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Research Article

Characteristic analysis of Spectral Domain OCT Pattern Of Macular Edema In Branch Retinal Vein Occlusion Nepalese Patients.

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Abstract

Aim : To study spectral domain optical coherence tomography (SD-OCT) characteristics of retinal layers in branch retinal vein occlusion. **Methods:** 30 patients with branch retinal vein occlusion attending vitreous retina clinic in a tertiary eye hospital were studied with SD-OCT. Integrity of inner segment outer segment junction, External limiting membrane, central retinal thickness and presence or absence of serous macular detachment were analysed. **Results:** 24 (80%) patients had disrupted photoreceptor Inner Segment Outer Segment (IS/OS) integrity. External Limiting Membrane was disrupted in 66.66% patients (n=20). Cystoid Macular Edema was present in 53.33% patients (n=16). Average central retinal thickness was 432.9 μm . **Conclusions:** Spectral domain oct characteristics can help to detect the changes in various retina layers and thus predict the visual outcome in patients with macular edema due to branch retinal vein occlusion.

Keywords: Branch Retinal Vein Occlusion, SD-OCT, IS/OS.

Introduction

BRVO is amongst the most common retinal diseases seen in clinical practice. It is usually a disease of the elderly age group with ninety percent of the patients being above the age of 50 years in a large series. Recognition of the disease is of paramount importance because its complications are a cause of significant visual morbidity. Epidemiological data from the Beaver Dam Eye Study suggest a prevalence and five-year incidence of 0.6% each^[1] Occlusion occurs most frequently at a retinal arterio venous crossing. Common risk factors are systemic hypertension, diabetes mellitus, hyperlipidemia,

glaucoma, smoking and age related atherosclerosis. Macular edema is a common cause of vision loss in patients with BRVO^[2]

Optical coherence tomography provides information regarding retinal tomography. It is like an in-vivo optical biopsy wherein we can see the histopathology of the retina. Spectral domain Oct (SD-OCT) has axial resolution of 6-7 microns which can provide better visualization of tissue pathology^[3] In various clinical trials decrease in central macular thickness on OCT is considered an important secondary endpoint.^[4] But it has

been found that some patients achieve only poor or limited improvement in visual acuity despite complete resolution of the macular edema. Integrity of the Foveal photoreceptor layer might explain the difference in final visual acuity after resolution of macular edema. The aim of this study was to identify the characteristics of macular edema on spectral –domain OCT which can help to predict the visual outcomes.

Identification of the hyper reflective lines in the photoreceptor layer has been made possible by spectral domain optical coherence tomography. The inner segment/outer segment junction, external limiting membrane, cone outer segment tips, and the retinal pigment epithelium were thought to be the origins of the four hyper reflective lines seen in the photoreceptor layer. Integrity of these lines has been linked with visual functions in various retinopathies, and has been suggested to carry prognostic implications^[5]

Materials and Methods

A Retrospective data analysis of 30 patients Diagnosed as BRVO with Macular edema at Vitro-retina Department of Lumbini Eye Institute from April 2014 to December 2014 was done. Ziess Cirrus HD OCT was used for analysis. Patient with Diabetes, any previous treatment for BRVO like LASER ,intravitreal steroid or anti VEGF, Old BRVO of more than 3 months were excluded from the study. The characteristic in OCT used for analysis were.[Fig.1]

1. Inner segment-outer segment (IS-OS) junction was studied for possible morphological alterations like thickening, absence, deformation and disruptions.
2. Integrity of external limiting membrane (ELM)
3. Central Foveal thickness.
- 4 .Presence or absence of Cystoid Macular Edema. Cystoid macular edema can present as isolated finding or in association with Serous retinal detachment

The defining criteria for above parameters were

1. The inner segment outer segment junction (IS-OS) normally presents as a hyper reflective line parallel to the retinal pigment epithelium.
- .2. A thin hyper reflective line above the IS-OS junction is the External limiting membrane. (ELM)
3. The retinal thickness was measured from the RPE to the ILM.
4. An area of hypo reflectivity in the sub foveal region is consistent with serous macular detachment.
5. The cystic spaces in the retina were considered as cystoids macular edema.

