MEDICAL UNIVERSITY OF VIENNA

OPTIMA Ophthalmic Image Analysis

Christian Doppler Forschungsgesellschaft

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Evaluation of outer retinal layers in neovascular AMD comparing High-Res OCT and SPECTRALIS OCT imaging

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Purpose

The aim of the study is to compare the visibility and accessibility of the **outer retinal layers** underneath fluid in neovascular age-related macular degeneration (nAMD) between the conventional **SPECTRALIS HRA+OCT** and the **High-Res OCT**.

Patients and Methods

- Patients with diagnosed nAMD and retinal fluid (intra- and subretinal fluid) of more than 250nl were included
- A conventional SPECTRALIS OCT and a High-Res OCT were performed at the same day
- The fluid on SPECTRALIS OCT was measured with a Deep Learning Algorithm – Vienna Fluid Monitor (RetInSight, Vienna, Austria)
- The following layers and biomarkers were manually annotated:

  Layers: ELM, EZ, RPE

  Biomarkers: SHRM, SRF
- Outer layer thickness and area of layer loss were compared between devices

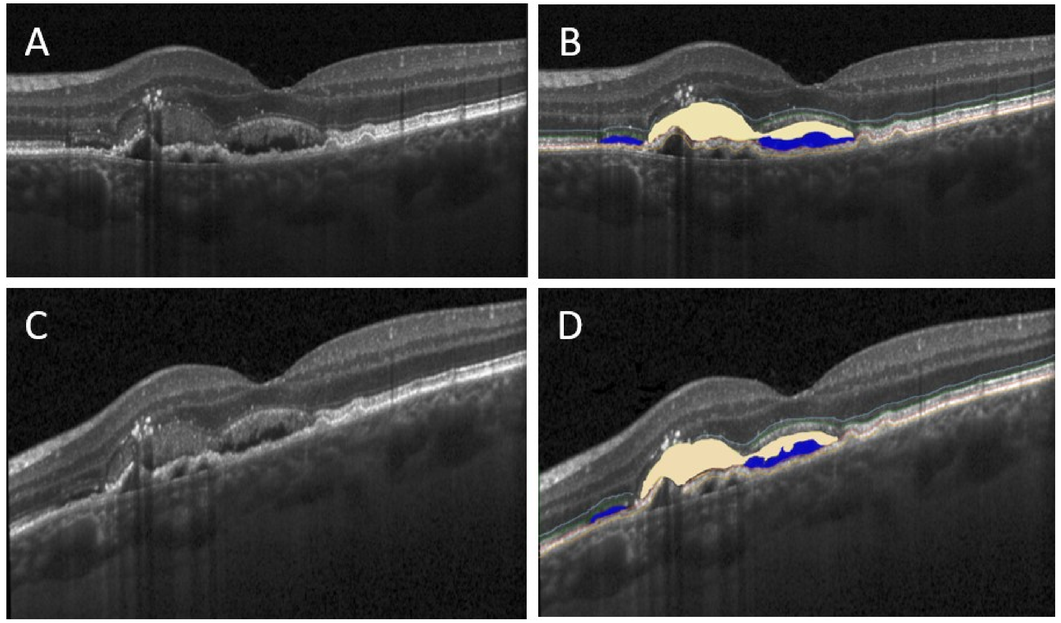

Figure 1: Example of neovascular AMD without (left column) and with (right column) manual annotation. High-Res OCT B-scans are shown on the upper row (A, B) and SPECTRALIS HRA+OCT B-scans (C, D) on the lower row. Manual annotation of the outer and inner boundary of RPE (orange and red line, respectively), EZ (green line) and ELM (blue line), SRF (blue area) and SHRM (beige area).

	SPECTRALIS OCT	High-Res OCT
Axial Resolution	7 µm	3 µm
Lateral Resolution	14 µm	14 µm
Speed	85 kHz	85 kHz
ICG Laser	Yes	No
Multicolor	468 / 518 / 815 nm	468 / 518 / 730 nm
Power	1,2mW at 880 nm	2,2 mW at 850 nm

Table 1: Technical details of the devices

Conclusion

- Central RPE thickness was significantly thinner on High-Res OCT in the central millimeter
- High-Res OCT images can provide more precise information on the outer retinal layers in nAMD

Results

- Fifteen eyes of 13 patients
- Mean age: 77.2 ± 8.33 years

Central 1 mm:

- **RPE thickness** differed significantly between the devices: 26.18 ± 3.43 µm and 28.25 ± 4.42 µm in High-Res and SPECTRALIS, respectively (p = 0.047).

Central 3 mm:

- **RPE thickness**: 23.31 ± 2.72 µm and 25.93 ± 3.36 µm in High-Res and SPECTRALIS, respectively (p = 0.061)
- **EZ-thickness**: 42.77 ± 10.58 µm and 42.75 ± 11.14 µm in High-Res and SPECTRALIS, respectively (p= 0.82)
- mean relative **RPE-loss, EZ loss**, and **ELM loss** did not differ significantly (p = 0.842, p = 0.510, p = 0.691, respectively).

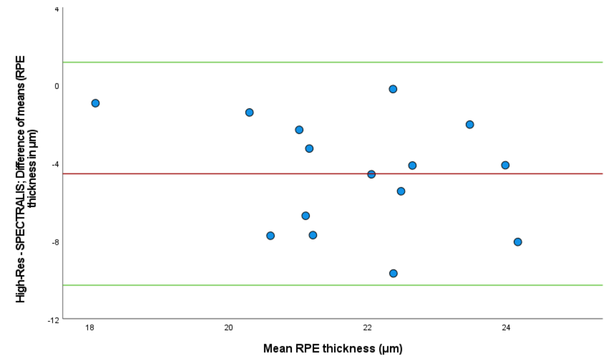

Figure 2: Bland Altman Plot shows the agreement of relative RPE thickness between the different devices (High-Res OCT and Spectralis OCT). The red line denotes the mean difference between the measurements in percentages. The 95% limits of agreement (mean difference ±1.96 SD of the difference) lie within the green lines.

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