens implants.

The surgical procedure included a conventional pars plana vitrectomy. Any vitreous traction present around the retinal tear was relieved. Indirect ophthalmoscopy was then performed to rule out any other preexisting or iatrogenic retinal tears. Fluid-air exchange with simultaneous endodrainage was performed either through the retinal tear if it was posterior or through a drainage retinotomy. Once pneumohydraulic reattachment was achieved, retinopexy was performed either by trans-scleral cryopexy or LIO laser barrage. Long acting tamponade was achieved by a non expansile mixture of air and C₃F₈ gas. The patients were advised to maintain a face down position for at least 12 hours – 16 hours daily for 3 weeks postoperatively. The duration of hospital stay was 3 days. The patients were monitored for any postoperative reaction and rise of intraocular pressure.

Follow up examination was performed every month for the first 3 months and then at 2 monthly intervals for the next 6 months. The duration of follow up varied from 6 months- 48 months.

Results

The patients were of the age group ranging from 7 years to 54 years (Mean- 37 years). The male:female ratio was 2:1. All patients had a detachment of less than a month due to superior breaks and the macula was off in all cases. The preoperative fundus findings were tabulated in Table 1.

<table>
<thead>
<tr>
<th>Table 1: Preoperative Fundus Findings &amp; Relevant Clinical Features</th>
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<tbody>
<tr>
<td>1. Pseudophakia : (PCIOL: 36, AC IOL: 11, SF IOL:3)</td>
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<tr>
<td>2. Hypotony : 15 eyes (30 %)</td>
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<td>3. AS reaction (Flare and Cells) : 10 eyes (20 %)</td>
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<td>4. Poor pupillary dilatation : 12 eyes (24 %)</td>
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<td>5. IOL Malposition : 4 eyes (8 %)</td>
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<td>6. PCO : 9 eyes (18 %)</td>
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<td>7. PC Rent : 6 eyes (12 %)</td>
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<td>8. Vitreous in AC : 3 eyes (6 %)</td>
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<td>9. Macula off : 50 eyes (100 %)</td>
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<td>10. No break found : 9 eyes (18 %)</td>
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<td>11. Choroidal detachment : 9 eyes (18%)</td>
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<td>12. Vitreous haze : 5 eyes (10 %)</td>
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<td>13. Total RD : 14 eyes (28 %)</td>
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<td>14. PVR C Grade : 5 eyes (10 %)</td>
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<td>15. Vitreous haemorrhage : 3 eyes (6 %)</td>
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The study population included 36 eyes with PC IOL implants (72 %); 11 eyes with AC IOL implants (22 %); and 3 eyes with trans-sclerally sutured PC IOL (6 %) implants. Preoperative hypotony (30 %); significant anterior chamber reaction (20 %); vitreous in anterior chamber (6 %); poor pupillary dilatation (24 %); malpositioned IOLs (8 %), PCO (18 %) and presence of vitreous haze (10 %) made intraoperative visualization difficult. Preoperative topical and systemic steroid administration to control the inflammation and combat hypotony was successful in achieving a quiet eye in 20 % cases. Use of flexible iris retractors, sphincterotomies, posterior capsulotomy and repositioning of the IOL into the bag or sulcus was performed intraoperatively to achieve adequate pupillary space for visualization of fundus periphery and to perform a thorough base excision. 18 % of patients had choroidal detachments associated with hypotony and total retinal detachment. Choroidal detachments were drained before placement of infusion canula. A break responsible for the detachments could not be identified in 18 % of patients either pre or intraoperatively.

Table 2. Intraoperative problems and complications

<table>
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<tr>
<th>Sl. No</th>
<th>Intraoperative Problems</th>
<th>Incidence (%)</th>
<th>Management</th>
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<tbody>
<tr>
<td>1</td>
<td>Corneal Odema</td>
<td>12 eyes (24%)</td>
<td>Debridement</td>
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<tr>
<td>2</td>
<td>Intraoperative hyphema</td>
<td>2 eyes (4%)</td>
<td>Viscoelastic inj into AC</td>
</tr>
<tr>
<td>3</td>
<td>Pupillary Miosis</td>
<td>14 eyes (28%)</td>
<td>Iris Retractors, adding Adrenalin to infusion fluid</td>
</tr>
<tr>
<td>4</td>
<td>Displacement of IOL</td>
<td>2 eyes (4%)</td>
<td>Conservative (1); Repositioning (1)</td>
</tr>
<tr>
<td>5</td>
<td>Shallowing of AC</td>
<td>4 eyes (8%)</td>
<td>Reformed spontaneously with prone positioning</td>
</tr>
<tr>
<td>6</td>
<td>Blood in Capsular bag</td>
<td>1 eye (2%)</td>
<td>Capsulotomy and drainage</td>
</tr>
<tr>
<td>7</td>
<td>Air in AC during fluid air exchange.</td>
<td>3 eyes (6%)</td>
<td>Cleared with flute needle</td>
</tr>
<tr>
<td>8</td>
<td>Moisture condensation on IOL</td>
<td>6 eyes (12%)</td>
<td>Scleral depression assisted base excision</td>
</tr>
<tr>
<td>9</td>
<td>Difficulty in base excision</td>
<td>4 eyes (8%)</td>
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Development of corneal edema intraoperatively and pupillary miosis were the two major intraoperative difficulties experienced during surgery. Epithelial debridement was necessary in 24 % of eyes to clear the visual axis for adequate visualization during surgery. Pupillary miosis intraoperatively was countered using iris retractors or by adding adrenalin to the infusion fluid in 28 % of cases. Intraoperative hyphema was caused by fluctuations in the intraocular pressure intraoperatively in 4 %. Injection of viscoelastic into the anterior chamber cleared the pupillary area. Shallowing of the anterior chamber after fluid-air exchange was observed in 8 % of eyes. In these 4 patients, the chamber reformed spontaneously when prone position was maintained postoperatively. Minimal displacement of the PC IOL which occurred intraoperatively in one patient was managed conservatively. Collection of blood within the capsular bag intraoperatively impaired visualization in 2 % of eyes necessitating central capsulectomy for drainage. Bubbling of air into the anterior chamber during fluid-air exchange occurred in all the 3 patients with sclerally sutured PC IOLs impairing visualization. Intraoperative moisture condensation in 12 % was cleared by flute needle. Moisture condensation on the posterior surface of the IOL in 6 eyes (12 %) with pre-existing posterior capsular rent was managed by gently sweeping the posterior surface of the IOL with a soft tipped aspiration needle.

