

SafetyLit January 3 2016

Appropriate polypharmacy and medicine safety: when many is not too many

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Drug Safety 2015; ePub(ePub): ePub.

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DOI 10.1007/s40264-015-0378-5 **PMID** 26692396

Abstract

The use of multiple medicines (polypharmacy) is increasingly common in middle-aged and older populations. Ensuring the correct balance between the prescribing of 'many' drugs and 'too many' drugs is a significant challenge. Clinicians are tasked with ensuring that patients receive the most appropriate combinations of medications based on the best available evidence, and that medication use is optimised according to patients' clinical needs (appropriate polypharmacy). Historically, polypharmacy has been viewed negatively because of the associated medication safety risks, such as drug interactions and adverse drug events. More recently, polypharmacy has been identified as a risk factor for under-prescribing, such that patients do not receive necessary medications and this can also pose risks to patients' safety and well-being. The negative connotations that have long been associated with the term polypharmacy could potentially be acting as a driving factor for under-prescribing, whereby clinicians are reluctant to prescribe necessary medicines for patients who are already receiving 'many' medicines. It is now recognised that the prescribing of 'many' medicines can be entirely appropriate in patients with several chronic conditions and that the risks of adverse drug events that have been associated with polypharmacy may be greatly reduced when patients' clinical context is taken into consideration. In this article, we outline the current perspectives on polypharmacy and make the case for adopting the term 'appropriate polypharmacy' in differentiating between the prescribing of 'many' drugs and 'too many' drugs. We also outline the inherent challenges in doing so and provide recommendations for future clinical practice and research.

PDF Y Endnote Y

Brain volume changes in gait control in patients with mild cognitive impairment compared to cognitively healthy individuals; GAIT study results

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DOI 10.1016/j.exger.2015.12.007 **PMID** 26705916

Abstract

BACKGROUND: Differences in brain structures involved in gait control between normal and pathological aging are still matter of debate. This study aims to compare the regional and global brain volume patterns associated with gait performances assessed with Timed Up and Go test (TUG) between cognitively healthy individuals (CHI) and patients with mild cognitive impairment (MCI).

MATERIAL AND METHODS: A total of 171 (80 CHI, 25 with amnesic MCI [a-MCI] and 66 with non-amnesic MCI [na-MCI]) participants (70.2±4.0years; 37% female) consecutively realized (rTUG) and imagined (iTUG) the TUG. rTUG measures the time needed to rise from a chair, walk 3m, turn around and return to a seated position and iTUG represents the validated imagined version of the TUG. Global and regional brain volumes were quantified from three-dimensional T1-weighted MRI using a semi-automated software.

RESULTS: Linear regression models show that increased rTUG (i.e. worse performance) was associated with lower total white matter, total grey matter, left and right hippocampal volume in patients with na-MCI ($P<0.045$), and with lower right hippocampal volume in CHI ($P=0.013$). Increased iTUG was associated with lower grey matter and left premotor cortex volumes in patients with na-MCI ($P<0.05$).

CONCLUSIONS: The findings showed different patterns of brain volumes reduction associated with increased rTUG and iTUG between CHI and MCI patients, except for the right hippocampal volume which was smaller in both groups.

PDF Y Endnote Y

Cardiovascular responses to orthostasis and their association with falls in older adults

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BMC Geriatr. 2015; 15(1): e174.

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DOI 10.1186/s12877-015-0168-z **PMID** 26703012 **PMCID** PMC4690276

Abstract

BACKGROUND: Orthostatic hypotension (OH) refers to a marked decline in blood pressure when upright. OH has a high incidence and prevalence in older adults and represents a potential intrinsic risk factor for falls in these individuals. Previous studies have not included more recent definitions for blood pressure responses to orthostasis, including initial, delayed, and recovery blood pressure responses. Furthermore, there is little research examining the relationships between cerebrovascular functioning and falling risk. Therefore, we aimed to: (i) test the association between different blood pressure responses to orthostatic stress and retrospective falling history and; (ii) test the association between cerebrovascular responses to orthostatic stress and falling history.

METHODS: We tested 59 elderly residents in long term care facilities who underwent a passive seated orthostatic stress test. Beat-to-beat blood pressure and cerebral blood flow velocity (CBFV) responses were assessed throughout testing. Risk factors for falls and falling history were collected from facility records. Cardiovascular responses to orthostasis were compared between retrospective fallers (≥ 1 fall in the previous year) and non-fallers.

