

Selective Scatter Photocoagulation (SSP) in Patients with Proliferative Diabetic Retinopathy without High Risk Characteristics

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The most significant complication of diabetes mellitus and which develops in 85% of all diabetics eventually is retinopathy. Diabetic retinopathy is the cause of blindness in approximately 2.5 million of the estimated 50 million blind people in the World [1]. The number of patients with diabetes mellitus in the year 2013 was 382 million and is projected to rise to 592 million by 2035 (an increase by 55%) [2]. The estimated prevalence of diabetic retinopathy ranges from 2.0% to 11.7% in studied populations across the world [3].

In the proliferative stage of diabetic retinopathy neovascularization is seen to occur on and adjacent to the disc (NVD) and also elsewhere in the retina (NVE). The bleeding from these vessels results in preretinal and vitreous hemorrhage causing severe visual loss. The Diabetic Retinopathy Study (DRS) identified certain high-risk characteristics, the presence of which predisposes these eyes to the risk of Severe Visual Loss (SVL). The High-Risk Characteristics (HRC) are disc

neovascularization (NVD) that is at least 1/4-1/3 disc area in extent, any disc neovascularization (NVD) with pre-retinal or vitreous hemorrhage or neovascularization elsewhere (NVE) that is at least 1/2 disc areas in extent and associated with pre-retinal or vitreous hemorrhage. Patients who have NVE but no signs of preretinal or vitreous hemorrhage are categorized as Proliferative Diabetic Retinopathy without High Risk Characteristics (PDR-non-HRC). The Diabetic Retinopathy Study (DRS) recommended prompt Pan Retinal Photocoagulation (PRP) in all patients meeting the High-Risk Criteria (HRC). PRP was found to reduce the risk of severe visual loss by more than 50%. The progression to severe visual loss at 5 years was 50% in those not lasered and only 20% in those treated by PRP [4,5]. DRS also recommended PRP to be considered prior to development of HRC in patients without high risk characteristics and also in cases of very severe or severe non-proliferative diabetic retinopathy in special situations such as patients who cannot maintain a regular follow-up. However Pan retinal photocoagulation can cause significant side effects like decreased visual field, reduced dark adaptation and worsening or inducement of macular edema [6,7].

To minimize the side effects of Pan retinal photocoagulation, the author has been treating patients who have proliferative diabetic retinopathy without high risk characteristics using Selective Scatter Photocoagulation (SSP). The observations of this approach are reported herein. No prior literature exists on the use of this approach in the management of patients with proliferative diabetic retinopathy.

Technique of Selective Scatter Photocoagulation (SSP)

In conventional PRP, as recommended by DRS, an entire extent of the retina from the arcade to the equator, for 360 degree is lasered using moderate intensity equally spaced burns. In Selective Scatter Photocoagulation (SSP) only the region surrounding the NVE and any adjacent capillary non-perfusion areas is lasered (Figure 1). Those with any NVD, any vitreous hemorrhage and NVE size more than 1/2 DD areas were not included in the study.

Review of case records of 12 patients with proliferative diabetic retinopathy without high risk characteristics treated between 2007 and 2013 using SSP. Effective regression of new vessels elsewhere (NVE) was achieved in all patients within 3 months (Figures 2 and 3). None of the patients progressed to develop severe vision loss (mean 3.5 years). 3 patients developed new areas of NVE during follow up



Figure 1: Color montage photograph of the right eye of a patient showing laser scars confined to the nasal retina following selective laser photocoagulation (SSP). Few laser scars of treatment for concurrent macular edema may also be observed.

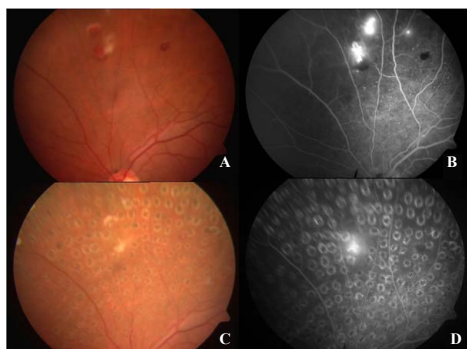


Figure 2: Pre laser photographs [Color (A) and fluorescein angiography FA (B)] show NVE in the superior retina of a patient with proliferative diabetic retinopathy without high risk characteristics. Post laser photographs [Color (C) and FA (D)] show regression of NVE following selective scatter photocoagulation.

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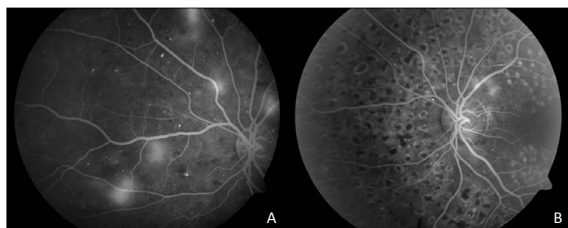


Figure 3: Pre laser FA (A) shows multiple early new vessels in the nasal retina of another patient with proliferative diabetic retinopathy with high risk characteristics. Post treatment (using selective scatter photocoagulation) shows regression of the new vessels.

and these were again effectively managed by further SSP. None of the patients progressed to develop neovascularization of the disc (NVD) or iris neovascularization. None of the patients developed diffuse diabetic macular edema or cystoid macular edema following SSP. Limitations of this study include the small number of patients enrolled, retrospective nature and lack of control group (i.e. those undergoing standard full PRP).

In conclusion, Selective Scatter Photocoagulation (SSP) was found to be safe and effective in reducing the risk of severe visual loss in patients with proliferative diabetic retinopathy without high risk

characteristics. Use of SSP in this selective category of patients with proliferative diabetic retinopathy would likely prevent the side effects seen with conventional Pan retinal photocoagulation.

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