

# Real-World Management and Outcomes in Retinal Vein Occlusion

## BACKGROUND

- Retinal vein occlusion (RVO) is a common vascular retinal disorder resulting from a blockage of venous outflow from the retina and is a leading cause of vision loss worldwide
- Cystoid macular edema (CME) is the accumulation of fluid within the intracellular spaces of the retina and is most common complication of RVO
- Types of RVO: central, hemispheric, or branched retinal vein occlusion (CRVO, HRVO, and BRVO)
- Neovascular age-related macular degeneration (NV-AMD) and diabetic macular edema (DME) studies have shown that real world outcomes do not always match those demonstrated in randomized clinical trials (RCTs)

## PURPOSE

- To evaluate the real world management and outcomes of eyes with retinal vein occlusion (RVO) and cystoid macular edema from five academic retina practices

## METHODS

- Multi-center retrospective study of acute RVO eyes from 2011-2015 with at least 1 year follow-up
- Visual acuity (VA), central subfield thickness (CST) on OCT, and management were recorded at 3, 6, 12, and 24 month follow-up
- Exclusion Criteria: Other retinal or choroidal conditions other than cataract surgery
- Treatments:
  - Anti-VEGF: Bevacizumab, Ranibizumab, Aflibercept
  - Steroids: Triamcinolone, Dexamethasone
  - Laser Photocoagulation

Table 1

	All (n = 262)	CRVO/HRVO (n = 163)	BRVO (n = 99)
Mean Age (SD)	69.9 (12.5)	69.7 (12.5)	70.2 (12.4)
Male (%)	106 (40.5)	65 (39.9)	41 (41.4)
Right eye (%)	81 (49.7)	70 (51.1)	44 (44.4)
Diabetes (%)	96 (36.6)	61 (37.4)	35 (35.4)
Dyslipidemia (%)	106 (40.5)	64 (39.3)	42 (42.4)
Hypertension (%)	164 (62.6)	98 (60.1)	66 (66.7)
Hypercoagulable State (%)	29 (11.1)	20 (12.3)	9 (9.1)
Glaucoma (%)	63 (24.0)	44 (27.0)	19 (19.2)
Phakic (%)	190 (72.5)	122 (74.9)	68 (68.7)

