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FAKULTAS KEDOKTERAN UNIVERSITAS PADJADJARAN
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Case Report : Management of Retinal Detachment in High Myopia
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Abstract

Introduction

High myopia is associated with globe elongation, and an excessive axial elongation of the globe can cause mechanical stretching and thinning of the choroid and RPE layers, resulting in various retinal degenerative changes, which one is retinal detachment. Retinal detachment caused by high myopia can be repaired by laser or pneumatic retinopexy, placement of a scleral buckle to hold the retina to the eye, or repaired by vitrectomy and replaced with silicone gel after the retina is reattached with laser.

Objective

To report and to compare management of rhegmatogen retinal detachment caused by high myopia.

Case report

There are 3 cases of rhegmatogen retinal detachment (RRD) caused by high myopia being reported. The first case is a 20 years old woman with RRD on the right eye repaired with scleral buckle and cryopexy. The second case is a 17 years old man with RRD on the left eye repaired with scleral buckle and cryopexy, but one week after surgery retinal detachment became worsen. The third case is a 56 years old man with RRD on the right eye repaired with scleral buckle and cryopexy.

Conclusion

The treatment of retinal detachment caused by high myopia can be vary depends on the retinal condition. A few things that must be taken into consideration in the management of retinal detachment in high myopic eyes are the area of detachment, the status of the macula, and the presence of PVR.

I. Introduction

High myopia or pathological myopia is associated with globe elongation and a refractive error of at least 6 diopters (D) and/or axial length of greater than 25.5 mm. The prevalence of high myopia varies considerably in different ethnic groups and has been estimated to be around 10% in Asian populations. Excessive axial elongation of the globe in high myopia can cause mechanical stretching and thinning of the choroid and retinal pigment epithelium layers, resulting in various retinal degenerative changes. It is well known that individuals with high myopia have increased risks of retinal complications such as peripheral retinal degenerations, retinal tears, retinal detachment, posterior staphyloma, chorioretinal atrophy. In a cross-sectional community-based

epidemiological study in HongKong, 56.1% and 11.3% of subjects with high myopia were found to have one or more peripheral retinal degenerative lesion or posterior pole lesion respectively. Some of these retinal lesions may be associated with severe irreversible visual loss and therefore it is important for clinicians to be aware of the retinal pathologies in high myopia. Among the different types of peripheral retinal degenerations in high myopia, lattice degeneration is the most important peripheral retinal degeneration which can predispose to rhegmatogenous retinal detachment (RRD).^{1,2}

Retinal detachment caused by high myopia can be repaired by pneumatic retinopexy, placement of a scleral buckle to hold the retina to the eye, or repaired by vitrectomy and replaced with silicone gel after the retina is reattached with laser. Although the success rate of re-attachment of retina is much higher with the modern techniques of pars plana vitrectomy and internal tamponades, conventional scleral buckling is still considered to be a safe and effective technique in the primary management of uncomplicated rhegmatogenous retinal detachments.^{1,3}

II. Case Report

2.1 Case One

A 20-years old woman came to Cicendo Eye Hospital (CEH) on April 28th 2011 with chief complain of seeing shadow in the upper peripheral visual field since three months ago. The patient has been using thick glasses since she was 8 years old. History of sensation of a flashing light was denied. No history of trauma, red eyes or previous surgery found. History of hypertension and diabetes mellitus was denied.

General examination was within normal limit. Ophthalmological examination revealed the uncorrected visual acuity (UCVA) of right eye was finger counting at one meter and left eye was finger counting at three meters. The best corrected visual acuity of right eye (S-10.00 C-3.50 X175) was 0.3 and left eye (S-11.75 C-3.50 X175) was 0.8 on Snellen chart. Amsler grid examination revealed a metamorphopsia on the right eye. Ocular motility was full to all direction. Intraocular pressure (IOP) using Schiotz tonometer were 10.4 mmHg on RE and 20.6 mmHg on LE. Anterior segment examination of both eyes were within normal limits. The posterior segment of the right eye (RE) revealed clear media, round and sharp border of optic disc, cup disc ratio was

0.3, artery vein ratio was 2:3, retinal detachment on inferior side, but the hole was not found, and attached macula, while the left eye (LE) revealed normal limits. We diagnosed the patient with rhegmatogen retinal detachment on the right eye and high myopia on both eyes, and we planned for pars plana vitrectomy, scleral buckle, endodrainage, endolaser with silicone oil tamponade for the right eye and do the barrage laser procedure for the left eye.

