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Driver Fitness in patients with Glaucoma and Cognitive Impairment

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Introduction:
Recent evidence suggests a relationship between cognitive impairment and glaucoma besides age alone. Whether impaired visual perception in glaucoma contributes to diminished cognitive function in patients with dementia, or cognitive impairment further limits visual perception due to optic nerve damage in glaucoma is unclear. Dimensions of vision beyond acuity can impair driver fitness. One objective of this study was to see if there were significant differences in age and measures of perceptual, cognitive and driving performance between older drivers with cognitive impairment and/or glaucoma and controls that still had good visual acuity. A second goal was to measure the strength of association between measures of visual, cognitive, and driving performance in these groups.

Methods:
302 older drivers were classified as having glaucoma alone (n=69), cognitive impairment alone (n=41), both (n=21) or neither (controls n=171). All participants had good visual acuity (20/40), a valid drivers license and were still driving. Demographic, health status, driving accidents and clinical tests of vision and driving performance (simulation and on-road) variables were analyzed using one-way ANOVAS and Pearson correlations.

Results:
Across clinical and driving measures, accidents and age, there were significant differences between those with cognitive impairment, with or without glaucoma, and controls. Subjects with glaucoma alone showed significant differences with controls on driving simulation tests and accidents. Differences between subjects with cognitive impairment, or glaucoma and cognitive impairment, only occurred on measures of self-reported visual health status, working memory (BVRT) and divided attention in the driving simulator. Driving simulator variables and measures of visual attention (UFOV) were significantly correlated with accidents.

Conclusion:
Driving simulation is a valid way to evaluate task performance and may be a more sensitive and salient method of detecting the additive and/or interactive effects of glaucoma and cognitive impairment in older drivers than vision and neuropsychological tests alone. More research is needed.

References:

Key Words: Glaucoma, Cognitive impairment, Driver fitness, Driving simulator, UFOV

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