



touchCONGRESS webinar

Will a scientific breakthrough translate into clinical benefits in nAMD?



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Webinar overview

Personalized medicine for nAMD

- Part 1: 19th EURETINA Congress 2019 – Why is retinal fluid important as a marker of disease activity in patients with nAMD?
- Part 2: 19th EURETINA Congress 2019 – How can the burden of nAMD be reduced, and patient adherence and QoL improved?
- Part 3: 19th EURETINA Congress 2019 – What are the real-life clinical unmet needs? Does size matter when considering treatment options?

Part 1.

19th EURETINA Congress 2019 – Why is retinal fluid important as a marker of disease activity in patients with nAMD?

Focus on retinal fluid may be used as a marker of disease activity and to guide individualized therapeutic strategy

nAMD – the leading cause of severe vision loss in the elderly population

nAMD is the leading cause of severe vision loss and legal blindness in people over the age of 65 in North America, Europe, Australia and Asia, impacting an estimated 20 to 25 million people worldwide^{1,2}

nAMD occurs when abnormal blood vessels leak fluid into the eye, causing irreversible damage and ultimately, blindness⁴

Early symptoms of nAMD include distorted vision or metamorphopsia and difficulties seeing objects clearly³

Prompt diagnosis and intervention are essential. As the disease progresses, cell damage increases, further reducing vision quality¹

nAMD, neovascular age-related macular degeneration.

1. Schmidt-Erfurth U, et al. *Br J Ophthalmol*. 2014; **98**:1144–1167; 2. Chopdar A et al. *BMJ* 2003;**26**:485–488; 3. NHS Choices. Macular degeneration - Symptoms. Available at <http://www.nhs.uk/Conditions/Macular-degeneration/Pages/Symptoms.aspx>. Accessed September 2019. 4. Fine SL et al. *N Engl J Med*. 2000;**342**:483–492

Retinal fluid as a key marker

Over the past 15 years, anti-VEGF agents have profoundly transformed the management of nAMD and are credited with unprecedented improvements in vision preservation and quality of life for millions of patients¹



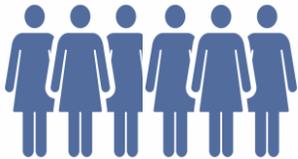
The best present option for vision preservation is a 'zero-tolerance for fluid' schedule of monitoring and intravitreal injections¹

Higher order optical coherence tomography (OCT) fluid burden assessment: Analysis from the OSPREY trial

J. Ehlers et al.



OSPREY: a Phase II randomized, double-masked, active-controlled study of 56 weeks' duration comparing brolocizumab to aflibercept in nAMD



- **Randomized 1:1 to brolocizumab 6 mg or aflibercept 2 mg, both at q8w dosing through week 40 after three monthly loading doses**
- **The final cycle was extended in the brolocizumab group for assessment of q12w dosing, with the aflibercept group maintained on q8w dosing (56 weeks)**

- Current conventional OCT metrics used in most clinical trials are limited to global measures of retinal thickness, retinal volume, manual linear measurements of specific features or qualitative interpretation (e.g. fluid presence)

- Higher-order OCT assessment enables in-depth evaluation of SD-OCT imaging biomarkers for therapeutic effect, including volumetric measurements of IRF/SRF, novel fluid features and parameters

This analysis evaluated the fluid burden metrics in the OSPREY Phase II trial for nAMD following treatment with brolocizumab or aflibercept

