Fractures and Head Injury

This document contains all abstracts for publications relating to fractures and head injuries for 2020. These abstracts have been sourced from SafetyLit.org and include only those relevant to falls prevention.

SafetyLit provides weekly abstracts of peer reviewed articles from researchers who work in the more than 30 distinct professional disciplines relevant to preventing and researching unintentional injuries, violence, and self-harm. Each week citations and summaries of about 400 articles and reports are included in a PDF document or through an RSS subscription.

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Fracture

Screening for high hip fracture risk does not impact on falls risk: a post hoc analysis from the SCOOP study

Condurache CI, Chiu S, Chotiyarnwong P, Johansson H, Shepstone L, Lenaghan E, Cooper C, Clarke S, Khioe RFS, Fordham R, Gittoes N, Harvey I, Harvey NC, Heawood A, Holland R, Howe A, Kanis JA, Marshall T, O'neill TW, Peters TJ, Redmond NM, Torgerson D, Turner D, McCloskey E. Osteoporos. Int. 2020; ePub(ePub): ePub.
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DOI 10.1007/s00198-019-05270-6 **PMID** 31960099
Abstract
A reduction in hip fracture incidence following population screening might reflect the effectiveness of anti-osteoporosis therapy, behaviour change to reduce falls, or both. This post hoc analysis demonstrates that identifying high hip fracture risk by FRAX was not associated with any alteration in falls risk.
INTRODUCTION: To investigate whether effectiveness of an osteoporosis screening programme to reduce hip fractures was mediated by modification of falls risk in the screening arm.
METHODS: The SCOOP study recruited 12,483 women aged 70-85 years, individually randomised to a control (n = 6250) or screening (n = 6233) arm; in the latter, osteoporosis treatment was recommended to women at high risk of hip fracture, while the control arm received usual care. Falls were captured by self-reported questionnaire. We determined the influence of baseline risk factors on future falls, and then examined for differences in falls risk between the randomisation groups, particularly in those at high fracture risk.
RESULTS: Women sustaining one or more falls were slightly older at baseline than those remaining falls free during follow-up (mean difference 0.70 years, 95%CI 0.55-0.85, $p < 0.001$). A higher FRAX 10-year probability of hip fracture was associated with increased likelihood of falling, with fall risk increasing by 1-2% for every 1% increase in hip fracture probability. However, falls risk factors were well balanced between the study arms and, importantly, there was no evidence of a difference in falls occurrence. In particular, there was no evidence of interaction ($p = 0.18$) between baseline FRAX hip fracture probabilities and falls risk in the two arms, consistent with no impact of screening on falls in women informed to be at high risk of hip fracture.
CONCLUSION: Effectiveness of screening for high FRAX hip fracture probability to reduce hip fracture risk was not mediated by a reduction in falls.

Language: en

Keywords
FRAX; Falls; Fractures; Older women; Osteoporosis; Screening

Depression, falls, and osteoporotic fractures

Zhou J, Xue Y. Osteoporos. Int. 2020; ePub(ePub): ePub.

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DOI 10.1007/s00198-020-05347-7 **PMID** 32170397

Abstract

We read the article by Afrin et al. with great interest [1]. In their study, the authors found that for postmenopausal women, falls in the previous 12 months were associated with fracture in the following 5 years through logistic regression models. They said the models were adjusted for baseline age, body mass index, dairy calcium intake, number of prescribed medications, number of chronic health disorders, current smoking, alcohol use, leisure physical activity, restricted mobility, and use of estrogen hormone therapy. However, in our opinion, the data of depression should be considered in the study.

Depression is a global public health concern [2]. Multiple studies have proved that depression was a risk factor for osteoporotic fractures [3,4,5]. In our previous study, we found that for postmenopausal women with osteoporosis, depression was associated with a higher risk of thoracolumbar fracture, with more fracture pain and lower quality of life in the 2 months following fracture [5]. Furthermore, a recent meta-analysis indicated that depression was significantly related to an increased risk of osteoporotic fracture and bone loss [6].

Falls are common in the elderly and a positive correlation between depression and falls was found in a few studies [7, 8]. Hoffman et al. found that among community-dwelling older adults, depression was associated with subsequent falls, but falls were not associated with later depression [7]. In a meta-analysis, the authors demonstrated that depression was a significant predictor of falls (OR = 1.46) [9]. Moreover, the Hendrich II Fall Risk Model is a widely used fall risk assessment tool, which is intended for the nurse at the point of care to predict patients' risk of falls [10]. In this model, depression is one of the eight risk factors.

