Monday, July 23

8:00 AM

Clinical and OCT Findings in Chronic Solar Retinopathy

- SHAILEEN PARIKH, MS, DO, FMRF
- Gazala Mansuri, MD

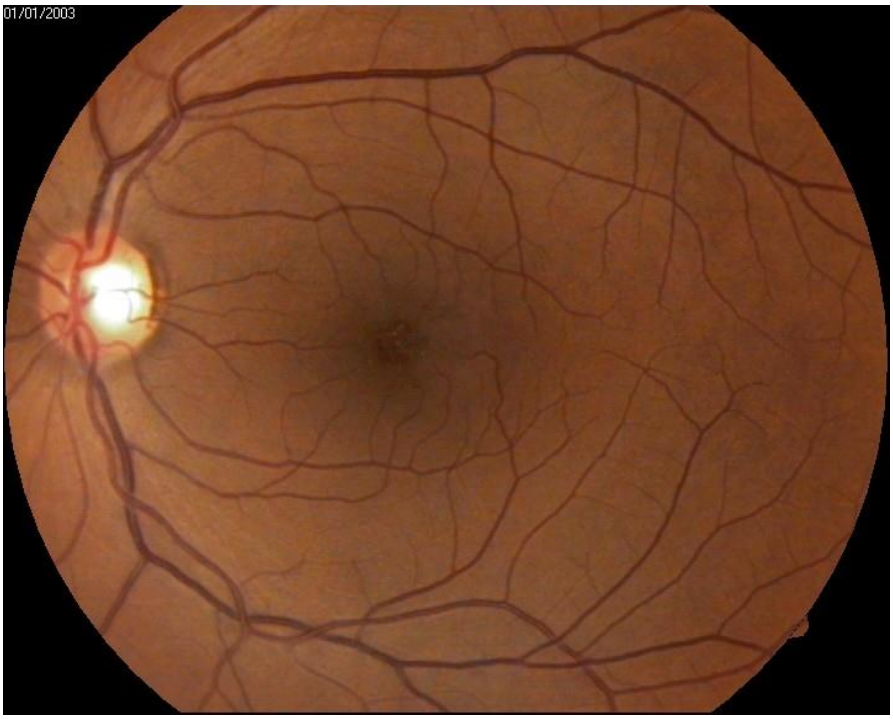
OBJECTIVE To study the clinical findings and OCT characteristics of chronic solar retinopathy in patients with history of long standing sun gazing.

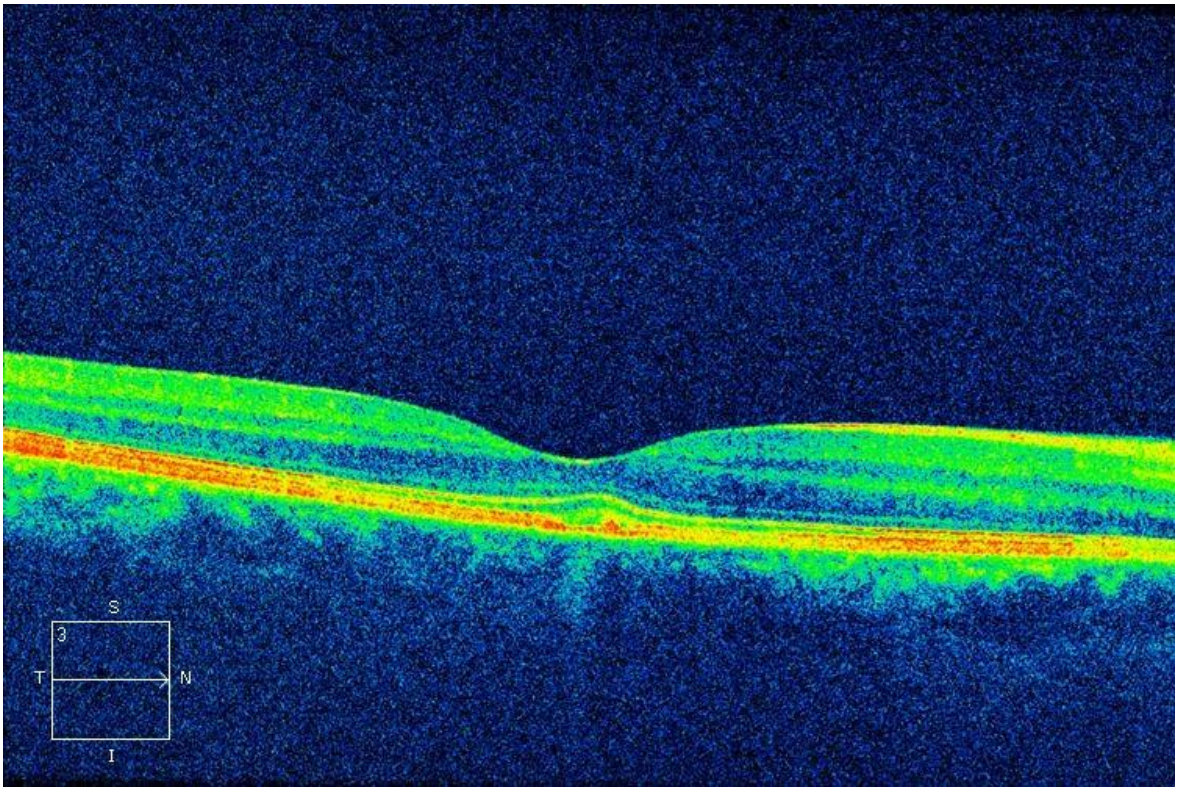
PURPOSE In India, sun gazing in early morning is a religious ritual. Regular sun gazing can cause chronic solar retinopathy with macular changes and decrease visual acuity. The study was perfomed to describe these clinical findings and OCT characteristics in such patients.