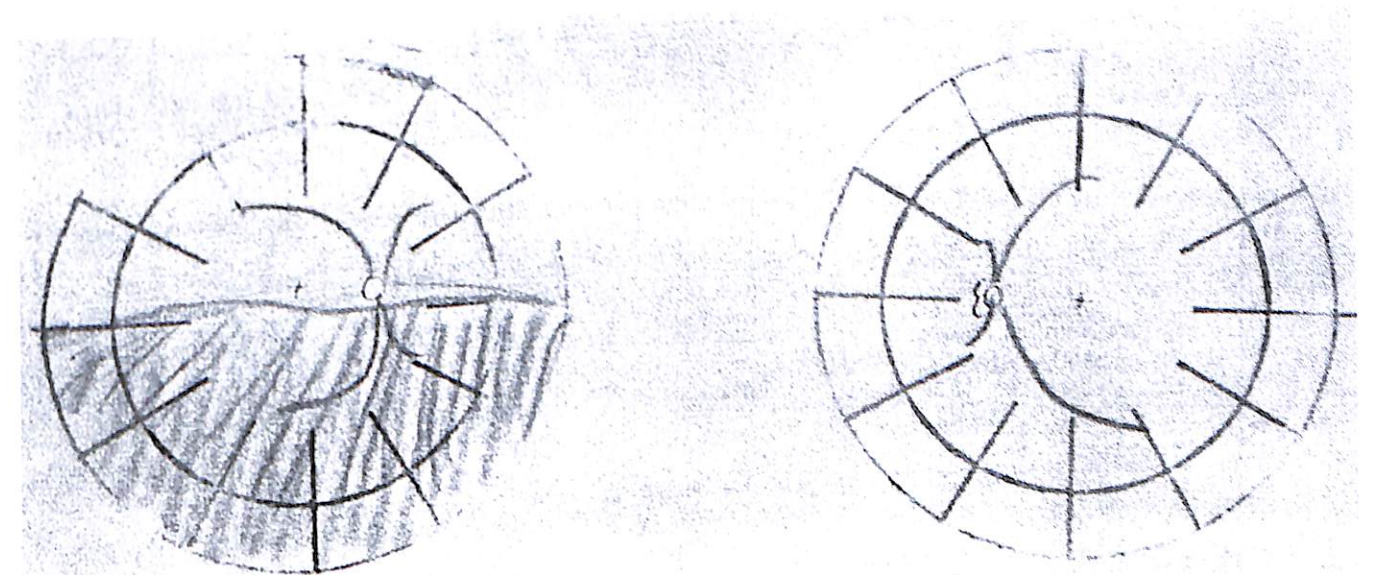


Figure 2.1 Fundus drawing on April 28th 2011

The laser was performed on the next day with laser spot size of 400 μm , for 0.1 ms and power ranging from 160 to 200 mW for approximately 500 burns were applied. The patient was prescribed antibiotic-steroid eye drop and suggested to control in 1 weeks.

The surgery was performed on the next week for RE. During the surgery, the hole was found on the inferior side, and was decided to do scleral buckle and retinal cryopexy only. Oral antibiotic, antibiotic and steroid eyedrops were given after the surgery. One day after surgery, the visual acuity of RE was finger counting on 1 meter. The funduscopy finding of RE revealed attached retina with cryo scar and attached macula.