Results

The patients were in age range 29-84 years. Majority of patients were in age range 51-60 yrs .RE was involved in 14 and LE was involved in 16 cases. we don't had a single case with Both Eye Involvement

Disrupted IS/OS junction [Fig. 2] was present in 24 case (80%). ELM was found to be disrupted [Fig.3] in 20 cases (66.66%). Both IS/OS and ELM disruption seen in 19 cases (63.6%). The Central Foveal thickness in central 1000micrometer area (inner circle) ranged from 174 -824 micrometer with an average of 432.9 µm. Cystoid macular edema [Fig.4] was noted in 16 cases (53.3%) and serous retinal detachment [Fig.5] was seen in 14 cases (46.6 %)

Discussion

SD OCT has become an important diagnostic and monitoring tool for Macular edema secondary to BRVO. It has become the secondary endpoint of treatment for various clinical trial after visual acuity. Various OCT studies have shown that the Foveal IS/OS integrity is the critical for the visual outcome^[6] Agrawal et al ^[7] studied SD OCT pattern in 39 patients with macular edema in BRVO and found IS/OS disruption in 30 cases(76.92%),ELM disruption in 25 cases(64.10%) which is quite same as our study.

Table 1: Comparison of SD-OCT characteristics in BRVO in various studies

STUDY	Number Of Cases Enrolled	IS/OS disruption	ELM Disruption
Kang HM et al	59	31 (52.54%)	23 (38.98%)
Aggrawal S et al	39	30 (76.92%)	25(64.10%)
Coscas G et al	9	6 (66.6%)	6(66.6%)
Our Study	27	24 (80%)	20 (66.6%)