METHODS It is a retrospective study of 36 patients who have been diagnosed as having chronic solar retinopathy. All the patients had come for complain of decrease vision or for a regular eye check up. Surprisingly none of the patient had given a history of sun gazing in primary history taking. After complete fundus examination with macular abnormalites, they have been asked about the history of sun gazing. 30 patients had a history of sungazig more than 1 year. All the patients had undergone complete eye check up with fundus photo documentation and OCT. All the patients had been followed up for minimum of 6 months.

RESULTS Out of 36 patients 28 patients had bilateral presentations. The age was ranging from 13 years to 63 years with average of 35.8 years. 30 patients had history of sun gazing more than 1 year. No patient had history of viewing sun eclipse. The best corrected visual acuity was ranging from 20/20 to 20/80 with mean visual acuity of 20/40. On fundus examination, 51(70.8%) eyes had subretinal yellowis deposits.43 eyes (59.7%) had RPE mottling. 16 eyes (22.2%) had RPE defects. Central Foveal thinning, lamellar macular hole, intraretinal cystic changesin outer reitna, interruption of external limiting memebrane, disorganized outer retinal layers and collection of materials with hyperreflectivity in foveal space were common OCT findings. Mean central Foveal thickness was 175 microns. In 6 months of average follow up, none of the patient showed significant progression in the disease.

CONCLUSION Sun gazing as a ritual can cause chronic solar retinopathy with reduced visual acuity. Macular changes on OCT and fundus examination are characteristic for chronic solar retinopathy. . Any person with characteristics macular changes should be asked history for chronic sun gazing.




S
3
T
N
I

8:05 AM

Misdiagnosis and Mistreatment of Optic Disc Pit Maculopathy – SD-OCT Features for Accurate Diagnosis: Multicenter International Study

- Matias Iglicki, MD
- Catharina Busch, MD
- Adrian T Fung, MBBS, MMed (Ophth Sci), MMed (Clin Epi), FRANZCO
- Alessandro Invernizzi, MD
- Miriana Mariussi, MD
- Pierre-Henry Gabrielle, MD
- Romina Arias, MD
- ZAFER CEBECI, MD
- Mali Okada, MBBS, MMed
- Jerzy Nawrocki, MD, PhD
- Zofia Michalewska, MD, PhD
- Michaella Goldstein, MD
- Adiel Barak, MD
- Dinah Zur, MD
- Anat Loewenstein, MD

OBJECTIVE Optic disc pit maculopathy is frequently under- and misdiagnosed in elderly patients presenting with subretinal fluid. OCT features can help to identify this maculopathy at early stages.

PURPOSE To report a cohort with ODPM presenting with neurosensory macular detachment that was initially misdiagnosed and mistreated as other cause of SRF. We review all other consecutive cases of ODPM and aim to compare spectral domain-optical coherence tomography (SD-OCT) features of those who were correctly identified at first to those that were misdiagnosed to investigate structural differences.

METHODS 59 patients with ODPM 1. Identification of consecutive patients presenting SRF related with ODP that were misdiagnosed and mistreated or correctly diagnosed at first. 2. Qual and quanti evaluation of SD-OCT features – comparing misdiagnosed and correctly diagnosed cases - graded by masked assessors. Main outcome measures:1 The proportion of patients with ODPM misdiagnoses , inaccurate diagnosis and treatment. 2 Morphological features on SD-OCT: SRF, inner and outer retinoschisis, communications with ODP and alterations of the RPE, comparing both groups. (3)BCVA ,closure of communication of optic disc pit and resolution of SRF at baseline and six months after proper treatment for ODPM.

RESULTS Fifteen patients (25.4%) with ODPM were correctly diagnosed initially. They were significantly younger than those that were misdiagnosed (age 33.8 ± 15.2 vs. 58.7 ± 15.8 years, $P < 0.0001$). Forty out of 44 eyes (90.9%) that were misdiagnosed received treatment before referral for their presumed diagnosis. On OCT, eyes that were misdiagnosed at first had significantly more outer retinoschisis at baseline (88.4% vs. 40.0%, P=0.0002) and more RPE alterations (90.0% vs. 27.3%, P<0.0001) at six months compared to those initially correctly diagnosed.

CONCLUSION Optic disc pit maculopathy may present later in life and mimic other diseases causing SRF. Awareness of this differential and the identification of pertinent SD-OCT features can help avoid inappropriate and delayed treatment for this underdiagnosed condition

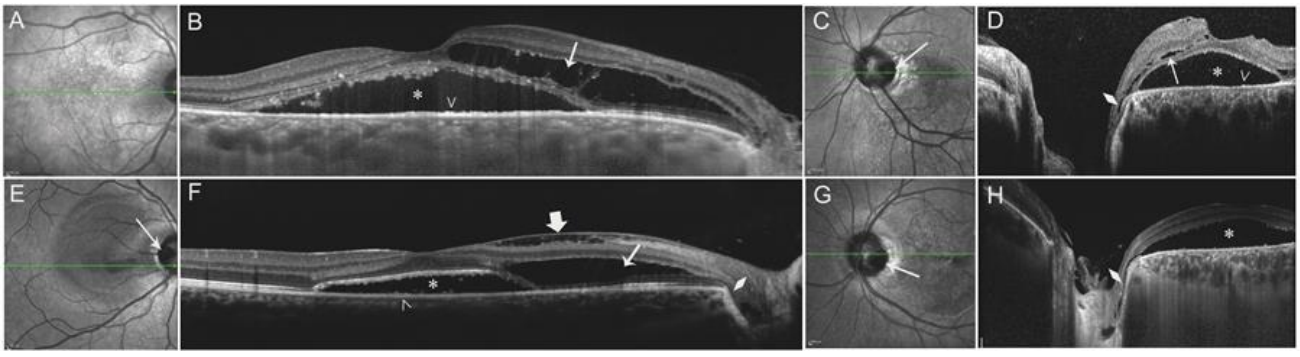


Table 2. Visual Acuity and OCT Features at Baseline and after 6 Months, Stratified for Initially Correctly and Misdiagnosed Eyes.

