

Disorganisation of the retinal inner layers (DRIL) in patients with Diabetic Macular Oedema

B Hamill¹, M Brown¹ T Peto¹, U Chakravarthy¹, Ian Pearce², James Warburton³, Sue Lupton⁴

¹Centre for Public Health, Queen's University, Belfast; ²St. Paul's Eye Unit, Royal Liverpool University Hospital, Liverpool; ³Novartis AG Basel; ⁴Novartis Pharma UK

Introduction

Disorganisation of the retinal inner layers (DRIL) is a common finding in eyes with diabetic macular oedema (DMO). DRIL is defined as the horizontal extent for which any boundaries between the ganglion cell layer/inner plexiform layer complex, inner nuclear layer, and outer plexiform layer can not be identified.

The finding of DRIL is assessed independently of, and is not graded differently in the presence of retinal oedema, intra-retinal cysts, or any other SD-OCT-evident pathology.

This purpose of this study is to report on the one-year change in disorganisation within the retinal inner layers in patients with DMO treated with Ranibizumab in the RELIGHT Clinical Trial.

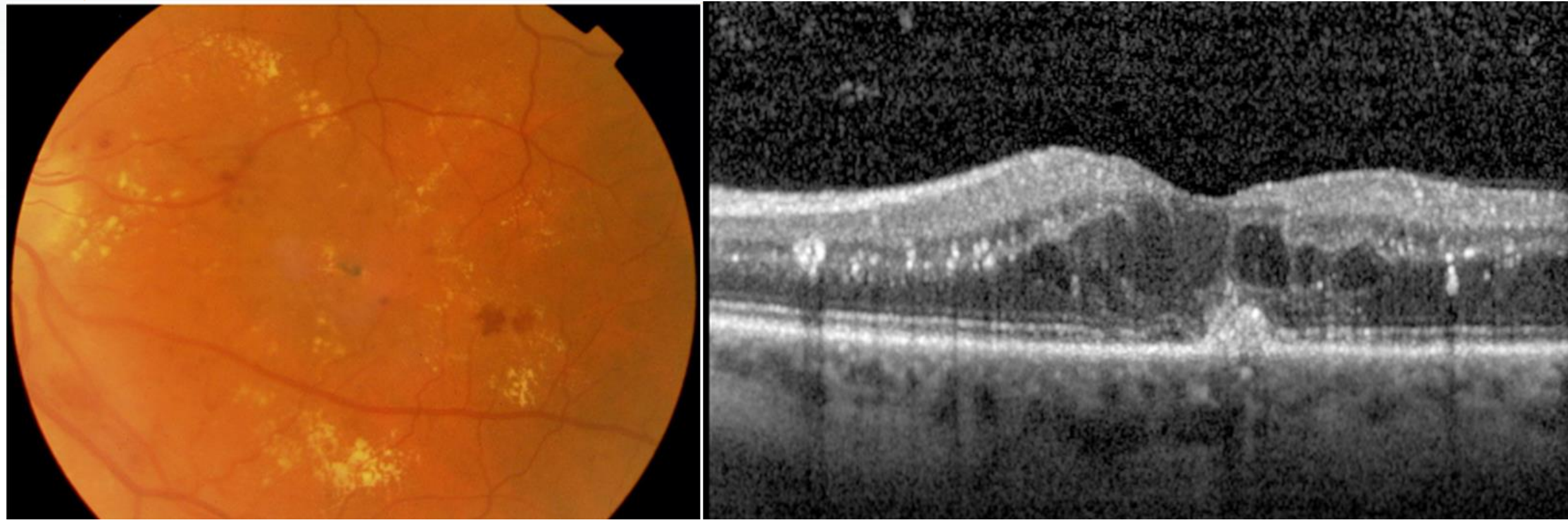


Figure 2. Colour and OCT images with mild DRIL.