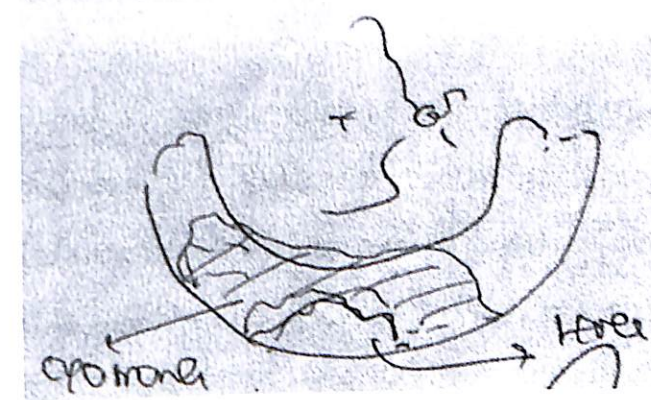


Figure 2.2 Fundus drawing one day after surgery

One week later, the UCVA of RE was finger counting at 1 meter and LE was finger counting at 3 meters. The funduscopy finding of RE revealed the same condition as before. The patient was suggested to undergo a barrage laser on her right eye. The laser was performed at the same day with laser spot size of $400\ \mu\text{m}$, for 0.1 ms and power ranging from 150 to 200 mW for approximately 850 burns were applied.

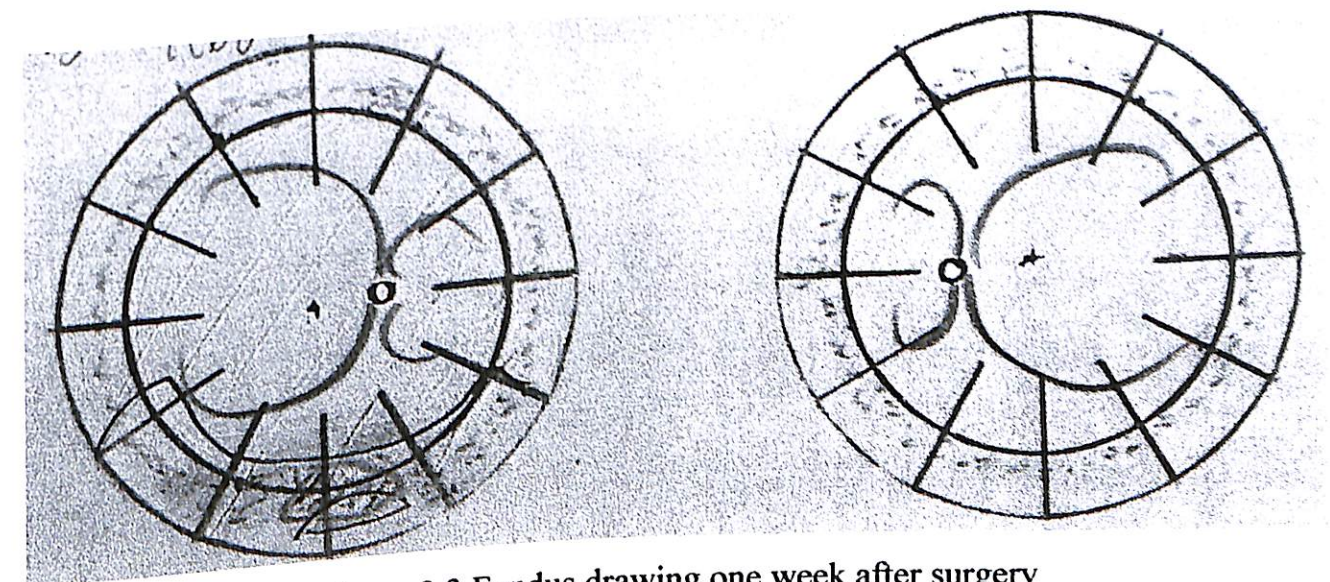


Figure 2.3 Fundus drawing one week after surgery

2.2 Case Two

A 17-years old man came to Cicendo Eye Hospital (CEH) on May 4th 2011 with chief complain of sudden decreased vision on his right eye since three days ago. The patient has been using thick glasses since 2 years before (RE -16.00D and LE -18.00D). No history of trauma, red eyes or previous surgery found. History of hypertension and diabetes mellitus was denied.