	All eyes (n=59)	Group 1 - Eyes correctly diagnosed initially (n=15)	Group 2- Eyes wrongly diagnosed initially (n=44)	*P* Value*
Baseline Characteristics				
Age, years, mean± SD, (range)	52.4 ± 19.0 (13 - 87)	33.8 ± 15.2 (13 - 67)	58.7 ± 15.8 (14 - 87)	< 0.0001
BCVA, logMAR, mean ± SD, (range)	0.59 ± 0.32 (0.10 - 2.00)	0.69 ± 0.41 (0.10 - 1.70)	0.55 ± 0.28 (0.10 - 2.00)	0.11
Outer Layer Retinoschisis, n (%)	44/58 (75.9)	6 (40.0)	38/43 (88.4)	**0.0002**
Inner Layer Retinoschisis, n (%)	28/57 (49.1)	4 (26.7)	24/42 (57.1)	0.04
SRF Presence, n (%)	42/51 (82.4)	15 (100)	44 (100)	-
SRF height, µm, mean ± SD, (range),	250 ± 125 (67 - 1000) n=41	799 ± 556 (83 - 1600), n=12	441 ± 119 (168 - 713)	0.09
RPE alterations, n (%)	35 (59.3)	11 (73.3)	24 (54.5)	0.20
Connectivity with Pit, n (%)	53 (89.8)	13 (86.7)	40 (90.9)	0.64
6 Months Follow-Up				
BCVA, logMAR, mean ± SD, (range)	0.47 ± 0.30 (0.00 - 1.40), n=51	0.74 ± 0.38 (0.20 - 1.30), n=11	0.40 ± 0.23 (0.00 - 1.40), n=40	0.009
Outer Layer Retinoschisis, n (%)	42/51 (82.4)	4/11 (36.4)	38/40 (95.0)	**< 0.0001**
Inner Layer Retinoschisis, n (%)	2/50 (4.0)	2/10 (20.0)	0/40 (0)	0.004

8:10 AM

Correlation of Active and Healing Features of Serpiginous-like Choroiditis (SC) on Optical Coherence Tomography Angiography (OCTA) With Indocyanine Green Angiography (ICGA)

- Manish Nagpal, MD, FRCS (UK)
- Rakesh Juneja, MS
- Navneet Mehrotra, DNB

OBJECTIVE To compare OCTA features of serpiginous like choroiditis with ICGA

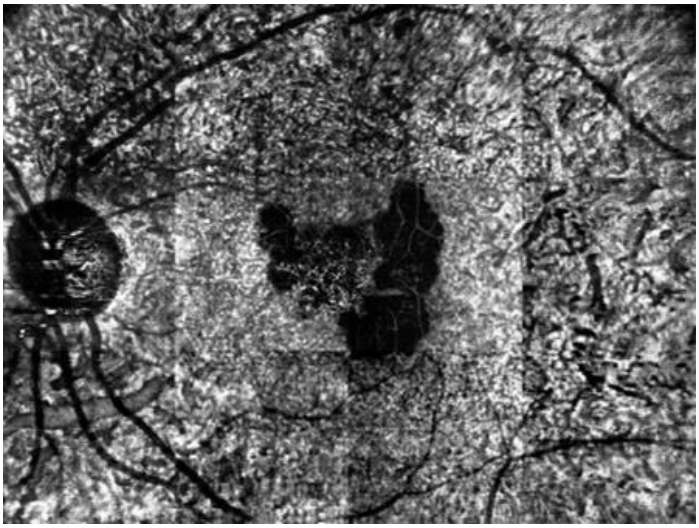
PURPOSE To describe OCTA features in different stages of serpiginous like choroiditis and to compare these findings with ICGA

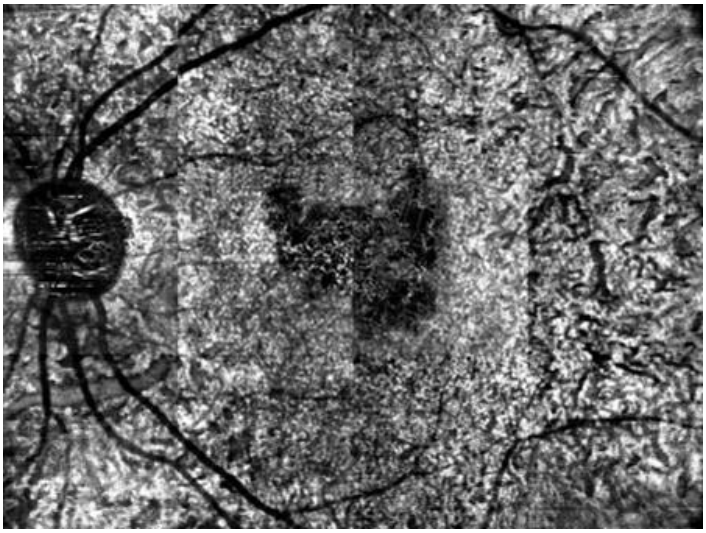
METHODS Prospective study, involving 82 eyes of 74 patients underwent OCTA and ICGA to compare the distinct choroidal vasculature features during the active and healing phases

RESULTS OCTA in active phase pre treatment revealed areas of large flow void beneath RPE-Bruch's membrane, which reduced during post treatment, healing phase along with appearance of vascular network. These features correlated well with

hypofluorescence in active phase and patches of reduced hypo and hyperfluorescence in healing phase on ICGA.