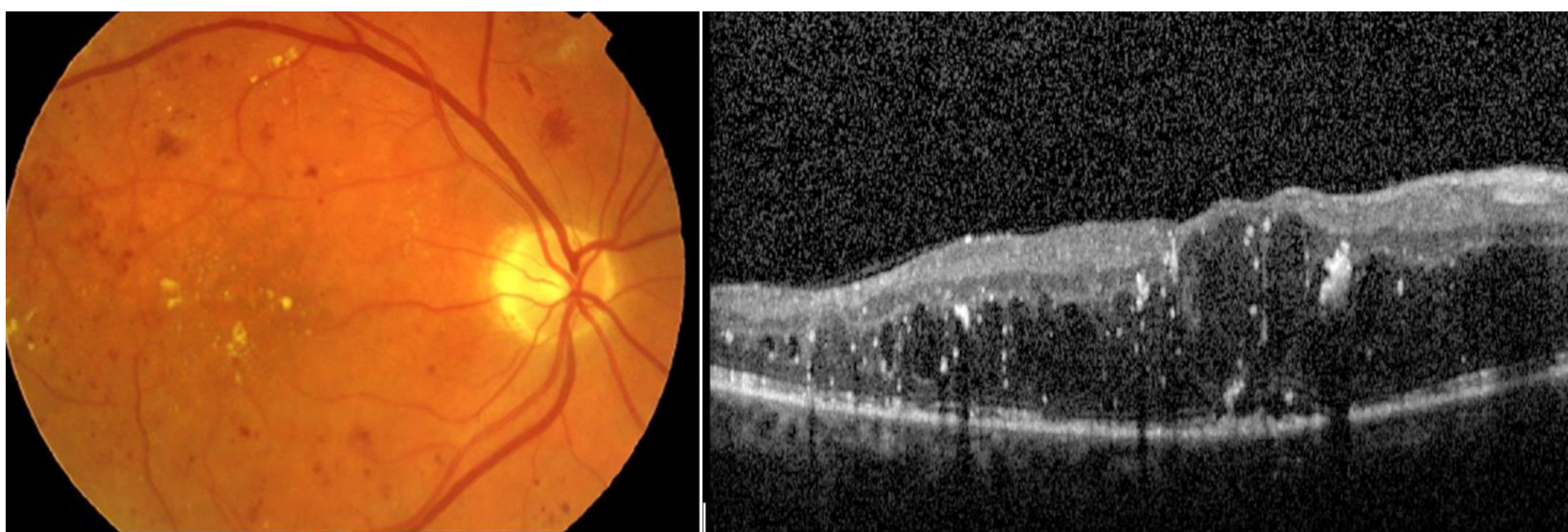


Figure 3. Colour and OCT images with moderate DRIL.

