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Introduction

- Several **imaging biomarkers** with varying predictive impacts have been implicated in anti-VEGF therapy of neovascular age-related macular degeneration (nAMD)
- Intraretinal cystoid fluid (IRC)** correlates strongly with poorer visual outcomes while
- Subretinal fluid (SRF)** is associated with a more favorable prognosis
- We analyzed **spatial correspondence** of IRC, SRF and **pigment-epithelial detachment (PED)** to provide further insight into the structure-function correlation of the main pathomorphologic components in nAMD
- using **fully automated three dimensional segmentation** of pathomorphologic lesions

Methods

- SD-OCT volume scans of 806 patients** with treatment-naïve nAMD available at the Vienna Reading Center were included into the analysis.
- IRC, SRF and PED were detected on a per-voxel basis using **fully automated segmentation algorithms**.
- We assessed **spatial correspondence** (Figure 1) by calculating the percentages of IRC-, SRF-, or PED-affected A-scans also affected by the respective other components per patient and reported the median across the population.
- For **validation**, **manual segmentation** was performed in a set of 38 patients

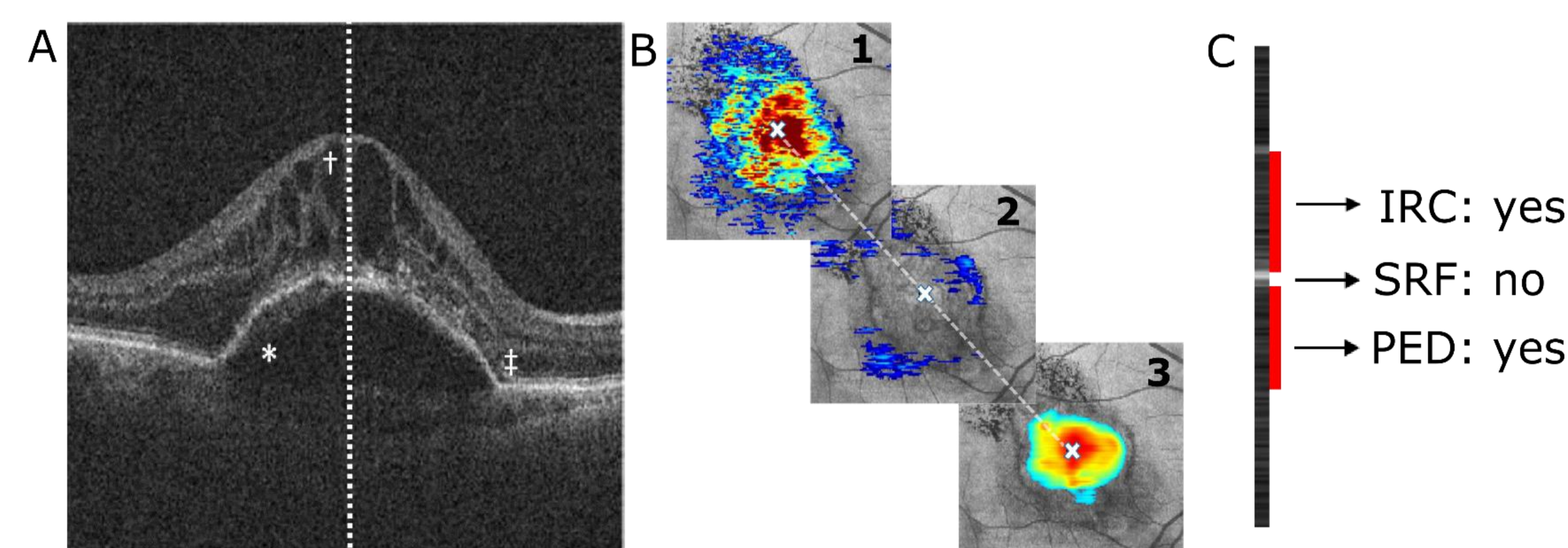


Figure 1: Assessment of spatial correspondence

(A) Central B-scan, dotted line marks sample A-scan, (B) IRC- (1), SRF- (2) and PED- (3) en-face thickness maps, (C) Marked in red alongside the sample pixel-wide A-scan are pathomorphologic components present

Results

Spatial correspondence of pathomorphologic components

- Highest spatial correspondence** was shown by IRC-affected scans presenting with PED as well as PED-affected scans presenting with IRC in automatically processed eyes in the 6 x 6-mm field.
- Spatial correspondence was lower** between IRC and SRF as well as SRF and PED (Figure 2). Example cases are provided in Figure 3.
- Consistent results were obtained in the central-1mm field. Similar patterns were observed in the manually segmented cases.