CONCLUSION OCTA as a non-invasive tool correlates accurately with ICGA findings for assessing the active and healing phases of lesions in serpiginous like choroiditis and thus can be used as an alternative diagnostic test





8:18 AM

Short-term Oral Mifepristone for the Treatment of Central Serous Chorioretinopathy (STOMP-CSC): A Placebo-Controlled Clinical Trial

- Roger A. Goldberg, MD, MBA
- Jeffrey S. Heier, MD

OBJECTIVE Given the association of central serous chorioretinopathy with cortisol, mifepristone, a GR2- receptor antagonist with high oral bioavailability, may be effective for these patients.

PURPOSE To investigate the efficacy and safety of mifepristone, a GR2-receptor antagonist, for patients with chronic or recurrent central serous chorioretinopathy.

METHODS Prospective, randomized, double-masked, multi-site, placebo-controlled trial of mifepristone 300- and 900-mg daily for four weeks in patients with chronic recurrent CSC. All patients were required to have subretinal fluid in the central ETDRS sub-field on SD-OCT. Central retinal thickness (CRT) and best-corrected visual acuity (BCVA) were measured throughout the study. Effect sizes were estimated using Cohen's d and NNT. No BCVA thresholds were applied for entry. Pregnant and breast-feeding women were excluded, as were those requiring concomitant systemic corticosteroids.

RESULTS 30 patients were randomized to placebo, 300- or 900-mg. Patients assigned to active treatment had a significant reduction in CRT (82 microns; $p<0.05$) and improvement in BCVA (3.6 ETDRS letters; $p<0.05$). Patients assigned to placebo did not have a significant change in CRT (47 microns) or BCVA (0.7 letters). Comparison of change in CRT between active- and placebo-treated patients did not reach statistical significance ($p=0.15$). 83% of patients had a baseline BCVA ≥ 20/40, which may have produced a ceiling effect on the change in BCVA. Mifepristone was well tolerated with no unexpected adverse events.

CONCLUSION Oral mifepristone may reduce subretinal fluid and improve visual acuity in patients with CSC. Larger studies are warranted to extend these findings.

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

8:27 AM

Nonexudative Choroidal Neovascularization Identified by Optical Coherence Tomographic Angiography Is a Precursor to Exudation

- David Huang, MD, PhD
- Steven T. Bailey, MD
- Yali Jia

OBJECTIVE To evaluate whether non-exudative choroidal neovascularization (CNV) is a risk factor for developing exudative CNV in eyes with intermediate age-related macular degeneration (AMD).

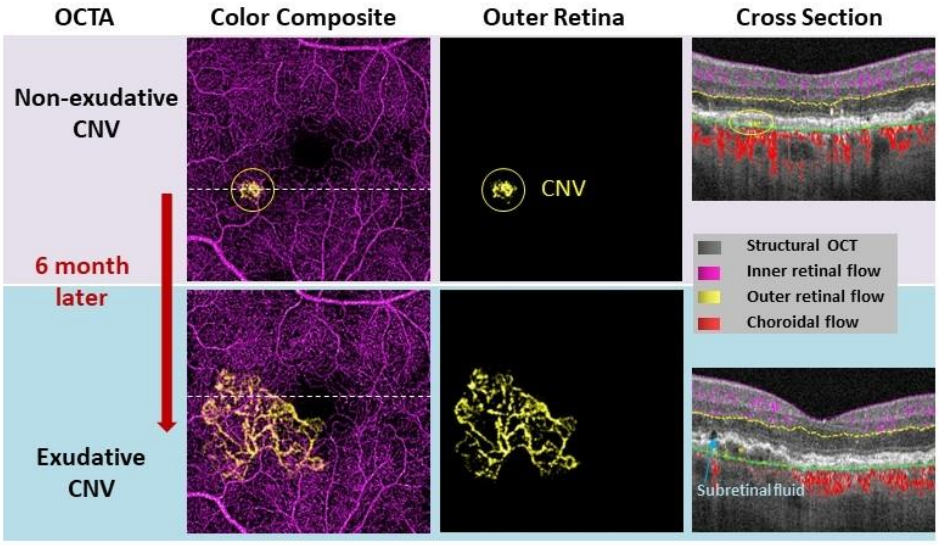
PURPOSE Non-exudative CNV is not an uncommon optical coherence tomographic angiography (OCTA) finding in eyes with intermediate AMD. This study investigates the natural history of these lesions and whether they present a higher risk of developing exudation compared to intermediate AMD eyes with similar characteristics except for non-exudative CNV.