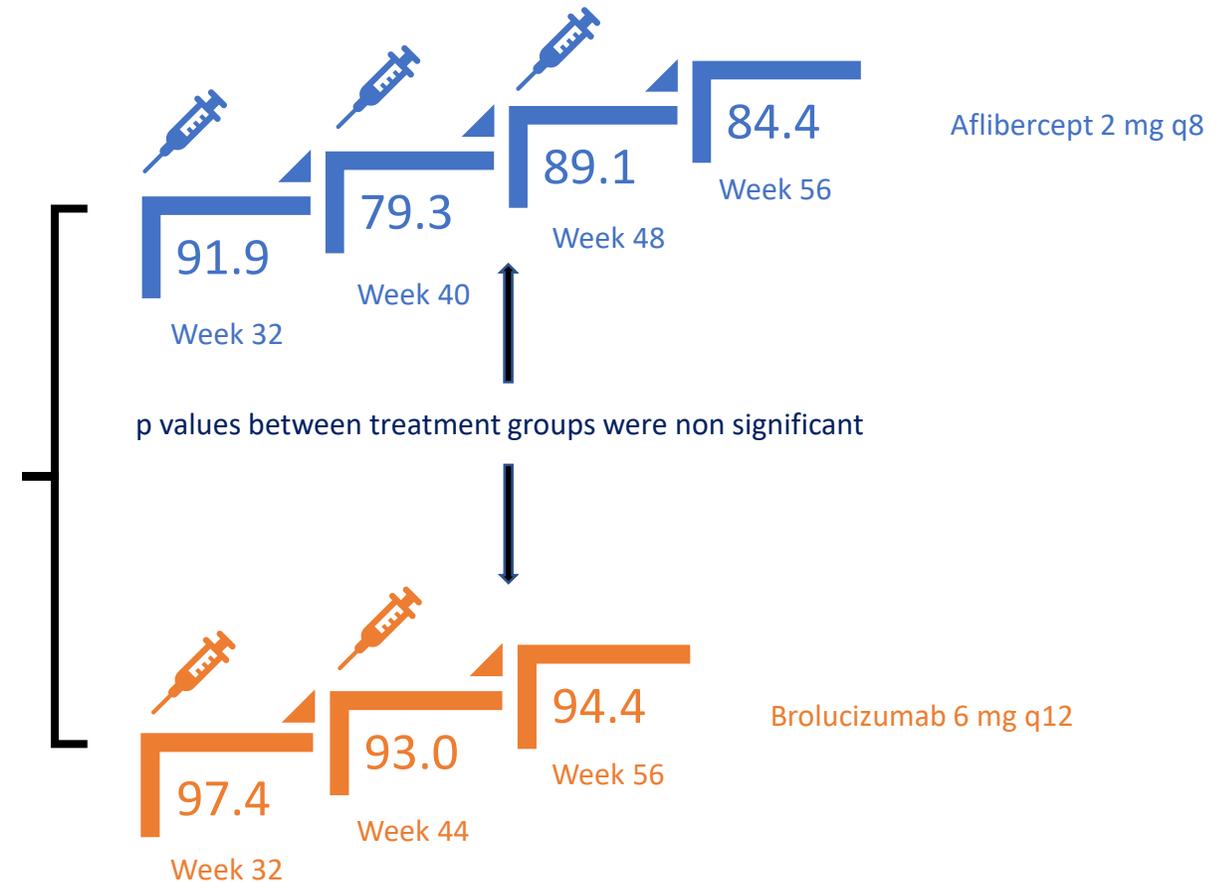
Higher order optical coherence tomography (OCT) fluid burden assessment: Analysis from the OSPREY trial

J. Ehlers et al.

- Using a novel OCT analysis platform, fluid features were successfully extracted and could be analysed for resolution extent and tempo

- Further analysis is ongoing

Percentage
reduction in
total fluid
from baseline



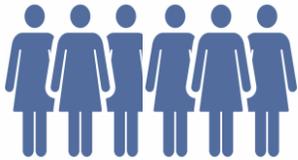
This preliminary higher-order OCT analysis is consistent with the overall published anatomical data from the Phase II OSPREY trial

Automated detection of macular fluid and its space and time-related change under anti-VEGF therapy

M. Michl et al.



Study objective was to fully detect and quantify SRF/IRF in patients with B/CRVO, DME and nAMD



- 2340 patients from five clinical, multicentre trials: 311 with BRVO/CRVO, 1109 with nAMD and 610 with DME
- All patients had received a standard anti-VEGF therapy over a 12 month period



In nAMD eyes, IRF volume decreased 91% from baseline to month 1 with only a minor decrease observed from month 1 to month 12

- Artificial intelligence analysis of OCT images
- Images were classified by an automated algorithm which segmented the images into either normal retina, SRF or IRF
- Images were analysed at baseline, 1 month, 2 months, 3 months and 12 months



In nAMD eyes, SRF volume decreased 98% from baseline to month one with only a minor decrease observed from month 1 to month 12

This study shows the feasibility of automated detecting fluid and tracking the amount of fluid over time providing a standardized, non-subjective image assessment



Implications for practice

- New treatments will help with the goal of keeping the retina dry
- New software and imaging methodologies for autodetection of fluid will reduce the burden on clinicians for detecting disease activity
- Future potential for remote and home monitoring of patients

Part 2.

