Analysis from spectral domain OCT combined with static perimetry for assessment of effectiveness in glaucoma surgery in POAG by FORUM Glaucoma Workplace software

Soucek P.[1,2], Novak J.[2], Souckova I.[1,2], Ivancova M.[2], Rusnak O.[3]

[1]Centrum klinicke oftalmologie, Praha, CZ, [2]The Eye Department, County Hospital Pardubice, Pardubice, CZ, [3]Carl Zeiss spol. s r.o., Praha, CZ

PURPOSE

To evaluate longitudinal changes in functional and structural measures of patients with POAG requiring filtering surgery utilizing the FORUM Glaucoma Workplace software (FGWs) outcomes.

Eye No.	1	2	3	4
Patient No.	1	1	2	3
Age (years)	67	67	76	58
Disc Area (mm2)	2.30	2.16	1.90	2.43
BCVA before operation (logMAR)	0.0	0.0	0.0	0.0
IOP before operation (mmHg)	25	26	18	23
BCVA at the last visit (logMAR)	0.0	0.0	0.0	0.0
IOP at the last visit (mmHg)	15	15	13	14
Follow-up (months)	36	32	20	20

Table 1 / Summary of eyes

METHODS

Four eyes of three patients (average age of 67 years, range 58-76) underwent uncomplicated and successful filtering surgery. BCVA (on ETDRS chart) was 0,0 (in logMAR) in all eyes. Intraocular pressure before operation was 23 mmHg on average (range 18-26), Table 1. In addition to periodical complex eye check, the combination of functional findings (30-2 and 10-2 test patterns) from static perimetry (HFA II-i, Zeiss) and anatomic examination (analysis of RNFL (Figure 1 and 2), optic nerve head and ganglion cells+inner plexiform layers (GCL+IPL)) with OCT (Cirrus HD-OCT, Zeiss) was evaluated by FGWs (Zeiss) before surgery and at the last visit. There were 40 parameters calculated altogether, Table 2. Values were labelled according standard statistic intervals in percentiles: ‘normal’ (better than 99th-5th percentile), ‘borderline’ (4th-1st) and ‘outside normal limits’ (less than 1st percentile) respectively. Shifts between intervals on either eye represented significant changes, Table 2. Combined reports were expressed graphically in the Eye No. 4, Figure 3 and 4. Metrics of RNFL together with GCL+IPL were reconstructed in PanoMaps in the Eye No. 4, Figure 5 and 6. Follow-up was 27 months on average (range 20-36), Table 1. Fundus picture and the Optic disc image was captured in the Eye No. 4, Figure 7 and 8.

RESULTS

BCVA remained 0,0 (in logMAR) in all eyes at the last visit. Intraocular pressure lowered to 14 mmHg on average (range 13-15), Table 1. There were both (positive - improvement and negative - worsening) shifts in PSD and positive shift in MD of 30-2 test. There was a positive shift in MD of 10-2 test. There was a positive shift of Superior GCL+IPL thickness. There were negative shifts in Temporal (especially CH08), Superior (especially CH01 and CH12), Inferior, Zone 1, Zone 2 and Zone 6 of RNFL thickness, Table 2.

			Eye 1	Eye 2	Eye 3	Eye 4
Central 30-2 Threshold Test		VFI (%)				
		MD (dB)	✓			
		PSD (dB)	×	✓✓		
Central 10-2 Threshold Test		MD (dB)				✓
		PSD (dB)				
HD-OCT	ONH Parameters	Average C/D Ratio				
		Vertical C/D Ratio				
		Cup Volume (mm3)				
		Rim Area (mm2)				
	RNFL Parameters (µm)	Average Thickness				
		Superior Quadrant				×
		Temporal Quadrant			×	
		Inferior Quadrant	××		×	
		Nasal Quadrant				
		Zone 1			×	×
		Zone 2	×			
		Zone 3				
		Zone 4				
		Zone 5				
		Zone 6			×	
		CH09				
		CH10				
		CH11				
		CH12			×	
		CH01				×
		CH02				
		CH03				
		CH04				
		CH05				
		CH06				
		CH07				
		CH08			×	
	GCL+IPL parameters (µm)	Average Thickness				
		Minimum Thickness				
		Temporal Superior Sector				
		Superior Sector				✓
		Nasal Superior Sector				
		Nasal Inferior Sector				
		Inferior Sector				
		Temporal Inferior Sector				

Table 2 / Statistical shifts (✓✓ Improvement by two statistical intervals (SI), ✓ Improvement by one SI, × Worsening by one SI, ×× Worsening by two SI)