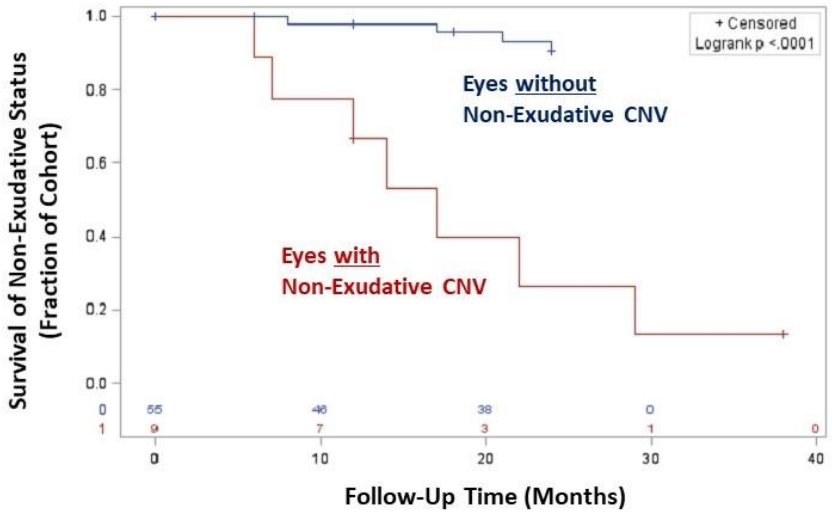
METHODS Patients with intermediate AMD in the study eye and exudative CNV in the fellow eye were enrolled in this prospective study. They were examined at baseline, regular follow-up at six-month intervals, and follow-up for any new symptoms. Conversion to exudative CNV was determined intra- or sub-retinal fluid on structural OCT, hemorrhage on ophthalmoscopy, or leakage on FA. On each visit, two

3mm macular OCTA scans (AngioVue, Optovue, Inc) were exported for custom processing including 3-dimensional projection artifact removal. Two masked certified graders were tasked to identify CNV as vascular networks in the outer retinal slab on both *en face* and cross-sectional OCTA.

RESULTS Sixty-four eyes were enrolled and 51 met image quality criteria and had complete follow-up for at least 24 months. Nine eyes (17.6%) developed non-exudative CNV and 11 eyes (21.5%) developed exudative CNV over two years. The non-exudative CNV did not produce visual symptoms. Seven of nine eyes (77.8%) with non-exudative CNV subsequently developed exudative CNV (Fig. 1) and the odds ratio (logistic regression) for developing exudative CNV was 44.2 ($P<0.0001$) relative to eyes without non-exudative CNV (Fig. 2). Four eyes developed exudative CNV despite negative OCTA scans at the previous regular visit 2, 3, 4, and 5 months previously.

CONCLUSION Non-exudative CNVs in the fellow eyes of exudative AMD patients pose a very high risk of progressing to exudation and should be followed closely. Monthly visits may be warranted initially. Regular screening with OCTA in eyes with intermediate AMD is important for risk stratification.





HUMAN RESEARCH This study involves human research.

IRB Approval Status: Approved by institutional review board

8:35 AM

The Use of Swept Source Optical Coherence Tomography Angiography (SS-OCTA) in Patients With Uveitis and Retinal Vasculitis

- Sumit Sharma, MD
- Peter K. Kaiser, MD
- Careen Lowder, MD, PhD
- Kimberly Baynes, BSN, RN, COA
- Arthi Venkat, MD
- Sunil Srivastava, MD

OBJECTIVE To evaluate swept source optical coherence tomography angiography in patients with uveitis and compare to findings seen on angiography.

PURPOSE Swept source optical coherence tomography angiography (SS-OCTA) offers the ability to obtain higher resolution macular images and montaged peripheral images. We sought to evaluate the findings on SS-OCTA in patients with uveitis and retinal vasculitis.

METHODS This is a prospective evaluation of a consecutive series of patients with uveitis and retinal vasculitis imaged with the Zeiss Plex Elite SS-OCTA device. A total of 218 patients with uveitis were successfully imaged with the Plex Elite system. 38 retinal vasculitis patients with montaged SS-OCTA were compared to wide field fluorescein angiography imaging. A total of 140 eye images of 54 patients were analyzed using a macular perfusion algorithm. Both vessel density and perfusion density were measured on 6x6 SS-OCTA images.

RESULTS A total of 480 images of 218 patients were obtained. Imaging was limited only in those with dense vitreous haze or poor fixation. In all patients with retinal vasculitis, peripheral non-perfusion was visualized equally as well on montaged SS-OCTA images and wide field angiography. However, activity on SS-OCTA in these patients could only be determined if there was acute non-perfusion. In 6 patients with sarcoidosis and simultaneous ICG angiography, SS-OCTA imaging revealed choroidal lesions which mapped to similar areas on ICG angiograpy and were not visible on examination or FA. The average macular perfusion density in the superficial complex was .39 and in the deep was .185. The vessel density of the superficial complex was 12.30 inverse millimeters and 5.18 inverse millimeters in the deep complex.

CONCLUSION SS-OCTA imaging in uveitis patients provided useful information in the management of disease. In those with retinal vasculitis, montaged images identified peripheral non-perfusion as well as wide field fluorescein angiography. In those with sarcoid uvieitis, choroidal OCTA imaging identified lesions seen only on ICGA imaging.

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

8:43 AM

Acute Macular and Peripapillary Angiographic Changes With Intravitreal Injections

- Alexander Barash, MD
- Richard B. Rosen, MD, DSc(Hon)
- Toco Y Chui, PhD

OBJECTIVE To determine the effects of acutely increased IOP following intravitreal injections on retinal perfusion density and thickness using OCT angiography (OCT-A).

PURPOSE To determine the effects of acutely increased IOP following intravitreal injections on retinal perfusion density and thickness using OCT angiography (OCT-A).