General examination was within normal limit. Ophthalmological examination revealed the uncorrected visual acuity (UCVA) of right eye was finger counting at one

meters and left eye was hand movement. Ocular motility was full to all direction. Intraocular pressure (IOP) using Schiottz tonometer were 20.6 mmHg on right eye and 6.4 mmHg on left eye. Anterior segment examination of right eye was within normal limits, while on left eye flare +2 and cells +2 were found. The posterior segment of the right eye (RE) revealed clear media with Weiss ring, round and sharp border of optic disc with PPCRA, cup disc ratio was 0.3, artery vein ratio was 2:3, retina was flat with tigroid fundus, peripheral degeneration, and dot hemorrhage, the macular was within normal limit. The posterior segment of the left eye (LE) revealed clear media, round optic disc, cup disc ratio and artery vein ratio was difficult to examined, retinal detachment in all quadrants except superior side with hole on inferotemporal side, and the macular was detached. We diagnosed the patient with high myopia on both eyes, myopic fundus with peripheral degeneration on the right eye and rhegmatogenous retinal detachment with proliferative vitreoretinopathy grade B on the left eye, and we planned to do barrage laser for the right eye and pars plana vitrectomy, scleral buckle, endodrainage, membrane peeling, endolaser, with silicone oil tamponade for the left eye.

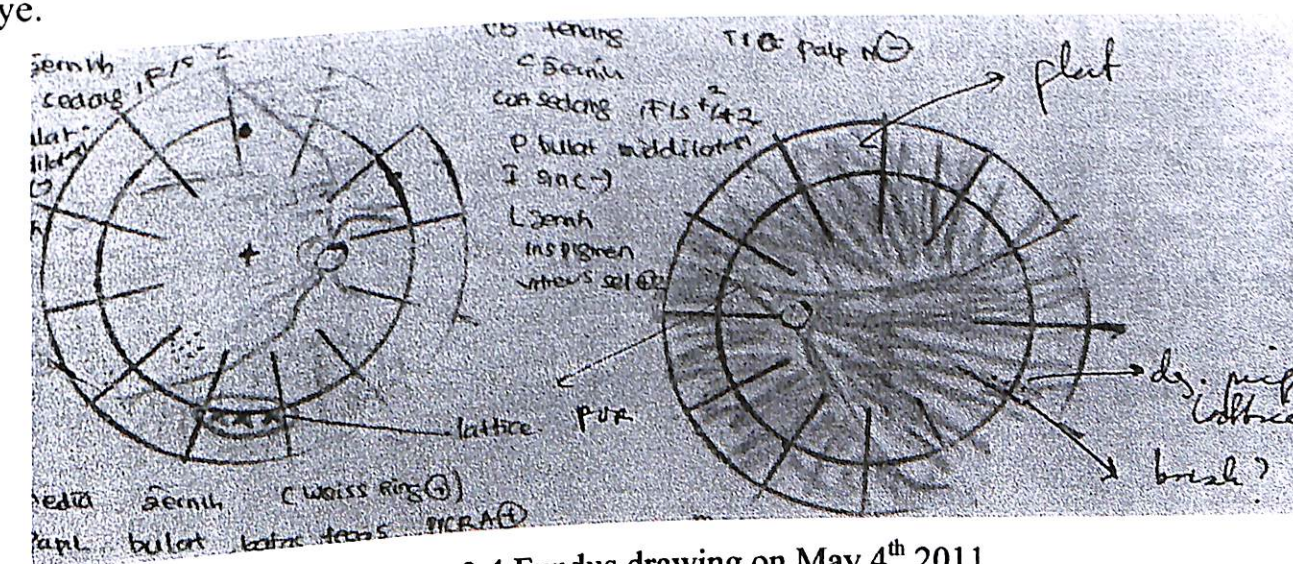


Figure 2.4 Fundus drawing on May 4th 2011

The laser was performed at the same day with laser spot size of 400 μ m, for 0.1 ms and power ranging from 180 to 360 mW for approximately 750 burns were applied.

The surgery was performed on the next week for LE. During the surgery, the hole was found on the inferotemporal side, and was decided to do scleral buckle and retinal cryopexy only. Oral antibiotic, antibiotic and steroid eyedrops were given after the surgery. One day after surgery, the visual acuity of RE was hand movement. The

fundusoscopic examination of RE revealed detached retina on the inferior side and detached macula.