RESULTS: Retrospective fallers had larger delayed declines in systolic arterial pressure (SAP) compared to non-fallers ($p = 0.015$). Fallers also showed poorer early (2 min) and late (15 min) recovery of SAP. Fallers had a greater decline in systolic CBFV.

CONCLUSIONS: Older adults with a positive falling history have impaired orthostatic control of blood pressure and CBFV. With better identification and understanding of orthostatic blood pressure impairments earlier intervention and management can be implemented, potentially reducing the associated risk of morbidity and mortality. Future studies should utilize the updated OH definitions

using beat-to-beat technology, rather than conventional methods that may offer less accurate detection.

PDF Y Endnote Y

Contribution of head position, standing surface, and vision to postural control in community-dwelling older adults

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Am. J. Occup. Ther. 2016; 70(1): 7001270010p1-8.

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DOI 10.5014/ajot.2016.015727 **PMID** 26709429

Abstract

Postural control requires the integration of sensorimotor information to maintain balance and to properly position and orient the body in response to external stimuli. Age-related declines in peripheral and central sensory and motor function contribute to postural instability and falls. This study investigated the contribution of head position, standing surface, and vision on postural sway in 26 community-dwelling older adults. Participants were asked to maintain a stable posture under conditions that varied standing surface, head position, and the availability of visual information. Significant main and interaction effects were found for all three factors.

FINDINGS from this study suggest that postural sway responses require the integration of available sources of sensory information. These results have important implications for fall risks in older adults and suggest that when standing with the head extended and eyes closed, older adults may place themselves at risk for postural disequilibrium and loss of balance.

PDF Endnote Y

Does vibration training reduce the fall risk profile of frail older people admitted to a rehabilitation facility? A randomised controlled trial

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DOI 10.3109/09638288.2015.1103793 **PMID** 26693802

Abstract

PURPOSE: To determine the effect of Vibration Training (VT) on functional ability and falls risk among a group of frail older people admitted to an inpatient rehabilitation unit in a regional hospital in New Zealand.

METHOD: A randomized controlled trial of 56 participants (mean 82.01 years in the intervention group and 81.76 years in the control group). VT targeting lower limb muscles with a frequency 30-50 Hz occurred three times per week until discharge. Amplitude progressively increased from 2 to 5 mm to allow the programme to be individually tailored to the participant. The control group received usual care physiotherapy sessions. Outcome measures were: Physiological profile assessment (PPA); and Functional Independence measure (FIM) and Modified Falls Efficacy Scale (MFES).

RESULTS: There was a statistically significant difference observed between the two groups in terms of FIM score ($F = 5.09$, $p = 0.03$) and MFES ($F = 3.52$, $p = 0.007$) but no difference was observed in

terms of PPA scores ($F = 0.96$, $p = 0.36$).

CONCLUSIONS: Among older people admitted to an inpatient rehabilitation facility there may be some beneficial effect to the use of VT in conjunction with usual care physiotherapy in terms of improved functional ability. The study design and the small dosage of VT provided may have precluded any change in falls risk among participants. Implications for Rehabilitation Vibration training (VT) may assist in reducing the risk of falling among at risk older people. Current pressures on health systems (ageing population, reduced hospital length of stay) necessitate the development of innovative strategies to maximise the rehabilitation potential of older people. Among older people admitted to an inpatient rehabilitation facility there may be some beneficial effect to the use of vibration training in conjunction with usual care physiotherapy in terms of improved functional ability.

