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CONGRESS ABSTRACTS

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CUTICULAR DRUSEN: CLINICAL PHENOTYPES AND NATURAL HISTORY DEFINED USING MULTIMODAL IMAGING

Lawrence A. Yannuzzi
Vitreous, Retina, Macula Consultants of New York, New York, NY, USA

Introduction: To define the range and lifecycles of cuticular drusen phenotypes using multimodal imaging. To re-evaluate the histologic characteristics of cuticular drusen.
Methods: Retrospective observational cohort study and experimental laboratory study of two hundred forty eyes of 120 clinic patients with cuticular drusen and 4 human donor eyes with cuticular drusen (n = 2), soft drusen (n = 1) and hard drusen (n = 1). Multimodal imaging comprised color photography, fluorescein angiography, indocyanine green angiography, near-infrared reflectance, fundus autofluorescence, high-resolution optical coherence tomography and ultra-widefield imaging were collected. Human donor eyes underwent processing for high-resolution light- and electron-microscopy. Main outcome measure was the appearance of cuticular drusen in multimodal imaging and the topography of cuticular drusen distribution. Age-dependent variations in cuticular drusen phenotypes including the occurrence of retinal pigment epithelium (RPE) abnormalities, choroidal neovascularization (NV), acquired vitelliform lesions (AVLs) and geographic atrophy (GA). Ultrastructural and staining characteristics of druse subtypes.
Results: Mean age of patients at first visit was 57.9 ± 13.4 years. Drusen and RPE changes were seen in the peripheral retina, anterior to the vortex veins, in 21.8% of eyes. Of eyes with more than 5 years of follow up, cuticular drusen disappeared from view in 58.3% of eyes, drusen coalescence was seen in 70.8% of eyes and new RPE pigmentary changes developed in 56.2% of eyes. RPE abnormalities, AVLs, NV and GA occurred at a frequency of 47.5%, 24.2%, 12.5% and 25%, respectively, and were significantly more common in subjects older than 60 years of age (all $P<0.015$). Occurrence of GA and NV were important determinants of final visual acuity in eyes with cuticular drusen (both $P<0.015$). Small cuticular drusen typically demonstrated a homogenous ultrastructural appearance similar to hard drusen, while fragmentation of the central and basal contents was frequently seen in larger cuticular drusen.
Conclusions: While the ultrastructural characteristics of cuticular drusen appear more similar to hard drusen, their lifecycle and macular complications are more comparable to soft drusen. Cuticular drusen are frequently discovered in patients who are younger than typical age-related macular degeneration and may confer a unique risk for the development of severe vision loss.

SWEPT-SOURCE OPTICAL COHERENCE TOMOGRAPHY ANGIOGRAPHY IN DRY AGE-RELATED MACULAR DEGENERATION

Alessandro Papayannis, Francesco Stringa, Emmanouil Tsamis, Paulo Eduardo Stanga
Manchester Vision Regeneration Lab at Manchester Royal Eye Hospital and NIHR/Wellcome Trust Manchester CRF, Manchester, UK

Introduction: Colour fundus photography, autofluoresence and Optical Coherence Tomography (OCT) were up until recently the only non invasive instruments for the multimodal imaging in AMD. The aim of this review is to describe qualitative and quantitative advantages of commercially available Swept Source OCT Angiography (SS OCTA) for dry Age-related Macular Degeneration (AMD) and their applicability as potential clinical trial endpoints.
Methods: A review of current literature related to the topic of SS OCTA and dry AMD.
Results: There are many promising automated quantitative OCTA parameters that can be used to diagnose the presence of dry AMD and to monitor the progression of the lesion, such as vascular density map. SS OCTA allow for deeper penetration into choroid and choriocapilaris (CC) with uniform signal sensitivity from the vitreous up to the chorioscleral interface. Reduced light scattering improves visualization through media opacities. Faster imaging speed, less sensitive to sample motion, allows for better quality of images in patients with poor fixation. 12 mm x 9 mm wide scans allow superior visualization and more data are collected in one single scan; while advanced volumetric layer detection algorithms can offer striking 3D visualization of the retina. Despite acknowledging the fact that vascular density analysis can be abnormal in areas above large drusen due to projection artifacts, the patients in our clinical practice present additional signs of vascular rarefaction extending over the retinal areas adjacent to them.
Conclusion: Ultrahigh Speed Swept Source OCTA is capable to noninvasively visualize alterations in the retinal and CC neurovascular layers of patients affected by non-exudative AMD therefore making it a promising and reliable tool for patient assessment for diagnostic and monitoring purposes.

TOMOGRAPHIC BIOMARKERS IN PROGRESSION TO MACULAR ATROPHY AND FIBROSIS

Giuseppe Casalino[1,2], Michael R Stevenson[1], Francesco Bandello[2], Usha Chakravarthy[1]
[1] Ophthalmology Macular Service, Belfast Health and Social Care Trust and Centre for Population Health, Queen's University Belfast, Belfast, UK
[2] Department of Ophthalmology, University Vita-Salute, IRCCS Ospedale San Raffaele, Milan, Italy