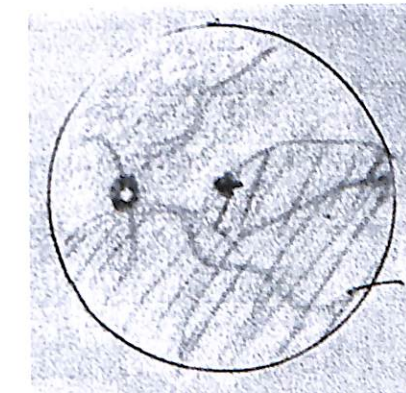


Figure 2.5 Fundus drawing one day after surgery

One week later, the UCVA of RE was finger counting at 1 meter and LE was light perception. The posterior segment of the right eye (RE) revealed clear media with light perception. The posterior segment of the right eye (RE) revealed clear media with Weiss ring, round and sharp border of optic disc with PPCRA, cup disc ratio was 0.3, artery vein ratio was 2:3, retina was flat with tigroid fundus, dot hemorrhage, and scar laser, the macular was within normal limit. The posterior segment of the left eye (LE) revealed clear media, round optic disc, cup disc ratio and artery vein ratio was difficult to examined, retinal detachment in all quadrants, and the macular was detached. We diagnosed the patient with high myopia on both eyes, myopic fundus on the right eye and rhegmatogen retinal detachment on the left eye, and we planned to do pars plana vitrectomy, endodrainage, endolaser, with silicone oil tamponade for the left eye.

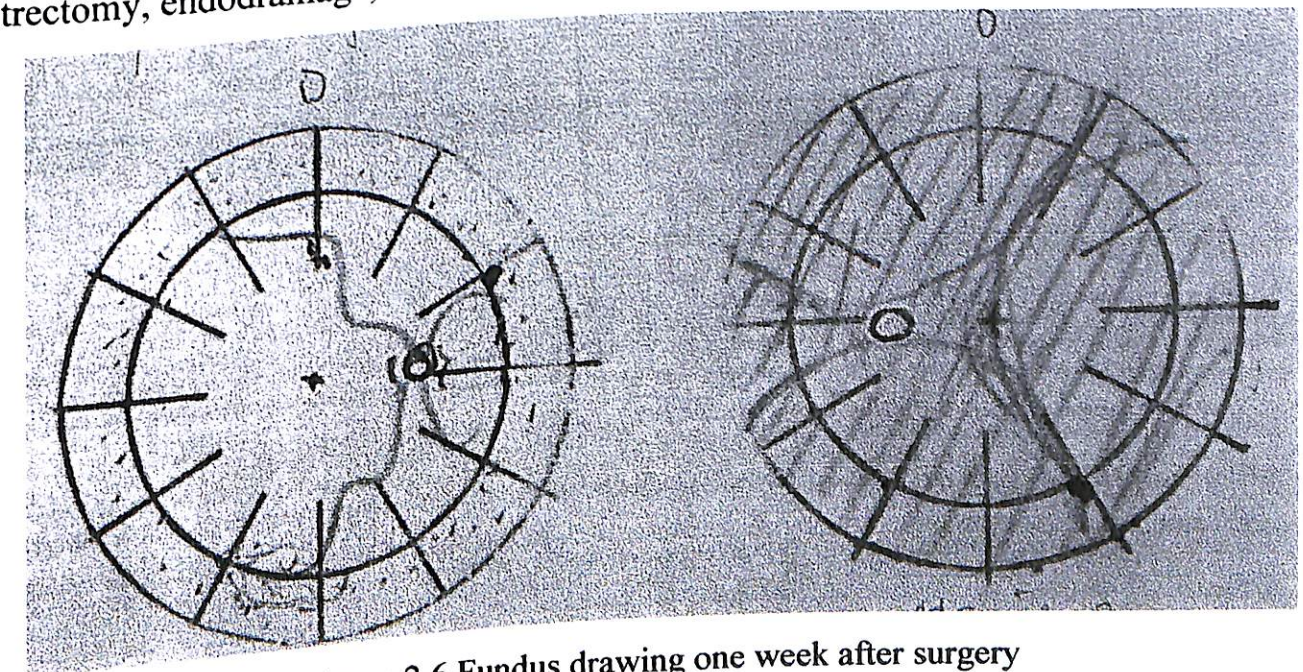


Figure 2.6 Fundus drawing one week after surgery

2.3 Case Three

A 56-years old man came to Cicendo Eye Hospital (CEH) on May 23rd 2011 with chief complain of sudden decreased vision on his right eye since ten days ago, and felt better looking on his left side. History of sensation of a flashing light was felt several days before visual disturbance. The patient has been using thick glasses since he was a child (-6.50 D on both eyes). No history of trauma, red eyes or previous surgery found. History of hypertension and diabetes mellitus was denied.

