10:20 AM

Association of Disorganization of Retinal Inner Layers With Clinical Outcomes and Fluorescein Angiographic Features in Central Retinal Vein Occlusion

- Akshay S Thomas, MD, MS
- Duncan E Berry, MD
- Sharon Fekrat, MD FACS
- Dilraj S Grewal, MD
- Sandra S Stinnett, DrPH

OBJECTIVE To determine whether disorganization of retinal inner layers (DRIL) is associated with clinical outcomes and fluorescein angiographic features in eyes with central retinal vein occlusion (CRVO).

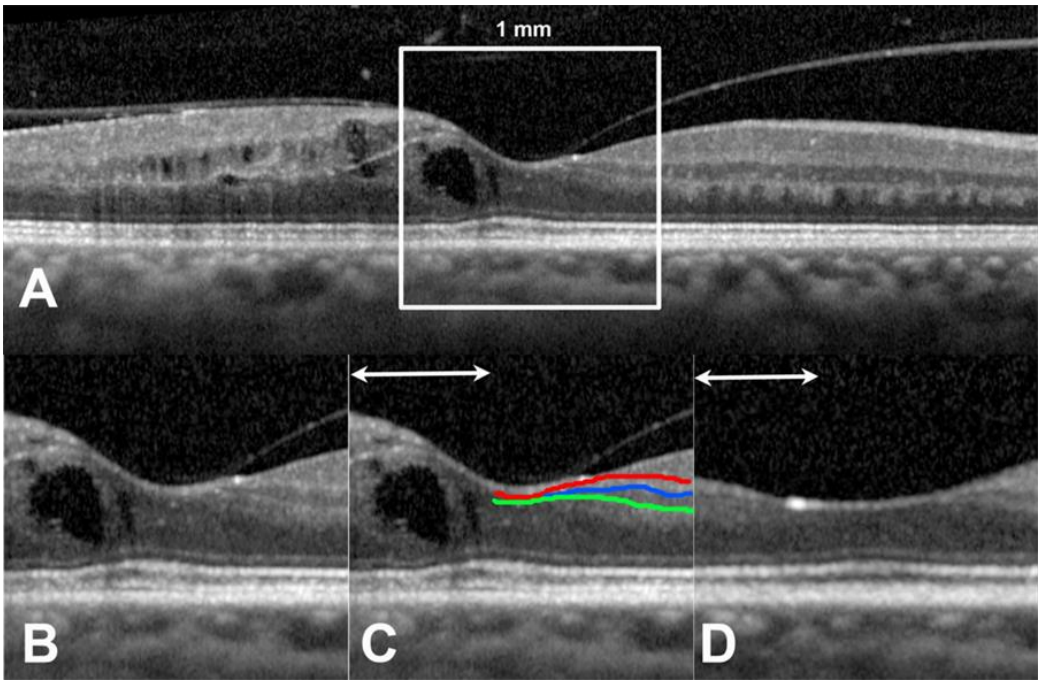
PURPOSE To determine whether disorganization of retinal inner layers (DRIL) on spectral domain-optical coherence tomography (OCT) is associated with clinical outcomes in eyes with acute central retinal vein occlusion (CRVO). We additionally evaluate whether DRIL correlates with ischemic findings on ultra-widefield fluorescein angiography (UWFFA).

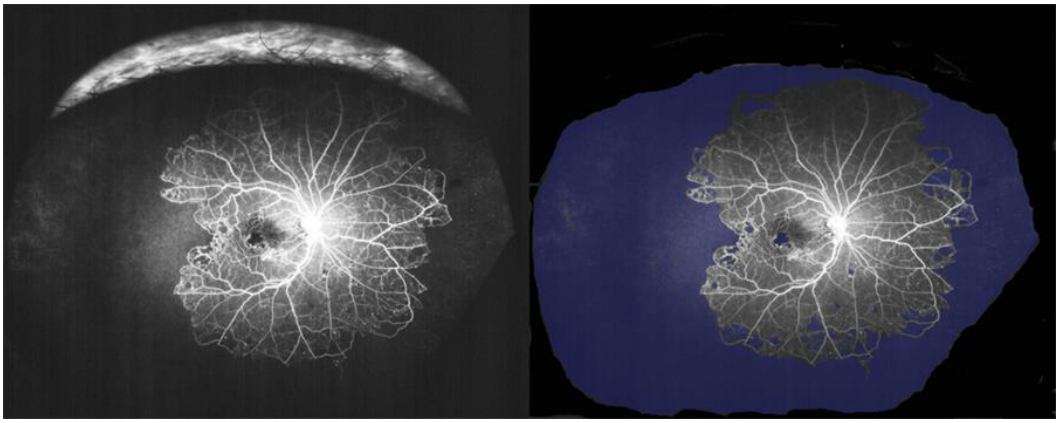
METHODS In this single-center, retrospective, longitudinal cohort study, patients with treatment-naïve acute CRVO and baseline UWFFA, OCT and >1 year of follow-up were included. The 1-mm-wide portion of the OCT line scan centered on the fovea was evaluated by two independent masked graders for extent of DRIL, ellipsoid zone disruption, external limiting membrane disruption and other OCT parameters at the baseline, 6-month, 12-month, and final visits. UWFFA images were assessed for ischemic index (IsI) values and foveal avascular zone (FAZ) enlargement by a masked