Introduction: Intravitreal anti-VEGF treatments have markedly improved the prognosis of neovascular age-related macular degeneration (nAMD). Real world data and long term follow up in patients with nAMD has shown that retinal scarring and atrophy of the macula continue to contribute to vision loss in these patients.
There has been a growing interest for identification of biomarkers on OCT over the past few years, especially for the early detection of biomarkers of both fibrosis and atrophy. A very interesting biomarker is subretinal hyperreflective material (HRM) which has been found to correlate with retinal scar development after treatment. We undertook a study of the outer retinal interface changes while patients were undergoing anti VEGF treatments with the particular intention to analyze the relationships between HRM evolution and scarring and atrophy at the macula of patients with nAMD.
Methods: All patients had optical coherence tomography imaging at baseline 1, 3, 6, and 12 months (M12). Macular scar and MA were determined on multimodal imaging, including color fundus (CF) and near infra-red imaging at baseline and M12.
Results: At baseline eyes graded on CF as exhibiting fibrin had thicker and wider HRM on OCT which correlated strongly with presence of a type of HRM which is termed undefined. Undefined HRM is the material that merges imperceptibly into the adjacent tissue layers and cannot be separately distinguished. We contrasted it with defined HRM which is a hyperreflective material that has clearly delineated borders. At M12 defined HRM was strongly associated with macular scarring. Ordinal regression showed that both thickness and width of HRM were significant risk factors for development of scars with thick fibrosis while risk factors for progression to atrophy were reticular psuedodrusen and thinner HRM.
Conclusion: Our study has shown that HRM may be used as a biomarker for the evolution of macular scar and atrophy in patients with nAMD undergoing treatment with anti VEGF therapies. Undefined HRM contains a high proportion of temporary elements of the neovascular complex and can resolve with anti-VEGF monotherapy. Defined HRM likely represents vascular and fibrotic elements that develop into persistent scars.

AN UNUSUAL CASE OF MACULAR DRUSEN

Livia Tomasso[1], Riccardo Sacconi[1,2], Lea Querques[1], Francesco Bandello[1], Giuseppe Querques[1]
[1] Department of Ophthalmology, University Vita-Salute, IRCCS Ospedale San Raffaele, Milan, Italy
[2] Department of Ophthalmology, University of Verona, University Hospital of Verona, Verona, Italy

Introduction: To describe an atypical case of macular drusenoid deposits in both eyes.
Methods: We analysed a 54 years old male two months after his ophthalmologist noticed macular drusen in both eyes. Past medical and ophthalmologic history was unremarkable, and he referred a winter flu-like syndrome some weeks before. The patient underwent complete ophthalmologic examination, including optical coherence tomography (OCT), fluorescein angiography (FA) and indocyanine green angiography (ICG).
Results: Visual acuity was 20/20 in both eyes, anterior segment evaluation and intraocular pressure (18 mmHg) were normal in both eyes. Fundus biomicroscopy showed slight pigment abnormalities at the posterior pole. Infrared imaging disclosed an irregular reflectivity of the posterior pole, with an irregular autofluorescence characterized by some hyper- and hypofluorescent spots at blue autofluorescence imaging. Structural OCT revealed a wavy and disrupted aspect of ellypsoid and interdigitation and an alterated reflectivity of the outer plexiform layer. Moreover, a thickening of the choroid is shown in the structural OCT. The early phase of FA was characterized by an irregular fluorescence of the posterior pole, with leakage in the late phases in both eyes, also in the periphery. Structural OCT B-scan passing trough the leakage spot revealed a focal disruption of the RPE. ICG imaging revealed an irregular early and late fluorescence, with areas of hyper- and hypofluorescence.
Conclusions: Differential diagnosis could be within cuticular drusen, lesions caused by multiple evanescent white dot syndrome, central serous chorioretinophaty, acute macular neuroretinophaty or pachychoroid. We hypothesezed that the diagnosis could be an association of pachychoroid and cuticular drusen.

QUANTIFICATION OF RETINAL MICROVASCULAR DENSITY IN OPTICAL COHERENCE TOMOGRAPHIC ANGIOGRAPHY IMAGES IN DIABETIC RETINOPATHY

José Cunha-Vaz[1,2], Lin An[3], Nathan D. Shemonski[3], Mário Soares[1,4], Torcato Santos[1], Marta Lopes[1], Catarina Neves[1], Mary K. Durbin[3]
[1] AIBILI - Association for Innovation and Biomedical Research on Light and Image, Coimbra, Portugal
[2] Faculty of Medicine - University of Coimbra (FMUC), Coimbra, Portugal
[3] Research and Development, Carl Zeiss Meditec, Inc, Dublin, California, USA
[4] Ophthalmology Department, Centro Hospitalar e Universitário de Coimbra (CHUC), Coimbra, Portugal

Introduction: Quantitative measurements based on optical coherence tomographic angiography (OCTA) may have value in managing diabetic retinopathy (DR), but there is limited information on the ability of OCTA to distinguish eyes with DR. Our objective was to evaluate the ability of measurements of retinal microvasculature using OCTA to distinguish healthy eyes from eyes with DR.
Methods: In this prospective cross-sectional study, OCTA was used to examine the eyes of participants with type 2 diabetes with or without DR and the eyes of participants without diabetes from September 17, 2015, to April 6, 2016. Density maps based on superficial retinal layer (SRL) and deeper retinal layer (DRL) images were generated after a method to remove decorrelation tails was applied to the DRL images. Both eyes of each participant were examined by means of a 3-mm OCTA scan and 7-field fundus photography using the Diabetic Retinopathy Severity Scale. Two measures were examined: perfusion density, based on the area of vessels, and vessel density, based on a map with vessels of 1-pixel width. The size of the foveal avascular zone was also calculated automatically, and so was the area under the receiver operating characteristic curve.
Results: A total of 50 eyes from 26 participants with diabetes (10 women and 16 men; mean [SD] age, 64.9 [7.5] years) and 50 healthy eyes from 25 participants without diabetes (14 women and 11 men; mean [SD] age, 64.0 [7.1] years) were imaged. All participants were white. Vessel density measured in the SRL had the highest area under the receiver operating characteristic curve (0.893 [95%CI, 0.827-0.959]), compared with perfusion density in the SRL (0.794 [95%CI, 0.707-0.881]), foveal avascular zone area (0.472 [95%CI, 0.356-0.588]), and vessel density in the DRL (0.703 [95% CI, 0.601-0.805]). Vessel density in the SRL negatively correlated with best-corrected visual acuity (r = -0.28; P = 0.05) and severity of DR (r = -0.46; P = 0.001). Density metrics correlated with age. No correlation was detected between vascular density or foveal avascular zone metrics and hemoglobin A1C or duration of diabetes.
Conclusions: Vessel density measured by OCTA provides a quantitative metric of capillary closure that correlates with severity of DR and may allow staging, diagnosis, and monitoring that do not require subjective evaluation of fundus images.