The patients were followed up for 12 months. The anatomic reattachment rate was 96 % with a single procedure. In 2 eyes (4 %) recurrent retinal detachment with advanced proliferative vitreoretinopathy and gross hypotony necessitated retreatrectomy with silicone oil tamponade. 80 % of the patients achieved a visual acuity > 6/12 to 6/60. Poor visual recovery in 10 eyes (20 %) was attributed to (1) Epiretinal membrane formation 2 eyes (4 %); (2) Macular hole 2 % (4) persistent cystoid macular edema 4 % (5) persistence of SRF in macular area detected by OCT in 10 %.

We analyzed factors which predicted poor visual recovery and redetachment. These included preoperative anterior chamber reaction, choroidal detachment, older patients and longer duration of detachment. There was no significant difference in the reattachment rates with the different IOL types.
**Discussion**

The basic surgical principles of scleral buckling and pars plana vitrectomy continue to apply to pseudophakic retinal detachment, but there are certain problems unique to pseudophakia. The greatest problem in repairing a pseudophakic retinal detachment is the difficulty in visualizing the peripheral retina. Retinal breaks cannot be found in as many as 20% of patients due to small miotic pupils, difficulty in viewing through edge of IOL, perilenticular membranes and posterior capsular opacification.

Visualization tends to be more difficult in iris fixated and AC IOLs. Because of uncertain visualization, there may be a tendency towards greater use of cryotherapy which is associated with increased inflammation and postoperative PVR. The location of the IOL, whether in anterior chamber, iris plane or in the posterior chamber presents problems during scleral buckling and vitrectomy.

1. An anterior chamber lens, during scleral depression may be forced against the angle causing bleeding.

2. Mobility of iris fixated lenses can cause corneal damage from anterior displacement at time of subretinal fluid drainage when the eye is hypotonous.

3. An intravitreal gas bubble will also displace an iris fixated lens anteriorly. Prior injection of air/healon into the anterior chamber will prevent this.

4. Postoperative pupillary block and choroidal detachment also causes anterior displacement of IOL against cornea requiring immediate repositioning to prevent irreparable corneal damage.

5. Dislocation of lens into vitreous can occur with posterior chamber intraocular lenses. Posterior chamber intraocular lenses pose the fewest difficulties during scleral buckling and vitreous surgery.

6. Intraoperative moisture condensation on the posterior surface of IOL during fluid-air exchange may impair visualization of posterior segment in eyes with preexisting posterior capsular rents.

7. Interaction between silicone oil and silicone foldable IOL in the presence of PC rent causes impaired visualization for surgery.

8. In our series of 3 cases of pseudophakic retinal detachment associated with trans-sclerally sutured posterior IOLs, the clinical features and problems faced during surgery did not differ from eyes with conventional posterior chamber intraocular lenses. All patients had well dilated pupils. Absence of posterior capsular opacification and perilenticular cocoon membranes made visualization of retinal periphery easy. Intraoperative problems such as IOL dislocation, significant IOL decentration, vitreous haemorrhage, hyphema and pseudophakic corneal touch were not experienced while managing these patients. The only intraoperative problem was difficulty in visualization during fluid - air exchange as air gushed into the anterior chamber. Similar problems are experienced in eyes with anterior chamber IOLs or posterior chamber IOLs with posterior capsular rent or following YAG capsulotomy.

IOL explantation for intraoperative decentration or dislocation of the IOL or to permit visualization for vitrectomy was not necessary in any patient. Adequate anterior vitreous base dissection was possible in all the eyes which permitted intraoperative retinal flattening.

