Pars Plana Vitrectomy with Silicone Oil or Gas Endotamponade in HIV-Related Rhegmatogenous Retinal Detachments in Thai Patients

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Objective: *To evaluate the efficacy and results of pars plana vitrectomy with endotamponade for retinal detachments caused by necrotizing retinitis in HIV patients.*
Material and Method: *The data of patients with HIV-related retinal detachment who underwent pars plana vitrectomy with silicone oil or gas endotamponade between January 2003 and June 2005 were retrospectively reviewed. The outcome measures were demographic data, anatomical, and visual results.*
Results: *Of all 24 eyes from 20 patients, 19 eyes underwent pars plana vitrectomy with silicone oil tamponade and 5 eyes with long-acting gas tamponade. Mean follow up time was 13 months (range 2-33 months). The overall anatomical success was 83% (84% and 80% with silicone oil and gas tamponade, respectively). Final best corrected visual acuity was equal or better than 5/200 in 12 eyes (50%). Forty-six percent had stabled or improved vision at the end of follow-up.*
Conclusion: *Pars plana vitrectomy with silicone oil or gas tamponade gives the high anatomical success rate in the repair of retinal detachments caused by necrotizing retinitis in HIV patients. There were the same reattachment rate and visual results between the two tamponade groups. However, the use of gas tamponade may be effective in patients with highly active antiretroviral therapy (HAART).*

Keywords: *Pars plana vitrectomy, HIV-associated retinal detachment, Silicone oil, Long-acting gas, Thai patients*

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Cytomegalovirus (CMV) retinitis is the most common retinal infection and affects approximately 20% of patients with the acquired immunodeficiency syndrome (AIDS)[1-5]. Retinal detachment is also a common complication of CMV retinitis, with a reported incidence rate of 50% per patient per year[6-8]. The second most common opportunistic retinal infection is a particularly aggressive variant of necrotizing herpetic retinitis[9,10]. Although the total number of patients affected by herpevirus infection is much smaller than the number with CMV retinitis, the rate of retinal detachment is much higher, approximately 70-80%[11,12].

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The purpose of this article was to evaluate the efficacy and results of pars plana vitrectomy with endotamponade in the repair of retinal detachments caused by this necrotizing retinitis in AIDS patients.

Material and Method

Patients

The authors retrospectively reviewed all 25 patients with CMV retinitis or necrotizing herpetic retinitis-related retinal detachment underwent surgical repair from January 2003 to June 2005 in the department of Ophthalmology, Prince of Songkla University, Thailand. The definition and clinical characteristics of CMV retinitis and necrotizing herpetic retinitis were the same as previously described[1-5,9,10]. Four patients had a follow up time less than one month and one underwent scleral buckling, so only 24 eyes of 20

patients were included in the presented study.

The pre-operative data included age, baseline visual acuity (VA), clinical diagnosis, prior treatments, macular involvement, and treatment with highly active antiretroviral therapy (HAART).

The postoperative data were final best corrected visual acuity (BCVA), follow up time, final lens status, anatomical success, and time of silicone oil removal if the silicone oil was used for endotamponade.

Surgical Technique

The surgeries were performed by either one of two retinal specialists (M.R. or A.K.). The operative procedures varied according to the surgeons' preferences but, in general, they consisted of standard 20-gauge pars plana vitrectomy, relief of all retinal traction and reattached by fluid-air exchange using an internal drainage retinotomy. Endolaser photocoagulation was applied in all patients and, if possible, 360 degree prophylactic laser was used if there was generalized peripheral retinal scar and thinning. Of all 24 eyes, the vitreal cavity of 19 eyes (79%) were filled with 5700 centistokes silicone oil (Bausch & Lomb Surgical Inc., St. Louis, MO) and 5 eyes (21%) were filled with long-acting gas (20% sulfur hexafluoride(SF_6) or 20% perfluoropropane(C_3F_8): Alcon Laboratories Inc., Fort Worth, TX). Some eyes underwent lensectomy with silicone oil filled to the iris plane and leaving aphakia. An iridectomy at the 6-o'clock position was generally performed.