General examination was within normal limit. Ophthalmological examination revealed the uncorrected visual acuity (UCVA) of right eye was hand movement and left eye was finger counting at two meters, and the corrected visual acuity of left eye was 0.7 on Snellen chart. Ocular motility was full to all direction. Intraocular pressure (IOP) using Schiottz tonometer were 10.2 mmHg for right eye and 17.3 mmHg for left eye. Anterior segment examination of both eyes were within normal limits. The posterior segment of the right eye (RE) revealed clear media, round and sharp border of optic disc, cup disc ratio was 0.3, artery vein ratio was 2:3, retinal detachment with hole on superotemporal side, and macular detachment, while the left eye (LE) revealed normal limits. We diagnosed the patient with rhegmatogen retinal detachment on the right eye and high myopia on the left eye, and we planned to do scleral buckle with retinal cryopexy for the right eye and do barrage laser for the left eye.

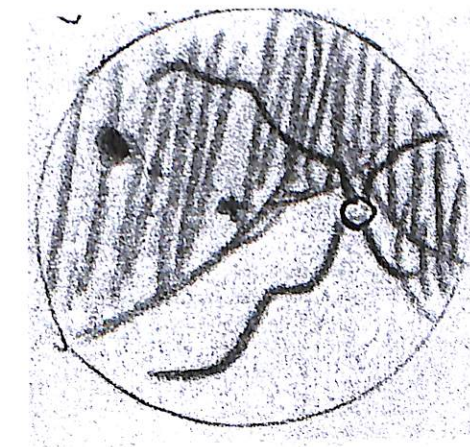


Figure 2.7 Fundus drawing on May 23rd 2011

The scleral buckle and retinal cryopexy was performed on the next day for RE. Oral antibiotic, antibiotic and steroid eyedrops were given after the surgery. One day after surgery, the visual acuity of RE was finger counting on 1 meter. The funduscopic

examination of RE revealed attached retina with cryo scar and attached macula. The plan for the LE was barrage laser on the next week.

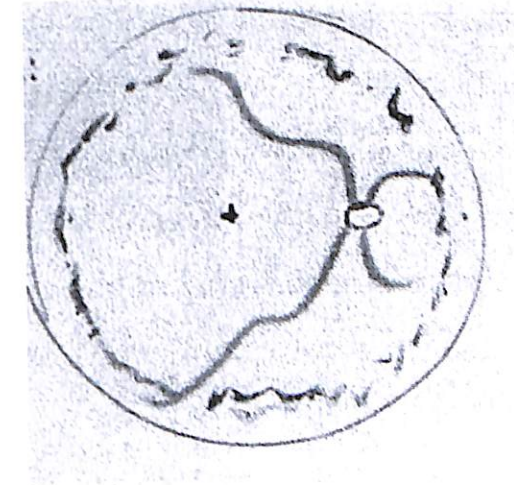


Figure 2.8 Fundus drawing one day after surgery

III. Discussion

People with high myopia are prone to retinal detachment. A detached retina needs immediate diagnosis and treatment to prevent vision loss. Myopia is caused by an eyeball that's longer than normal. Because the eyeball is longer, it pulls on the retina and is prone to pulling a piece of the retina off the back of the eye wall. The retina is also thinner overall in myopic people and more prone to developing small holes or tears.^{1,2,4}

Symptoms of posterior vitreous detachment and retinal break formation include sudden or gradual increase in the number of floaters and/or flashes. In patients with RRD, they may also develop symptoms of curtain-like progressive visual field loss and blurring of vision. Dilated fundus examination should be carried out in patients with these symptoms as soon as possible to detect for the development of retinal break or retinal detachment.^{4,5}

In these 3 cases, the visual acuity were 1/60 or worse, and from the history taking revealed the symptoms in these cases are sudden loss visual acuity, which two of them develop symptoms of seeing flashes. These 3 patients are also have been using thick glasses since they were children. In case 1, RE S-10.00 C-3.50 X175, and LE S-11.75 C-3.50 X175, in case 2, RE S-14.00 D and LE S-18.00 D, in case 3 the patient has been using glasses with S-6.50 D on both eyes.