ISCHEMIC INDEX CHANGES IN DIABETIC RETINOPATHY AFTER INTRAVITREAL DEXAMETHASONE IMPLANT USING ULTRA WIDE-FIELD FLUORESCEIN ANGIOGRAPHY: A PILOT STUDY

Mariacristina Parravano[1], Lea Querques[2], Riccardo Sacconi[2,3], Alessandro Rabiolo[2], Daniele De Geronimo[1], Monica Varano[1], Francesco Bandello[2], Giuseppe Querques[2]
[1] G.B. Bietti Foundation-IRCCS, Rome, Italy
[2] Department of Ophthalmology, University Vita-Salute, IRCCS Ospedale San Raffaele, Milan, Italy
[3] Eye Clinic, Department of Neurological and Movement Sciences, University of Verona, Verona, Italy

Introduction: To investigate the effect of dexamethasone intravitreal implant on peripheral ischemia in patients affected by diabetic macular edema (DME).
Methods: Patients with treatment naïve diabetic retinopathy and macular edema undergoing intravitreal dexamethasone implant for diabetic macular edema (DME) were enrolled. Patients underwent a comprehensive ocular examination at baseline (<2 weeks before treatment) and 10 ± 2 weeks after dexamethasone implant including best corrected visual acuity (BCVA), intraocular pressure (IOP), optical coherence tomography (OCT), ultra-widefield (UWF) retinography and UWF fluorescein angiography.
Results: Five eyes of three consecutive patients (all males; mean age 73.3 ± 10.1 years) with type 2 DM were enrolled. Mean duration of DR was 6.9 ± 3.9 years. Mean interval between UWFA acquisition was 12.1 ± 2.1 weeks and the mean interval between intravitreal injection and UWFA acquisition was 11.0 ± 1.6 weeks. Mean pre- and post-injection BCVA was 0.37 ± 0.21 logMAR and 0.29 ± 0.09 logMAR, respectively. Mean pre- and post-injection CMT was 457.8 ± 123.4 µm and 388.4 ± 50.3 µm, respectively. Mean pre- and post-injection ischemic index was 37.5 ± 26.2% and 16.9 ± 12.2% (2.2 folds reduction), respectively.
Conclusions: Intravitreal dexamethasone implant reduces peripheral retina ischemia in patients with DR evaluated by means of UWF fluorescein angiography.

AUTOMATED ANALYSIS OF RETINAL EXTRACELLULAR. SPACE CHANGES. OCT-LEAKAGE

José Cunha-Vaz[1,2], Dalila Alves[1], Torcato Santos[1], Catarina Neves[1], Mário Soares[1,3], Conceição Lobo[1,2]
[1] AIBILI - Association for Innovation and Biomedical Research on Light and Image, Coimbra, Portugal
[2] Faculty of Medicine - University of Coimbra (FMUC), Coimbra, Portugal
[3] Ophthalmology Department, Centro Hospitalar e Universitário de Coimbra (CHUC), Coimbra, Portugal

Introduction: To compare the location of the sites of lower reflectivity, as determined by OCT-Leakage using Spectral Domain Optical Coherence Tomography (SD-OCT), with sites of fluorescein leakage identified by Fluorescein Angiography (FA) in eyes with diabetic retinopathy.
Methods: Fifty-two eyes from 28 patients with diabetes type 2 and presence of non-proliferative diabetic retinopathy were imaged with FA and SD-OCT (Angioplex, Carl Zeiss Meditec, Inc.). All FA images were analyzed by 2 experienced graders, and the area surrounding well defined sites of leakage was outlined by the graders. The SD-OCT scans were processed using OCT-Leakage proprietary software and semi-automated segmentation. Both procedures were performed without access to the clinical data.

Results: In eyes that were classified as having well-defined sites of leakage on FA, OCT-Leakage showed a sensitivity of 95.9% (91.4%-100.0%) and a specificity of 75.4% (61.7%-89.2%) regarding agreement between these sites of alteration of the Blood-Retinal Barrier (BRB). The areas of abnormal extracellular fluid increase were larger than the areas of fluorescein leakage and included the well-defined leakage sites identified by FA. OCT-Leakage identified localized increases in extracellular space, mainly in the Inner Nuclear, Outer Plexiform or Outer Nuclear Layers, even in eyes without leakage on FA.
Conclusions: OCT-Leakage performed using SD-OCT was found to better identify abnormal retinal fluid than did FA and showed good sensitivity and specificity in comparison with FA for identification of sites of alterations of the BRB.