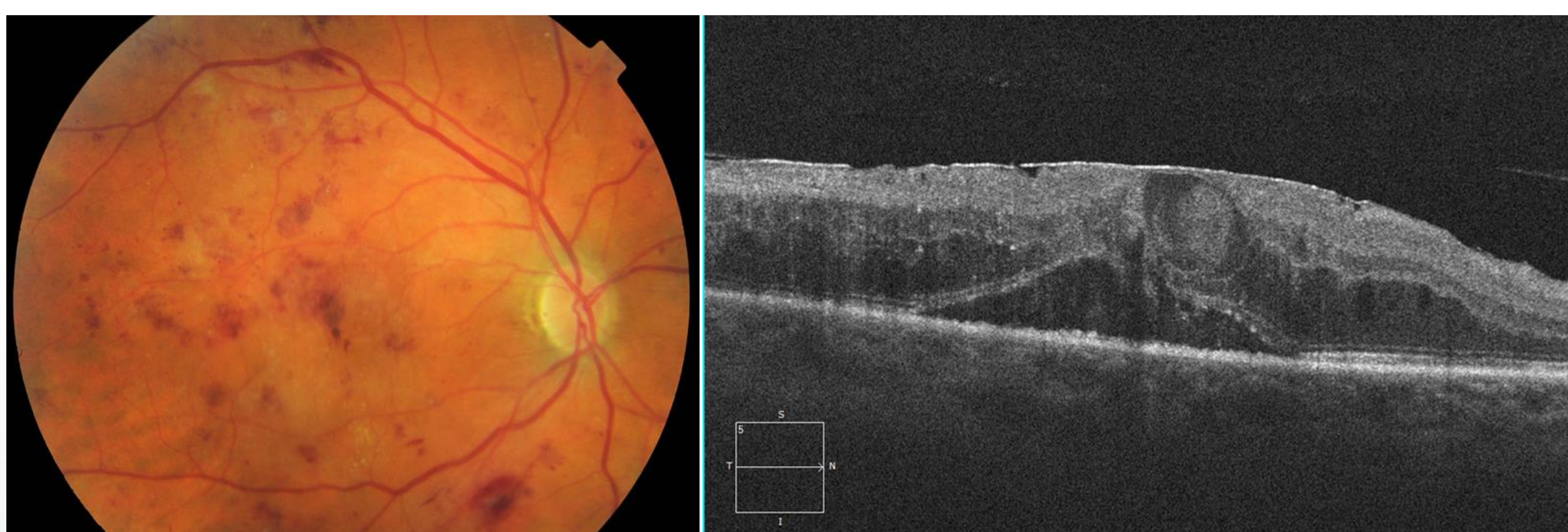


Figure 4. Colour and OCT images with severe DRIL

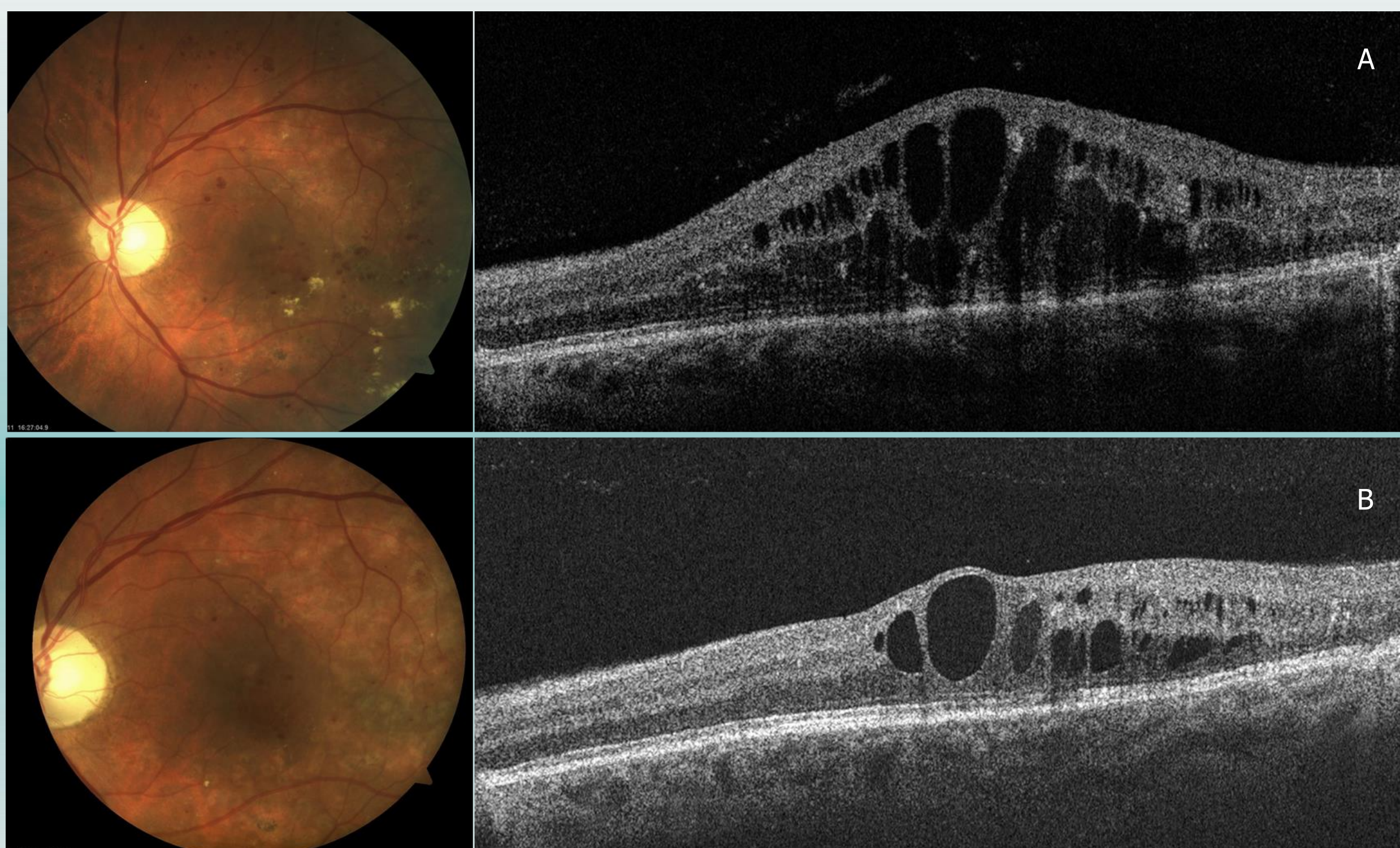


Figure 5. Colour and OCT images taken at baseline visit show participant with severe DRIL (A). Colour and OCT images taken for the same participant at 1 year post treatment with Ranibizumab show moderate DRIL (B).