19th EURETINA Congress 2019 – How can the burden of nAMD be reduced, and patient adherence and QoL improved?

Focus on importance of treatment regimens

Outcomes for patients with nAMD in the real-world are often inferior to randomized controlled trials

Monthly dosing with ranibizumab was shown to improve BCVA by approximately seven and eleven letters on the ETDRS chart at 12 months in the pivotal, Phase III trials MARINA and ANCHOR, respectively, and improvements were generally sustained up to 24 months^{1,2}

More recently, individualized dosing of ranibizumab has been shown to achieve similar gains in BCVA compared with monthly dosing³

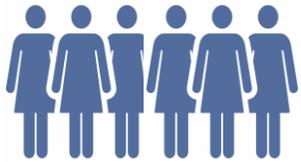
Registry studies have identified that in real-world practice, physicians tend to follow treatment regimens that are different from those suggested by randomized controlled trials, such as 'as needed' (*pro re nata*) or treat and extend⁴

Key efficacy outcomes and treatment intervals with treat and extend (TandE) ranibizumab compared to aflibercept for neovascular age-related macular degeneration (nAMD): The 24-month, randomized, RIVAL study

M. Gillies et al.



A 24-month, partially masked, randomized, multicentre Phase IV clinical trial conducted at 24 sites across Australia on patients diagnosed with visual impairment due to nAMD



- Treatment-naive patients aged ≥ 50 years diagnosed with active, subfoveal choroidal neovascularization secondary to nAMD with BCVA ≥ 23 logMAR letters
- Randomized (1:1) to receive three monthly loading doses of ranibizumab 0.5 mg or aflibercept 2.0 mg followed by an individualized T&E regimen according to disease activity criteria
- 278 patients were included for analysis (ranibizumab: n=141, aflibercept: n=137)

- Disease activity criteria (one of)
 - Loss of VA ≥ 5 letters than best VA recorded
 - New retinal haemorrhage
 - Presence of intraretinal or subretinal fluid on OCT

- BCVA assessors and the central reading centre, which was responsible for adjudicating the investigator's assessment of disease activity on OCT and to grade multimodal images, were masked to treatment allocations

Key efficacy outcomes and treatment intervals with treat and extend (TandE) ranibizumab compared to aflibercept for neovascular age related macular degeneration (nAMD): The 24 month, randomized, RIVAL study

M. Gillies et al.

- Ranibizumab 0.5 mg and aflibercept 2.0 mg achieved a similar number of injections and VA improvements over 24 months using a T&E regimen for nAMD
- No difference in the proportion of patients achieving maximum injection intervals at least once during the study between ranibizumab and aflibercept
- Overall safety profile was similar for ranibizumab and aflibercept

Mean change in BVCA

	Month 12		Month 24	
Ranibizumab	7.2	} TD (95% CI) 2.3 (-0.3, 4.9) P=0.08	6.6	} TD (95% CI) 2.0 (-0.7, 4.6) P=0.15
Aflibercept	4.8		4.6	

Proportion of patients gaining ≥15 letters

	Month 12		Month 24	
Ranibizumab	22	} OR (95% CI) 1.05 (0.53, 2.08) P=0.89	25	} OR (95% CI) 1.61 (0.77, 3.35) P=0.21
Aflibercept	21		19	