PDF Y Endnote Y

Dual-task performance in older adults during discrete gait perturbation

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(Copyright © 2015, Springer Science+Business Media)

DOI 10.1007/s00221-015-4533-0 **PMID** 26715410

Abstract

The dual-task (motor and cognitive) performance of eight older adults (72.0 ± 6.4 years; 5 female; 3 male) was evaluated. Vocal choice reaction times (cognitive task) were measured at standstill as well as during unperturbed and perturbed gait (motor task). The perturbation was administered using customized shoes instrumented to lower a small (18.4 mm high) aluminum flap suddenly under the medial or lateral forefoot during a single swing phase of 12 of 30 gait trials. The ankle inverted or everted an average of 10 or 9 degrees, respectively, depending on the flap deployed. Medial and lateral perturbations were randomized between the left and right feet. The results show that vocal choice reaction time was significantly prolonged by gait, both perturbed (614.7 ± 80.2 ms) and unperturbed (529.9 ± 119.3 ms), compared to standstill (332.8 ± 76.5 ms; $p = 0.0015$). Further, the prolongation associated with gait perturbation was significant, compared to that with unperturbed gait ($p = 0.016$). The kinematics of the first post-perturbation (recovery) step, with or without concomitant vocal choice reaction task performance, was not significantly different from those of the average step during unperturbed gait. We conclude that in healthy older adults, the requirement to respond to a gait challenge resulted in deterioration in the performance of a concurrent cognitive task as indicated by significant prolongation of response time in the vocal choice reaction task. In contrast, performance of the motor task was not adversely affected.

PDF Y Endnote Y

Effects of vitamin D and exercise on the wellbeing of older community-dwelling women: a randomized controlled trial

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Gerontology 2015; ePub(ePub): ePub.

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DOI 10.1159/000442441 **PMID** 26682749

Abstract

BACKGROUND: Evidence for the effects of exercise and vitamin D supplementation on quality of life (QoL), fear of falling (FoF) and mental wellbeing in older adults is conflicting.

OBJECTIVE: To study the effects of vitamin D supplementation and multimodal group exercise on psychosocial functions of wellbeing, including QoL, mental wellbeing and FoF.

METHOD: This is a 2-year, double-blind, placebo-controlled vitamin D and open exercise intervention trial with 409 older Finnish women (70-80 years of age) randomized to 4 treatment arms: (1) placebo without exercise, (2) vitamin D (800 IU/day) without exercise, (3) placebo and exercise, and (4) vitamin D (800 IU/day) with exercise. Exercisers participated in group exercise twice per week for 12 months and once per week for the subsequent 12 months, plus home exercises.

RESULTS: When comparing with the placebo without exercise group, there were no statistically significant differences between groups receiving either vitamin D, exercise or both treatments for changes in QoL or mental wellbeing (although a slight decline was seen in mental wellbeing in those receiving vitamin D only, $p = 0.044$). The initial slight reduction in FoF was significant in all intervention groups compared with controls ($p < 0.05$), but this was only temporary.

CONCLUSION: Neither vitamin D nor exercise contributes to better QoL, FoF or mental wellbeing in community-dwelling healthy older women with sufficient vitamin D levels.

PDF Endnote Y

End-of-life care planning and fragility fractures of the hip: are we missing a valuable opportunity?

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Clin. Orthop. Relat. Res. 2015; ePub(ePub): ePub.

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DOI 10.1007/s11999-015-4675-1 **PMID** 26689582

Abstract

BACKGROUND: Approximately 20% of all geriatric patients who sustain low-energy hip fractures will die within 1 year of the injury, and approximately 3% will die during the initial inpatient hospital stay. Accordingly, the event of a geriatric hip fracture might be an apt prompt for discussing end-of-life care: in light of the risk of death after this injury, the topic of mortality certainly is germane. However, it is not clear to what degree physicians and patients engage in end-of-life planning even when faced with a hospital admission for this potentially life-threatening condition.

QUESTIONS/PURPOSES: We assessed the frequency with which end-of-life care discussions were documented among a sample of geriatric patients admitted for hip fracture surgery.

METHODS: We studied 150 adult patients, 70 years and older, admitted between September 2008 and July 2012 for the care of an isolated low-energy hip fracture, who did not have documented evidence of end-of-life care planning before the time of admission. For each patient, the medical record was scrutinized to identify documentation of end-of-life care discussions, an order changing "code status," or a progress note memorializing a conversation related to the topic of end-of-life care planning.

RESULTS: Of the 150 subjects who had no documented evidence of end-of-life care planning at the time of admission, 17 (11%) had their code status changed during the initial hospitalization for hip fracture, and an additional four patients (3%) had a documented conversation regarding end-of-life care planning without a subsequent change in code status. Accordingly, there were 129 (86%)

patients who had no record of any attention to end-of-life care planning during the hospital stay for hip fracture surgery.