Hence, given the sophisticated correlation among depression, falls, and osteoporotic fractures, it is necessary to take account of the data of depression in the adjusted models.

Language: en

In-hospital fall and fracture risk with conditions in the Elixhauser Comorbidity Index: an analysis of state inpatient data

Davis J, Casteel C, Peek-Asa C. J. Patient Saf. 2020; ePub(ePub): ePub.

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DOI 10.1097/PTS.0000000000000637 **PMID** 32168270

Abstract

OBJECTIVE: In-hospital falls (IHFs) are a significant burden to the healthcare industry and patients seeking inpatient care. Many falls lead to injuries that could be considered a hospital-acquired condition (HAC). We demonstrated how administrative data can be used to quantify how many IHFs occur and identify what conditions increase the risk for these falls.

METHODS: Iowa State Inpatient Database records from 2008 to 2014 for adults older than 50 years were used to quantify IHFs, falls resulting in an HAC (HAC IHFs), and fractures during in-hospital treatment. The medical conditions used in the Elixhauser Comorbidity Index were evaluated for the risk of the separate fall-related outcomes using Poisson regression.

RESULTS: There were 1770 records that had an IHF for an IHF rate of 0.26 per 1000 patient days. Psychoses (rate ratio = 1.95, 95% confidence interval = 1.63-2.34) and alcohol abuse (rate ratio = 1.77, 95% confidence interval = 1.40-2.24) showed the greatest increase in IHF risk. These conditions also increased the risk of HAC IHFs and in-hospital fractures. Fluid and electrolyte disorders, deficiency anemias, and chronic pulmonary disease increased the risk for IHFs/HAC IHFs but did not increase the risk of in-hospital fractures.

CONCLUSIONS: Administrative data can be used to track various fall-related outcomes occurring during inpatient treatment. Several conditions of the Elixhauser Comorbidity Index were identified as increasing the risk of fall-related outcomes and should be considered when evaluating a patient's risk of falling.

Language: en

Differences in treatment and prognosis by the experience of falls or bone fracture in elderly patients with atrial fibrillation

Akama J, Suzuki S, Kato Y, Arita T, Yagi N, Otsuka T, Semba H, Kishi M, Kano H, Matsuno S, Uejima T, Oikawa Y, Matsuhama M, Yajima J, Takeishi Y, Yamashita T. Heart Vessels 2020; ePub(ePub): ePub.

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DOI 10.1007/s00380-020-01592-2 **PMID** 32266477

Abstract

Treatment and prognosis of elderly patients with atrial fibrillation (AF) may differ by the experience of fall or bone fracture. However, their current status is still unclear. From our institute database between 2010 and 2015, 674 AF patients with age ≥ 70 years were selected and were divided into those who experienced fall or fracture during the observation period (F/F group; n = 49) and those who did not (non-F/F group; n = 625). We compared the treatment and prognosis between the 2 groups. Patients in the F/F group were older (79 vs 76 years, P < 0.001) and had more comorbidities compared with those in the non-F/F group. The prescription rate of oral anticoagulant was similar between the two groups (77.6% vs 68.2%, P = 0.201), where warfarin was predominant. The F/F group was not associated with higher incidence of ischemic stroke. The F/F group was associated with a higher incidence of heart failure events (adjusted odds ratio (OR) 3.88; 95% confidence intervals (Cl) 1.70-8.85; P = 0.001), and cardiovascular events (OR 3.43; 95% Cl 1.71-6.85; P < 0.001). In elderly AF patients in a cardiovascular hospital, the experience of fall or fracture did not affect the prescription of oral anticoagulants and the incidence of ischemic stroke, but it was significantly associated with increase of heart failure.