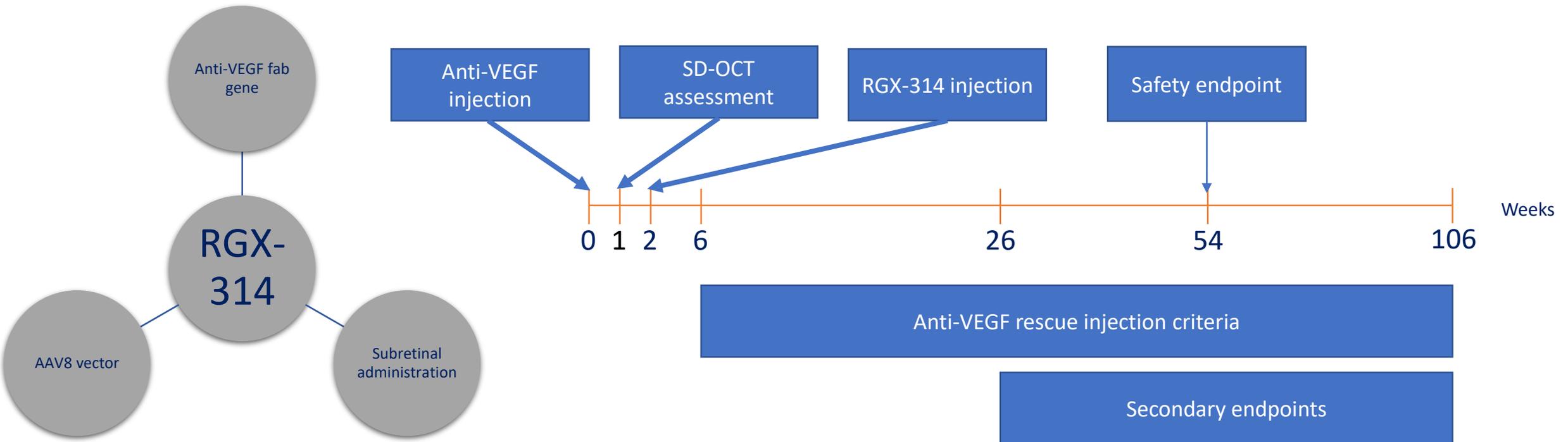
The RIVAL study shows that a T&E approach with ranibizumab offers improved visual outcomes and clinical efficacy

RGX-314 gene therapy: Interim results of an ongoing Phase I/IIa study to evaluate the safety and tolerability in subjects with neovascular age-related macular degeneration

P. Dugel et al.



A Phase I/IIa trial of delivery of a gene encoding an anti-VEGF fab protein



RGX-314 gene therapy: Interim results of an ongoing Phase I/IIa study to evaluate the safety and tolerability in subjects with neovascular age-related macular degeneration

P. Dugel et al.



A Phase I/IIa trial of delivery of a gene encoding an anti-VEGF fab protein

- RGX-314 was well tolerated at all doses (n=42)
- Dose-dependent increases in protein expression level at one month post administration was observed across all doses
- Cohort 3 sustained RGX-314 protein at one year with stability in vision and anatomy despite few to no injections
- 50% of subjects in cohort 3 remain injection free at 18 months

	Aqueous RGX-314 protein one month post-treatment	Mean # of anti-VEGF injections through six months	Mean change in CRT through six months (range)	Mean change in BCVA through six months
Cohort 1 3x10 ⁹ GC/eye (N=6)	2.4 ng/ml	4.7	-14 μm (-181μm to +92 μm)	-2 letters (-8 to +10 letters)
Cohort 2 1x10 ¹⁰ GC/eye (N=6)	12.8 ng/ml	3.8	+26 μm (-7μm to +62 μm)	+7 letters (-4 to +15 letters)
Cohort 3 6x10 ¹⁰ GC/eye (N=6)	160.2 ng/ml	1.3	-14 μm (-27μm to +7 μm)	+8 letters (0 to +21 letters)

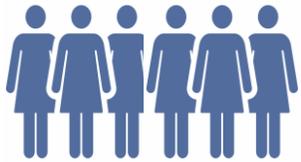
Gene therapy for nAMD offers the potential to sustain clinical outcomes while alleviating treatment burden

Efficacy of intravitreal aflibercept administered using treat and extend regimen over 2 years in patients with neovascular age related macular degeneration: 1 year ARIES results

P. Mitchell et al.



A multicentre, randomized, open-label, active-controlled, parallel-group, phase IIIb/IV study comparing the efficacy of IVT-AFL administered by two different T&E regimens over two years in treatment-naïve patients with nAMD



- Treatment-naïve patients with nAMD (n=271)
- IVT-AFL injections at weeks 0, 4, 8 and 16
- Randomized (1:1) to receive early-or late-start T&E