For silicone oil removal, pars plana approach was performed and cataract surgery with or without intraocular lens implantation was done if there was dense cataract obscuring the fundus.

Results

From 24 eyes of 20 patients, 22 eyes (19 patients) were diagnosed as CMV-related retinal detachments and 2 eyes (1 patient) were retinal detachments from necrotizing herpetic retinitis (Table 1). The mean age was 32 years (range 9-47 years). Eighty percent (16 of 20 patients) received HAART therapy before retinal detachments were detected. Among CMV eyes, 55% were previously treated with intravitreal gancyclovir and 2 eyes with necrotizing herpetic retinitis were treated with systemic acyclovir at the same time of the surgical interventions. The preoperative best corrected visual acuity (BCVA) was varied from 20/20 to light projection (PJ) and pre-operative macular attachments were found in 5 eyes (21%).

After vitrectomy, 19 eyes were filled with silicone oil whereas SF_6 and C_3F_8 were used as retinal tamponade in 1 and 4 eyes, respectively (Table 1). An average time to silicone oil removal was 8.5 months (range 4-13 months). There were 4 eyes that silicone oil was not removed at the end of the follow up. One of them had no light perception due to severe retinal and optic nerve involvement so the silicone oil was left if no complications occurred. Two had localized inferior retinal redetachment not involving macula and one of them was lost to follow-up after undergoing prophylactic laser.

Table 1. Patient data

	Silicone oil group	Gas group
Number of eyes	19	5
Diagnosis		
- Cytomegalovirus retinitis, eyes	17	5
- Herpetic necrotizing retinitis, eyes	2	none
Prior gancyclovir injection		
- Cytomegalovirus retinitis, eyes	7	5
- Herpetic necrotizing retinitis, eyes	none	none
HAART, patients	12	4
Final retinal reattachment, eyes (%)	16 (84%)	4 (80%)
Final BCVA, eyes (%)		
Stabled or improved	10 (53%)	1 (20%)
≥ 5/200	10 (53%)	2 (40%)
< 5/200 - PL	7 (37%)	2 (40%)
No PL	2 (10%)	1 (20%)

BCVA = Best corrected visual acuity, HAART = Highly active antiretroviral therapy
PL = light perception

The mean follow up time was 13 months (range 2-33 months). The anatomical success was 84% in the silicone oil group, 80% in the gas tamponade group and the overall success rate was 83% (20 eyes from 24 eyes). The final best corrected visual acuity (BCVA) in silicone oil and gas tamponade group were better than ambulatory vision ($\geq$ 5/200) in 53% and 40%, respectively (p = 1.0). Moreover, the final BCVA in both groups showed stable or improved vision in 53% and 20%, respectively (p = 0.32). The overall, 50% had final best corrected visual acuity of 5/200 or better and 46% (11 eyes from 24 eyes) had stable or improved vision. At the end of follow-up, however, the best corrected visual acuity of no light perception presented in 3 eyes, hand motion in 4 eyes and counting finger in 5 eyes.

Discussion

Silicone oil tamponade in the vitreous cavity for retinitis-related retinal detachments was pioneered by Freeman et al[13]. The use of silicone oil in the repair of the complex retinal detachment is associated with a high anatomical success rate[6,12,14-18]. This method of repair has become generally accepted as the treatment of choice for patients with AIDS and CMV retinitis with retinal detachments because of its ability to occlude existing retinal holes or holes that might develop in the future[13]. For the operative time, the procedures tend to be quicker and there may be less risk of exposure to HIV for the surgeon because less suturing is involved than with scleral buckles. The visual results, however, after silicone oil tamponade for HIV-related retinal detachment are usually poor. Jabs et al[8] reported a successful reattachment rate of 70% with vitrectomy and silicone oil tamponade but only 1 of 20 patients achieved a final visual acuity greater than 20/200. Dugel et al[14] reported a reattachment rate of 90% but 4 of 19 patients had improved visual acuity compared with preoperative levels at the time of death. They found that optic atrophy was seen in over 95% of the operated eye. Freeman et al [15], in contrast, found encouraging visual results. They reported a rate of macular reattachment of 90% with a minimum of 3 months of follow-up. Their visual results were favorable in selected patients, with the visual acuity of 20/100 or better in 62% of eyes.

