# Anti-Vascular Endothelial Growth Factor Resistance in Exudative Macular Degeneration and Polypoidal Choroidal Vasculopathy.

Kokame GT, deCarlo TE, Kaneko KN, Omizo JN, Lian R.

Ophthalmol Retina. 2019 Sep;3(9):744-752.

## ABSTRACT

**PURPOSE:**

To evaluate the prevalence of polypoidal choroidal vasculopathy (PCV) in different ethnic populations and to determine the prevalence of PCV in eyes with exudative age-related macular degeneration (AMD) that is sensitive and resistant to anti-vascular endothelial growth factor (VEGF) therapy.

**DESIGN:**

Retrospective chart review.

**PARTICIPANTS:**

Two hundred fifty-three eyes of 221 patients with exudative AMD.

**METHODS:**

Baseline data were collected on all eyes diagnosed with exudative AMD, which included ethnic data. Polypoidal choroidal vasculopathy was diagnosed using indocyanine green angiography (ICGA) with the scanning laser ophthalmoscope. Exudative AMD eyes were separated into 2 groups: anti-VEGF-resistant eyes with persistent subretinal fluid, subretinal hemorrhage, or macular edema after 4 anti-VEGF injections and anti-VEGF-sensitive eyes defined as eyes without residual disease activity. The prevalence of PCV was determined in each group based on ICGA.

**MAIN OUTCOME MEASURES:**

Prevalence of PCV in exudative AMD, and in different ethnic populations, and prevalence of anti-VEGF resistance in eyes with and without PCV.

**RESULTS:**

Exudative AMD was diagnosed in 253 eyes of 221 patients. Polypoidal choroidal vasculopathy was noted to have a prevalence of 45.1% (114/253 eyes) in the overall population. Polypoidal choroidal vasculopathy was noted in 51.6% (81/157) of eyes with wet AMD in Asians, 31.9% (23/72 eyes) of eyes with wet AMD in white persons, and 28.6% (4/14 eyes) in a small group of Pacific Islanders. Polypoidal choroidal vasculopathy was diagnosed in 50% (60/120 eyes) of eyes in the anti-VEGF-resistant group, which is more prevalent than the 30.2% (29/96 eyes) in the anti-VEGF-sensitive group ($P < 0.001$).

**CONCLUSIONS:**

Polypoidal choroidal vasculopathy is more prevalent in Asian patients with exudative AMD, but is more prevalent than generally recognized in white patients. Polypoidal choroidal vasculopathy is more prevalent in anti-VEGF-resistant eyes in both white and Asian patients, which could help to predict therapeutic response.

# Disproportion of lamellar capillary non-perfusion in proliferative diabetic retinopathy on optical coherence tomography angiography.

Uchitomi D, Murakami T, Dodo Y, Yasukura S, Morino K, Uji A, Yoshitake T, Fujimoto M, Tsujikawa A.

Br J Ophthalmol. 2019 Sep 13.

## ABSTRACT

**PURPOSE:**

To characterise the non-perfused areas (NPAs) in the superficial and deep capillary layers (sNPAs and dNPAs, respectively) in the posterior pole in proliferative diabetic retinopathy (PDR) on wide-field optical coherence tomography angiography (OCTA) images.

**METHODS:**

We retrospectively reviewed 104 eyes of 70 patients with PDR from whom wide-field swept source OCTA images were acquired. sNPAs and dNPAs were manually measured in each quadrant of the inner (1-3 mm diameter), intermediate (3-6 mm), and outer (6-10 mm) rings centred on the fovea. Two qualitative findings, that is, *segmented NPAs* and *periarteriolar NPAs*, were also compared.

**RESULTS:**

The dNPAs were greater than the sNPAs ($p<0.001$) in each subfield. The outer ring had higher rates of deep NPAs than did the intermediate ring in the superior, inferior and temporal quadrants ($p=0.010$, $p=0.004$ and $p<0.001$, respectively), whereas no differences were detected in the nasal quadrant ($p=1.000$). Similarly, sNPA rates were higher in the outer ring than in the intermediate ring in the inferior and temporal subfields ($p=0.003$ and $p<0.001$, respectively). In 45 eyes with extensive NPAs, there were modest correlations between the dNPAs in the nasal and temporal quadrants in the intermediate ($\rho=0.341$, $p=0.026$) and outer ($\rho=0324$, $p=0.032$) rings, whereas sNPAs exhibited no associations. *Segmented NPAs* were delineated more frequently in the superficial layer than in the deep layer ($p<0.001$). *Periarteriolar NPAs* were more frequent in the deep layer ($p<0.001$).

**CONCLUSIONS:**

Three-dimensional assessment of wide-field OCTA promotes a better understanding of the enigmatic disproportion of lamellar NPAs in the posterior pole in PDR.