- Primary endpoint was mean change in BVCA, measured using ETDRS letters, from week 16 to 104

Early-start T&E
Injection interval extended by two-week increments, from week 16 to 104

Late-start T&E
IVT-AFL qw8 regimen from week 16 to 52 followed by interval extended by two-week increments regimen, from week 52 to 104

Aim to assess whether IVT-AFL administered in an T&E regimen is non-inferior to a late-start T&E regimen in nAMD

Efficacy of intravitreal aflibercept administered using treat and extend regimen over 2 years in patients with neovascular age related macular degeneration: 1 year ARIES results

P. Mitchell et al.

93% of early-start and 96% of late-start T&E regimen patients maintained vision (<15 ETDRS letter loss) from baseline to week 104

CRT was recused by 162 μm (early-start) and 159 μm (late-start) from baseline to week 104

Functional and anatomical improvements were achieved with a mean of 12 (early-start) vs. 13 (late-start) injections

Up to 52% of patients had last injection intervals of ≥ 12 weeks up to week 104

The safety profile was consistent with previous studies of IVT-AFL

BVCA change from week 16 to week 104 with the early-start T&E regimen was statistically non-inferior to BVCA change with the late-start T&E regimen

Extended q16w dosing potential for faricimab in neovascular age related macular degeneration: STAIRWAY phase 2 trial

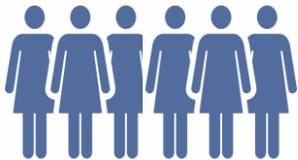
FG Holz et al.



A multicentre, randomised, active comparator-controlled, parallel-group, 52-week, phase II trial conducted in the United States



Faricimab, the first bispecific antibody designed for intraocular use, binds and neutralises both Ang-2 and VEGF-A



- Patients aged ≥ 50 years with nAMD and subfoveal CNV
- Patients were randomized 2:2:1 to intravitreal 6.0 mg faricimab, q16w or q12w after initiation, or 0.5 mg ranibizumab every 4 weeks (q4w)

Primary objective was to evaluate the efficacy of faricimab administered at q16w and q12w intervals, assessed by BCVA (ETDRS letter score)

Disease assessment was performed at week 24, 12 weeks after the last loading dose

Patients randomized to the faricimab q16w arm who had active disease at week 24 received treatment every 12 weeks through the trial end

Extended q16w dosing potential for faricimab in neovascular age related macular degeneration: STAIRWAY phase 2 trial

FG Holz



At week 24, 65% (36/55) of faricimab-treated patients had no disease activity 12 weeks after their previous injection



Initial BCVA improvements for faricimab-treated patients were fully maintained with q16w and q12w dosing



No new or unexpected safety signals were identified



CST and CNV lesion size reductions with q16w and q12w faricimab were comparable with q4w ranibizumab



At week 52, q16w faricimab-, q12w faricimab- and q4w ranibizumab-treated patients had a mean BCVA change from baseline of 11.4, 10.1 and 9.6 letters, respectively, with 46.4%, 33.3% and 37.5% of patients, respectively, gaining ≥ 15 letters from baseline

Two large, global Phase III trials are underway to investigate the efficacy and safety of dual inhibition of Ang-2 and VEGF in patients with nAMD

Outcomes of suspending VEGF inhibitors for neovascular age-related macular degeneration when lesions have been inactive for 3 months

M. Gillies et al.



An observational study from a prospectively designed international treatment outcomes registry

Eyes that had received a minimum of five anti-VEGF injections enrolled in the Fight Retinal Blindness! registry of nAMD treatment outcomes were considered to have suspended treatment if they had a ≥ 3 month documented period of inactivity of the choroidal neovascular lesion with no further treatments unless the lesion reactivated



Currently little evidence that it is safe to suspend VEGF inhibitors for nAMD

Time and proportion to re-activation of the lesion were analysed using Kaplan-Meier survival curves. Visual outcomes following treatment suspension were assessed with paired t-tests

Main outcome measures included the proportion of eyes resuming treatment due to lesion re-activation, change in VA at time of re-activation and recovery of vision 12 months later

Outcomes of suspending VEGF inhibitors for neovascular age-related macular degeneration when lesions have been inactive for 3 months