Language: en

Keywords

Atrial fibrillation; Cardiovascular events; Falls; Heart failure

Comparative effectiveness of functional tests in fall prediction after hip fracture

Wald P, Chocano-Bedoya PO, Meyer U, Orav EJ, Egli A, Theiler R, Bischoff-Ferrari HA. J. Am. Med. Dir. Assoc. 2020; ePub(ePub): ePub.
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DOI 10.1016/j.jamda.2020.02.008 **PMID** 32276783
Abstract
OBJECTIVES: To assess the validity of 4 functional tests in predicting falls within the first year after hip fracture.
DESIGN: Prospective study of functional tests shortly after hip surgery and incident falls during 12 months' follow-up. SETTING AND PARTICIPANTS: The sample comprised 173 adults with acute hip fracture, aged 65 years and older (79% women, 77% community dwelling, mean age 84.2 years), who participated in a clinical trial of vitamin D or home exercise.
METHODS: We assessed 4 functional tests [Timed Up and Go test (TUG), grip strength, and knee flexor and extensor strength in the nonoperated leg] by trained study physiotherapists at baseline (1-12 days after hip fracture surgery). During 12 months' follow-up, we ascertained all fall events by monthly personal phone calls, a telephone hotline, and a patient diary. Then we compared TUG and strength test performance at baseline between future single fallers, recurrent fallers, and nonfallers over the 12-month follow-up. All analyses adjusted for age, body mass index, gender, 25-hydroxyvitamin D status at baseline, days of follow-up, and treatment allocation (the original trial tested vitamin D treatment and/or a home exercise program).
RESULTS: Ninety-two of 173 (53%) participants fell and experienced 212 falls. Participants who became recurrent fallers (n = 54) had significantly longer TUG times at baseline than those who did not fall (n = 81) in the following 12 months (mean TUG for recurrent fallers = 71.6 seconds, SD = 8.2 seconds, vs mean TUG for nonfallers = 51.4 seconds, SD = 6.9 seconds; P = .02). There were no significant differences in TUG times between single fallers and nonfallers. For all 3 strength tests, there were no significant differences between single fallers, recurrent fallers, and nonfallers.
CONCLUSIONS AND IMPLICATIONS: In this population of frail older adults recruited shortly after hip fracture surgery, only the TUG test discriminated between future recurrent fallers and nonfallers over a 12-month follow-up. Because of the high incidence and serious consequences of falls in older adults after a hip fracture, it is very important to identify practical and clinically related tests to predict repeated falls in the first year after a hip fracture, which is of great public health importance.
Language: en
Keywords
Falls; Timed Up and Go test; functional assessments; grip strength; hip fracture; knee flexor and extensor strength

Effect of fall characteristics on the severity of hip impact during a fall on the ground from standing height

Lim KT, Choi WJ. Osteoporos. Int. 2020; ePub(ePub): ePub.

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DOI 10.1007/s00198-020-05432-x **PMID** 32346772

Abstract

The magnitude of hip impact force during a fall on the ground (i.e., concrete surface) from standing height was determined. We found that this force decreases up to 59%, depending on how they land on the ground.

INTRODUCTION: We determined the magnitude of hip impact force that humans may experience in the event of a fall from standing height on the ground, in order to examine how the hip impact force was affected by characteristics of a fall.

METHODS: Twenty subjects mimicked a typical older adults' falls on a mat. Trials were acquired with three initial fall directions: forward, sideways, and backward. Trials were also acquired with three knee positions at the time of hip impact: knee together, knee on the mat, and free knee. During falls, attenuated vertical hip impact forces and corresponding depression of the mat were measured via a force plate placed under the mat and motion capture system, respectively. Using a mass-spring model, actual hip impact force and body stiffness during a fall on the ground were estimated.

RESULTS: Hip impact force averaged 4.0 kN (SD = 1.7). The hip impact force was associated with knee condition ($F = 25.6$, $p < 0.005$), but not with fall direction ($F = 0.4$, $p = 0.599$). Compared with "knee on the mat," hip impact force averaged 59% and 45% greater in "free knee" and "knee together," respectively (4.6 versus 2.9 kN, $p < 0.005$; 4.3 versus 2.9 kN, $p < 0.005$). However, the hip impact force did not differ between "free knee" and "knee together (4.6 versus 4.3 kN, $p = 0.554$).

CONCLUSION: Our results suggest that hip fracture risk during a fall decreases substantially, depending on how they land on the ground, informing the development of safe landing strategies to prevent fall-related hip fractures in older adults.

Language: en

Keywords

Falls; Hip fracture; Hip impact force; Kinematics; Older adults

Prevalence and risk factors of falls in adults one-year after total hip arthroplasty for osteoarthritis: a cross-sectional study

Hunter SW, Bobos P, Somerville L, Howard J, Vasarhelyi EM, Lanting B. Am. J. Phys. Med. Rehabil. 2020; ePub(ePub): ePub.