THE AKITA MOUSE MODEL OF DIABETES AS A POSSIBLE NEW TOOL TO PREVENT THE DEVELOPMENT OF DIABETIC RETINOPATHY

Silvia Maestroni, Gianpaolo Zerbini
Complications of Diabetes Unit, Diabetes Research Institute, San Raffaele Scientific Institute, Milan, Italy

Introduction: Diabetic retinopathy takes several years to develop and even longer time to progress to its final, sight-threatening, proliferative stage. Because of these characteristics, it is quite difficult to set up in humans feasible studies aimed to verify the possibility to prevent the development of this complication or to treat it once established. To solve this problem and to clarify whether the Akita diabetic mouse can represent a valid model of "human-like" diabetic retinopathy, we monitored in vivo in this mouse, by fluorescein angiography and optical coherence tomography (OCT) the progression of the ocular complication.
Methods: Seven Akita mice (that spontaneously develop hyperglycemia and diabetes) and 7 C57BL6 mice (used as controls) were followed for a total of 36 weeks. Fluorescein angiography and OCT were performed at 3, 8, 16, 24 and 36 weeks on anesthetized animals. Weight and glycemic levels were measured on a weekly basis.
Results: As expected the blood glucose levels of the Akita mice remained stable and significantly increased with respect to the control animals for the entire duration of the study.
A progressive thinning of the retinal nerve fiber layer (RNFL) paralleled by a reduction of the total retinal thickness could be detected by OCT starting from 8 weeks of age. Major signs of vascular dysfunction could not be demonstrated by means of the fluorescein angiography even after several months of diabetes.
Conclusions: The Akita diabetic mouse recapitulates the early stages of "human" diabetic retinopathy as demonstrated by the early development of neuroretinal degeneration. At difference with humans but in line with other animal models of diabetes the vascular stages of diabetic retinopathy are instead not detectable in the Akita mouse. Altogether these findings suggest the Akita mouse as an ideal model to verify the possibility to prevent the development of diabetic retinopathy by controlling its early subclinical dysfunctions.

AN UNUSUAL CASE OF DIABETES AND DELAYED PUBERTY

Emanuela Aragona, Rosangela Lattanzio, Elena Bruschi, Angela Malegori, Giuseppe Querques, Francesco Bandello
Department of Ophthalmology, University Vita-Salute, IRCCS Ospedale San Raffaele, Milan, Italy

Introduction: Mauriac syndrome is a rare complex clinical condition characterized by precocious onset of diabetes in association with a severe growth disorder and early retinopathy, nephropathy, neuropathy and hepatomegaly. We describe a case of Mauriac syndrome characterized by visual function worsening concomitant with glycemic control improvement, which recovered after anti-VEGF treatment.
Methods: A 16 years old girl affected by Mauriac syndrome was admitted to the emergency department of Scientific Institute San Raffaele Hospital, Milan, Italy, in ketoacidosic state. The patient underwent to a complete ophthalmologic evaluation including slit lamp examination and fluorescein angiography. Moreover, because of the loss of vision occurred after the normalization of glycaemic level, we established a set of follow-up visits (baseline, two months, six months and one year) to assess changes of her visual function.
Results: Best-corrected visual acuity (BCVA) was 20/20, and fundoscopy and fluorescein angiography showed bilateral non-proliferative retinopathy. The patient complained of vision loss (20/100) after two months, with concomitant glycaemic control normalization. Fundus examination disclosed diabetic retinopathy progression, characterized by increasing haemorrhages, blood-retinal barrier breakdown complicated by macular edema and subfoveal detachment. In the left eye, peripapillary haemorrhage was associated to sectorial hyperfluorescence of optic disc, as an early sign of diabetic papillopathy. At the six-month follow-up, the patient underwent bilateral anti-VEGF injections because of no visual function improvement. This was supported both by fundoscopy and imaging showing further progression of diabetic retinopathy. The first injection induced functional (BCVA changed to 20/25) and anatomical improvement (central macular thickness changed from 425 micron at the baseline to 244 micron in RE and from 303 micron to 237 in LE) with reduced macular edema and subfoveal detachment). A second injection was performed one month later. At the one-year follow-up, BCVA was 20/20, and diabetic retinopathy was still moderately present at the posterior pole, without evidences of macular edema. Ischemic areas and intraretinal microvascular abnormalities persisted in peripheral retina.
Conclusions: Our case showed visual function worsening concomitant with glycemic control improvement, which represents a typical aspect of Mauriac syndrome, and we described functional and anatomical improvement after anti-VEGF treatment. Further studies are needed to better define ophthalmologic features of Mauriac syndrome as well as the role of anti-VEGF therapy for the treatment of related retinal complications.

OPTICAL COHERENCE TOMOGRAPHY ANGIOGRAPHY FEATURES OF ANGIOID STREAKS

Eleonora Corbelli[1], Adriano Carnevali[1,2], Alessandro Marchese[1], Maria Vittoria Cicinelli[1], Lea Querques[1], Riccardo Sacconi[1,3], Francesco Bandello[1], Giuseppe Querques[1]
[1] Department of Ophthalmology, University Vita-Salute, IRCCS Ospedale San Raffaele, Milan, Italy
[2] Department of Ophthalmology, University of "Magna Graecia", Catanzaro, Italy
[3] Department of Ophthalmology, University of Verona, University Hospital of Verona, Verona, Italy