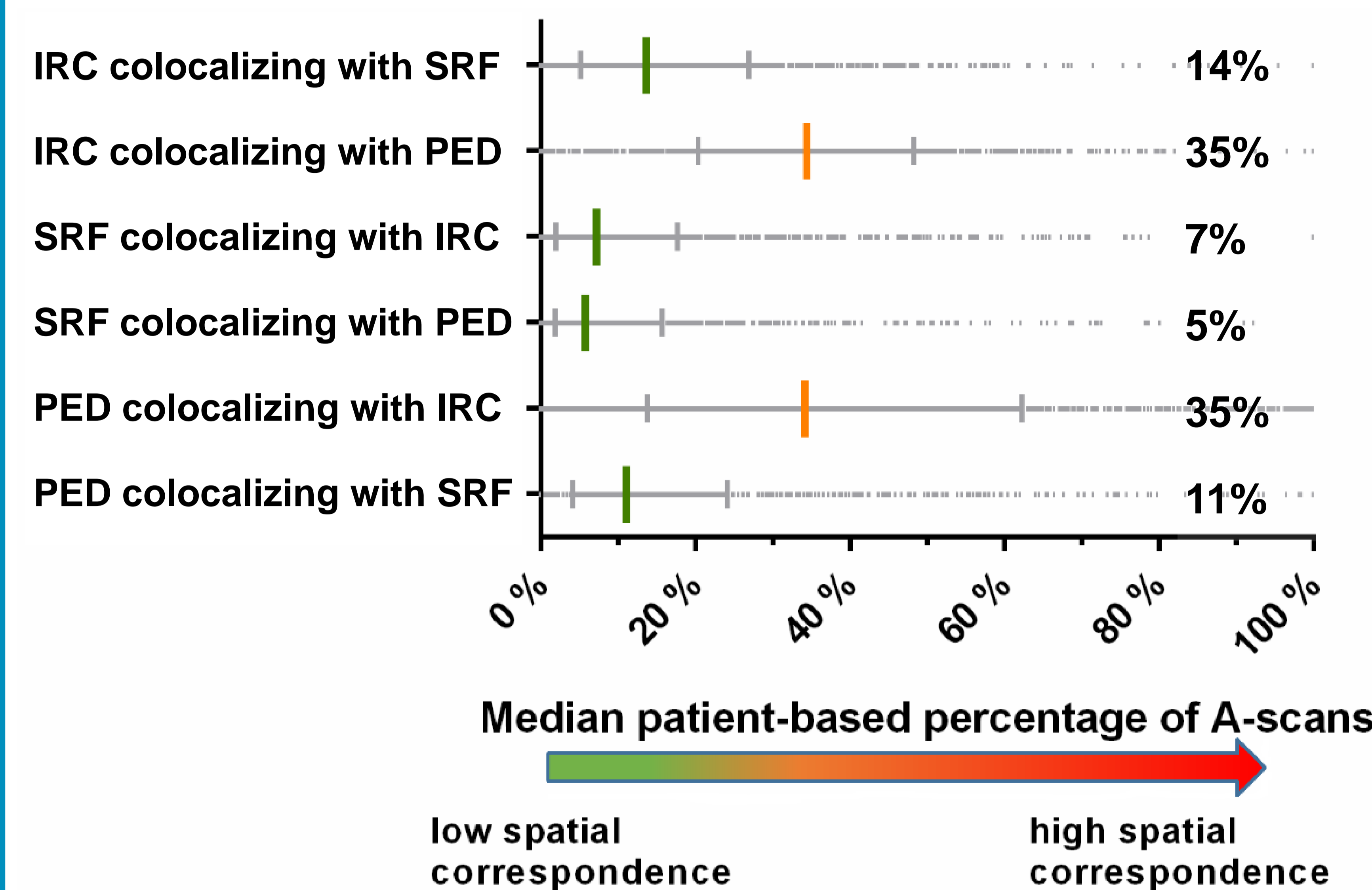


Figure 2: Spatial correspondence between IRC, SRF and PED per patient in the 6 x 6-mm field in automatically segmented scans

Areas affected by pathomorphologic components

Fluid type	Area in 6 x 6-mm field (%)		Area in central-1mm field (%)	
	Median	IQR	Median	IQR
(A)				
IRC	6	[2; 12]	39	[17; 66]
SRF	13	[5; 23]	11	[4; 34]
PED	6	[4; 10]	57	[32; 74]
(B)				
IRC	2	[1; 5]	20	[6; 46]
SRF	12	[7; 23]	26	[6; 68]
PED	8	[8; 11]	58	[30; 74]