In the presented study, 84% (16 from 19 eyes) of silicone oil group and 80% (4 from 5 eyes) of gas tamponade group had completely anatomical reattachment. The overall final best corrected visual acuity was 5/200 or better in 50% of eyes, 20/200 or better in 42% (10 from 24 eyes) and 46% (11 from 24 eyes) had stable or improved vision. This poor visual outcome despite high anatomical reattachment may be mainly due to macular and optic disc involvement, including active CMV retinitis involved macula, macular scar, epiretinal membrane or intraretinal membrane formation at macula and optic disc atrophy. Although the authors found that the eyes that used silicone oil tamponade had better visual results (stable or improved vision in 53% in the silicone oil group and 20% in the gas tamponade group, p = 0.32), the p-value showed no statistical significance. However, the high percentage of success from the silicone oil group might come from the better and long term tamponade effect of silicone oil in such complicated detachments. On the other hand, the use of gas tamponade may be effective in patients receiving HAART therapy. Of 5 eyes with gas tamponade, 4 eyes that were receiving HAART therapy achieved final retinal reattachment, whereas, the eye without HAART therapy failed to reattach retina. Nevertheless, because of the small number of eyes done with gas tamponade in the presented study, the visual results analysis was limited.

Factors related to poor vision other than macular involvement and optic disc atrophy were not specifically addressed in the presented study. Retinitis progression through the macula is an obvious way in which treated eyes might lose vision, independently of the surgical repair of the retinal detachment. A report that repair of retinitis-related detachments with silicone oil might be associated with optic atrophy, particularly in patients with AIDS with high intraocular pressure (IOP)[14], was not supported by a subsequent study with prospectively collected data[16]. In that study, optic nerve atrophy was correlated with extent of retinitis in both silicone-filled eyes and fellow eyes that were not operated on but was independent of IOP. Length of surgery, intra-operative blood pressure, IOP, and progression of retinitis postoperatively may account for many of the adverse visual outcomes following silicone oil repair of retinal detachment[16-18].

The authors intended to remove silicone oil in all eyes regardless of the CD4 level. However, Schaller et al[19] suggested removing silicone oil safely from the patients with AIDS who showed immune recovery in the current era of HAART. They believed that the retina/RPE adhesion was stronger when the immune status was recovered by HAART. Certainly, it is clear that intraocular inflammation exists in HAART-responding patients with healed CMV retinitis may contribute to more scarring and a stronger retina/RPE

adhesion[20]. Moreover, the longer survival of the patients also increases the risk of severe side effects due to longstanding silicone oil, such as silicone oil emulsification, hypotony, secondary glaucoma, and corneal opacification. All of these factors should lead us to reconsider the need for silicone oil in the presented patients with CMV retinitis-related retinal detachment. The presented study has shown good anatomical success in patients with HAART using gas tamponade (4 in 5 eyes) instead of silicone oil.

Alternatives to silicone oil have been proposed for repair of retinal detachment in such patients. Orellana et al[21] achieved good surgical results with a more conservative management approach. Treatments with laser, scleral buckling, or simple pars plana vitrectomy were chosen, depending on the extent of the detachment, the activity of the retinitis and the overall health of the patient. The success rate of laser photocoagulation and scleral buckling was approximately 77%. The series of Canzano et al[22] highlights the potential to avoid the use of silicone oil in patients with CMV retinitis. Their patients were operated on in the HAART era and most had received HAART. However, the fact that active retinitis was present at the time of retinal detachment and low CD4 cell counts were present in most patients suggested that immune recovery had not occurred. The surgical technique used by the authors included pars plana vitrectomy with posterior hyaloid delamination and scleral buckling. The perfluoropropane gas was used instead of silicone oil. Laser was used not only around the drainage retinotomy and around any breaks but a scatter photocoagulation pattern was also used to treat necrotic areas of retina. With the good success rate of these authors, Freeman[23] raised the re-evaluation of the traditional approach to the repair of CMV retinitis detachments. The use of scatter laser to cover all areas of necrosis is an interesting adjunct. In the presented study, the authors performed the 360-degree endophotocoagulation in most cases similar to the previous study. The authors do believe that this was the clue to have good surgical results.