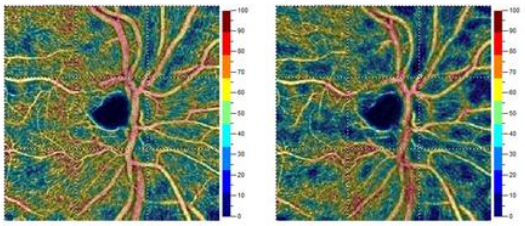
METHODS This was a prospective observational clinical study of 40 eyes (39 patients) in a tertiary care retina center in NYC from October 2016-June 2017. Patients were over age 18, with vision >20/100, able to fixate and without media opacities precluding OCT-A, receiving intravitreal bevacizumab or aflibercept for diabetic retinopathy, RVO, AMD, retinal neovascularization, or radiation retinopathy. 3x3mm macular and 4.5x4.5mm peripapillary OCT-A perfusion density, macular OCT thickness, and IOP were measured pre- and post-injection. Paired t test was used to compare pre- and post-injection perfusion density and OCT thickness, with regression analysis for baseline IOP, IOP change, and age.

RESULTS 40 eyes of 39 patients over age 18 (Mean 60.6 years, Std. Deviation 11.82) were studied. Statistically significant decreases in angiographic perfusion density ($p<0.05$) were found in most areas of the superficial and deep layer macular OCT-A, and the overall optic nerve head and the RPC, preferentially temporal. Macular OCT thickness was significantly decreased in the temporal region and increased in the nasal region. Regression analysis showed relationships between age and decreased superficial macular perfusion, but not deep macular perfusion, peripapillary perfusion, or macular thickness. Pre-injection IOP was not related to perfusion density, and was only related to OCT thickness in the fovea. IOP change was related to decreased superficial macular perfusion density but not with deep macular or peripapillary perfusion, nor macular thickness.

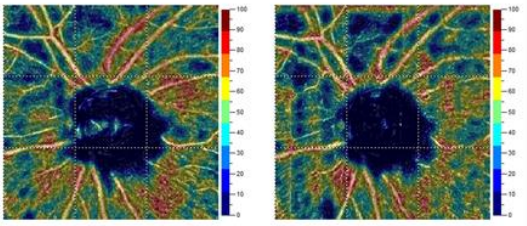
CONCLUSION Intravitreal injections produce acute IOP changes which reduce macular and peripapillary perfusion density. Therefore, it is possible that patients receiving regular intravitreal injections may be sustaining perfusion-related injury to ocular structures that may produce glaucomatous damage to the macula and optic nerve.

Optic Nerve

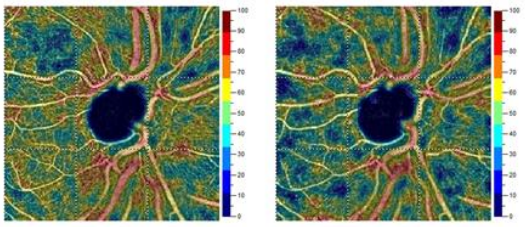
Pre-Injection | Post-Injection | Pre-Injection | Post-Injection



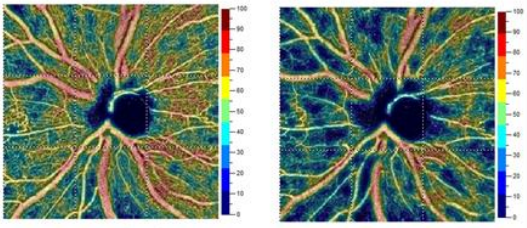
Patient 1 - Proliferative Diabetic Retinopathy, IOP 53



Patient 3 - Polypoidal Choroidal Vasculopathy, IOP 57



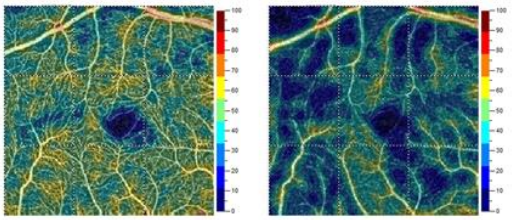
Patient 2 - Macular Degeneration, IOP 49



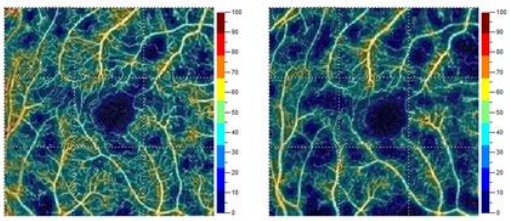
Patient 4 - Macular Edema, IOP 39

Macula

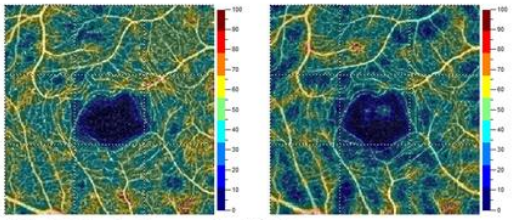
Pre-Injection | Post-Injection | Pre-Injection | Post-Injection



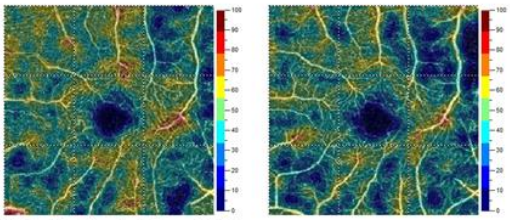
Patient 1 - Proliferative Diabetic Retinopathy, IOP 53