People with myopia of -1 to -3 diopters have a risk four times as high as the general population of RD, while people whose refractive error is higher than -3 diopters have a tenfold risk. The risk of RD in high myopes (people with a -6.00 or higher diopter) is 5% per year. A study reported in the *American Journal of Epidemiology* suggests that 55% of all RDs are caused by myopia.²

Indirect funduscopy examination showed good macula condition in one case, while in the other case the macula had been detached. All cases are underwent the same surgical procedure, which are scleral buckle with retinal cryopexy and barrage laser on the fellow eye.

The principals of surgery for retinal detachment are find all breaks, create a chorioretinal irritation around each break and bring the retina and the choroid into contact for sufficient time to produce a chorioretinal adhesion to permanently wall of the subretinal space. The most important element in management is a careful retinal examination, first preoperatively and than intraoperatively.^{4,6}

Retinal detachments caused by myopia can be repaired by pneumatic retinoplexy, which seal the retina back to the wall of the eye, or surgically, with placement of a scleral buckle to hold the retina to the eye. Vitreous fluid may be removed from the eye and replaced with silicone gel after the retina is reattached with laser. Laser photocoagulation is used for the treatment of eyes which have developed retinal hole or break. Since around 30% of eyes with acute RRD have been found to have lattice degeneration, prophylactic laser treatment can also be performed in patients with peripheral retinal degenerations, especially those with a history of retinal detachment in the fellow eye. In eyes with retinal detachment, laser photocoagulation alone is insufficient to treat the condition and vitreoretinal surgery is required. Surgical modalities for RRD include pneumatic retinoplexy, scleral buckling surgery with cryopexy, and pars plana vitrectomy with intravitreal tamponade such as gas or silicon oil. For patients in whom the macula is still attached, they will generally have favourable visual outcome postoperatively. However, for patients in which the central of the fovea is detached, the visual prognosis of the patient is more variable and some patients might develop irreversible visual loss despite successful retinal detachment surgery. Therefore, prompt ophthalmic consultation is advised for early detection of retinal detachment in order to prevent irreversible visual loss.^{4,5,6}

Scleral buckle is a procedure which is done to relieve vitreous traction on retinal breaks, alter intraocular fluid currents and reappose retina to the RPE. Choosing a sclera buckling technique is a multi factorial decision that takes into account the number and position of the retinal breaks, the size of the eye, surgeon preference and associated vitreoretinal findings. External drainage of subretinal fluid and/or anterior chamber paracentesis may be indicated if IOP increase due to displacement volume from the buckling effect. Cryotherapy (freezing) is applied around retinal breaks prior to placing the buckle. Complication of scleral buckle include induced myopia, anterior ocular ischemia, diplopia, ptosis, orbital cellulitis, subretinal hemorrhage from drainage and retinal incarceration at the drainage site.^{3,6}