Introduction: Angioid streaks (AS) are bilateral and irregular lines deep to the retina, resulting from breaks in a calcified Bruch's membrane (BM). Choroidal neovascularization represents the major cause of visual loss in patients with AS. We use optical coherence tomography angiography (OCT-A) to analyse AS and CNV secondary to AS in order to propose a new CNV classification on the basis of OCT-A criteria.
Methods: Patients affected by AS with and without choroidal neovascularization (CNV) were individuated from a pool of consecutive patients presenting between October 2015 and March 2016 at the Medical Retina & Imaging Unit of the Department of Ophthalmology, University Vita-Salute, San Raffaele Hospital in Milan. Each patient was evaluated by multimodal imaging, including OCT-A.
Results: Thirty-eight eyes of 19 consecutive patients (8 females/11 males; mean age 57.2 ± 12.4, [range, 26-75 years]) with AS were included. Thirty out of 38 eyes (17 patients) with CNV, and 8 out of 38 eyes (6 patients) without CNV were included. Moreover 10 out of 30 eyes with CNV were excluded because of poor OCT-A image quality. In the majority of cases, CNV revealed on OCT-A tangled appearance, always associated with signs of neovascular inactivity on multimodal imaging (100% vs 0%, inactive vs active, respectively). Signs of neovascular activity on multimodal imaging has been often associated with CNV interlacing appearance (71.4% vs 28.6%, active vs inactive, respectively). Moreover, OCT-A revealed a total of 27 angioid streaks. Most of them (20 AS) appeared as a choriocapillary rarefaction, corresponding to an hypo-reflective area of the retinal pigment epithelium-Bruch's membrane complex on structural SD-OCT. In 7 AS, choriocapillary segmentation of OCT-A showed an irregular vascular network, possibly representing fibrovascular tissue over the crack-like breaks in calcified Bruch's membrane.
Conclusions: OCT-A is a non-invasive imaging technology useful to characterize AS, possibly gathering inside in their pathogenesis. Moreover OCT-A is able to identify CNV secondary to AS and to evaluate CNV activity.

RETINITIS PIGMENTOSA AND CYSTOID MACULAR PATTERN

Francesco Parmeggiani[1], Katia De Nadai[2], Carla Enrica Gallenga[1], Elena Bolletta[1], Marzio Chizzolini[2]
[1] Eye Clinic, Department of Biomedical and Specialty Surgical Sciences, University of Ferrara, Ferrara, Italy
[2] Center for Retinitis Pigmentosa of Veneto Region, Camposampiero Hospital, Azienda ULSS 6 Euganea, Padova, Italy

Introduction: The cystoid macular pattern (CMP) is the most common macular change in eyes affected by retinitis pigmentosa (RP), with a frequency of about 20.4% (Testa F et al. 2014). During the routine clinical practice, the main therapeutic options currently include topical carbonic anhydrase inhibitors (CAIs), systemic CAI (acetazolamide, ACZ), and intravitreal dexamethasone implant (IVT-DEX).
Methods: We retrospectively analyzed a large series of patients with typical RP, in which CMP has been firstly treated with topical CAI three times a day for at least 4 months and, as second line therapies, with the minimumeffective dose of orally administered ACZ ranging from 250 to 750 mg in a day and/or four-monthly IVT-DEX scheduled with an as-needed regimen.
Results: The frequency of CMP among our 524 patients with RP was 20.9% (219 of 1045 eyes). Different CMP severity, unpredictable influence of the possible concomitant epiretinal membrane, and remarkable percentage of unilateral CMP (28.9%) were observed. The presence of CMP-related greater central macular thickness (CRT) was not necessarily correlated with a worse best-corrected visual acuity (BCVA), whereas visual impairment was strongly correlated with the damage of photoreceptor inner segment/outer segment. In particular, a 63-year-old woman continuously treated with oral ACZ for bilateral CMP who also received a single IVT-DEX in the non-responder eye that, after the intravitreally administered dexamethasone, has reached a long-term increase of BCVA and reduction of CRT during a 27-month follow-up.
Conclusions: Although CAIs can allow the absorption of intra-retinal fluids in patients with RP-related CMP, there is a significant percentage of unresponsiveness to both topical and systemic administration of these drugs (Liew G et al. 2015). On the other hand, the systematic utilization of as-needed IVT-DEX in 31 eyes affected by RPrelated CMP has been resulted in more predictable and promising outcomes, reaching a satisfactory response up to 14 months after the first intravitreal implant (Mansour AM et al. 2017). In our patient, the combined therapy with ACZ and IVT-DEX has pointed out an outstanding prolongation of implant benefits, indicating a possible positive synergism of these therapeutic approaches for RP-related CMP.

OCT-A IN CENTRAL SEROUS CHORIORETINOPATHY

Riccardo Sacconi[1,2], Giuseppe Querques[1]
[1] Department of Ophthalmology, University Vita-Salute, IRCCS Ospedale San Raffaele, Milan, Italy
[2] Department of Ophthalmology, University of Verona, University Hospital of Verona, Verona, Italy

Introduction: To evaluate the effects of oral eplerenone in treatment-naïve patients affected by central serous chorioretinopathy (CSC), and to identify predictive factors associated with a better response to eplerenone by multimodal retinal imaging.
Methods: This is an interventional non-randomized clinical study. Twenty-eight treatment-naïve CSC eyes were prospectively enrolled and treated with oral eplerenone for 1 to 3 months. Primary outcomes included the percentage of eyes achieving complete resolution of subretinal fluid (SRF) on structural optical coherence tomography (OCT) after treatment, and changes in best-corrected visual acuity (BCVA) and central macular thickness (CMT). Secondary outcomes included the presence of pathological findings on indocyaine green angiography (ICGA) and OCT-angiography (OCT-A) at baseline associated with different response to eplerenone treatment.
Results: Seventeen eyes (61%) demonstrated total reabsorption of SRF on structural OCT, 5 eyes (18%) presented a partial response to eplerenone therapy and 6 eyes (21%) showed no response. Eplerenone treatment has also proven efficacy in reducing CMT and improving BCVA ($p<0.001$). The complete response to eplerenone treatment was associated with absence of CNV at OCT-A and the presence of hotspot at ICGA ($p<0.001$ and $p = 0.002$, respectively). None of 7 eyes with CNV in OCT-A imaging had a complete response to eplerenone and none of 3 eyes without hotspot at ICGA showed a complete response to the treatment.
Conclusions: Our results confirmed the effectiveness of eplerenone therapy in treatment-naïve CSC. Multimodal retinal imaging allowed us to propose predictive factors (i.e. absence of CNV on OCT-A and presence hotspot on ICGA) for better response to eplerenone.