CONCLUSIONS: Our findings suggest that physicians may be missing a valuable opportunity to help patients and their families be better prepared for potential future health issues. End-of-life care planning respects patient autonomy and enhances the quality of care. Accordingly, we recommend that discussion of goals, expectations, and preferences should be initiated routinely when patients present with a fragility fracture of the hip. **LEVEL OF EVIDENCE:** Level IV, therapeutic study.

PDF Y Endnote TY

Mild cognitive impairment is associated with falls among older adults: findings from the Irish Longitudinal Study on Ageing (TILDA)

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Exp. Gerontol. 2015; ePub(ePub): ePub.

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(Copyright © 2015, Elsevier Publishing)

DOI 10.1016/j.exger.2015.12.008 **PMID** 26707711

Abstract

INTRODUCTION: The role of mild cognitive impairment (MCI) on falls among older adults remains under-investigated. The aim of this study was to evaluate the association between MCI and number of falls or occurrence of non-accidental falls among older adults.

METHODS: Data from the first wave of the Irish longitudinal Study on Ageing (TILDA) was analysed. The analytical sample consisted of 5364 individuals aged ≥ 50 years. MCI was defined as: Montreal Cognitive Assessment (MoCA) score < 26 ; presence of subjective cognitive complaints; Mini-Mental State Examination (MMSE) score ≥ 14 ; and no limitations in activities of daily living (ADL).

Multivariable poisson and logistic regression analyses were conducted to assess the association between MCI and number of falls or presence of non-accidental falls in the past 12 months.

RESULTS: The prevalence of MCI was 10.1%. In the fully-adjusted model, MCI was associated with a higher rate of falls (PR=1.41 95%CI=1.05-1.89) and odds for non-accidental falls in the past 12 months (OR=1.67 95%CI=1.07-2.61). Muscle strength and performance indicators, and medical health conditions were influential factors in the association between MCI and falls but did not fully explain the association.

CONCLUSION: MCI is related with higher rates of falls and the occurrence of non-accidental falls among older adults. Future studies are warranted to clarify the underlying mechanism linking MCI and falls, and to establish interventions targeting MCI to reduce the risk of falls.

PDF Y Endnote Y

Motor-cognitive dual-task training improves local dynamic stability of normal walking in older individuals

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Clin. Biomech. 2015; ePub(ePub): ePub.

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(Copyright © 2015, Elsevier Publishing)

DOI 10.1016/j.clinbiomech.2015.11.021 PMID 26682629

Abstract

BACKGROUND: Extreme levels of gait variability and local dynamic stability of walking are associated with risk of falling and reduced executive functions. However, it is not sufficiently investigated how gait variability and local dynamic stability of human walking develop in the course of a motor-cognitive intervention. As dancing implies high demands on (and therewith trains) executive functioning and motor control, it might increase local dynamic stability or reduce gait variability.

METHODS: 32 older healthy participants were randomly assigned to either a health-related exercise group (age: mean=68.33years, standard deviation=3.17years; BMI: mean=27.46, standard deviation=2.94; female/male: 10/6) or a dancing group (age: mean=66.73years, standard deviation=3.33years; BMI: mean=26.02, standard deviation=3.55; female/male: 11/5). Based on angular velocity data of trunk kinematics, local dynamic stability and stride-to-stride variability in level overground walking were assessed prior to and after the specific intervention. The data were analysed by a blinded observer using two-way repeated measures ANOVAs. Based on one-way ANOVAs, time and group effects were determined.

FINDINGS: Regarding the variability of trunk movements, no interaction effect was observed ($F_{1,30}=0.506$, $P=.482$; $\eta^2=0.017$). For local dynamic stability of trunk movements, an interaction effect in favour of the dancing group was observed ($F_{1,30}=5.436$; $P=.026$; $\eta^2=0.146$).

INTERPRETATION: Our data indicate that a dancing programme (which combines cognitive and motor efforts) might increase local dynamic stability in older people.

PDF Y Endnote Y

Postural blood pressure electrocardiographic changes are associated with falls in older people

Saedon NI, Zainal-Abidin I, Chee KH, Khor HM, Tan KM, Kamaruzzaman SK, Chin AV, Poi PJ, Tan MP. *Clin. Auton. Res.* 2015; ePub(ePub): ePub.