# Influence of the intraocular lens optic-haptic junction on illumination of the peripheral retina and negative dysphotopsia.

Erie JC, Simpson MJ, Bandhauer MH.

J Cataract Refract Surg. 2019 Sep;45(9):1335-1339.

## ABSTRACT

**PURPOSE:**

Use optical modeling to evaluate the effect of the intraocular lens (IOL) optic-haptic junction on retinal illumination and negative dysphotopsia.

**SETTING:**

Mayo Clinic, Rochester, Minnesota, USA.

**DESIGN:**

Schematic model eye.

**METHODS:**

Ray-tracing software for an extended light source was used to simulate **retina** illumination in a pseudophakic eye with a biconvex high-index acrylic IOL and a 2.5 mm pupil. The haptic junction was modeled using an annular cone of haptic material of 0.75 mm width located between the optic and haptic. Ray-tracing diagrams and simulated **retina** illumination profiles were compared with and without the haptic junction. Retinal locations were scaled to visual angles from 70 to 110 degrees horizontally.

**RESULTS:**

Light incident on the peripheral optic creates a nonuniform **retina** illumination pattern consisting of a 5-degree band of nonilluminated **retina** bounded posteriorly by light refracted by the optic and anteriorly by light that missed the optic. Light incident on the haptic junction illuminates **retina** differently in that light that typically misses the optic (input angle 79 to 91 degrees) is instead refracted at a large angle or internally reflected by the haptic junction, which removes the illuminated peripheral **retina** that would otherwise delineate the shadow region. Further modification to the haptic junction region improved peripheral **retina** illumination and shifted the shadow region 10 degrees anteriorly.

**CONCLUSIONS:**

The haptic junction illuminated the peripheral **retina** differently than the peripheral optic, and this might explain why a horizontal haptic junction minimizes negative dysphotopsia. A

modification to the optic-haptic junction redirected illumination and shifted the **retina** shadow anteriorly, possibly decreasing awareness.

# Collateral Vessels in Branch Retinal Vein Occlusion: Anatomic and Functional Analyses by OCT Angiography.

Tsuboi K, Sasajima H, Kamei M.

Ophthalmol Retina. 2019 Sep;3(9):767-776.

## ABSTRACT

**PURPOSE:**

To analyze collateral vessels (CVs) associated with branch retinal vein occlusion (BRVO) anatomically and functionally using OCT angiography (OCTA).

**DESIGN:**

Retrospective review.

**PARTICIPANTS:**

Twenty-nine consecutive patients with BRVO.

**METHODS:**

The distribution of the CVs 12 months after the onset of BRVO was studied using spectral-domain OCTA. En face 3 × 3-mm OCTA images were acquired from 9 locations centered on the fovea and used to create a montage image of an 8.1 × 8.1-mm square. The CVs were identified in 3 separate areas: the radial peripapillary capillary (RPC), superficial capillary plexus (SCP), and deep capillary plexus (DCP) layers. The numbers of CVs were evaluated in 4 regions: zone 1, the area within a 3-mm diameter circle centered on the fovea; zone 2, the area between the 3-mm diameter circle and its outer 6-mm diameter circle; zone 3, the area beyond the 6-mm diameter circle; and the temporal raphe.

**MAIN OUTCOME MEASURES:**

The relationship between the number of CVs and vessel density (VD) in each layer, persistent macular edema (ME) at 12 months, and the number of injections of anti-vascular endothelial growth factor (VEGF) agents.

**RESULTS:**

The number of CVs in zone 1 was correlated negatively ($P = 0.0079$) with the VD in the SCP, and the numbers of CVs in zone 3 and the temporal raphe were correlated negatively ($P = 0.0017$ and $P = 0.036$, respectively) with the VD in the DCP. The number of CVs in the RPC and total number of CVs were also correlated negatively ($P = 0.0034$ and $P = 0.0113$, respectively) with the VD in the DCP. In patients with persistent ME, the number of CVs in

zone 1 was significantly (P = 0.0156) greater than in patients with nonpersistent ME and correlated positively (P = 0.025) with the number of anti-VEGF injections.

**CONCLUSIONS:**

The CVs in BRVO form as result of capillary dropout and are considered to represent remodeling of the retinal capillaries. The CVs around the fovea may be good indicators of persistent ME

# ALTERNATIVE MANAGEMENT OF CIRCUMSCRIBED CHOROIDAL HEMANGIOMA USING INTRAVITREAL METOPROLOL.

Jorge R, Chaves L, Cunha ADS, Correa ZM.

Ophthalmol Retina. 2019 Sep;3(9):753-759.