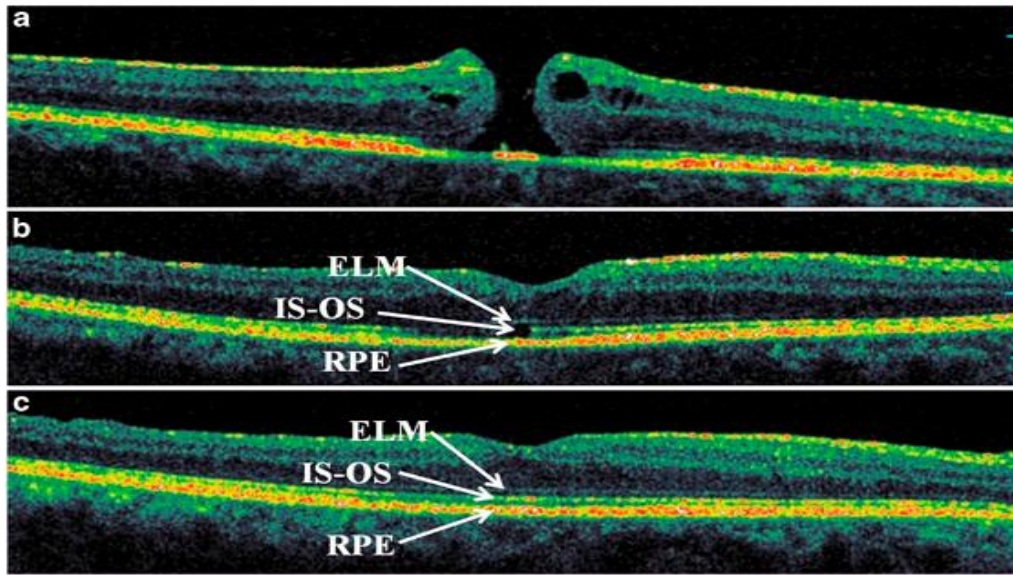


Fig.1 showing Different Retinal Layer In SD-OCT

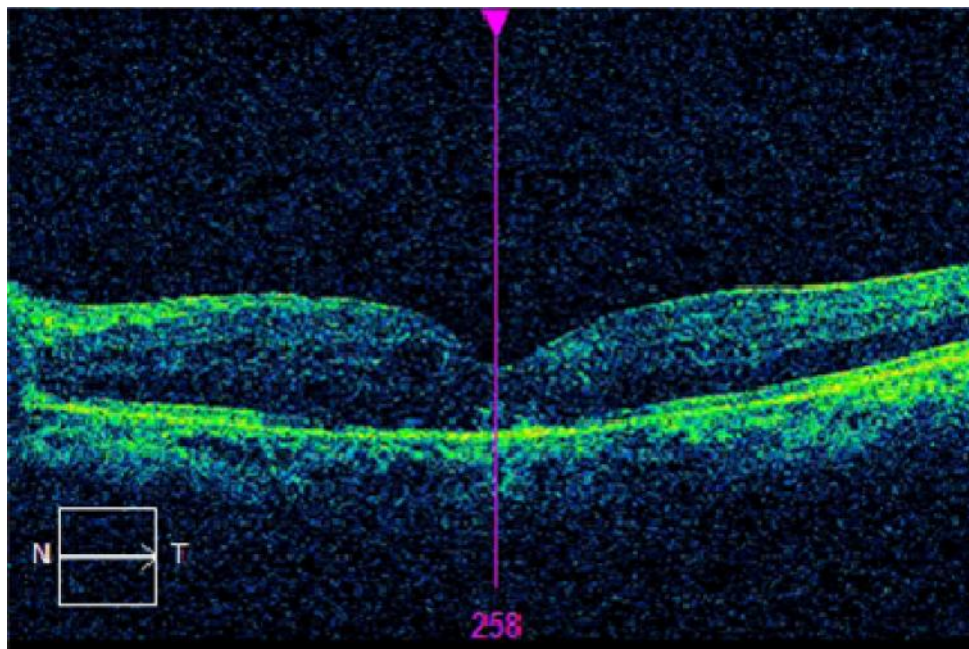


Fig 2; SD-OCT showing Disrupted IS/OS junction

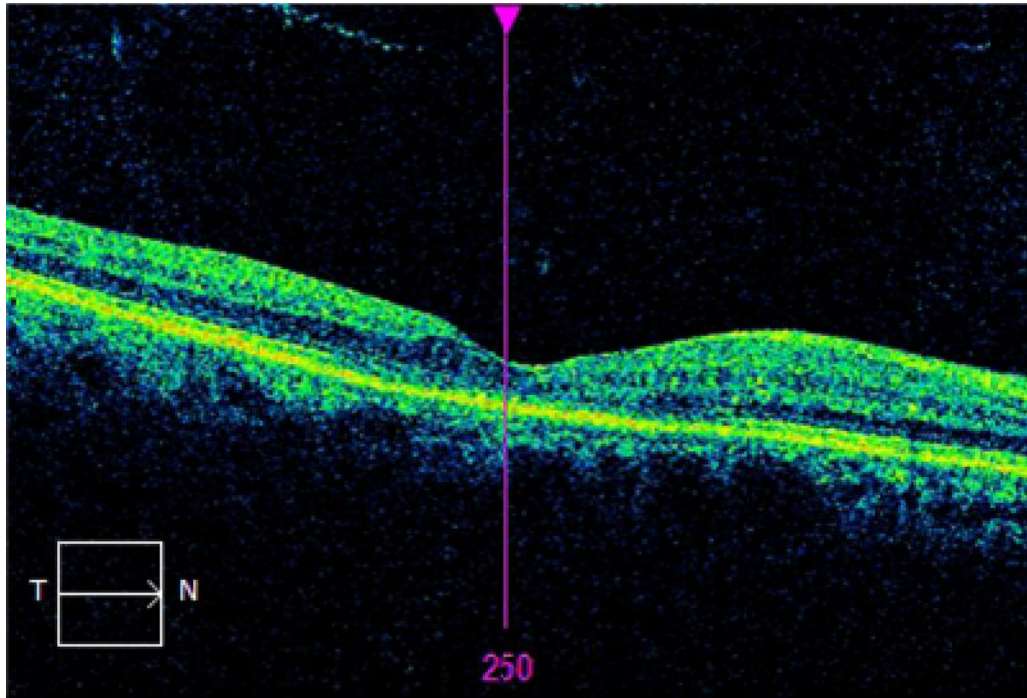


Fig 3. Disrupted External Limiting Membrane(ELM)