Conclusion

The present study showed the good results of anatomical success in pars plana vitrectomy with silicone oil or gas tamponade in patients with HIV-related retinal detachments. The eyes that underwent silicone oil tamponade had the same visual results compared with gas tamponade. However, from a small number of cases with gas tamponade group, it may be done confidently and selectively in patients with HAART.

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การรักษาจอตาหลุดลอกที่เกี่ยวเนื่องกับการติดเชื้อ HIV ด้วยวิธีการผ่าตัดแบบ pars plana vitrectomy และใส่สารกดจอตาด้วยน้ำมันซิลิโคนหรือแก๊ส

แมนสิงห์ รัตนสุคนธ์, อนุชิต กิจธารทอง, ศิริรักษ์ วิเศษศิลปานนท์, สุภาวดี สมบูรณ์กิจ

วัตถุประสงค์: *เพื่อศึกษาผลการรักษาจอตาหลุดลอกที่เกิดจากการติดเชื้อ cytomegalovirus หรือ herpes ในผู้ป่วยภูมิคุ้มกันบกพร่อง*

วัสดุและวิธีการ: *เก็บข้อมูลผู้ป่วยภูมิคุ้มกันบกพร่องที่ได้รับการวินิจฉัยว่ามีจอตาหลุดลอกจากการติดเชื้อ cytomegalovirus หรือ herpes และได้รับการผ่าตัด pars plana vitrectomy และใส่สารกดจอตาด้วยน้ำมันซิลิโคน หรือแก๊สตั้งแต่เดือนมกราคม พ.ศ.2546 ถึงเดือนมิถุนายน พ.ศ.2548 โดยเก็บข้อมูลเกี่ยวกับการได้รับยาต้านไวรัส (HAART-highly active antiretroviral therapy) ลักษณะทางกายวิภาคของจอตาก่อนและหลังการผ่าตัด ระดับสายตา และระยะเวลาที่ผ่าตัดเอาน้ำมันซิลิโคนออก*

ผลการศึกษา: *ในการศึกษาครั้งนี้ 24 ตาที่ได้รับการผ่าตัดโดยวิธี pars plana vitrectomy มีการใส่สารกดจอตาด้วยน้ำมันซิลิโคนจำนวน 19 ตาและแก๊สจำนวน 5 ตา พบว่าอัตราการติดกลับของจอตาเท่ากับร้อยละ 84 และร้อยละ 80 ตามลำดับโดยมีระยะเวลาการติดตามผลการรักษาเฉลี่ยเท่ากับ 13 เดือน มีระดับสายตาเมื่อสิ้นสุดการติดตามผลการรักษามากกว่าหรือเท่ากับ 5/200 จำนวน 12 ตา (ร้อยละ 50) และมีระดับสายตาเท่ากับ หรือ ดีกว่าก่อนการผ่าตัด ร้อยละ 46*

สรุป: *การผ่าตัดด้วยวิธี pars plana vitrectomy และใส่สารกดจอตาด้วยน้ำมันซิลิโคนหรือแก๊ส มีอัตราการติดกลับของจอตาที่ดี โดยพบว่าอัตราการติดกลับและระดับการมองเห็นหลังผ่าตัดไม่แตกต่างกันระหว่างทั้งสองกลุ่ม นอกจากนี้ในรายที่ได้รับยาต้านไวรัสมาก่อน สามารถพิจารณาใช้สารกดจอตาด้วยแก๊สแทนน้ำมันซิลิโคนได้*