

Management and Outcome of Vitrectomy in Severe Proliferative Diabetic Retinopathy with Combined Retinal Detachment

Aliya Sultana¹

¹Assistant Professor, Vitreo Retina Department, Sarojini Devi Eye Hospital, Hyderabad, Telangana

ABSTRACT

Background: Diabetic retinopathy (DR) is the leading cause of new blindness in patients. Vitrectomy is also thought to increase retinal blood flow by decreasing the resistive index. Aims and Objectives: To know the surgical outcome of vitrectomy in severe diabetic retinopathy patients with combined tractional and rhegmatogenous retinal detachment. **Methods:** Retrospective study done in our institute at Sarojini Devi Eye Hospital, Hyderabad. Data of 50 diabetic patients who underwent vitrectomy for combined retinal detachment during June 2014 to June 2015 was collected from medical records. 31 patients were male patients, 19 patients were female patients. Systemic hypertension was common co morbidity in most of the patients. Other co morbidity noted in our patients were coronary artery disease and chronic kidney disease, most of the male patients had either coronary or chronic kidney disease, female patients had associated hypertension commonly than other co morbidities. Age group of 6 patients was 30 to 40 years, 36 patients were between 40 to 45 years, eight patients were above 50 years. All patients with combined retinal detachment underwent detailed systemic and ocular examination. Systemic co morbidities were detected and surgery planned after physician clearance. Cardiac patients were advised to stop anti coagulants one week before surgery after taking cardiologist clearance, nephropathy patients who were on renal dialysis were advised for heparin free dialysis before ocular surgery. All patients underwent pars plana vitrectomy with silicone oil tamponade. 240 band was used in 3 patients. Three patients in our study were injected anti Vegf before Vitrectomy. **Results:** 28 seven patients showed good anatomical and visual outcome, BCVA in all 28 patients after silicone oil removal was 6/36, 12 patients improved to 6/60, 5 patients improved to 6/24, CF 1 mt in two patients and vision was only PL + in 3 patients after surgery. **Conclusion:** Surgical outcome in severe proliferative diabetic retinopathy patients depends on the vitreo retinal attachments. Hyaloid stripping in periphery is very difficult in ischemic retina. Risk of retinal tears is high. Risk of intra operative bleed is high when the proliferative tissue is active with visible blood vessels. Extension of traction in periphery has poor prognosis. PFCL helps in membrane peeling. Combined retinal detachment with focal vitreo retinal attachments has good anatomical and visual outcome.

Keywords: Combined retinal detachment, tractional retinal detachment (TRD), fibrovascular proliferation (FVP), pre retinal fibrosis, anti vegf.

INTRODUCTION

Diabetes is one of the leading cause of blindness in our country, Hyderabad is highly prevalent area for diabetic retinopathy, most of the patients are becoming blind due to severe proliferative retinopathy, really a challenging to treat these cases. Despite many screening programs and awareness programs still retina clinic has more severe proliferative retinopathy patients.^[1-3]

Traction retinal detachments (TRD) is an advanced form of PDR that results from neovascular growth from existing retinal vasculature into the vitreomacular interface with an accompanying fibrotic tissue and contractile elements. Growth factors create a biochemical environment favorable for angiogenesis.^[1,2]

using the hyaloid as a scaffold they eventually invade the cortical vitreous, thereby creating firm adhesions between the hyaloid and the inner retina.^[2-5]

The co-development of contractile fibrous tissue results in anteroposterior and tangential traction on the fibrovascular complex and thinned ischemic retina by the vitreous. Excessive traction frequently causes the fragile new vessels to bleed into the vitreous and/or pre-retinal space, and the retina to deform and detach.^[4,5]

We carried this study with a purpose to study the management and visual outcome after pars plana vitrectomy in all these cases. Aim of our study is to know the surgical outcome of vitrectomy in severe diabetic retinopathy patients with combined tractional and rhegmatogenous retinal detachment.

MATERIALS AND METHODS

50 patients of severe proliferative diabetic retinopathy were studied retrospectively in our institute from June 2014 to June 2015. All these patients were from Telangana state, most of them were from Hyderabad city. Retrospective study done at Sarojini Devi Eye Hospital, tertiary centre, Hyderabad, Telangana State.

Name & Address of Corresponding Author

Dr Aliya Sultana
Assistant Professor,
Vitreo Retina Department,
Sarojini Devi Eye Hospital,
Hyderabad, Telangana

Neovascular buds grow from the larger retinal blood vessels into the potential space between the internal limiting membrane and the posterior hyaloid, and by

All these patients data was collected from medical records, patients were of different age groups, after detailed ocular and systemic examination, physician clearance was taken and posted for surgery.