(A) Automatically segmented scans (B) Manually segmented scans
 IQR, interquartile range

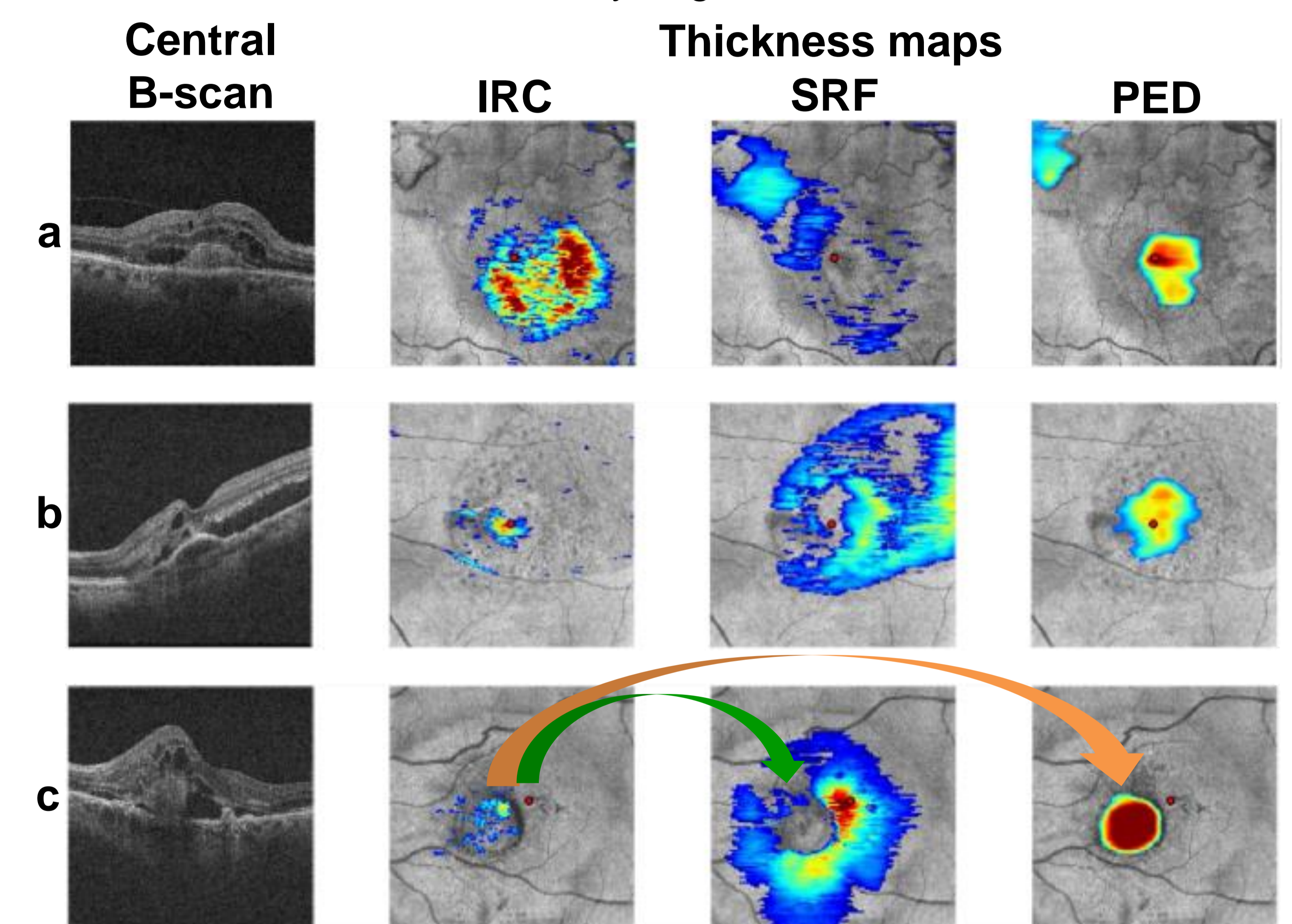


Figure 3: Automatically (a, b) and manually (c) segmented cases. Orange arrow represents higher spatial correspondence, green arrow represents lower spatial correspondence

Frequency of pathomorphologic components

Fluid type	Automated Segmentation	Manual Segmentation
	n = 827 (%)	n = 38 (%)
IRC	97	71
SRF	100	74
PED	95	100

Conclusion

- In treatment-naïve nAMD, IRC most frequently occur above PED. In contrast, SRF appears spatially anti-correlated to IRC and PED.
- Therefore, the positive effects of SRF on visual function may be attribute to a lower likelihood of concomitant IRC in the same area.

