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Article

Glaucoma Assessed by OCT and Visual Field Tests at Al-Kadhimiya Hospital, Iraq

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Abstract: This prospective, non-randomized, cross-sectional study conducted at Al-Kadhimiya Teaching Hospital in Baghdad, Iraq, from May to December 2023, assessed the effectiveness of Optical Coherence Tomography (OCT) and Visual Field (VF) testing in diagnosing and monitoring glaucoma in 261 eyes of 156 patients. The study excluded patients with other ocular diseases and utilized the OCT Topcon Maestro2 and Octopus 900 VF devices. Statistical analysis was performed using SPSS software. Results showed no significant differences in age (p=0.58) and gender (p=0.08). Visual acuity results indicated significant differences among eyes (P<0.01), with 64.74% of eyes being OU, 20.51% OD, and 14.74% OS. OCT outcomes categorized eyes as borderline (25.64%), min-effect (39.74%), and max-effect (34.62%) with no significant differences. VF tests revealed 78.85% of eyes as restricted with significant outcome differences. The study concludes that combining OCT and VF testing offers complementary diagnostic information, providing a comprehensive assessment and aiding in the monitoring and management of glaucoma.

Keywords: Glaucoma, Optical Coherence Tomography, Visual field, Iraq

1. Introduction

Glaucoma is a widespread chronic, cause of blindness, ranking the second, after cataracts, to cause blindness worldwide (1,2). Progressive loss of retinal ganglion cells and their axons and associated vision field abnormalities are hallmarks of this irreversible optic neuropathy (3-5). A key step in avoiding vision loss and essential to effective therapy is early glaucoma diagnosis and visual field assessment monitoring (6). Optical coherence tomography (OCT) and visual field (VF) assessment have been the imaging detection of choice for objective assessment of glaucomatous alterations, both complement each other and are critical for diagnosing and assessing glaucoma (7,8), optical coherence tomography (OCT) assessed structural visual damage, in contrast, visual field (VF) detect functional visual damage (9).

Optical coherence tomography (OCT) is a noninvasive medical tomographic modality with a greater resolution than other clinical tomographic techniques, a quick measurement speed, and a maximal measurement depth or penetration depth. The OCT can assist in the diagnosis of glaucoma by providing information on the profundity of the optic nerve cupping and the thickness of the retinal nerve fiber layer (8,10). Visual Field test measures the amount of central and peripheral vision, that is how much the patient sees in the middle or outer edges of his vision. Ophthalmic evaluation can be reached through the detection of the visual field. Visual field measurement is the difference in

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light sensitivity between the center and periphery areas. It is a key part of the glaucoma evaluation process. Automated perimetry has substantially increased the efficiency of visual field (VF) testing and is now important to treatment patients with glaucoma (11,12).

In this study, we aimed to provide an overview of glaucoma assessment and monitoring by OCT and visual field to investigate the use and effectiveness of OCT and visual field testing in diagnosing glaucoma patients which intended Al-Kadhemiah Teaching Hospital.

2. Materials and Methods

This study was done in Al-Kadhimiya Teaching Hospital in Baghdad, Iraq. It was a prospective, non-randomized, cross-sectional study undertaken at a single center. In this study, glaucoma sufferers have been the subjects. Every patient had their visual acuity and intraocular pressure measured between May and December of 2023. 261 eyes of 156 patients who were examined by OCT & V.F instruments for assessment of glaucoma patients through more than 6 months were included prospectively.

The outcome measures were OCT, V.F are reported in this study. The local ethics committee approved the study. Excluded patients from the study had other ocular diseases. OCT Topcon maestro2 and octopus 900 Visual Field devices were used as measures and instruments of the study. The SPSS software version 28 installed on a personal computer was used for statistical analyses.

3. Results

The study is based on extracting and documenting it in a data sheet designed for this study. The outcome measures were Age, sex, Eye laterality (OD and OS), V.A, IOP, OCT, and V.F examinations reported in this study.

There were no statistically significant differences in terms of age (p= 0.58) and gender (p = 0.08) as shown in Table (1).

Table 1. Demographical features of studied patients

Parameters	No (%)
Age (Years)	
34-50	54(34.62)
51-65	58(37.18)
66-80	44(28.21)
Total	156
Sex	
Males	80(51.28)
Females	76(48.72)
Total	156

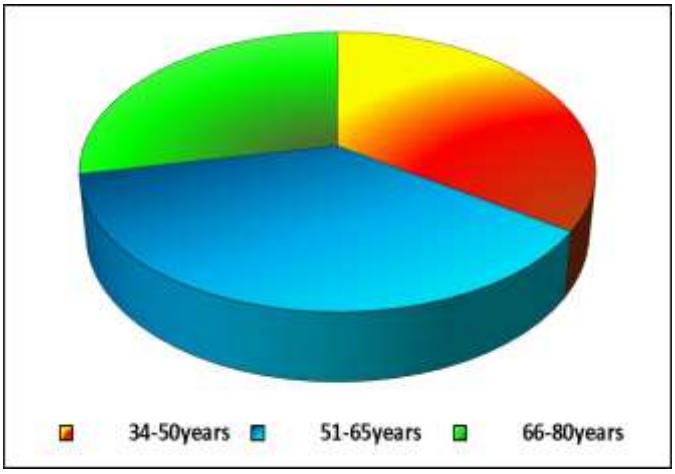

Figure 1. Eye Distribution Regarding Patient Age Groups

Figure 2. Eye Distribution Regarding Patient Sex

According to the visual acuity results (Table 2), 101(64.74%) of the studied eyes are OU, 32(20.51%) OD, and 23(14.74%) OS, and shows significant differences (P<0.01). No significant differences (P>0.05) were reported regarding Glaucoma severity.