All patients underwent 20 G parsplana vitrectomy , fluid air exchange , endo laser and silicone oil injection. After surgery patient was followed for a period of 3 months, if retina is stable and flat, silicone oil removal was planned. After removal of silicone oil, patients were followed for one month, 3 months [Figure 1 & 2].

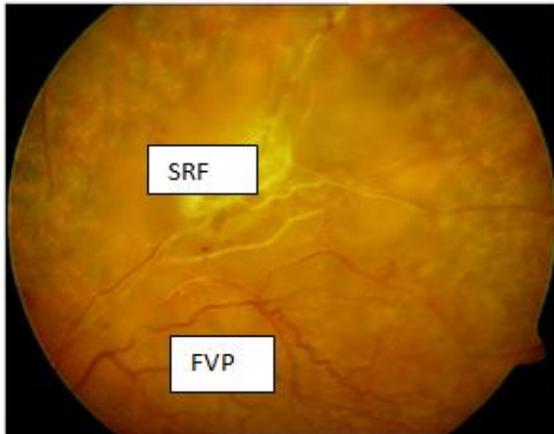


Figure 1: SRF & FVP



Figure 2: FVP

RESULTS

Patients with combined retinal detachment showed various outcome based upon the extent of retinal detachment, proliferative membranes, tractions, vascular complexes and also age. Anatomical and visual come was good in young adults without co morbidities, patients with associated hypertension, coronary artery disease and nephropathy showed poor outcome.

Table 1: BCVA after removal of silicone oil

No. of patients	BCVA
5	6/24
28	6/36
12	6/60
2	CF 1mt
3	Perception of light

Delayed presentation was noted in female patients, bilateral combined retinal detachment was also noted in female patients, outcome was bad in female patients compared to male patients [Table 1].

Patients with comorbidities:

- 6 male patients with coronary artery and nephropathy
- 2 female patients coronary artery disease
- 10 patients with associated hypertension
- 4 patients with only nephropathy
- 28 patients were only diabetic

Table 2: Gender-wise Distribution.

Gender	No. of Patients
Male	31
Female	19

Table 3: Age-wise Distribution.

Age Group	No. of Patients
30-40	6
40-45	36
45-50	8

DISCUSSION

Oxidative stress and retinal ischemia causes the production of angiogenic factors, particularly VEGF, and several chemokines. Increased levels of nitric oxide (NO) pathway metabolites (citrulline and arginine) have been found in the vitreous of eyes with RRD and TRD and excess NO creates toxic free radicals that may inhibit mitochondrial function and cause cell death by damaging DNA.^[4,5]

The retinal pigment epithelium (RPE) pump produces negative pressure in the subretinal space creating a concave retinal configuration between tractionally elevated areas with heavy pre-retinal fibrosis. Retinal elevation is highest at loci of anteroposterior vitreoretinal traction and beneath broader areas of tangential traction. Combined tractional and rhegmatogenous retinal detachment is rare condition. A literature review shows that 7–35% of cases undergoing pars plana vitrectomy (PPV) for complications of diabetic retinopathy had combined RD characterized by presence of retinal breaks with FVP. Usually breaks are slit like, round or oval. These breaks are small hidden with in retinal folds or covered by adjacent FVP tissue.^[6-8]

Possible Pathways For The Combined Retinal Detachment To Occur:

First, active FVP with TRD undergoes further traction to induce break formation. Second, the fibrotic tissue and the vitreous exert traction on the atrophic retina in a chronic PDR with or without TRD, causing break formation. Third, vitreous anterior-posterior directed traction on the adherent FVP tissue induces flap tear formation. Fourth, traction induced by PRP or anti-VEGF on attached or detached retina causes formation of breaks. Combined retinal detachment in proliferative

diabetic retinopathy can occur either in the early fibrovascular stage or in the late fibrous stage.^[7-9]

Indications of Vitrectomy In Diabetic Retinopathy^[8-10]

1. Nonclearing vitreous hemorrhage
2. Traction retinal detachment involving the macula
3. Combined tractional-rhegmatogenous retinal detachment
4. Progressive active fibrovascular proliferation
5. Macular edema associated with posterior hyaloidal traction
6. Dense premacular haemorrhage

In our study 20 patients presented with combined RRD in their first visit. Only 8 patients who regularly attend our retina clinic for check up developed combined RRD. PRPC done in both patients. Six patients referred from outside received anti vegf for vitreous haemorrhage. Most of the female patients had chronic PDR. Young adults with PDR had limited extent of RRD and focal VR adhesions. Only 2 patient presented with combined RRD in burnt out stage.