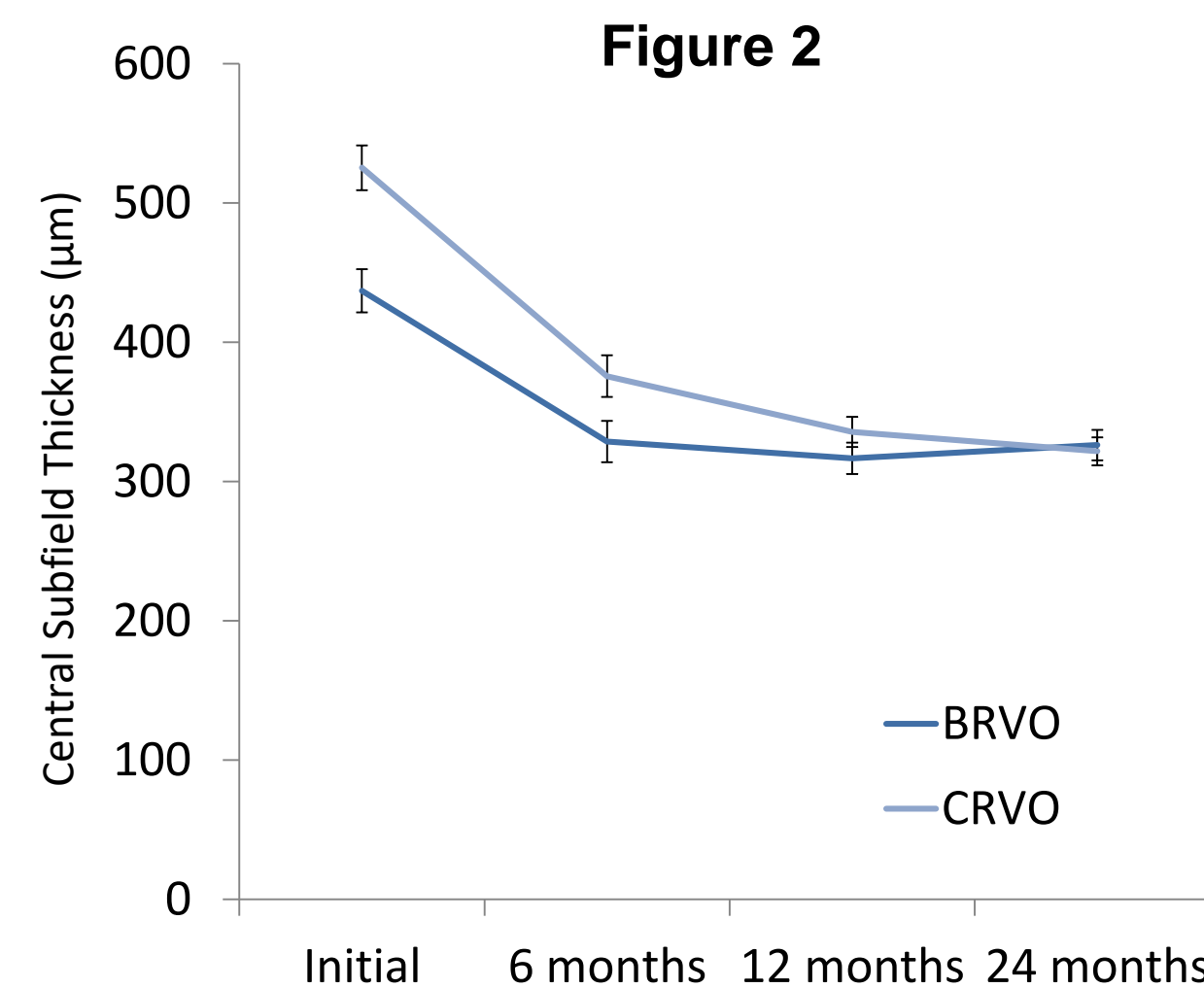
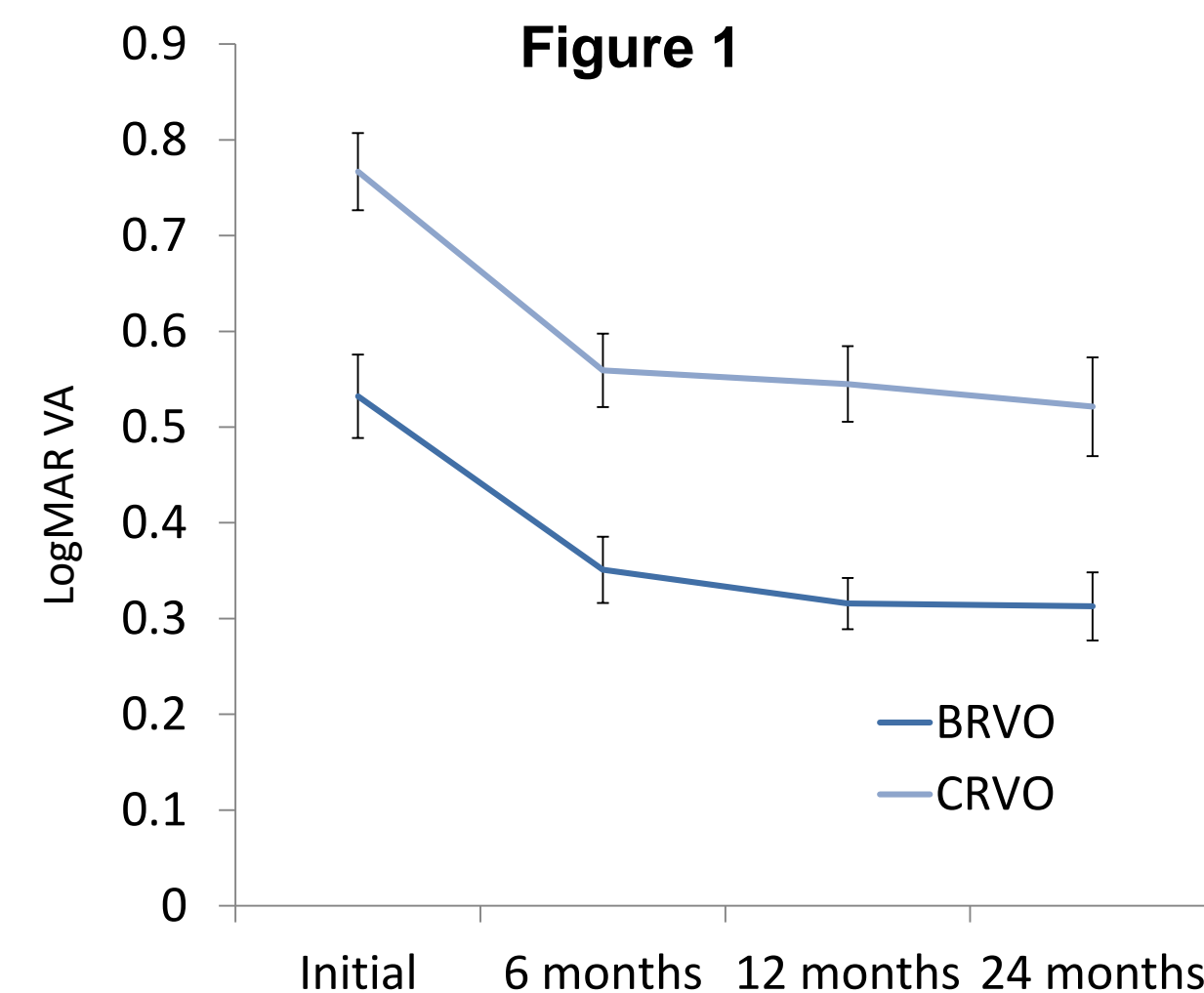
## DATA