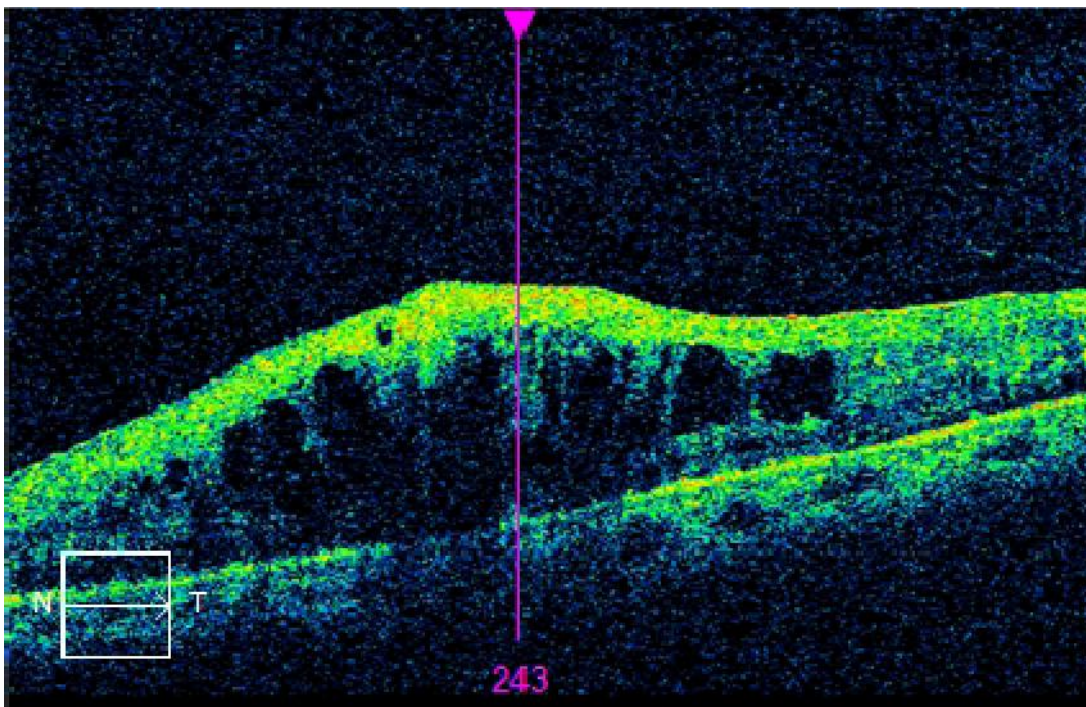


Fig 4..Cystoid Macular Edema

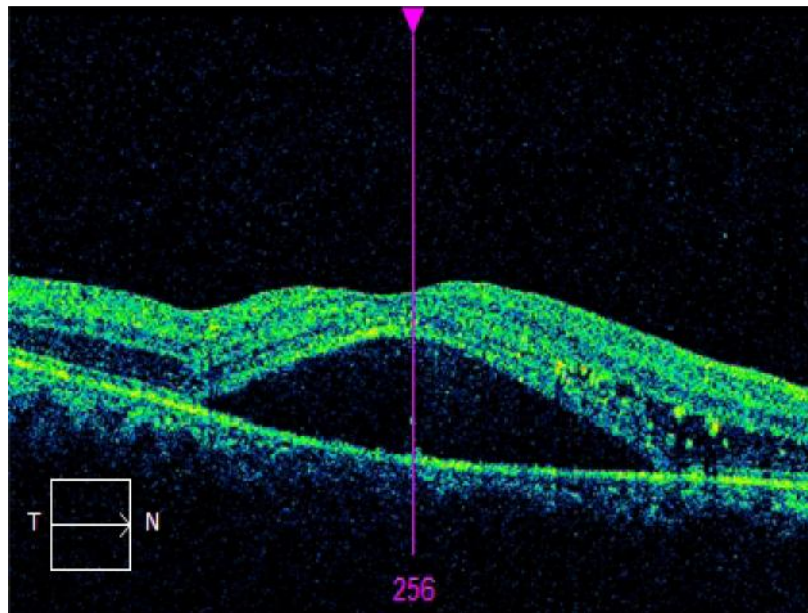


Fig 5..Serous Retinal Detachment

In a study by Kang et al^[6] 59 patients, 31 patients had disrupted photoreceptor integrity .23 patients had disruption of ELM .They concluded that the strongest predictor of final best corrected visual acuity baseline visual acuity.In our study 81% (22/27) patients had IS-OS junction disruption.