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DOI 10.1097/PHM.0000000000001456 **PMID** 32332196

Abstract

Total hip arthroplasty (THA) is very successful in alleviating the pain from osteoarthritis. Yet deficits in lower extremity strength, gait and balance after surgery has identified this group at risk of falls. Considering the high number of people annually receiving a THA, further elaboration of factors associated with falls are needed to refine falls prevention guidelines. The objective was to examine the prevalence and circumstances of falling and the risk factors associated with falling in older adults in the first year after THA surgery. This was a cross-sectional study involving 108 individuals (age of 72.4±6.5years, 60% females) who had unilateral THA. The primary outcome was falls and their circumstances during the 12 months after the THA. Twenty-five people (23.1%) had at least one fall and the majority of falls (56%) occurred 6 to 12 months after surgery. Falls resulted in minor injuries for 44% and 12% reported major injuries. The strongest independent predictor for falls was a history of a previous joint replacement with OR of 7.38, 95% CI(2.41, 22.62), p<.001. Overall, the information highlights that falls are common after THA, yet considering the older age of people having this surgery screening for falls risk should follow established guidelines.

Language: en

The effect of fall biomechanics on risk for hip fracture in older adults: a cohort study of video-captured falls in long-term care

Yang Y, Komisar V, Shishov N, Lo B, Korall AM, Feldman F, Robinovitch SN. J. Bone Miner. Res. 2020; ePub(ePub): ePub.

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DOI 10.1002/jbmr.4048 **PMID** 32402136

Abstract

Over 95% of hip fractures in older adults are caused by falls, yet only 1-2% of falls result in hip fracture. Our current understanding of the types of falls that lead to hip fracture is based on reports by the faller or witness. We analyzed videos of real-life falls in long-term care to provide objective evidence on the factors that separate falls that result in hip fracture from falls that do not. Between 2007-2018, we video-captured 2377 falls by 646 residents in two long-term care facilities. Hip fracture was documented in 30 falls. We analyzed each video with a structured questionnaire, and used Generalized Estimating Equations to determine relative risk ratios (RRs) for hip fracture associated with various fall characteristics. All hip fractures involved falls from standing height, and pelvis impact with the ground. After excluding falls from less than standing height, risk for hip fracture was higher for sideways landing configurations (RR = 5.50; 95%CI: 2.36-12.78) than forward or backward, and for falls causing hip impact (3.38; 1.49-7.67). However, hip fracture risk was just as high in falls initially directed sideways as forward (1.14; 0.49-2.67), due to the tendency for rotation during descent. Falling while using a mobility aid was associated with lower fracture risk (0.30; 0.09-1.00). 70% of hip fractures involved impact to the posterolateral aspect of the pelvis. Hip protectors were worn in 73% of falls, and hip fracture risk was lower in falls where hip protectors were worn (0.45; 0.21-0.99). Age and sex were not associated with fracture risk. There was no evidence of spontaneous fractures. In this first study of video-captured falls causing hip fracture, we show that the biomechanics of falls involving hip fracture were different than non-fracture falls for fall height, fall direction, impact locations, and use of hip protectors.

Language: en

Keywords

Biomechanics; Falls; Hip fracture; Hip protectors; Video capture

Association of abductor hip muscle atrophy with fall-related proximal femur fractures in the elderly

Erinc S, Bozca MA, Bankaoğlu M, Çakırtürk S, Yahşi Y, Özdemir HM. Injury 2020; ePub(ePub): ePub.

DOI 10.1016/j.injury.2020.04.054 **PMID** unavailable

Abstract

OBJECTIVE: The purpose of this study was to evaluate an association between fall-related intertrochanteric or femoral neck fractures and gluteus medius and minimus atrophy, furthermore, to find a correlation of whether any difference between femoral neck or intertrochanteric fracture and degree of muscle atrophy MATERIALS AND METHODS: A retrospective review of 230 patients with intertrochanteric or femoral neck fracture, aged > 65 years, and 60 age- matched controls was performed. We assessed gluteus medius and minimus atrophy and calculated the cross-sectional area (CSA) and ratio of lean muscle to adipose infiltration (M/A ratio) for each muscle.