Table 1

	IVB only (%)	IVR only (%)	IVA only (%)	Mixed anti-VEGF (%)	IVS only (%)	Mixed IVS and anti-VEGF (%)	Laser only (%)	Mixed laser and Injections (%)
Initial Visit (n = 262)	58.8	28.6	2.7	0.0	2.3	0.0	1.1	0.0
1 - 3 mos (n=258)	53.1	30.2	4.3	3.1	1.2	0.5	0.8	0.4
4 - 6 mos (n = 256)	37.5	29.7	8.2	2.3	1.6	0.8	4.7	4.2
7 - 12 mos (n = 262)	36.3	27.5	11.1	2.7	3.1	1.1	6.5	3.8
13 - 24 mos (n = 231)	32.5	22.5	16.9	5.2	6.1	0.9	5.2	3.0

Table 2

Patients with >6 months without treatment	All (n = 94, 36%)	CRVO/HRVO (n = 57, 36%)	BRVO (n = 37, 37.4%)
Mean No. of Months to Resolution (SD)	7.0 (4.9)	7.0 (4.9)	7.2 (4.8)
Mean No. Anti-VEGF Injections (SD)	4.4 (3.2)	4.3 (3.2)	4.1 (3.0)
Mean No. Steroid Injections (SD)	0.1 (0.4)	0.1 (0.4)	0.08 (0.4)
Mean No. Lasers (SD)	0.1 (0.3)	0.1 (0.3)	0.3 (0.6)



## RESULTS

- 262 patients met the study criteria
- The demographics and systemic and ocular comorbidities are listed in Table 1
- The management of the patients is summarized in Table 2
- 36% of patients were observed without treatment for >6 months (Table 3)
- There was a significant improvement (p<0.001) in VA (Figure 1) and CST (Figure 2) for patients after 1 year
  - BRVO patients:
    - mean logMAR VA improved from 0.52±0.33 to 0.30±0.22
    - CMT improved from 398±111 to 316±115
  - CRVO patients
    - Mean logMAR improved from 0.80±0.51 to 0.53±0.42
    - CMT improved from 503±160 to 321±139

## CONCLUSIONS

- RVOs with CME are largely managed using intravitreal anti-VEGF agents
- Real world outcomes of RVOs with CME demonstrate improvement in VA and CMT with treatment, however, these improvements are less than those found in RCTs.