An anatomic success rate of 93.0% (88.8-93%) for pseudophakic retinal detachment cases have been reported by Schepens in 1991. The PC IOL group has a significantly greater prevalence of good postoperative visual acuity compared to AC IOL groups which have the worst visual prognosis. The cause of poor visual recovery after retinal detachment repair in patients with AC IOL is attributed to the increased occurrence of postoperative corneal oedema. Patients having an AC IOL implant have a higher degree of occurrence of breakdown of BAB (blood-aqueous barrier) before treatment of retinal detachment. Therefore the persistent corneal dysfunction in the presence of an AC IOL may trigger the postoperative corneal oedema and explain the poorest visual acuity outcomes.

The statistically significant poor prognostic indicators for reattachment are.
1. Presence of AC IOL (2) Eyes with AC reaction (3)  
Presence of macula off RD (4) Preoperative PVR (5)  
Older age etc

The reasons for failure include the development of proliferative vitreoretinopathy, failure to close an existing break or development of a new break. Although the anatomic reattachment rate is comparable to that in phakic eyes, the visual results are not so good. The postoperative visual recovery is worst with AC lenses due to the presence of corneal decompensation and higher incidence of cystoid macular edema. The other causes of poor visual recovery after successful anatomic reattachment are macular degeneration, cystoid macular edema, epimacular membrane proliferation,  
macular pucker and photoreceptor dysfunction.

Pars plana vitrectomy has become accepted as the treatment of choice for certain complex retinal detachments. The commonest indications are difficult breaks and PVR. In simple retinal detachments, external scleral buckling procedures are still preferred. The role of primary vitrectomy in the management of these cases is still controversial.

Scleral buckling procedures can be complicated by a variety of intraoperative and postoperative complications which can impair the final visual result. A combination of factors may result in intrusion, extrusion or infection of the scleral buckle. Mobility problems may be induced by the presence of bulky scleral buckle or due to disinsertion or rupture of the extraocular muscle during surgery. External drainage of SRF may result in subretinal haemorrhage, retinal incarceration or a retinal break. Encircling elements may reduce the blood flow as shown by colour doppler studies and results in anterior segment ischaemia. Refractive changes are a rule after scleral buckling procedure and may be especially problematic if a significant degree of anisometropia has been induced in a previously emmetropic eye. Buckling elements may result in distortion of macula and reduction of macular function. Further buckling procedures may be associated with postoperative CME which may account for delayed return of vision.

Vitrectomy offers certain advantages over scleral buckling in that it affords a direct approach to vitreous traction. Internal drainage of SRF with simultaneous FAE allows pneumohydraulic retinal reattachment. Vitreous opacities are removed at the time of vitrectomy and postoperative mobility is less. It should also be recognized that there are potentially hazardous complications of this procedure like progression of nuclear sclerotic cataract, glaucoma, iatrogenic tears and detachment and vitreous haemorrhage, etc.

Primary pars plana vitrectomy offers an alternative to scleral buckling procedures in the management of selected cases of primary rhegmatogenous retinal detachment. A larger series with longer follow up is needed before the efficacy of this procedure is established.

References

HUMOUR IN OPHTHALMOLOGY

Political Correctness (Or Euphemism?)

RRV

Recently I happened to come across a slim volume titled ‘Politically Correct Fairy Tales’. The first fairy tale was named “The Melanotically Impoverished Person of Royal Descent and Seven Vertically Challenged People”. Lost, aren’t you? It was the story of Snow White and the Seven Dwarfs.

The word ‘political correctness’ will not be found in any dictionary printed before the nineties. But once it came into vogue, it is there with a vengeance. Nowadays anything one say may be interpreted on its political correctness.

As we are all aware there are no blind people any more. They are all ‘visually handicapped’ or still better, ‘visually challenged’. Even the word handicapped is considered improper. ‘Differently abled’ is the current correct term, it seems. Sometimes we tend to forget and blurt out the outmoded word and cause wrinkles to pop up on the foreheads of discerning listeners.

Even though it has got disadvantages for people over forty (who are used to speaking or writing in a straight forward manner), it has some advantages too. This comes in handy while explaining the (unfavourable) outcomes of your treatment, surgical or medical. The aqueous percolation through the artificial intralamellar pathway is suboptimal, you can say about a failed bleb. These 'suboptimal' or 'deficiently optimal' results can be there in any treatment. The more obfuscating the word/ phrase is, the better. The same is true for prognostication too. You can be fully honest, yet incomprehensible. And the patient/ by-standers will be impressed into the bargain.

Another advantage is that all of us who called ourselves as ‘General Ophthalmologists’ can now use the much more impressive sounding ‘Comprehensive Ophthalmologist’.

Some time back, in a hospital attached to a Central Government Institution, one of those pompous Central Secretaries came for a visit. The Ophthalmologist was conducting the weekly medical board when a visit was paid to the OPD.

“Ah…m..m. You check the fields of all the crane operators, don’t you?” asked the Secretariat Mandarin. “Of course sir, we do digital perimetry”. The answer satisfied him, especially the ‘digital’ part. I am sure that he did not know that ‘digital’ can allude to your fingers too. Another example of political correctness saving the day!