M. Gillies et al.



Study identified 434 eyes that suspended treatment and were tracked for at least 12 months thereafter. The estimated percentage of eyes re-activating in the first year following treatment suspension was 41%, increasing to 79% by the fifth year



The median time to re-activation was 504 days



The 275 eyes whose lesion was observed to re-activate lost a mean of 4.2 letters (95% confidence interval [CI]: -5.6, -2.8; $P < 0.001$) from the last injection to the time of re-activation; 206 eyes resumed treatment for at least 12 months after re-activation and recovered a mean of +1.2 letters (95% CI: -0.4, 2.7; $P = 0.133$), resulting in a net loss of 3.3 letters (95% CI: 2.3, 5.1; $P < 0.001$) compared with VA at treatment suspension



Lower VA at time of suspension and longer duration on treatment were associated with reduced risk of re-activation, but median time to re-activation was substantially greater when eyes had been treated for at least 3 years

Caution should be exercised to avoid suspending treatment prematurely and further research is warranted to identify which eyes might be able to suspend treatment safely



Implications for practice

- New treatment options with a longer duration of effect will lower the treatment burden on patient and the workload on clinicians
- Patients for whom treatment is stopped require close monitoring to avoid reactivation of disease

Part 3.

19th EURETINA Congress 2019 – What are the real-life clinical unmet needs?
Does size matter when considering treatment options?

Focus on how smaller sized anti-VEGF antibodies may address the real-life unmet needs and confer clinical benefits

Longer acting anti-VEGF agents

High burden of intravitreal injections^{1,2}

- Require frequent and indefinite evaluations, with a particularly high burden during the first two years of treatment
- Current treatments have a short duration of effect
- Despite robust response and visual gains in many patients, up to 30 percent may continue to lose vision from baseline



Smaller anti-VEGF agents³

- Allow a higher molar concentration to be prepared intravitreal injection
- Possible extended duration of effect
- Possible improved ocular tissue penetration

Efficacy and safety of abicipar compared with ranibizumab in the treatment of neovascular age-related macular degeneration: Results from the CEDAR and SEQUOIA phase 3 clinical trials

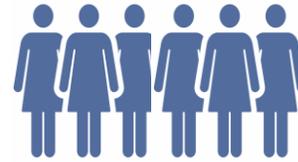
E. Souied et al.



Two randomized, double-masked, parallel-group clinical trials with identical protocols in ophthalmologic clinical practices in 32 countries worldwide to assess the safety and efficacy of abicipar vs. ranibizumab in treatment-naïve patients with nAMD



The DARPin therapeutic abicipar pegol (abicipar) is a VEGF inhibitor with smaller size, higher affinity for VEGF, and a longer half-life in the vitreous compared with ranibizumab.



- Patients with active choroidal neovascularization secondary to AMD and BCVA of 24–73 ETDRS letters
- Treatment arms:
 - Abicipar 2 mg q8
 - Abicipar 2 mg q12
 - Ranibizumab 0.5 mg q4
 - Sham treatment given in the abicipar arms on months when abicipar not injected
- The primary efficacy measure was proportion of patients with stable vision, defined as a <15-letter loss in BCVA from baseline, at week 52
- Secondary endpoint was mean BVCA change from baseline to week 52

Efficacy and safety of abicipar compared with ranibizumab in the treatment of neovascular age-related macular degeneration: Results from the CEDAR and SEQUOIA phase 3 clinical trials

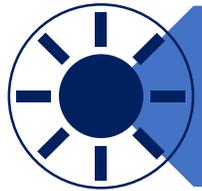
E. Souied et al.



Abicipar q8 and q12 met the prespecified criteria for noninferiority to monthly ranibizumab for the primary and secondary endpoints



Reductions in CRT at week 52 were similar between both abicipar arms (6–8) injections and the ranibizumab arm (13 injections)



Higher cumulative percentage of patients in the abicipar arms achieved initial clearance of all fluids at all timepoints



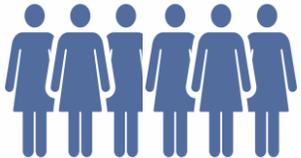
Abicipar-treated patients had a higher risk of developing intraocular inflammation

Time to dry analysis of brolucizumab versus aflibercept in patients with neovascular AMD: 96 week data from the HAWK and HARRIER trials