grader. Associations of DRIL with UWFFA findings and clinical outcomes including best-corrected visual acuity (VA) were analyzed.

RESULTS Twenty-five eyes of 25 patients with CRVO and a mean follow-up time of 25.6±11.6 months were included. Mean DRIL extent at baseline was 620±433 microns. Eighteen of 25 eyes (72%) had DRIL at baseline; however, neither its presence nor extent were associated with baseline VA. In a cross-sectional analysis of each visit, extent of DRIL correlated with worse VA at both the 6-month (ρ=0.656; p=0.001) and final (ρ=0.509; p=0.016) visits. At final follow-up, the extent of DRIL was the OCT parameter most strongly correlated with the baseline IsI on UWFFA (ρ=0.418; p=0.047) and was also the only OCT parameter whose correlation with baseline enlarged FAZ on UWFFA approached statistical significance (p=0.057). On multivariate regression analysis, the extent of DRIL at final follow-up was the only OCT feature to be significantly associated with worse VA (p=0.013) and remained significant when accounting for cystoid macular edema as a potential confounder.

CONCLUSION Extent of DRIL is not associated with presenting vision in treatment-naïve eyes with acute CRVO. Following 6 months of follow-up however, the extent of DRIL correlates with worse VA and is predictive of worse VA through over 2 years of follow-up. Ischemic features on UWFFA at baseline are predictive of the extent of DRIL development at final follow-up.





HUMAN RESEARCH This study involves human research.

IRB Approval Status: Approved by institutional review board

10:25 AM

Disorganization of Retinal Inner Layers Predicts Visual Acuity Response to Anti-VEGF Therapy for Macular Edema Secondary to Retinal Vein Occlusion

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- Felipe Ferreira Conti, MD
- Fabiana Q Silva, MD
- Rishi P. Singh, MD

OBJECTIVE To determine if DRIL is a prognosticator of visual acuity (VA) at baseline and in treatment response in retinal vein occlusion (RVO).

PURPOSE Disorganization of inner retinal layers (DRIL) has been studied in eyes with center-involved diabetic macular edema and has demonstrated a significant correlation with VA. The goal of this study is to determine the value of DRIL in patients with macular edema secondary to RVO. Specifically correlation of VA with DRIL presence at baseline and in response to treatment with anti-VEGF (AVF) therapy.

METHODS This retrospective chart review included 147 eyes of 147 patients presenting with treatment naïve RVO (branch, central or hemispheric) with a minimum of 12 months of follow up. Three horizontal raster scans centered at the fovea and divided into 3 regions: central 1mm, central 2mm excluding the central 1mm, and area outside the central 2mm were evaluated for any presence of DRIL. A DRIL score of 0-3 was

calculated based on DRIL presence or absence in the 3 regions at baseline, 6 months and 12 months by 2 masked graders, a third masked grader was used for discrepancies. Baseline DRIL presence and changes in DRIL scores at 6 and 12 months were correlated with changes in VA.

RESULTS Across all RVO patients at 12 months an average VA change of +11.8 ETDRS letters was seen. Baseline presence of any DRIL was seen in 61.9% of eyes (91/147). In the BRVO group, presence of any DRIL at baseline correlated with lower baseline ETDRS score (p=0.002). In the CRVO/HRVO group baseline DRIL did not demonstrate statistically significant lower ETDRS scores (p=0.092). However, absence of DRIL at baseline in this group was associated with greater VA gains at 6 months when adjusting for baseline VA (p=0.044). Over the 12 month period there was reduced DRIL in 51% of patients, increased DRIL in 23.1% despite treatment, no change in DRIL from baseline in 13.6% and no DRIL seen in 28.6% of patients. Continued presence of DRIL in the BRVO group was predictive of less VA gain with treatment up to 6 months (p=0.025). In the CRVO/HRVO group increasing DRIL scores at any time point was predictive of reduced VA improvement for both the 6 month (p=0.002) and 12 month (p<0.001) time points.