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(Copyright © 2015, Springer Science+Business Media)

DOI 10.1007/s10286-015-0327-5 PMID 26695401

Abstract

OBJECTIVES: To determine the magnitude of postural blood pressure change, differences in ECG between fallers and non-fallers were measured. Postural blood pressure change is associated with symptoms of dizziness, presyncope, and syncope.

METHODS: In this cross-sectional study were included participants from The Malaysian Falls Assessment and Intervention Trial: fallers, aged 65 years or older with two or more falls or one injurious fall in 12 months, from a teaching hospital; and non-fallers, aged 65 years and older found through word-of-mouth and advertising. Noninvasive beat-to-beat blood pressure was measured at 10 min supine rest and 3 min standing. The maximal drop in systolic and diastolic pressure was calculated from a 12-lead ECG interpreted by a cardiologist. Basic demographics, medical history, and symptoms of dizziness, presyncope, and syncope were recorded for all patients.

RESULTS: We recruited 155 fallers and 112 non-fallers. Fallers had a significantly longer PR interval (179 ± 32 vs. 168 ± 27 ms, $p = 0.013$) and a longer corrected QT interval (449 ± 41 vs. 443 ± 39 msec, $p = 0.008$), and larger change in SBP (28 ± 14 vs. 19 ± 9 mmHg, $p < 0.001$) with posture change. SBP drop of ≥ 30 mmHg associated with recurrent and injurious falls [odds ratio [95 % confidence

interval] = 7.61 (3.18-18.21)]. The changes remained significant after adjustment for symptoms of dizziness, presyncope and syncope.

INTERPRETATION: Older individuals with recurrent and injurious falls have significantly longer PR and QT intervals and larger SBP reduction with posture change as compared to non-fallers, and these are not explained by the presence of dizziness, presyncope, or syncope. SBP cut-off of ≥ 30 mmHg considered for postural measurements using continuous BP monitors, the significance of this value needs to be evaluated.

PDF Y Endnote Y

Rebalance without the balance: a research note on the availability of community-based services in areas where nursing homes have closed

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Res. Aging 2015; ePub(ePub): ePub.

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DOI 10.1177/0164027515622244 **PMID** 26685182

Abstract

Policies to "rebalance" funding away from nursing homes and toward home and community-based services (HCBS) have encouraged national trends of nursing home closure and an expansion of the HCBS industry. These changes are unfolding without a clear understanding of what services are available at the local level. The purpose of this study was: (1) to describe the current distribution of community-based services (CBS) in areas where nursing homes have closed and (2) to examine differences in availability of CBS using local market and population characteristics as regressors in a multinomial logistic model. We collected data on and geocoded CBS facilities and then used ArcGIS to define a 5-mile radius around all nursing homes that closed between 2006 and 2010 and compared these local market areas. In rural areas, availability of CBS does not appear to compensate for nursing home closures. Policies encouraging HCBS may be outpacing availability of CBS, especially in rural areas.

PDF Y Endnote Y

Yoga-based exercise improves balance and mobility in people aged 60 and over: a systematic review and meta-analysis

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Age Ageing 2015; ePub(ePub): ePub.

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(Copyright © 2015, Oxford University Press)

DOI 10.1093/ageing/afv175 **PMID** 26707903

Abstract

OBJECTIVE: one-third of community-dwelling older adults fall annually. Exercise that challenges balance is proven to prevent falls. We conducted a systematic review with meta-analysis to determine the impact of yoga-based exercise on balance and physical mobility in people aged 60+ years.

METHODS: searches for relevant trials were conducted on the following electronic databases:

MEDLINE, EMBASE, Cochrane Central Register of Controlled Trials, CINAHL, Allied and Complementary Medicine Database and the Physiotherapy Evidence Database (PEDro) from inception to February 2015. Trials were included if they evaluated the effect of physical yoga (excluding meditation and breathing exercises alone) on balance in people aged 60+ years. We extracted data on balance and the secondary outcome of physical mobility. Standardised mean differences and 95% confidence intervals (CI) were calculated using random-effects models. Methodological quality of trials was assessed using the 10-point Physiotherapy Evidence Database (PEDro) Scale.