AN UNEXPECTED FINDING AFTER RETINAL VEIN OCCLUSION

Alessandro Arrigo, Riccardo Sacconi, Francesco Bandello, Giuseppe Querques
Department of Ophthalmology, University Vita-Salute, IRCCS Ospedale San Raffaele, Milan, Italy

Introduction: A 72 years old male patient with diagnosis of branch retinal vein occlusion (BRVO) of left eye (LE) one year before presented for routinely follow-up control. The BRVO did not require any treatment. Medical clinical history included diabetes mellitus type 2, lymphoma under chemotherapy, obstructive sleep apnea syndrome, bilateral glaucoma and a previous BRVO in the right eye (RE) laser-treated.
Methods: The patient underwent complete ophthalmologic examination, whichincluded best-corrected visual acuity (BCVA), structural optical coherence tomography (OCT) and multimodal fundus images (Spectralis, Heidelberg Engineering, Heidelberg, Germany), OCT angiography (OCTA; Zeiss AngioPlex, Carl Zeiss Meditec, Dublin, CA) and ultra-wide field fluorescein angiography (California; Optos PLC, Dunfermline, UK).
Results: BCVA was 20/100 in RE and 20/32 in LE, pressure was 12 mmHgin both eyes. Fluorescein angiography of both RE and LE showed extensive compensative circles due to long-lasting BRVO. Of note, fundus autofluorescence revealed the presence of a macular hyper-autofluorescent lesion, which corresponded to a hyper-reflective subfoveal deposit on structural OCT; this finding was not detected in any of the previous controls performed at our Institution. OCTA nicely showed the collateral temporal circles in the LE, and revealed the presence of blood flow suggestive of single collateral vessel descending from the deep capillary plexus up to and possibly below the subfoveal deposit.
Conclusion: In this case OCTA revealed the presence of blood-flow signal from a collateral vessel located in the deep capillary plexus up to and possibly below the subfoveal hyper-reflective deposit. We hypothesize that it can represent a retinal-choroidal anastomosis (RCA), starting from retinal capillaries and reaching the choriocapillary and choroidal vessels in order to allow a vascular shunt between the 2 circulations. The development of this RCA might be secondary to the ischemic stimulus caused by BRVO, thus justifying the absence of any foveal alterations (including macular edema or hemorrhages) one year before, during its acute phase, which could have been responsible for the hyperreflective subfoveal deposit. However, it cannot be excluded that this finding may represent an OCTA artifact. Indeed, it is known that OCTA analysis may suffer from a number of pitfalls related to its inability to filter out from the particles' movement analysis the exclusive signal of the blood flow. In this context, what OCTA detected as blood flow and thus a vessel might be the result of the movement of the material composing the foveal deposit. This may explain the absence of a clear foveal alteration on fluorescein angiography, which might be also related to resolution limits of the methodology. Finally, what we interpreted as RCA, could actually representa projection artifact from the collateral down to the choriocapillary, Through an old hemorrhage (the hyper-reflective deposit) that developed close to the collateral.
In conclusion, this case reports on the presence of blood flow from a single collateral in the deep capillary plexus descending up to and possibly below the subfoveal hyper-reflective deposit, suggestive of RCA. Further studies are needed to confirm these findings.

AN UNUSUAL PERIFOVEAL VASCULAR LESION

Luigi A. De Vitis[1], Riccardo Sacconi[1,2], Francesco Bandello[1], Giuseppe Querques[1]
[1] Department of Ophthalmology, University Vita-Salute, IRCCS Ospedale San Raffaele, Milan, Italy
[2] Eye Clinic, Department of Neurological, Biomedical and Movement Sciences, University of Verona, Verona, Italy

Introduction: Perifoveal Exudative Vascular Anomalous Complex (PEVAC) is an uncommon retinal disease, recently described by our group. We report a case of a patient with diagnosis of PEVAC, treated by intravitreal anti-vascular endothelial growth factor (anti-VEGF).