CONCLUSION Both baseline presence of DRIL and changes in DRIL burden during treatment with AVF agents for macular edema secondary to RVO are useful prognostic indicators of ETDRS score improvement when adjusting for baseline ETDRS. In this study, a stronger association was seen in the CRVO/HRVO group than in the BRVO group.

HUMAN RESEARCH This study involves human research.
IRB Approval Status: Approved by institutional review board

10:30 AM

Peripheral Findings in Macular Telangiectasis Type 2

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- Prethy Rao, MD, MPH
- Sandeep Randhawa, MD
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- Bruce R. Garretson, MD
- Kimberly A. Drenser, MD,
- Alan J. Ruby, MD
- Tarek S. Hassan, MD
- Michael T. Trese, MD
- George A Williams, MD
- Antonio Capone, MD

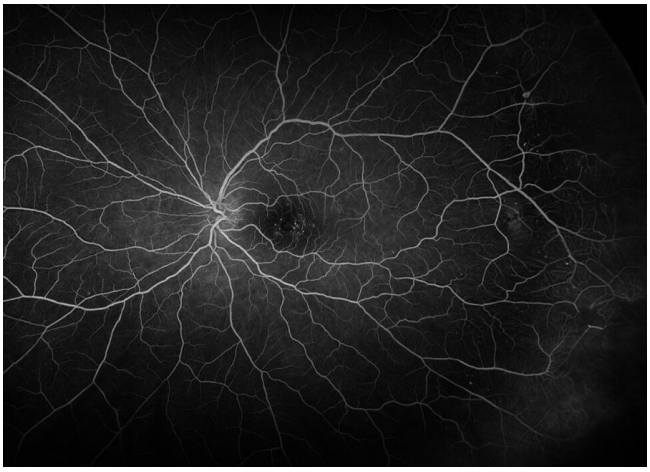
OBJECTIVE To evaluate the retinal periphery in patients with macular telangiectasis type 2.

PURPOSE Juxtafoveal telangiectasis (JXT), or macular telangiectasis type 2, is an idiopathic acquired disease, with characteristic macular microvasculature changes and neurosensory degeneration in both eyes. It has largely been described as a disease confined to the posterior pole. Herein, we describe peripheral retinal and vascular changes in a series of patients with JXT who underwent ultra-widefield fluorescein angiography (UWFA).

METHODS Retrospective, consecutive case series. The charts and imaging of 21 patients (42 eyes) with JXT that underwent UWFA were reviewed and findings were described.

RESULTS Mean age was 66±2.3 years old. There were 11 males and 10 females, 17 Caucasians, 2 African Americans, and 2 Asians. Fifteen patients had hypertension, 6 had diabetes mellitus type 2, and 3 had coronary artery disease; only 1 patient had hypertensive retinopathy and none had diabetic retinopathy. Mean visual acuity was 20/30 OD and 20/30 OS. On UWFA, 33 of 42 (79%) had perifoveal staining, with the majority occurring temporally (n=28); 31 had right angle venules (74%), 20 had microaneurysms (48%), 4 had venous-venous shunts (10%), and 4 had arterio-venous shunts (10%). Thirty-four patients had capillary nonperfusion (81%), with the majority being minimal or mild in severity (24 of 34). Eighteen patients had a characteristic morphology to the peripheral capillary dropout (43%), which we have termed pruning. Twelve patients had arterial tortuosity (29%), and fourteen patients had venous tortuosity (33%).

CONCLUSION We note a high incidence of peripheral vascular and retinal findings in patients with macular telangiectasis type 2, using UWFA. There appear to be characteristic vascular changes that occur in this disease, independent of systemic disease.



HUMAN RESEARCH This study involves human research.
IRB Approval Status: Approved by institutional review board

10:42 AM

Comparison of Visual Outcome in Neovascular Glaucoma to Anterior Segment Neovascularization Without Glaucoma

- Hossein Ameri, MD, PhD, FRCSI, MRCOphth
- Ananth Sastry, MD
- Christine Ryu

OBJECTIVE Is there any difference between the visual outcome in patients with neovascular glaucoma (NVG) to that of patients with anterior segment neovascularization without glaucoma (ASNV)?