EYE NO. 4

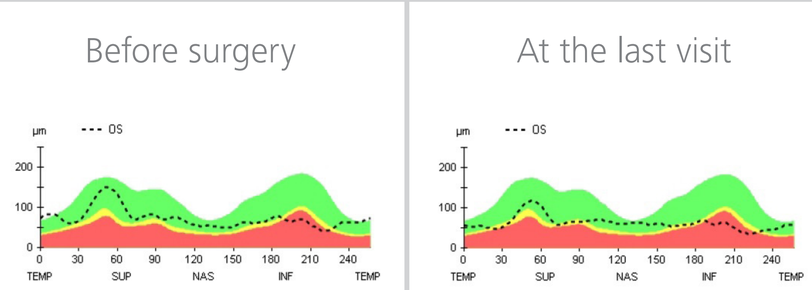

Fig. 1 / Curve of RNFL

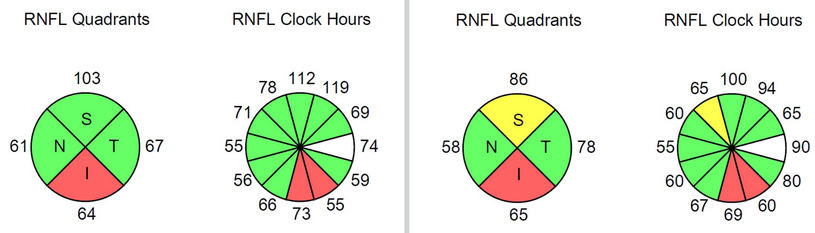

Fig. 2 / Sectors of RNFL

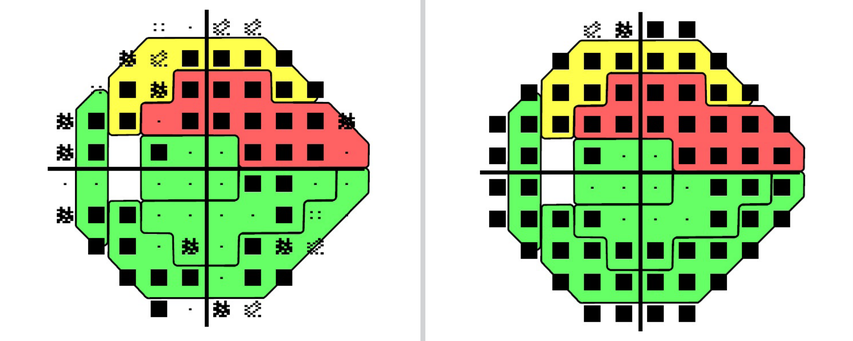

Fig. 3 / Combined Report of Zones of RNFL and 30-2 Perimetry

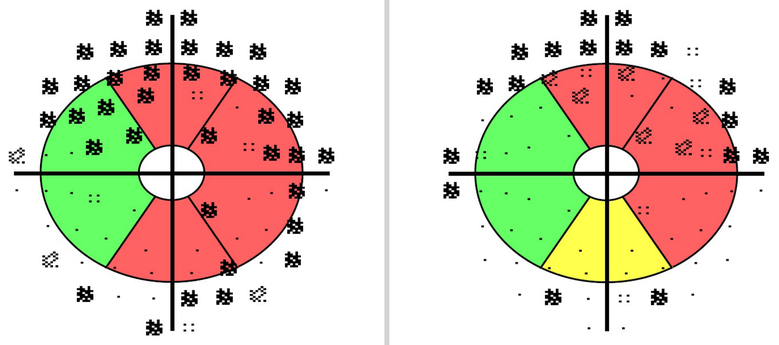

Fig. 4 / Combined Report of GCL+IPL and 10-2 Perimetry

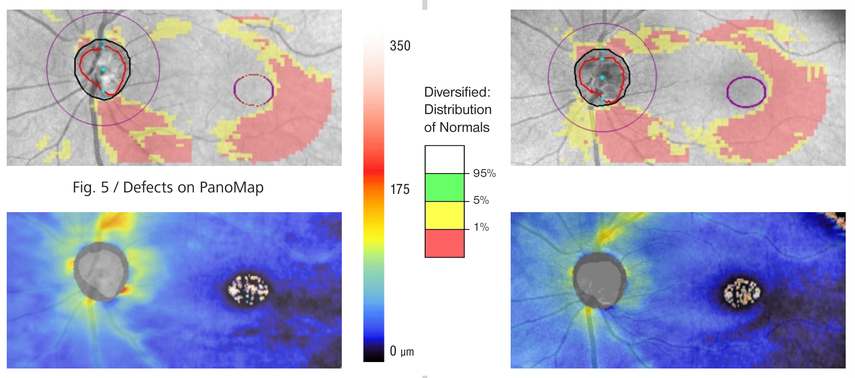

Fig. 5 / Defects on PanoMap

Fig. 6 / Retinal Thickness on PanoMap

Fig. 7

Fig. 8

CONCLUSIONS

Significant changes have been identified in 13 from 40 calculated parameters (33%). Combined reports highlighted the relationship between functional and structural measures in clinical settings. Evaluation of longitudinal changes of glaucomatous optic neuropathy after filtering surgery in POAG using FGWs seems to be superior to single examinations. Future enlarged studies with longer follow-up are needed.

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