13th EUGMS
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DEVELOPING PREVENTIVE ACTIONS IN GERIATRICS

QUALITATIVE GAIT ABNORMALITIES OF NEUROLOGICAL TYPE, CLINICAL CHARACTERISTICS AND DISABILITY IN OLDER COMMUNITY-DWELLERS WITHOUT NEUROLOGICAL DISEASES

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INTRODUCTION

- Gait abnormalities are common in older adults

  Verghese et al (JAGS, 2006)

- Associated with adverse outcomes (disability, falls, dementia, death)

  Verghese et al (J Neurol, 2010)

- Gait is often evaluated using quantitative screening variables (gait speed) Studenski et al (JAMA, 2011)

- Qualitative gait assessment is typically practiced by neurologists in routine physical examination but not in older adults without overt neurological diseases

INTRODUCTION

- There is a lack of standardization of qualitative and visual assessment of gait
- The epidemiology of Neurological Gait Abnormalities (NGA) is largely unexplored

AIM:

- Assess the prevalence of NGA and its subtypes in a cohort of well-functioning older community-dwellers
- Analyze its association with demographics, clinical and functional characteristics, and with difficulties in the activities of daily living

METHODS

PARTICIPANTS

Healthy, Aging and Body Composition Study (1997-1998):

- N = 2627
- 70-79 years old
- Community-dwelling
- Without disability

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Healthy Brain Project (2006-2008):

- Able to walk 20m
- Eligible for MRI neuroimaging
- Without neurological or psychological disease (Medical histories)

Video recording of gait assessment

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METHODS

NEUROLOGICAL GAIT ABNORMALITIES:

- Standarized neurological exam
- Gait assessment: walk back and forth and tandem walk along 1,5m walkway
- Analysis of video-recordings and classification of qualitative gait abnormalities subtype according to Verghese et al (NEJM, 2002).
- Non-neurological abnormalities of gait (rheumatologic, cardio-respiratory, etc.) were not considered NGA

OTHER VARIABLES:

- CGA including cognitive and physical function assessment and measures of vascular burden

RESULTS

- N = 177
- Median Age (IQR): 82 (4) years old
- 55.4 % women
- Neurological Gait Abnormalities prevalence: 27.7%

Type of NGA	Description	Prevalence
Unsteady	Marked swaying, loss of balance, or falls	19/177 (**10.7%**)
Ataxic	Wide-based gait with other features associated with cerebellar disease (such as heel-to-shin incoordination or intention tremor)	5/177 (2.8%)
Frontal	Short steps, wide base, difficulty in picking the feet up off the floor (magnetic response)	4/177 (2.3%)
Parkinsonian	Small, shuffling steps, flexed posture, lack of arms swing, en bloc turns, festination, and postural instability	7/177 (**4.0%**)
Neuropathic	Unilateral or bilateral foot drop and other neuropathic signs such as a “stocking”-pattern sensory loss and an absence of deep-tendon reflexes	5/177 (2.8%)
Hemiparetic	Swing legs outward and in a semicircle from the hip (circumduction) + history or other clinical signs of stroke	8/177 (**4.5%**)
Spastic	Both legs circumduction, and, when this abnormality is severe, the legs cross in front of one another (scissoring)	1/177 (0.6%)

RESULTS

Baseline Characteristic Median (IQR) or N (%)	Total sample (N=177)	No NGA (N=128)	Present NGA (N=49)	p-value*
Demographics and comorbidities				
Age	82.0 (4.0)	82.0 (4.0)	83.0 (5.0)	0.05
Self-reported poor health status	34 (19.2%)	17 (13.3%)	17 (34.7%)	0.001
Diabetes	47 (26.6%)	24 (18.8%)	23 (46.9%)	0.0001
Cognitive function and mood				
3MS Score	95.0 (8.0)	96.0 (7.0)	92.0 (7.0)	0.01
DSST Score	36.0 (17.0)	38.0 (17.0)	30.5 (22.5)	0.007
Physical function				
Usual pace gait speed	0.99 (0.28)	1.05 (0.28)	0.85 (0.33)	<0.0001
Physical activity (kcal/kg/week, walking + stairs)	2.2 (5.3)	3.1 (7.4)	1.2 (2.7)	0.001
Disability				
ADL (≥ 1)	95 (53.7%)	58 (45.3%)	37 (75.5%)	<0.0001

RESULTS

	Unadjusted* Models	Adjusted Model
	OR (95% CI)†	OR (95% CI)†
Age	1.15 (1.02, 1.30)	1.06 (0.91, 1.23)
Diabetes	3.83 (1.88, 7.84)	3.24 (1.38, 7.59)
Hypertension	2.73 (0.90, 8.30)	
Self-reported fair or poor health status	3.47 (1.59, 7.56)	1.41 (0.47, 4.24)
3MS Score	0.97 (0.93, 1.02)	
DSST Score	0.97 (0.94, 0.99)	1.01 (0.98, 1.05)
Physical activity (kcal/kg/week, walking + stairs)	0.85 (0.76, 0.94)	0.89 (0.80, 0.99)
Quadriceps strength (kin-com peak torque)	0.99 (0.98, 1.00)	
Six M walk time (m/sec)	1.81 (1.34, 2.44)	
Usual pace gait speed (m/sec)	0.02 (0.003, 0.10)	0.04 (0.005, 0.27)

Cross-sectional association of baseline characteristics with NGA.
†ORs model probability that person has NGA (versus reference of no NGA).

RESULTS

	Unadjusted* Models	Adjusted Model 1	Adjusted Model 2
	†OR (95% CI)	†OR (95% CI)	†OR (95% CI)
Age	1.07 (0.95, 1.21)		
Diabetes	0.91 (0.45, 1.83)		
Self-reported health (poor)	13.50 (3.09, 59.00)	10.71 (2.40, 47.82)	6.44 (1.33, 31.11)
DSST Score	0.98 (0.96, 1.00)		
Physical Activity	0.98 (0.95, 1.01)		
NGA	4.94 (2.13, 11.50)	3.95 (1.64, 9.52)	2.41 (0.93, 6.22)
Usual pace walking speed	0.01 (0.002, 0.08)		0.03 (0.004, 0.24)

Cross-sectional association between baseline characteristics and ADLs.

†ORs model probability that person has ≥ 1 ADLs difficulty (versus reference of none ADLs difficulty). Adjusted Model 1. Adjusted for all the variable with statistically significant associations in Unadjusted Models. Adjusted Model 2. Adjusted Model 1 + Usual pace walking speed.

CONCLUSIONS

- In our sample, NGA were associated with diabetes and lower physical activity, which might be due to a "systemic" action since diabetes is a consolidated risk factor for different conditions which are contributors to abnormalities of gait (cerebrovascular disease, peripheral neuropathy, peripheral vascular disease, …)
- NGA were associated with slower gait and reduced functional status, suggesting that these abnormalities of gait might be linked to disability
- These results, if confirmed by longitudinal studies, might add information for preventing and managing mobility disability.

CONFLICT OF INTEREST DISCLOSURE

I have no potential conflict of interest to report

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THANK YOU FOR YOUR ATTENTION!

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