## ABSTRACT

**BACKGROUND/PURPOSE:**

To describe a patient with visually symptomatic circumscribed choroidal hemangioma (CCH) treated successfully with intravitreal beta-blocker.

**METHODS:**

This is an interventional single case report of a 63 year-old man with a juxtafoveal CCH and extensive subretinal fluid (SRF) unsuccessfully treated with intravitreal anti-VEGF. Off-label intravitreal use of metoprolol (50µg/0.05 ml) was then performed. Main outcome measures were resolution or decreased subretinal fluid on OCT, visual stability or improvement, lack of retinal/ocular toxicity.

**RESULTS:**

Following 2 intravitreal injections of metoprolol (1 month apart), significant response was observed with decrease of SRF and visual improvement to 20/400 during a 9-week follow-up after the injections.

**CONCLUSION:**

These preliminary findings suggest that intravitreal metoprolol can be a safe alternative treatment for patients with CCH. This off-label therapy could represent another option for patients with this condition.

# Short-term eplerenone for treatment of chronic central serous chorioretinopathy; a prospective study.

Moein HR, Bierman LW, Novais EA, Moreira-Neto C, Baumal CR, Rogers A, Duker JS, Witkin AJ.

Int J Retina Vitreous. 2019 Sep 9;5:39.

## ABSTRACT

**BACKGROUND:**

Increased mineralocorticoid activity is one of the plausible causes of chronic central serous chorioretinopathy (CSCR) and mineralocorticoid inhibitors such as eplerenone have been investigated as its potential therapy. This study investigates the short-term safety and efficacy of oral eplerenone in patients with chronic CSCR.

**PATIENTS AND METHODS:**

Prospective study of 13 eyes of 13 patients with the diagnosis of chronic CSCR. All patients received eplerenone 50 mg/day for 4 weeks. Enhanced depth imaging optical coherence tomography (OCT) was obtained. Best corrected visual acuity (BCVA), and OCT parameters including sub retinal fluid (SRF), choroidal thickness (CT) and central macular thickness (CMT), were measured manually.

**RESULTS:**

The mean SRF height decreased slightly at 1-month follow-up as compared to baseline, but the change was not statistically significant (94.18 ± 17.53 vs. 113.15 ± 18.69; p = 0.08). Subfoveal CT and CMT was significantly reduced as compared to baseline (6.6% [p = 0.002] and 7.05% [p = 0.04], respectively). The BCVA did not change significantly (20/28 vs. 20/30 [p = 0.16]).

**CONCLUSION:**

This study suggests that oral eplerenone may be used as a safe and potentially effective treatment in chronic CSCR, however there are minimal short-term effects on subretinal fluid or visual acuity therefore therapeutic trials longer than one month are necessary to test its benefits.*Trial registration* Clinicaltrials.gov identification number: NCT01822561. Registered 3/25/13, https://clinicaltrials.gov/ct2/show/study/NCT01822561.

# Intravitreal ranibizumab versus laser photocoagulation for retinopathy of prematurity: efficacy, anatomical outcomes and safety.

Kang HG, Choi EY, Byeon SH, Kim SS, Koh HJ, Lee SC, Kim M.

Br J Ophthalmol. 2019 Sep;103(9):1332-1336.

## ABSTRACT

**BACKGROUND/AIMS:**

To compare the efficacy, anatomical outcomes and complications of intravitreal ranibizumab with those of laser photocoagulation for retinopathy of prematurity (ROP).

**METHODS:**

This is a retrospective case series of 314 eyes from 165 infants diagnosed with type I ROP and treated with either laser photocoagulation (161 eyes) or intravitreal ranibizumab (0.25 mg/0.025 mL) injection (153 eyes) between January 2006 and December 2016 in a tertiary referral-based hospital. The main outcome was the rate of recurrence requiring additional treatment. Secondary outcomes included the incidence of major complications and final refractive error.

**RESULTS:**

The mean follow-up was 36.3±31.9 months. Recurrences requiring further intervention were noted in 22 (13.7%) laser-treated and 15 (9.8%) ranibizumab-treated eyes (p=0.196). Retinal detachment (8 vs 1, p=0.037) and macular dragging (7 vs 1, p=0.039) were observed in the laser-treated and injection-treated groups, respectively, but no systemic or neurodevelopmental adverse events were reported. In the ranibizumab group, 95.6% showed fully vascularised retinas. Multivariate analyses revealed that birth weight (OR 0.993, p=0.023) and higher ROP stage (OR 11.222, p=0.008) influenced the incidence of major complications.

**CONCLUSION:**

Intravitreal ranibizumab for ROP appears to achieve similar therapeutic effects than did laser photocoagulation, but with fewer surgical complications such as retinal detachment or macular dragging.