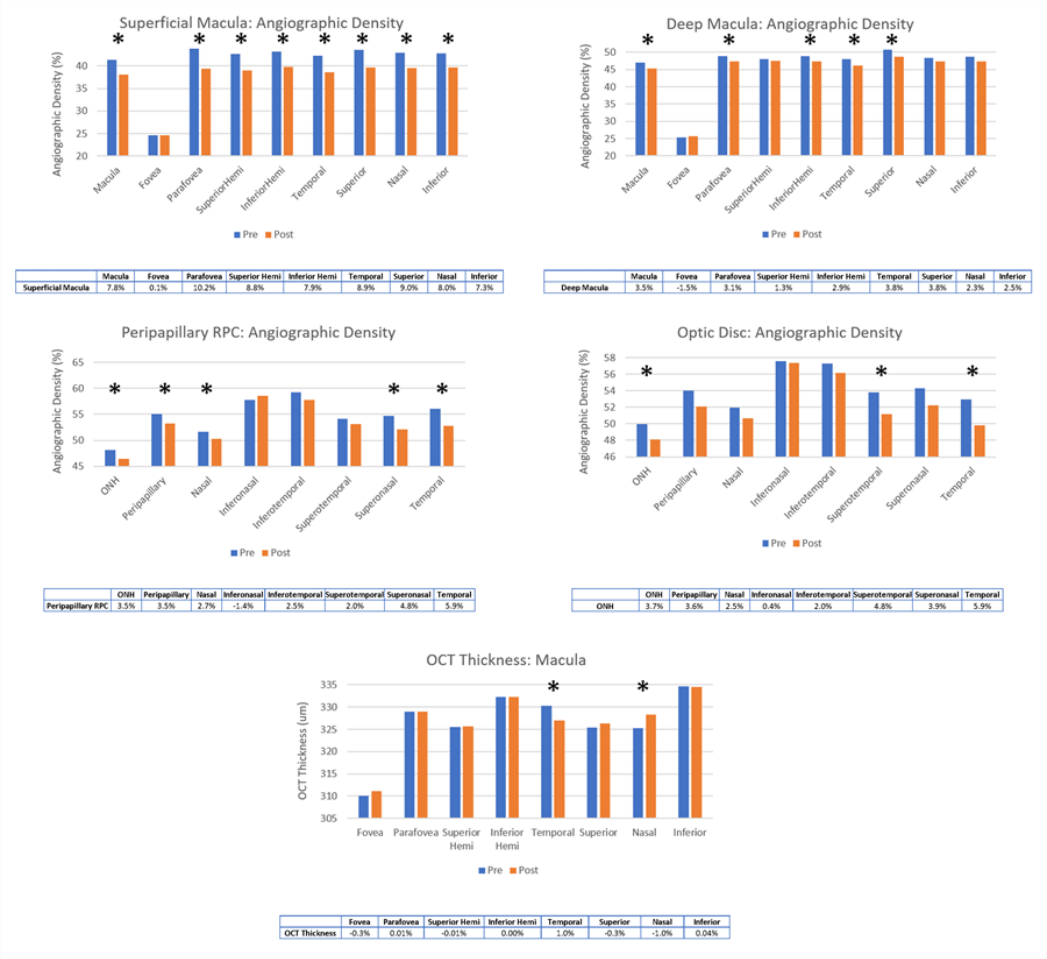
Patient 3 - Polypoidal Choroidal Vasculopathy, IOP 57



Patient 2 - Macular Degeneration, IOP 49



Patient 4 - Macular Edema, IOP 39



	Macula	Fovea	Parafovea	Superior Hemi	Inferior Hemi	Temporal	Superior	Nasal	Inferior
Superficial Macula	7.8%	0.1%	10.2%	8.8%	7.9%	8.9%	9.0%	8.0%	7.3%

	Macula	Fovea	Parafovea	Superior Hemi	Inferior Hemi	Temporal	Superior	Nasal	Inferior
Deep Macula	3.5%	-1.5%	3.1%	1.3%	2.9%	3.8%	3.8%	2.3%	2.5%

	ONH	Peripapillary	Nasal	Inferonasal	Inferotemporal	Superotemporal	Superonasal	Temporal
Peripapillary RPC	3.5%	3.5%	2.7%	-1.4%	2.5%	2.0%	4.8%	5.9%

	ONH	Peripapillary	Nasal	Inferonasal	Inferotemporal	Superotemporal	Superonasal	Temporal
ONH	3.7%	3.6%	2.5%	0.4%	2.0%	4.8%	3.9%	5.9%

	Fovea	Parafovea	Superior Hemi	Inferior Hemi	Temporal	Superior	Nasal	Inferior
OCT Thickness	-0.3%	0.01%	-0.01%	0.00%	1.0%	-0.3%	-1.0%	0.04%

HUMAN RESEARCH This study involves human research.

IRB Approval Status: Approved by institutional review board

8:55 AM

Correlation of Peripheral Nonperfusion on Ultra-widefield Fluorescein Angiography with Macular Flow Loss on OCT Angiography in Sickle Cell Retinopathy

- Adrienne W. Scott, MD
- Ian C Han, MD
- Marguerite O Linz, BA
- Tin Yan A Liu, M.D.
- Yang (Alice) Zhang, MD CM
- Jing Tian

OBJECTIVE To determine whether the degree of peripheral nonperfusion on ultra-widefield fluorescein angiography correlates with macular vessel density on OCT angiography in patients with sickle cell disease.

PURPOSE Although macular and peripheral vascular changes have been characterized in sickle cell retinopathy, little is known about the relationship between the severity of macular and peripheral disease. This study assesses the correlation between quantitative measures of macular vascular flow loss on OCT angiography (OCTA) and peripheral nonperfusion on ultra-widefield fluorescein angiography (UWF FA).

METHODS Consecutive patients with sickle cell disease were evaluated prospectively. Patients with prior treatment for sickle cell retinopathy, other retinal vascular disease, or inadequate view for imaging were excluded. All patients underwent dilated fundus examination as well as UWF FA and macular OCTA imaging on the same

day. A masked grader measured peripheral nonperfusion seen on UWF FA to calculate an ischemic index (visualized nonperfusion/total visualized retinal area × 100%), and OCTA measurements of macular vessel density were recorded. The degree of peripheral nonperfusion and macular vessel density were then correlated.