E. Souied et al.



Post-hoc analyses of Phase III, multicentre, randomized, double-masked trials of brolucizumab for nAMD



- Patients were randomized to intravitreal brolucizumab 3 mg (HAWK only) or 6 mg or aflibercept 2 mg
- After loading with 3 monthly injections, brolucizumab-treated eyes received an injection every 12 weeks (q12w) and were interval adjusted to every 8 weeks (q8w) if disease activity was present; aflibercept-treated eyes received q8w dosing
- The primary hypothesis was noninferiority in mean BCVA change from baseline to week 48 (margin of 4 letters)

Rationale for *post-hoc* analyses

- Sustained drying of retina is an indicator of better disease control and may be associated with improved long term outcomes
- Retreatment decisions are made based on OCT and sustained dryness is potentially associated with reduced treatment burden

Time to dry analysis of brolucizumab versus aflibercept in patients with neovascular AMD: 96 week data from the HAWK and HARRIER trials

E. Souied et al.

Results are consistent with the superior fluid outcomes seen for brolucizumab at weeks 16, 48 and maintained to week 96

More than 50% of patients on brolucizumab 6 mg were maintained exclusively on a q12w dosing after loading up to week 48

Overall safety of brolucizumab was comparable to aflibercept and consistent with published data in other anti-VEGF drugs

The 48 and 96 week "time to dry" analyses showed that, vs aflibercept:

- Brolucizumab patients achieved 'first to fluid free' faster
- More patients treated with brolucizumab achieved sustained dryness

	Week	Treatment arm	Percentage of patients never fluid free (presence of IRF and/or SRF)
Hawk	48	Brolucizumab 3 mg (n=330)	7.3
		Brolucizumab 6 mg (n=334)	7.5
		Aflibercept 2 mg (n=336)	14.9
	96	Brolucizumab 3 mg (n=330)	3.9
		Brolucizumab 6 mg (n=334)	6.0
		Aflibercept 2 mg (n=336)	9.8
Harrier	48	Brolucizumab 6 mg (n=330)	4.2
		Aflibercept 2 mg (n=332)	9.6
	96	Brolucizumab 6 mg (n=330)	2.4
		Aflibercept 2 mg (n=332)	7.2

Visual and expanded anatomical outcomes for brolucizumab versus aflibercept in patients with neovascular AMD: 96 week data from HAWK and HARRIER

FG Holz et al.



Post-hoc analyses of phase III, multicentre, randomized, double-masked trials of brolucizumab for nAMD



Superior anatomic results were seen for brolucizumab at weeks 16 and 48 and maintained at week 96



More patients achieved fluid resolution with brolucizumab during both the matched and maintenance phases up to week 96



More patients demonstrated sustained dryness for ≥ 2 and ≥ 3 consecutive visits to week 96 with brolucizumab

	Week	Treatment arm	Percentage of patients with complete fluid resolution*
Hawk	16	Brolucizumab 3 mg (n=341)	50.6
		Brolucizumab 6 mg (n=349)	58.9
		Aflibercept 2 mg (n=344)	39.1
	48	Brolucizumab 3 mg (n=341)	58.2
		Brolucizumab 6 mg (n=349)	64.1
		Aflibercept 2 mg (n=344)	49.5
	96	Brolucizumab 3 mg (n=341)	62.1
		Brolucizumab 6 mg (n=349)	71.3
		Aflibercept 2 mg (n=344)	58.8
Harrier	16	Brolucizumab 6 mg (n=348)	60.3
		Aflibercept 2 mg (n=346)	45.4
	48	Brolucizumab 6 mg (n=348)	65.2
		Aflibercept 2 mg (n=346)	47.7
	96	Brolucizumab 6 mg (n=348)	64.8
		Aflibercept 2 mg (n=346)	52.4

*Absence of IRF, SRF and sub-RPE fluid)
nAMD, neovascular age-related macular degeneration; RPE, retinal pigment epithelium.
Holz FG et al. Presented at 19th EURETINA Congress 2019.



Implications for practice

- The approval of new agents that achieve better dryness of the retina will improve the treatment options available to clinicians
- Fewer injections will reduce the treatment burden on patients and potentially improve adherence