## REFERENCES

Brown, D. M., Campochiaro, P. A., Singh, R. P., Li, Z., Gray, S., Saroj, N., . . . Investigators, C. (2010). Ranibizumab for macular edema following central retinal vein occlusion: six-month primary end point results of a phase III study. *Ophthalmology*, 117(6), 1124-1133 e1121. doi:10.1016/j.ophtha.2010.02.022

Campochiaro, P. A., Heier, J. S., Feiner, L., Gray, S., Saroj, N., Rundie, A. C., . . . Investigators, B. (2010). Ranibizumab for macular edema following branch retinal vein occlusion: six-month primary end point results of a phase III study. *Ophthalmology*, 117(6), 1102-1112 e1101. doi:10.1016/j.ophtha.2010.02.021

Campochiaro, P. A., Sophie, R., Pearlman, J., Brown, D. M., Boyer, D. S., Heier, J. S., . . . Group, R. S. (2014). Long-term outcomes in patients with retinal vein occlusion treated with ranibizumab: the RETAIN study. *Ophthalmology*, 121(1), 209-219. doi:10.1016/j.ophtha.2013.08.038

Finger, R. P., Wiedemann, P., Blumhagen, F., Pohl, K., & Holz, F. G. (2013). Treatment patterns, visual acuity and quality-of-life outcomes of the WAVE study - a noninterventional study of ranibizumab treatment for neovascular age-related macular degeneration in Germany. *Acta Ophthalmol*, 91(6), 540-546. doi:10.1111/j.1755-3768.2012.02493.x

Heier, J. S., Campochiaro, P. A., Yau, L., Li, Z., Saroj, N., Rubio, R. G., & Lai, P. (2012). Ranibizumab for macular edema due to retinal vein occlusions: long-term follow-up in the HORIZON trial. *Ophthalmology*, 119(4), 802-809. doi:10.1016/j.ophtha.2011.12.005

Heier, J. S., Clark, W. L., Boyer, D. S., Brown, D. M., Vittit, R., Bertiner, A. J., . . . Haller, J. A. (2014). Intravitreal aflibercept injection for macular edema due to central retinal vein occlusion: two-year results from the COPERNICUS study. *Ophthalmology*, 121(7), 1414-1420 e1411. doi:10.1016/j.ophtha.2014.01.027

Holz, F. G., Tadayoni, R., Beatty, S., Berger, A., Cereda, M. G., Cortez, R., . . . Sivaprasad, S. (2015). Multi-country real-life experience of anti-vascular endothelial growth factor therapy for wet age-related macular degeneration. *Br J Ophthalmol*, 99(2), 220-226. doi:10.1136/bjophthalmol-2014-305327

Ogura, Y., Roeder, J., Korobelnik, J. F., Holz, F. G., Simader, C., Schmidt-Erfurth, U., . . . Group, G. S. (2014). Intravitreal aflibercept for macular edema secondary to central retinal vein occlusion: 18-month results of the phase 3 GALILEO study. *Am J Ophthalmol*, 158(5), 1032-1038. doi:10.1016/j.ajo.2014.07.027

Xuejing Chen, C. S., Jeffery Heier. (2017). *Progression to Surgery for Epiretinal Membranes with Good Vision*. Abstract. Ophthalmology. Ophthalmic Consultants of Boston, Tufts Medical Center. ARVO.

Yeh, S., Kim, S. J., Ho, A. C., Schoenberger, S. D., Bakri, S. J., Ehlers, J. P., & Thorne, J. E. (2015). Therapies for macular edema associated with central retinal vein occlusion: a report by the American Academy of Ophthalmology. *Ophthalmology*, 122(4), 769-778. doi:10.1016/j.ophtha.2014.10.013

## DISCLOSURES

Disclosures: AEK: Consultant for Allergan, Alimera Sciences, MYW: None; AVR: Consultant for Allergan; RPS: Consultant for and Grants from Regeneron, Alcon, Genentech, Consultant for Shire, Biogen, Grants from Zeiss; KMW: None; GCY: Consultant for Allergan, Alimera, Zeiss, Southern California Desert Retina, Grants from Alcon and E Matilda Ziegler Foundation, Iridex; K-YL: None; EN: Consultant for Allergan; KCC: None; JPC: Consultant for Allergan, KC: None

This research was funded in part by: AEK: unrestricted departmental funding from Research to Prevent Blindness (New York, NY), and P30 EY001319 from the National Institutes of Health (Bethesda, MD); JPC: research was funded in part by unrestricted departmental funding from Research to Prevent Blindness (New York, NY), and P30 EY010572 from the National Institutes of Health (Bethesda, MD).