RESULTS Thirty-six eyes from 19 patients (10 women, 9 men) with a mean ± SD age of 30.8 ± 9.1 years were included. Sickle genotypes included 14 patients with SS (73.7%), 4 with SC (21.1%), and 1 with β-thalassemia (5.2%). Average ischemic index was 4.4% for all eyes and was found to be higher in patients with sickle SC (8.0%) than in those with sickle SS (3.2%; $P = 0.01$). Ischemic index was higher (9.3%) in those with proliferative sickle cell retinopathy (Goldberg stage 3 or above) than in those without (2.8%; $P < 0.01$). Ischemic index on UWF FA showed a statistically significant correlation ($P < 0.05$) with vessel density on OCTA in the temporal subfield of the superficial capillary plexus and in all subfields of the deep capillary plexus. The average ischemic index for eyes with proliferative sickle cell retinopathy was 9.0%. The odds ratio of an ischemic index greater than 9.0% was 3.0 if vessel density within the temporal subfield of the superficial capillary plexus was less than 49.5%.

CONCLUSION Peripheral nonperfusion seen on UWF FA is greater in those with sickle SC disease and proliferative retinopathy and is correlated with macular vessel density on OCTA, especially that within the deep retinal plexus. OCTA may be a useful tool for assessing the severity of sickle cell retinopathy and providing insight into when UWF FA may be warranted.

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

9:00 AM

Ultra-widefield OCTA for Evaluation of Vascular Perfusion

- Kasra Rezaei, M.D.
- Qinqin Zhang
- Zhongdi Chu, MS
- Wang Ruikang, PhD

OBJECTIVE The UW-OCTA is a non invasive imaging modality that can evaluate the peripheral retinal vascular density, capillary flow impairment zone and localize neovascularization in patients with DR.

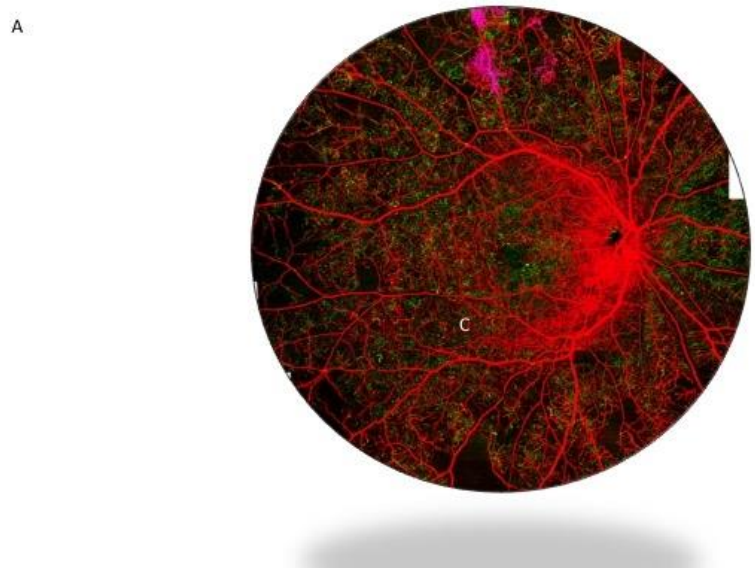
PURPOSE To use UW-OCTA for evaluation of retinal vascular density index, vessel diameter index and capillary flow impairment zone in patient with diabetic retinopathy (DR).

METHODS UW-OCTA was developed based on a 1060 nm swept source OCTA engine (Plex Elite, Carl Zeiss Meditec. Inc) running at100 kHz A-line rate with motion tracking mechanism. A montage scanning protocol was used to get UW-OCTA imaging, covering a field of view (FOV) of ~120 degrees. Complex OMAG algorithm was used to extract blood flow information including retina vascular density index, vessel diameter index, and capillary flow impairment zone in patients with diabetic retinopathy (DR).

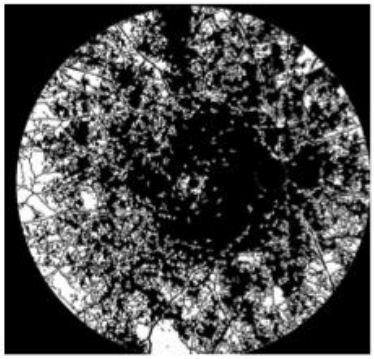
RESULTS 20 patients with non-proliferative diabetic retinopathy and proliferative diabetic retinopathy underwent UW-OCTA. The UW-OCTA images provide distinct and detailed visualization of vascular networks over ~120-degree FOV and was able to

localize the area of neovascularization located in the peripheral retina, retina vascular density index, vessel diameter index, and capillary flow impairment zone in patients with diabetic retinopathy (DR).

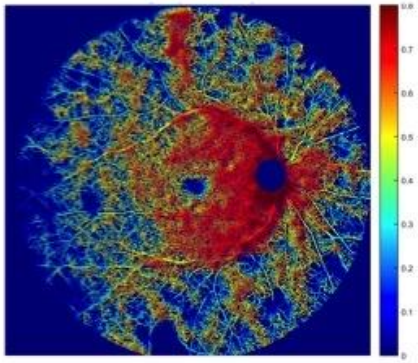
CONCLUSION The UW-OCTA is a non invasive imaging modality that can be used to evaluate the peripheral retinal vascular density index, vessel diameter index, capillary flow impairment zone and localize the area of neovascularization in patients with diabetic retinopathy. The UW-OCTA can be used frequently to closely monitor the progression of diabetic retinopathy and evaluate the response to different treatment modality.



B



C



HUMAN RESEARCH This study involves human research.

IRB Approval Status: Approved by institutional review board