In 8 cases breaks were visible before surgery. In 6 cases of chronic PDR and extensive RRD the breaks seen at the time of surgery under active FVP. Breaks were enlarged while dissecting thick fibrotic plaque from retina. Delayed presentation noted in elderly individuals with chronic PDR. Patients with active neo vascular RRD had poor prognosis. Release of traction extending to periphery had risk of retinal breaks due to ischemic retina. PFCL used to stabilize the retina while peeling membranes.

Literature review showed use of 5mm circumferential band helps in releasing antero posterior VR traction. In our our study we used 2.5mm 240 band for 3 patients where the tractional bands were extending to periphery, two patients showed good anatomical outcome, but for one patient there was persisting retinal detachment. Patients with active FVP had intra operative ocular hemorrhage, risk of formation of thick clots on retina was high.^[6-8]

In two cases the anatomical visual outcome was poor, retina in this patients was thin in some areas, part of the retina was thickened, fibrotic retina resisting to flatten, relaxing retinotomy done. Prognosis in these 2 cases was very poor.

Two patients had poor visual outcome in spite of good anatomical success, one had ischemic maculopathy and other had pale disc. Three patients with only perception of light had elevated retina infero temporally with residual tractional bands in inferior quadrant.

CONCLUSION

Extent of fibrovascular proliferation is one of the main parameter to determine the surgical outcome. Extent of RRD was not major factor to determine the outcome. With current vitrectomy techniques the

surgical results are more acceptable. Hyaloid stripping in periphery was very difficult in ischemic retina. Due to vitreoschisis, residual hyaloid increases the risk of PVR. Avoid PRPC near the tractional bands and Anti vegf in vitreous haemorrhage with preexisting TRD. Combined retinal detachment with focal vitreo retinal attachments has good anatomical and visual outcome.

REFERENCES

1. Michael W Stewart, David J Browning and Maurice B Landers. Current management of diabetic tractional retinal detachments. *Indian J Ophthalmol*. 2018 Dec; 66(12): 1751–1762. Ya-JuiHsu, Yi-TingHsieh et al. Clinical Study Combined Tractional and Rhegmatogenous Retinal Detachment in Proliferative Diabetic Retinopathy in the Anti-VEGF Era. *Journal of Ophthalmology* Volume 2014.
2. Y Imamura, M Minami, M Ueki, B Satoh, T Ikeda et al. Use of perfluorocarbon liquid during vitrectomy for severe proliferative diabetic retinopathy. *Br J Ophthalmol* 2003;87:563–566.
3. S Sinawat, T Rattanapakorn et al. Intravitreal bevacizumab for proliferative diabetic retinopathy with new dense vitreous hemorrhage after full panretinal photocoagulation. *Clinical Study. Eye* (2013) 27, 1391–1396;
4. Stewart MW, Browning DJ, Landers MB. Current management of diabetic tractional retinal detachments. *Indian J Ophthalmol* 2018;66:1751-62.
5. Boyer DS, Yoon YH, Belfort R Jr., Bandello F, Maturi RK, Augustin AJ, et al. Three-year, randomized, sham-controlled trial of dexamethasone intravitreal implant in patients with diabetic macular edema. *Ophthalmology* 2014;121:1904-14.
6. Flynn HW Jr., Chew EY, Simons BD, Barton FB, Remaley NA, Ferris FL 3rd, et al. Pars plana vitrectomy in the early treatment diabetic retinopathy study. ETDRS report number 17. The early treatment diabetic retinopathy study research group. *Ophthalmology* 1992;99:1351-7.
7. Kempen JH, O'Colmain BJ, Leske MC, Haffner SM, Klein R, Moss SE, et al. The prevalence of diabetic retinopathy among adults in the United States. *Arch Ophthalmol* 2004;122:552-63.
8. Diabetic Retinopathy Clinical Research Network, Elman MJ, Aiello LP, Beck RW, Bressler NM, Bressler SB, et al. Randomized trial evaluating ranibizumab plus prompt or deferred laser or triamcinolone plus prompt laser for diabetic macular edema. *Ophthalmology* 2010;117:1064-77.e35.
9. Brownlee M. Biochemistry and molecular cell biology of diabetic complications. *Nature* 2001;414:813-20.
10. Diederer RM, La Heij EC, Deutz NE, Kessels AG, van Eijk HM, Hendrikse F, et al. Increased nitric oxide (NO) pathway metabolites in the vitreous fluid of patients with rhegmatogenous retinal detachment or diabetic traction retinal detachment. *Graefes Arch Clin Exp Ophthalmol* 2006;244:683-8.

How to cite this article: Sultana A. Management and Outcome of Vitrectomy in Severe Proliferative Diabetic Retinopathy with Combined Retinal Detachment. *Ann. Int. Med. Den. Res.* 2016; 2(3):164-66.

Source of Support: Nil, **Conflict of Interest:** None declared