Methods: A patient affected by PEVAC was identified at the Department of Ophthalmology of the San Raffaele Hospital, Milan in 2016. The patient underwent a complete ophthalmologic examination, including structural optical coherence tomography (OCT), OCT-angiography (OCTA), wide-field color fundus photograph, fundus autofluorescence (FAF), fluorescein angiography (FA) and indocyanine green angiography (ICG).
Results: The patient was a 46-year-old, male, construction worker, in otherwise good general condition. At the ophthalmologic examination he referred distorted vision in the right eye (RE) and his best-corrected visual acuity was 20/25 and 20/20, respectively for the RE and the left eye (LE). Amsler's test for the RE was positive for metamorphopsia. The color fundus photograph for the RE disclosed a round reddish lesion sourrounded by yellowish exudation located inside 500 µm from the center of the fovea, which appeared as mainly hypoautofluorescent at the FAF. At the FA the round reddish lesion was hyperfluorescent in the early phase and with leakage in the late phase. ICG did not show other lesions. OCT disclosed a round hyper-reflective lesion with intra-retinal cysts and hard exudates. At the OCTA images it was visible an isolated large dilation in the retinal capillary plexuses, with detectable flow inside the complex. LE was unremarkable at multimodal imaging. The patient was treated with 3 intravitreal injections of anti-VEGF (Ranibizumab), without any detectable improvement.
Conclusions: PEVAC is characterized by unilateral, isolated, intraretinal, perifoveal, large aneurismal change. It generally affects otherwise healthy patients that do not show evidence of arterial hypertension, diabetes, retinal vein occlusion or any other retinal vasculopathy. In our case, it did not respond to intravitreal injection of anti-VEGF.

CLINICAL SPECTRUM OF MACULAR-FOVEAL CAPILLARIES EVALUATED WITH OPTICAL COHERENCE TOMOGRAPHY ANGIOGRAPHY

Maria Vittoria Cicinelli[1], Adriano Carnevali[1,2], Alessandro Rabiolo[1], Lea Querques[1], Ilaria Zucchiatti,[1] Vincenzo Scorcia[2], Francesco Bandello[1], Giuseppe Querques[1]
[1] Department of Ophthalmology, University Vita-Salute, IRCCS Ospedale San Raffaele, Milan, Italy
[2] Department of Ophthalmology, University of "Magna Graecia", Catanzaro, Italy

Introduction: To describe macular-foveal capillaries (MFC) by means of optical coherence tomography angiography (OCT-A) and to identify the clinical spectrum of this angiographic feature.
Methods: Patients with MCF presenting at the Medical Retina & Imaging Unit of the Department of Ophthalmology, University Vita-Salute San Raffaele in Milan were recruited. Patients underwent a complete ophthalmologic examination that included slit-lamp examination, fundus examination, measurement of best-corrected visual acuity (BCVA), fundus autofluorescence (FAF), and spectral-domain OCT (Spectralis HRA + OCT; Heidelberg Engineering, Heidelberg, Germany). Fluorescein angiography (FA) was performed in selected cases. OCT-A was performed through Zeiss prototype (AngioPlex, CIRRUS HD-OCT models 5000, Carl Zeiss Meditec, Inc., Dublin, USA).
Results: Twelve eyes of 10 consecutive Caucasian patients (5 males and 5 females, 50%) presenting MFC were included. Mean age was 66.2 ± 10.2 years (range: 53-79); mean BCVA was 0.1 ± 0.13 logMAR (range: 0-0.4, corresponding to 20/20 to 20/50). Mean central macular thickness was 348 ± 57.6 µm. Two patients were affected by macular pucker, two by post-surgical macular edema, two by age-related macular degeneration, one by diabetic retinopathy, one by dome-shaped macula, one presented with chronic serous chorioretinopathy, and one with branch artery occlusion. Six eyes disclosed a complete absence of the foveal avascular zone, whereas the six other cases showed a partial foveal avascularity. No significant difference was found between complete and incomplete MFC with regards to BCVA ($p = 0.272$) and CMT ($p = 0.870$).
Conclusions: Cases of persistent MFC are heterogeneous in demographic characteristics, fundus appearance, and visual function. MFC, presenting either as complete absence of the FAZ or as only partial foveal avascularity, may complicate different retinal pathologies or represents a coincident finding.

RETINAL LESION WITH MICROVASCULAR ABNORMALITIES

Giovanni Fogliato, Eleonora Corbelli, Riccardo Sacconi, Giuseppe Querques, Francesco Bandello
Department of Ophthalmology, University Vita-Salute, IRCCS Ospedale San Raffaele, Milan, Italy

Introduction: We reported a case of a isolated iuxtapapillary retinal hemangioma followed-up and treated with intravitreal anti-VEGF and dexamethasone injections.
Methods: A 26 years-old man presented with a progressive unilateral visual loss and metamorphopsiae since 3 months before. A comprehensive ophthalmic evaluation including best-corrected visual acuity, ophthalmoscopy, and retinal multimodal imaging (multicolor, fundus autofluorescence (FAF), fluorescein angiography (FA), indocianine-green angiography (ICGA), spectral-domain optical coherence tomography (SD-OCT) and optical coherence tomography angiography (OCT-A)) was carried out to characterize the retinal lesion. Intravitreal treatment, including anti-VEGFs and corticosteroids, was reported.
Results: After clinical and instrumental evaluation a isolated iuxtapapillary retinal hemangioma was diagnosed. Peculiar features of this case are reported: cystoid macular edema, neuroretinal foveal detachment and radial perifoveal exudates. A clinical and morphological improvement without a complete resolution of symptoms and signs was observed after 6 ranibizumab, 3 aflibercept and 1 dexamethasone-implant intravitreal injections across a 1-year follow-up period.
Conclusions: We reported a rare condition of isolated iuxtapapillary retinal hemangioma, complicated by intraretinal and subretinal exudation and concomitant vision loss and distortion. Location and histological characteristics of the lesion complicated the less-invasive intravitreal treatment, with a only-partial resolution and a relapse of symptoms and signs after therapies. Advantage and disadvantage of more-invasive treatment (such as thermal laser or photodynamic treatment) are discussed.