RESULTS: six trials of relatively high methodological quality, totalling 307 participants, were identified and had data that could be included in a meta-analysis. Overall, yoga interventions had a small effect on balance performance (Hedges' $g = 0.40$, 95% CI 0.15-0.65, 6 trials) and a medium effect on physical mobility (Hedges' $g = 0.50$, 95% CI 0.06-0.95, 3 trials).

CONCLUSION: yoga interventions resulted in small improvements in balance and medium improvements in physical mobility in people aged 60+ years. Further research is required to determine whether yoga-related improvements in balance and mobility translate to prevention of falls in older people. PROSPERO Registration number CRD42015015872.

PDF Y Endnote Y

Effect of augmenting cholinergic function on gait and balance

Mancini M, Fling BW, Gendreau A, Lapidus J, Horak FB, Chung K, Nutt JG.

BMC Neurol. 2015; 15(1): 264.

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DOI 10.1186/s12883-015-0523-x **PMID** 26697847 **PMCID** PMC4690312

Abstract

BACKGROUND: Impaired mobility and falls are clinically important complications of Parkinson's disease (PD) and a major detractor from quality of life for which there are limited therapies. Pathological, neuroimaging and clinical evidence suggest that degeneration of cholinergic systems may contribute to impairments of balance and gait in PD. The proposed trial will examine the effects of augmentation of the cholinergic system on balance and gait.

DESIGN: The study is a single-site, proof of concept, randomized, double-blind, cross-over trial in patients with PD. Each treatment period will be 6 weeks with a 6-week washout between treatments for a total of 18 weeks for each subject. Donepezil in 2.5 mg capsules or identical appearing placebo capsules will be increased from two per day (5 mg) to four capsules (10 mg) after 3 weeks, if tolerated. Subjects will have idiopathic Parkinson's disease, Hoehn and Yahr stages 2 to 4. We anticipate recruiting up to 100 subjects for screening to have 54 enrolled and 44 subjects complete both phases of treatment. Dropouts will be replaced. As this is a crossover trial, all subjects will be exposed to both donepezil and to placebo. The primary outcome measures will be the root mean square of the mediolateral sway when standing and the variability of the stride duration when walking for two minutes. Secondary outcomes will be the computerized Attention Network Test to examine three domains of attention and the Short-latency Afferent Inhibition (SAI), a physiological marker obtained with transcranial magnetic stimulation as a putative marker of cholinergic activity.

DISCUSSION: The results of this study will be the most direct test of the hypothesized role of cholinergic neurotransmission in gait and balance. The study is exploratory because we do not know

whether donepezil will affect gait, balance or attention, nor which measures of gait, balance or attention will be sensitive to drug manipulation. We hypothesize that change in cholinergic activity, as measured with SAI, will predict the relative effectiveness of donepezil on gait and balance. Our immediate goal is to determine the potential utility of cholinergic manipulation as a strategy for preventing or treating balance and gait dysfunction in PD. The findings of this trial are intended to lead to more sharply focused questions about the role of cholinergic neurotransmission in balance and gait and eventually to Phase II B trials to determine clinical utility of cholinergic manipulation to prevent falls and improve mobility. TRIAL REGISTRATION: This trial is registered at clinical trials.gov (NCT02206620).

PDF Y Endnote Y

Effect of leg selection on the Berg Balance Scale scores of hemiparetic stroke survivors: A cross sectional study

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Arch. Phys. Med. Rehabil. 2015; ePub(ePub): ePub.

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DOI 10.1016/j.apmr.2015.11.017 **PMID** 26707457

Abstract

OBJECTIVE: To examine whether selection of the non-paretic or paretic leg as the weight-bearing leg in items 13 'standing unsupported one foot in front' and item 14 'standing on one leg' of BBS will influence the item scores, and thus the total score.

DESIGN: Cross sectional study.

SETTING: University-based rehabilitation laboratory.

PARTICIPANTS: Sixty-three community dwelling people with chronic stroke (aged ≥ 50)

INTERVENTIONS: None

MAIN OUTCOME MEASURE: Berg Balance Scale.

RESULTS: The four BBS total scores ranged from 48.4 to 50.7. The total score was significantly lower when a participant was asked to step forward with the non-paretic leg in item 13, and stand on the paretic leg in item 14. Fewer participants received a maximum score with the BBS1 formulation than the others. In addition, the correlations with walking speed and ABC scores were greatest with the BBS1 score.