Table 2. Ophthalmic Features Of Studied Patients

Parameters	No (%)	P value
Eye		
OU	101(64.74)	<0.01**
OD	32(20.51)	
OS	23(14.74)	
Total	156	
Glaucoma		
Mild	40(25.64)	0.224ns
Moderate	62(39.74)	
Advance	54(34.62)	
Total	156	
IOP	12-37	
BCVA	6/60 – 6/6	

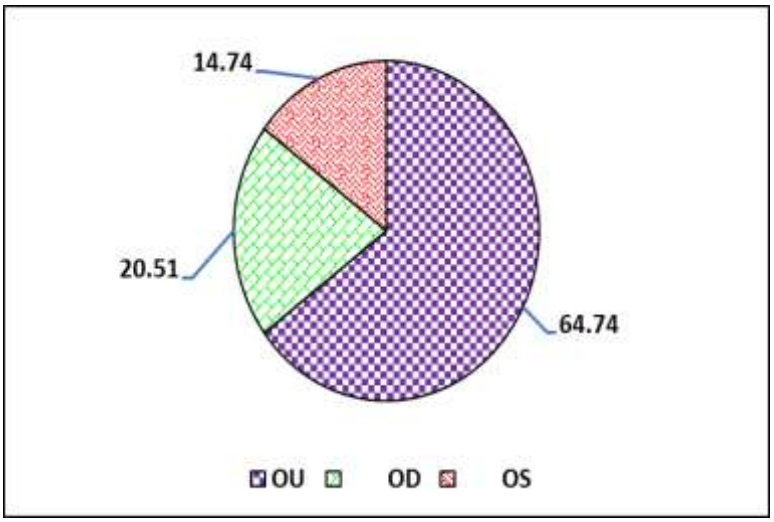

Figure 3. Eye Distribution Regarding Visual Acuity

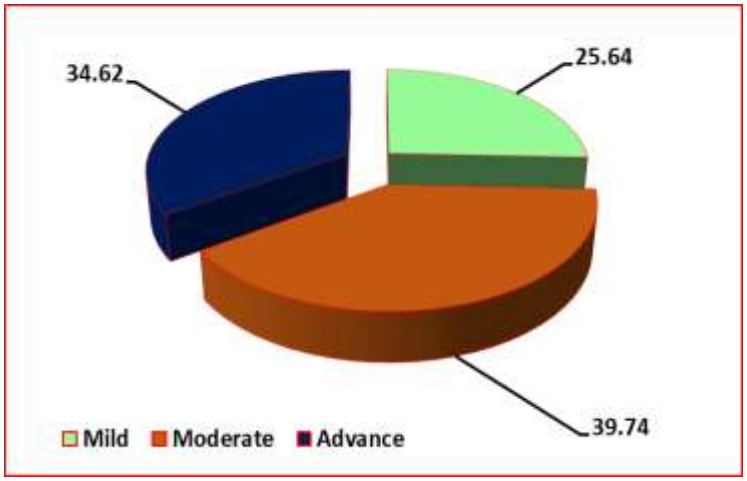

Figure 4. Eye Distribution Regarding Glaucoma Severity

Based on OCT outcome eyes studied were categorized as 40(25.64%) borderline, 62(39.74%) as min-effect, and 54(34.62%) max-effect, no significant differences were reported between them.

Of most eyes examined with the VF test, 123(78.85%) of eyes were evaluated as restricted, whereas 33(21.15%) were non-restricted, however, significant differences were viewed in the outcome of VF.

Table 3. Patient's Eyes Regarding OCT And VF Examinations

Parameters	No (%)	P value
Optical Coherence Tomography (OCT) Borderline Min-Effect Max-Effect Total	 40(25.64) 62(39.74) 54(34.62) 156	0.224ns
Visual Field (VF) Restricted Non-restricted Total	 123(78.85) 33(21.15) 156	<0.01**

4. Discussion

Optical Coherence Tomography (OCT) imaging is a crucial component in the evaluation and management of glaucoma, but it doesn't have sufficient capability to be used as a screening tool (13). The best diagnostic detection comes from combining different assessment methods for ocular examination, such as combining RNFL, ONH, and GCC analysis with IOP measurement and visual field testing (14).

The combined use of Optical Coherence Tomography (OCT) and visual field testing offers a comprehensive approach to the assessment of glaucoma, leveraging the strengths of each modality to provide a more nuanced understanding of the disease progression (15,16). While OCT is a powerful technique for measuring glaucoma development, visual field testing remains the primary way for diagnosing glaucomatous damage. Visual field abnormalities may precede structural changes in certain cases. Perimetry versus OCT for disease progression detection depends on disease stage (8,17). The present study used both OCT and visual field testing to assess glaucoma.

5. Conclusion

OCT and visual field testing are important diagnostic tools in the assessment and management of glaucoma. Combining OCT and visual field testing can provide complementary information for glaucoma assessment. Therefore, combining these tests provides a comprehensive assessment of the disease and aids in monitoring progression and guiding the management and treatment of glaucoma.

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