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ABSTRACT

TITLE: Assessing the association between the visual field (VF) loss and gait in glaucoma

ABSTRACT BODY:

Purpose: Literature examining the influence of glaucoma on gait is limited. Previous work has shown that fear of falling is strongly associated with glaucoma in patients, which potentially could lead to, or result from, changes in gait. Here, we assessed whether VF loss in individuals with glaucoma influences their gait.

Methods: In this prospective cohort study the GAITRite Electronic Walkway (CIR Systems Inc) was used to collect information on study participants' gait. The GAITRite system measures temporal and spatial gait parameters via an electronic walkway that contains eight sensor pads. Participants' gait was measured for their normal walk and under dual task performance (carrying a cup or a tray). VF loss of the better eye was used as a measure of glaucoma severity. Multiple linear regression models were employed to assess the association between the gait parameters and VF loss in participants. Models controlled for age, race and gender as covariates.

Results: Data from 200 participants was used in this analysis. Participants with greater VF loss demonstrated a wider base of support while walking normally ($\beta = +0.074$ cm per 1 dB decrement in VF mean deviation [MD], 95% confidence interval [CI] = 0.007 to 0.140, $p = 0.030$), walking while carrying a cup ($\beta = +0.079$ cm/1 dB decrement in VF MD, 95%CI = 0.017 to 0.140, $p = 0.013$), and walking while carrying a tray ($\beta = +0.069$ cm/1 dB decrement in VF MD, 95%CI = 0.008 to 0.130, $p = 0.028$). No other gait measures were significantly associated with severity of VF loss. However, greater VF loss was associated with greater coefficients of variation in step length ($\beta = +0.0014/1$ dB decrement in VF MD, 95%CI = 0.0007 to 0.0020, $p < 0.001$), stride length ($\beta = +0.0012/1$ dB decrement in VF MD, 95%CI = 0.0007 to 0.0018, $p < 0.001$), and stride velocity ($\beta = +0.0012/1$ dB decrement in VF MD, 95%CI = 0.0004 to 0.0021, $p = 0.004$) under normal walking conditions, as well as while carrying a cup or tray ($p < 0.01$ for all).

Conclusions: Glaucoma patients with greater VF loss demonstrate a wider base of support while walking in addition to greater step-to-step variability in several gait parameters including step length, stride length and stride velocity. These findings may be useful in identifying glaucoma patients at higher risk of mobility deficits such as falls.