Coscas G et al^[8] studied the SD-OCT patterns of retinal venous occlusion with macular edema treated with sustained release dexamethasone implant (Ozurdex) in 9 patients. SD OCT demonstrated the presence of external limiting membrane and integrity of IS-OS junction in 6/9 patients at end of three months. They concluded that final visual acuity in eyes with still interrupted or thickened IS-OS junction was poorer than those with intact IS-OS line.

In Our 4 Patients IS/OS disruption was seen whereas ELM was not disrupted in those which signifies that ELM is more resilient than IS/OS junction.

Shin H J et al^[9] retrospectively studied 31 eyes of 31 patients with ME secondary to RVO to see the Association between integrity of foveal photoreceptor layer and visual outcome in retinal vein occlusion. They concluded that the final VA is associated with the integrity of foveal photoreceptor layer. Better VA and the smaller length of disrupted IS/OS on SD OCT at initial visit are indicators of better visual outcome in patients with RVO .In another study by Tsujikawa et al^[10] in 91 eyes of 91 patients with Retinal vein occlusion large serous retinal detachment was present in 24 eyes(26.37%).

Conclusion

Foveal IS/OS junction integrity is the most important structure that is responsible for visual integrity and unfortunately this is the mostly affected retinal layer in Retinal vein occlusion. Development and advancement in SD –OCT has helped greatly to evaluate such layers in detail that helps in treatment monitoring.

References

- 1) Klein R, Klein BE, Moss SE, Meuer SM. The epidemiology of retinal vein occlusion: The Beaver Dam Eye Study. *Trans Am Ophthalmol Soc* 2000;98:133–41
- 2) *Retina* . fourth edition. Stephen J. Ryan. Pg. 1350
- 3) *Optical Coherence Tomography of Macular Diseases and Glaucoma*. Third edition. Amod Gupta .Vaishali Gupta. Pg 6
- 4) *Retina* . fourth edition. Stephen J. Ryan. Pg 1281
- 5) Ian Y. Wonga, Lawrence P. Iua, Hideki Koizumib, Wico W. Laia; The inner segment/outer segment junction: what have we learnt so far? *Lippincott Williams & Wilkins* ,Vol 23,Number 3,Page 210-18
- 6) Kang HM, Chung EJ, Kim YM, Koh HJ. Spectral-domain optical coherence tomography (SD-OCT) patterns and response to intravitreal bevacizumab therapy in macular edema associated with branch retinal vein occlusion. *Graefes Arch Clin Exp Ophthalmol*. 2012 Jun 1
- 7) Aggrawal S, Billore P, Bharwada R, Spectral Domain OCT Patterns Of Macular Edema Associated With Branch Retinal Vein Occlusion In Indian Eyes, *NJIRM* 2013; Vol 4(6) Nov-Dec
- 8) Coscas G, Coscas F, Zucchiatti I, Glacet-Bernard A, Soubrane G, Souied E.. SD-OCT pattern of retinal venous occlusion with cystoid macular edema treated with Ozurdex. *Eur J Ophthalmol*. 2011 Sep-Oct; 21(5):631-6. Doi: 10.5301/EJO.2011.7428
- 9) Shin HJ, Chung H, Kim HC. Association between integrity of foveal photoreceptor layer and visual outcome in retinal vein occlusion, *Acta Ophthalmology*, 2011 Feb;89(1):e35-40.
- 10) Tsujikawa A, Sakamoto A, Ota M : Serous retinal detachment associated with retinal vein occlusion ,*American J Ophtalmology*, 2010 Feb;149(2):291-301.