A CASE OF RETINAL PIGMENT EPITHELIAL DETACHMENT

Chiara Giuffrè, Francesco Bandello, Giuseppe Querques
Department of Ophthalmology, University Vita-Salute, IRCCS Ospedale San Raffaele, Milan, Italy

Purpose: To describe the case of a woman affected with age related macular degeneration (AMD), who developed a type 3 CNV in the left eye (LE).
Methods: Case report.
Results: A 73-year-old woman diagnosed with AMD was referred to our Department complaining about mild metamorphopsia in the left eye. Her past general medical history was unremarkable. Slit lamp examination of anterior segment of both eyes was within normal limits, while fundus biomicroscopy disclosed greyish macular and paramacular lesions surrounded by drusen in the LE and drusen at posterior pole in the right eye (RE). The patient signed a comprehensive consent form according to good clinical practice guidelines, before undergoing multimodal imaging. Blue fundus autofluorescence of LE disclosed a hyperautofluorescent zone temporally to the macula, and some little hypoautofluorescent areas just around the fovea. Structural spectral domain optical coherence tomography (SD-OCT) showed a pigment epithelial detachment (PED) with a linear hyperreflective lesion adherent to the back surface of retinal pigment epithelium (RPE), and some onion lesions within the detachment, consistent with a type 1 CNV; a little further from the center, a flat RPE elevation with atrophic changes and a rounded hyperreflective finding consistent with a blood vessel wall, in the outer plexiform and outer nuclear layers, were reported. No intraretinal or subretinal fluid was detected. Fluorescein angiography showed window defects, staining and leakage in the macula and some hyperfluorescent points in correspondence of the flat and atrophic lesion seen on structural SD-OCT. Performing optical coherence tomography angiography, a point that showed the presence of flow was detected just beneath the deep capillary plexus, that lead us to classify the lesion as a early type 3 CNV. Multimodal imaging of RE was within normal limits.
Conclusions: This case underlines the possibility of a coincidence of type 1 and early type 3 CNV, in absence of retinal exudation.

THE IMITATION GAME

Luigi Capone, Elisabetta Miserocchi, Eleonora Corbelli, Lea Querques, Giuseppe Querques, Francesco Bandello
Department of Ophthalmology, University Vita-Salute, IRCCS Ospedale San Raffaele, Milan, Italy

Introduction: To describe a case of syphilis and HIV simulating Bechet's disease.
Methods: A 26 year-old Italian male was referred to our Department complaining of blurred vision in both eyes for one month. His medical history was remarkable for colitis, oral ulcers and uncertain genital lesions. Past ophthalmological history was negative. The patient underwent complete ophthalmologic examination including best-corrected visual acuity (BCVA), slit-lamp exam, structural optical coherence tomography (OCT) (Spectralis, Heidelberg Engineering, Heidelberg, Germany) and ultra-wide field (UWF) color fundus, fundus autofluorescence (AF) and fluorescein angiography (FA) (California; Optos PLC, Dunfermline, UK).
Results: BCVA was 20/25 in right eye (RE) and 20/100 in left eye (LE), intraocular pressure was 13 mmHg in both eyes. The anterior segment showed keratic precipitates, cells and flare ++ in anterior chamber and posterior synechiae in both eyes. UWF fundus color photography demonstrated in RE no vitreous haze, peripheral signs of retinal vasculitis with perivascular sheathing, while in LE revealed vitreous haze and signs of retinal vasculitis with abnormal perivascular sheathing. Of note, UWF-AF revealed the presence of hyper-autofluorescent areas in the posterior pole and peripheral retina. Structural OCT disclosed loss of ellipsoid zone in both eyes. UWF-FA showed diffuse retinal perivascular leakage during the early and late phases in both eyes. Based on the clinical history and the ophthalmologic findings our first diagnostic suspect was Bechet's disease. However, infectious and autoimmune full work-up has been recommended to confirm our diagnosis and to exclude other possible causes of uveitis. The patient resulted positive for both syphilis and HIV and immediately appropriate therapy has been started.
Conclusions: In conclusion, we described a case of panuveitis in a young man with syphilis-HIV co-infection initially misdiagnosed as Bechet's disease. Syphilis, indeed, has been known as "the great imitator" because it may cause symptoms similar to many other diseases. Moreover, recently, syphilis has re-emerged as a major sexually transmissible infection and co-infection with HIV is frequent especially in MSM (men who have sex with men). Thus, it is necessary a multidisciplinary approach and syphilis diagnosis may be excluded in cases of panuveitis.

UNUSUAL CASES OF MYOPIC TRACTION MACULOPATHY (MTM)

Giacomo Panozzo
Ophthalmology Department, Civil Hospital Bussolengo, Verona, Italy

MTM is a tractional syndrome, determined by 2 non elastic retinal components: internal limiting membrane (ILM), responsible of a diffuse tangental traction, and arteriolar wall, acting like a stretched cord. Natural history of MTM follow the gauss law: a stretched tissue (or cord) that can't follow an irregular contour will separate from it assuming a regular concave shape.
Focal MTM will therefore probably remain stable, while diffuse and central MTM may progress over time. Even in stable cases at OCT follow up, microperimetry demonstrates however a progressive functional damage.
There are anyway another two components that is not taken into account in this scheme, and that may play an important role: the vitreous and the sclera.
Vitreous may degenerate, especially if an intravitreal therapy is performed for myopic CNV, and precipitate an otherwise stable situation.
Even the scleral contour may change over time, and modify the MTM pictures: there are eyes where the staphiloma progresses, but other also where it becomes less prominent with partial spontaneous regression of MTM.
In summary, MTM is a tractional syndrome where many factors may act together determining different behavior: stability, progression but also regression is possible, and close follow up is necessary in all cases.