RESULTS: The atrophy scores for the g.medius and g.minimus muscles on the fractured side were significantly higher than scores on the healthy side and scores in the control group. The atrophy scores for the g.medius on the healthy side were not significantly different from scores in the control group. The atrophy scores for g.medius were significantly different between the fractured side and the healthy side for all ages, the atrophy scores for g.minimus was significantly different in the patients aged over 75. There was no significant difference in the following parameters between the fractured side and healthy side of the patients aged 65 - 75 years; the atrophy score, CSA and M/A ratio. The patients have a lower CSA and M/A ratio on the fractured side than on the healthy side and lower CSA and M/A ratio than in the control group. However, there were no significant differences in the M/A ratio between the healthy side and the control group. CSA was not significantly different between the fractured side and healthy side in the male patients and in the patients with lower BMI (<30). There was no significant difference in the atrophy scores between subjects with intertrochanteric versus femoral neck fractures, the CSAs of the g.medius and g.minimus were significantly different between the intertrochanteric fracture and femoral neck fracture groups.

CONCLUSIONS: The fractured sides showed greater g.medius and g.minimus muscle atrophy, which may be a predictor of fall-related hip fractures in the elderly. Gluteal muscle volume may be associated with proximal femur fracture subtype.

Language: en

Keywords

Aging; Gluteus medius; Hip abductor muscles; Hip fractures; Proximal femur fracture

Factors associated with screening positive for high falls risk in fragility fracture patients: a cross-sectional study

Rotondi NK, Beaton DE, Sujic R, Bogoch E, Inrig T, Linton D, Weldon J, Jain R, Sale JEM. BMC Musculoskelet. Disord. 2020; 21(1): e372.

DOI 10.1186/s12891-020-03410-2 **PMID** 32532279

Abstract

BACKGROUND: We sought to report the prevalence of fragility fracture patients who were screened at high falls risk using a large provincial database, and to determine the characteristics associated with being screened at high falls risk.

METHODS: The study population included fragility fracture patients 50+ years of age who were screened at 35 hospital fracture clinics in Ontario over a 3.5 year period. The outcome was based on two screening questions measuring the risk of falling, both adapted from the STEADI (Stopping Elderly Accidents, Deaths & Injuries) tool. Multivariable associations of sociodemographic, fracture-related, and health-related characteristics were evaluated using logistic regression.

RESULTS: Of the sample, 9735 (44.5%) patients were classified as being at high falls risk, and 12,089 (55.3%) were not. In the multivariable logistic regression, being 80+ years of age (vs. 50-64 years of age), non-community dwelling (vs. living with spouse, family member, roommate), having a mental/physical impairment (vs. none), and taking multiple medications, were all strongly associated with being screened at high falls risk.

CONCLUSIONS: Living in a non-community dwelling and taking 4+ medications were the variables most strongly associated with being screened at high falls risk. These are potentially modifiable characteristics that should be considered when assessing falls risk in fragility fracture patients, and particularly when designing interventions for preventing subsequent falls. Ongoing work to address the higher risk of falls in the fragility fracture population is warranted.

Language: en

Keywords

Fragility fracture; Cross-sectional observational study; Deaths & Injuries); Risk of falling; STEADI (Stopping Elderly Accidents

Elucidating failure mechanisms in human femurs during a fall to the side using bilateral digital image correlation

Grassi L, Kok J, Gustafsson A, Zheng Y, Väänänen SP, Jurvelin JS, Isaksson H. J. Biomech. 2020; 106: e109826.

DOI 10.1016/j.jbiomech.2020.109826 **PMID** 32517988

Abstract

An improved understanding of the mechanical properties of human femurs is a milestone towards a more accurate assessment of fracture risk. Digital image correlation (DIC) has recently been adopted to provide full-field strain measurements during mechanical testing of femurs. However, it has typically been used to measure strains on the anterior side of the femur, whereas in both single-leg-stance and sideways fall loading conditions, the highest deformations result on the medial and lateral sides of the femoral neck. The goal of this study was to measure full-field deformations simultaneously on the medial and lateral side of the femoral neck in a configuration resembling a fall to the side. Twelve female cadaver femurs were prepared for DIC measurements and tested in sideways fall at 5 mm/s displacement rate. Two pairs of cameras recorded the medial and lateral side of the femoral neck, and deformations were calculated using DIC. The samples exhibited a two-stage failure: first, a compressive collapse on the superolateral side of the femoral neck in conjunction with peak force, followed by complete femoral neck fracture at the force drop following the post-elastic phase. DIC measurements corroborated this observation by reporting no tensile strains above yield limit for the medial side of the neck up to peak force. DIC measurements registered onto the bone micro-architecture showed strain localizations in proximity of cortical pores due to, for instance, blood vessels. This could explain previously reported discrepancies between simulations and experiments in regions rich with large pores, like the superolateral femoral neck.