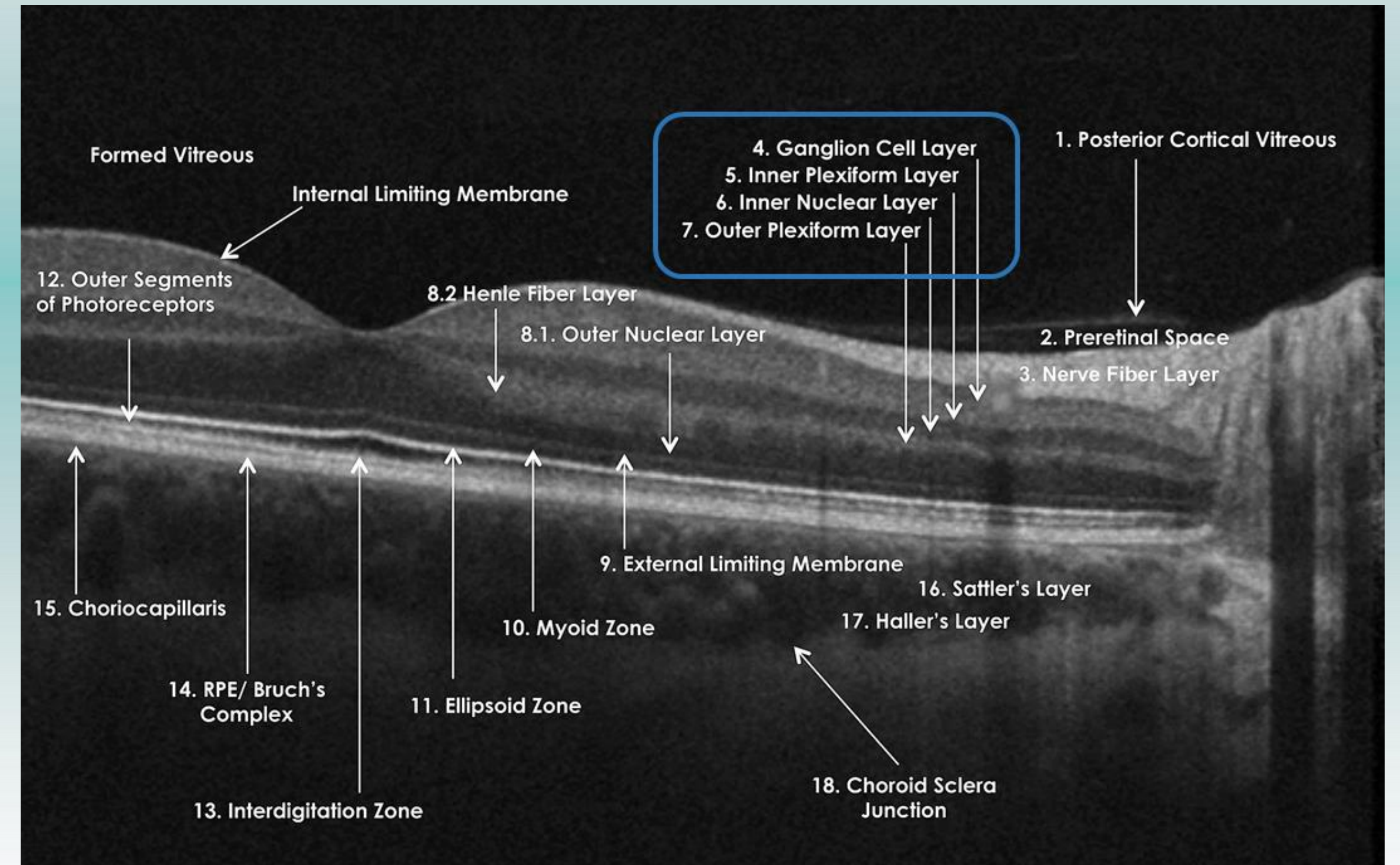


Figure 1. Healthy retina without DRIL, imaged using Heidelberg Spectralis. DRIL is assessed from 4-7.

Method

RELIGHT was a Phase IIIb 18-months prospective multicentre single-arm study of individualised treatment with Ranibizumab in 109 patients with DME in the United Kingdom with best corrected visual acuity (BCVA) recorded at every visit along with retinal imaging and these data have been published.

A subsequent assessment of the multimodal image repository acquired during RELIGHT was undertaken in a reading centre. DR severity was graded on colour images using the Early Treatment of Diabetic Retinopathy Severity Scale (ETDRS) and optical coherence tomography (OCT) graded for features of DME and presence and extent of disorganization of the inner retina (DRIL) measured on the foveal scan.

The closest three B scans located immediately adjacent (superior scans +1 to +3 and inferior scans -1 to -3) to the fovea were subjected to a graded assessment of DRIL severity (categories: none, mild, moderate and severe). We calculated a composite unweighted DRIL severity score and a weighted score with scans closest to the fovea having the maximum weighting (x 4 at the fovea and x 1 for the furthest scan). Data were analysed using cross tabulations and frequencies and relationships with BCVA tested.

Results

Scans were available at both baseline and 12-months in 82 participants. On comparing DRIL severity by location, a gradient was observed with a higher frequency of more severe DRIL in the foveal scan compared to those further from the fovea. Following treatment, the horizontal extent of mean DRIL at the fovea at baseline reduced from 1332.7 μ m (SD. 786.4) to 923.7 μ m (SD. 713.5) at month 12. The weighted baseline severity score (range 7 to 48) improved after treatment with the greatest reduction in DRIL severity observed in the foveal scan. Eyes with a reduction of > - 20 in weighted DRIL score had a median VA of 67 letters (SD 7.8) at baseline compared to those with worsening DRIL (change > + 10) with a median VA of 62 (SD 11.6)

Conclusion

Treatment with an anti-VEGF results in improved retinal morphology. Change in weighted DRIL severity score was better in eyes with better baseline VA.