CONCLUSIONS: Our findings suggest that BBS1 was the most challenging formulation for our participants; this might serve to minimize the BBS's ceiling effect. These findings provide a rationale for amending the BBS administration guidelines with the BBS1 formulation.

PDF Y Endnote Y

Fall injuries in Nepal: a countrywide population-based survey

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Ann. Glob. Health 2015; 81(4): 487-494.

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DOI 10.1016/j.aogh.2015.07.004 **PMID** 26709280

Abstract

BACKGROUND: An estimated 424,000 fatal falls occur globally each year, making falls the second leading cause of unintentional injury-related deaths after road traffic injuries. More than 80% of fall-related fatalities occur in low- and middle-income countries. Data from low-income South Asian countries like Nepal are lacking, particularly at the population level. The aim of this study was to provide an estimate of fall-injury prevalence and the number of fall injury-related deaths countrywide in Nepal and to describe the epidemiology of fall injuries in Nepal at the community level.

METHODS: A countrywide cross-sectional study was performed in 15 of the 75 districts in Nepal using the Surgeons Overseas Assessment of Surgical Need (SOSAS) survey tool. The SOSAS survey gathers data in 2 sections: demographic data, including the household's access to health care and recent deaths in the household, and assessment of a representative spectrum of surgical conditions, including injuries. Data was collected regarding an individuals' experience of injury including road traffic injuries, falls, penetrating trauma, and burns. Data included anatomic location, timing of injury, and whether health care was sought. If health care was not sought, the reason for barrier to care was included. Descriptive statistics were used to analyze the data.

RESULTS: Of 2695 individuals from 1350 households interviewed, 141 reported injuries secondary to falls (5.2%; 95% confidence interval [CI], 4.4%-6.1%), with a mean age of 30.7 years; 58% were male. Falls represented 37.2% of total injuries (n = 379) reported (95% CI, 32.3%-42.3%). Twelve individuals who suffered from a fall injury were unable to access surgical care (8.5%; 95% CI, 4.5%-14.4%). Reasons for barrier to care included no money for health care (n = 3), facility/personnel not available (n = 7), and fear/no trust (n = 2). Of the 80 recent deaths reported, 7 were due to fall injury (8.8%; 95% CI, 3.6%-17.2%), and patients had a mean age of 46 years (SD 22.8). Surgical care was not delivered to those who died for the following reasons: no time (n = 4), facility/personnel not available (n = 1), fear/no trust (n = 1), and no need (n = 1).

CONCLUSION: The Nepal SOSAS study provides countrywide, population-based data on fall-injury prevalence in Nepal and has identified falls as a crucial public health concern. These data highlight persistent barriers to access to care for the injured and the need to improve trauma care systems in developing countries such as Nepal.

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Vestibular contribution to balance control in the medial gastrocnemius and soleus

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DOI 10.1152/jn.00512.2015 **PMID** 26683068

Abstract

The soleus (Sol) and medial gastrocnemius (mGas) muscles have different patterns of activity during standing balance and may have distinct functional roles. Using surface electromyography we previously, observed larger responses to galvanic vestibular stimulation (GVS) in the mGas compared to the Sol muscle. However, it is unclear whether this difference is an artifact that reflects limitations associated with surface electromyography recordings or whether a compensatory balance response to a vestibular error signal activates the mGas to a greater extent than the Sol. In the present study, we compared the effect of GVS on the discharge behaviour of nine Sol and twenty-one mGas motor units from freely standing subjects. In both Sol and mGas motor units, vestibular stimulation induced

biphasic responses in measures of discharge timing (11 ± 5.0 [mGas] and 5.6 ± 3.8 [Sol] counts relative to the sham (mean \pm standard deviation)), and frequency (0.86 ± 0.6 Hz [mGas], 0.34 ± 0.2 Hz [Sol] change relative to the sham). Peak-to-trough response amplitudes were significantly larger in the mGas (62% in the probability-based measure and 160% in the frequency-based measure) compared to the Sol (multiple $p < 0.05$). Our results provide direct evidence that vestibular signals have a larger influence on the discharge activity of motor units in the mGas compared to the Sol. More tentatively, these results indicate the mGas plays a greater role in vestibular-driven balance corrections during standing balance.

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