Language: en

Keywords

Mechanical testing; Digital image correlation; Direction of principal strain; Femurs; Hip fractures; Sideways fall; Strain distribution

Exploring of the mechanism of rib fracture caused by landing on different parts of the trunk after falls from height using finite element method

Hu WH, Shao Y, Li ZD, Zou DH, Zhang JH, Chen YJ, Wang HJ. Fa Yi Xue Za Zhi 2020; 36(2): 181-186.

DOI 10.12116/j.issn.1004-5619.2020.02.007 **PMID** 32530164

Abstract

OBJECTIVE To study the mechanism of rib fracture caused by landing on different parts of the trunk using finite element method, and to provide some new techniques and new ideas for the reconstruction of the whole process of falls from height.

METHODS The finite element method was used to study the rib fracture of human security model THUMS4.0 caused by landing on different parts of the trunk. Then the model was compared with actual cases and the mechanism of rib fracture caused by falls from height was analyzed from a biomechanical point of view.

RESULTS There were some differences in the stress and strain distribution as well as the rib fracture sites when different parts touched the ground. Ribs on both sides of the body were fractured when the front of the trunk touched the ground, and the fractures were mainly located in the junction of the ribs and costal cartilage and the midaxillary line area. When the right anterior part of the trunk touched the ground, rib fracture occurred first on the side that touched the ground, and rib fractures were mainly located in the area from the right midaxillary line to the posterior axillary line, and junction of ribs on both sides and costal cartilage. When the back of the trunk touched the ground, the fracture sites were mainly located on the back of the ribs on both sides. When the right posterior part of the trunk touched the ground, multiple rib fractures were likely to occur in the parts that touched the ground. The plastic strains were mainly concentrated at the fracture sites, while the von Mises stresses were not only concentrated at the fracture sites, but also at other sites.

CONCLUSION There are some differences in rib fracture location sites and injury mechanisms when different parts of the trunk touch the ground.

Language: en

Keywords

forensic pathology; biomechanics; finite element method; rib fractures; fractures, stress; injury caused by fall from height; damage mechanism

Hip fractures are preventable: a proposal for osteoporosis screening and fall prevention in older people

Kwok TCY, Law SW, Leung EMF, Choy DTK, Lam PMS, Leung JCS, Wong SH, Ip TP, Cheung CL. Hong Kong Med. J. 2020; 26(3): 227-235.

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DOI 10.12809/hkmj198337 **PMID** 32554817

Abstract

[Abstract unavailable]

Language: en

Randomised controlled trial assessing the effect of a technology-assisted gait and balance training on mobility in older people after hip fracture: study protocol

Maranesi E, Riccardi GR, Lattanzio F, Di Rosa M, Luzi R, Casoni E, Rinaldi N, Baldoni R, Di Donna V, Bevilacqua R. BMJ Open 2020; 10(6): e035508.

DOI 10.1136/bmjopen-2019-035508 **PMID** 32546491

Abstract

INTRODUCTION: Deficits in balance and walking ability are relevant risk factors for falls during ageing. Moreover, falls are a risk factor for future falls, strongly associated with adverse health outcomes, such as fear of falling or fractures, particularly, hip fracture. For this reason, the development of prevention tools and innovative rehabilitation strategies is one of the main objectives in geriatrics. Effective interventions to promote hip recovery after hip fracture are characterised by intensive and repetitive movements. One treatment approach is to increase the number of steps during the rehabilitation sessions and to improve the balance and the endurance of the patients in the use of technological devices.

METHODS AND ANALYSIS: This randomised controlled trial aimed to evaluate an innovative rehabilitation treatment of elderly patients with hip fractures. A total of 195 patients with hip fractures will be recruited and randomly divided into three groups: traditional rehabilitation programme, traditional rehabilitation programme plus TYMO system and traditional rehabilitation programme plus Walker View. Assessments will be performed at baseline, at the end of treatment, at 6 months, and at 1 and 2 years after the end of the treatment. Only subjects hospitalised 4 weeks prior to the beginning of the study will be taken into consideration. Twenty treatment sessions will be conducted, divided into three training sessions per week, for 7 weeks. The technological intervention group will carry out 30 min sessions of traditional therapy and 20 min of treatment with a technological device. The control group will perform traditional therapy sessions, each lasting 50 min. The primary outcomes are risk of falling, gait performance and fear of falling.