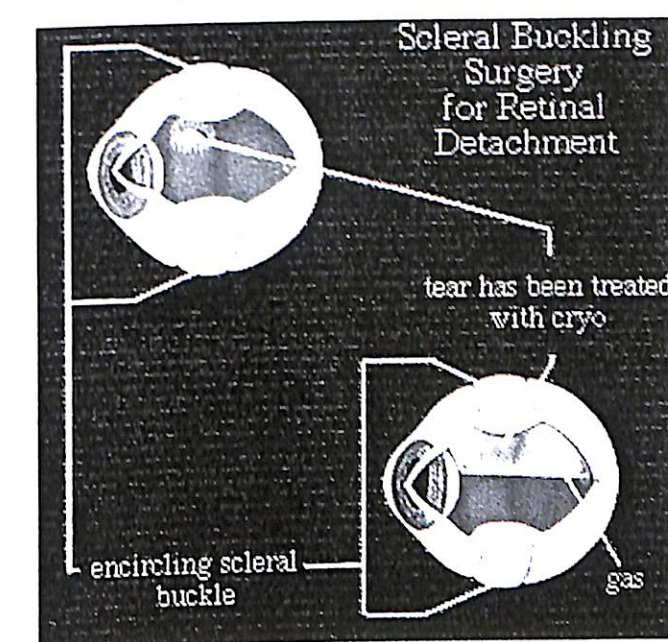


Figure 3.1 Scleral buckle⁵

Radial scleral buckle is indicated to U-shaped tears or Fishmouth tears and posterior breaks. Circumferential scleral buckle indicated to multiple breaks, anterior breaks and wide breaks. Encircling buckles indicated to breaks more than 2 quadrant of retinal area, lattice degeneration located on more than 2 quadrant of retinal area, undetectable breaks, and proliferative vitreous retinopathy.⁶

In two cases, the visual acuity in one day after surgery was 1/60 with attached retina, while in case two the visual acuity was hand movement with the retina still detached, so the patient was planned to undergo pars plana vitrectomy procedure with endolaser and endodrainage. In second case, the area of the detached retina may explain the failure of retinal reattachment, since almost the whole quadrants were detached,

including the macula, and there were also proliferative vitreoretinopathy (PVR) present. This condition also caused the failure of scleral buckle and retinal cryopexy procedure. In such condition, pars plana vitrectomy with silicone oil tamponade, endodrainage and endolaser procedure are more likely to be done.

Up to 90 % of retinal detachments can be successfully re-attached. According to Prevent Blindness America, 40% of people after retinal re-attachment have excellent vision; the other 60% will have some vision loss. Eighty-five percent of cases will be successfully treated with one operation with the remaining 15 percent requiring 2 or more operations. After treatment patients gradually regain their vision over a period of a few weeks, although the visual acuity may not be as good as it was prior to the detachment, particularly if the macula was involved in the area of the detachment. However, if left untreated, total blindness could occur in a matter of days.^{7,8}

The prognosis for the first and the third patient is *dubia ad bonam*, since the area of detached retina not as vast as the second case, although in case three the macula was also detached, but one day after surgery the retina were attached. The prognosis for the second case is *dubia ad malam*, since almost the whole quadrants were detached, including the macula, and there were also proliferative vitreoretinopathy (PVR) present.

IV. Conclusion

A few things that must be taken into consideration in the management of retinal detachment in high myopic eyes are the area of detachment, the status of the macula, and the presence of PVR. Those aspects may influence the plan of management, whether scleral buckle and retinal cryopexy would be sufficient to give a better prognosis or would a pars plana vitrectomy be the choice of procedure

REFERENCES

1. Ryan SJ. Retina Volume III : Surgical Retina. Section 2 : Retinal Reattachment Surgical Principles and Techniques. St.Louise, Missouri : Mosby 2001. p 1961-2062
2. Lai T. Retinal Complication of High Myopia. Medical Bulletin. Vol. 12 no. 9. 2007. p 18-20
3. Kreissig I. Primary Retinal Detachment. Option for Repair. Germany : Springer-Verlag. 2005. p 55-80
4. American Academy of Ophthalmology. Periferal Retinal Abnormalities. Section 12: Retina and Vitreous. San Francisco: The Fundamental of American Academy of Ophthalmology. 2010-2011. p 292-302
5. Kanski, Jack J. Clinical Ophthalmology. A Systemic Approach. 6th Edition. UK: Butterworth-Heinemann Elsevier Limited. 2006. p 710-720
6. Michels RG. Wilkinson CP. Rice TA. Retinal Detachment Chapter 11 : Alternative Methods for Retinal Reattachment. USA : Mosby Company 1990. p 583-624.
7. Haritoglou C, Brandlhuber U, Kampik A, Priglinger S. Anatomic Success of Scleral Buckling for Rhegmatogenous Retinal Detachment- A Retrospective Study of 524 Cases. Ophthalmologica. 2010; 224 : 312-8.
8. Karim MT, Jan S, Karim S, Iqbal S, Saeed N. Outcome of Scleral Buckling Procedure for Primary Rhegmatogenous Retinal Detachment. JPMA. 2010. 60: 754