PURPOSE Several studies have reported the visual outcome in patients with NVG. However, the visual outcome in ASNV is unknown. The purpose of this retrospective observational clinical study was to evaluate the visual outcome in patients with NVG and ASNV and compare the two groups to find out whether lack of glaucoma at presentation results in a more favorable outcome in ASNV patients.

METHODS A total of 378 eyes in patients seen between 2005 and 2015 in LAC + USC (Los Angeles County + University of Southern California) Medical Center were included in the study. 84 eyes had ASNV and 294 eyes had NVG at presentation. ASNV was defined as neovascularization of iris or angle with IOP of 21 mmHg or less. Exclusion criteria comprised prior intraocular surgery, prior use of IOP lowering drops, other concurrent

forms of glaucoma, or other forms of visually significant pathology. The mean follow up period was 1.5 years. A Two-Sample t-test assuming unequal variance was used to compare the average best corrected visual acuity (BCVA) between the two groups at each time point.

RESULTS At presentation, mean BCVA was significantly better in ASNV compared to NVG (20/200 and 20/2000, respectively; $p<0.0000003$); 71 eyes with NVG had VA of light perception (LP) or worse, but none in ASNV group. Similarly, the final BCVA was significantly better in ASNV compared to NVG (20/100 and 20/1800, respectively; $p<0.0006$); 103 eyes with NVG had LP or worse vision, but none in ASNV group. Patients in both groups received pan retinal photocoagulation (PRP) or intravitreal bevacizumab or both. Within six months, nine of the 84 eyes with ASNV developed NVG despite treatment; all of these eyes eventually needed glaucoma tube shunt. The final BCVA of ASNV eyes that progressed to NVG was significantly worse than those that didn't (6ft/200 and 20/125, respectively; $p=0.03$).

CONCLUSION This is the first study to evaluate the visual outcome of ASNV and compare it to NVG. Overall, eyes with ASNV had a significantly better BCVA both at presentation and at the final visit compared to NVG. 11% of eyes presenting with ASNV progressed to NVG despite treatment, and the final BCVA was significantly worse than those that did not progress.

HUMAN RESEARCH This study involves human research.
IRB Approval Status: Approved by institutional review board

10:50 AM

New Biosimilar Bevacizumab and Ranibizumab for Retinal Diseases

- Alay S. Banker, MD

OBJECTIVE To evaluate the efficacy and safety of new intravitreal biosimilar bevacizumab and ranibizumab in retinal vascular diseases

PURPOSE To evaluate the efficacy and safety of new intravitreal biosimilar anti-vegfs bevacizumab and ranibizumab injections in the treatment of various retinal vascular diseases

METHODS A prospective consecutive case series of eyes with choroidal neovascularization (CNV) secondary to age-related macular degeneration (AMD), retinal vein occlusion (RVO), diabetic macular edema (DME) and threshold Retinopathy of prematurity (ROP), each of which received intravitreal injections of a biosimilar bevacizumab or ranibizumab. Comprehensive ophthalmic examinations and detailed systemic evaluations were performed at baseline and all follow-up visits. Primary outcome measures were changes in best-corrected visual acuity and central subfield thickness, complete vascularization in cases of ROP. Secondary outcome measures included ocular and systemic adverse events.

RESULTS Biosimilar intravitreal ranibizumab were administered to 22276 eyes while 2237 eyes received biosimilar bevacizumab injections. All eyes had resolution of retinal edema with the central subfield thickness reducing from a mean of 371.65 microns to

327.76 microns ($p<0.01$). Mean post-injection LogMar visual acuity also significantly improved from 0.51 to 0.36 ($p<0.05$). All the eyes (100%) with threshold ROP showed complete vascularization. None of the patients complained of blurred vision, ocular pain, or bulbar injection at any of the follow-up visits, nor was intraocular inflammation noted. None of the patients experienced serious ocular or systemic adverse events.

CONCLUSION One data confirms that intravitreal injections of new biosimilar bevacizumab and ranibizumab in retinal vascular diseases is effective and safe. These new biosimilars could become safe, low-cost therapies for retinal diseases.

HUMAN RESEARCH This study involves human research.
IRB Approval Status: Approved by institutional review board