ETHICS AND DISSEMINATION: The study was approved by the Istituto di Ricerca e Cura a Carattere Scientifica, Istituto Nazionale Ricovero e Cura Anziani Ethics Committee, with identification code number 19 014. Trial results will be submitted for publication in journals and conferences.

TRIAL REGISTRATION NUMBER: NCT04095338.

Language: en

Keywords

public health; information technology; rehabilitation medicine

Why do falls and lower limb fractures occur more frequently in the diabetic patient and how can they be prevented?

Bell DSH, Goncalves E. Diabetes Ther. 2020; ePub(ePub): ePub.

DOI 10.1007/s13300-020-00877-z **PMID** 32651838

Abstract

Due to primarily sarcopenia and hypoglycemia but also neuropathy, hypotension, analgesics and polypharmacy, there is an increased incidence of falls and hip fractures in both the type 1 and type 2 diabetic patient. Utilization of insulin, hypotensive drugs, analgesics and perhaps canagliflozin further increases the risk. Thiazolidinedione use may increase the risk of osteoporosis and fracture. Prolonged hyperglycemia resulting in cross-linking of collagen and advanced glycosylation end products alter the microarchitecture and increase bone fragility. Higher serum vitamin D levels seem to decrease the incidence of both falls and fractures. Following a hip fracture, mortality in the diabetic patient is increased largely because of cardiovascular events and pneumonia. Prevention of sarcopenia includes dietary therapy, vitamin D and testosterone replacement when appropriate.

Language: en

Keywords

Falls; Sarcopenia; Aging; Neuropathy; Diabetes; Fractures; Hypoglycemia; Osteoporosis; Polypharmacy

Effectiveness of home-based rehabilitation program in minimizing disability and secondary falls after a hip fracture: protocol for a randomized controlled trial

Sadruddin Pidani A, Sabzwari S, Ahmad K, Mohammed A, Noordin S. Int. J. Surg. Protoc. 2020; 22: 24-28.

DOI 10.1016/j.isjp.2020.06.002 **PMID** 32695954

Abstract

INTRODUCTION: Hip fractures are a major health problem globally and are associated with increased morbidity, mortality, and substantial economic costs. Successful operative treatment of hip fracture patients is necessary for the optimization of post-op mobility and functional recovery of the patient. Rehabilitation after surgical stabilization of a hip fracture is crucial in order to restore pre-fracture function and to avoid long-term institutionalization. In particular ongoing exercise which targets balance can prevent up to 40% of falls. Therefore, we have designed a post-discharge home-based physical rehabilitation intervention program to minimize disability and falls in this high-risk elderly population.

Methods and analysis: The study will be an open label, simple randomized controlled trial at a single hospital. The two arms will be equally allocated on a 1:1 ratio into intervention and control groups. The control arm will receive the usual standard postoperative rehabilitation. The intervention group will receive an extended home-based rehabilitation program twice a week continued for 3 months (12 weeks) after discharge. The Primary outcome of the study is occurrence of falls. Falls will be measured at 3, 6, 12, and 24 months by research-assistant follow-up telephone calls for both the groups. Mobility-related disability will be measured with a self-reported test at every routine follow-up for up to two years using a performance-based short battery tool. Negative binomial regression model will be used to compare number of falls in both the groups by computing incidence ratio rates.

Ethics and dissemination: Approval for the conduction of this study has been taken from the Ethical Review Committee (ERC) of the institution. Evidences which will be obtained from this study will facilitate to propose changes in existing guidelines and policies for treating fall and hip fracture patients.Trial registrationThis trial is registered on clinicaltrials.gov ID: NCT04108793.

Language: en

Keywords

Physical activity; Disability; Rehabilitation; CTU, Clinical trial unit; Elderly population; ERC, Ethical Review committee; Hip fracture; Secondary falls; THR, Total hip replacement

The effectiveness of exercises on fall and fracture prevention amongst community elderlies: a systematic review and meta-analysis

Wong RMY, Chong KC, Law SW, Ho WT, Li J, Chui CS, Chow SKH, Cheung WH. J. Orthop. Translat. 2020; 24: 58-65.

DOI 10.1016/j.jot.2020.05.007 **PMID** 32695605

Abstract

OBJECTIVE: To analyze the effectiveness of exercise interventions on falls and fall-related fracture prevention among community-dwelling elderlies.

Methods: Literature search was conducted in Pubmed and Embase. Keywords used for literature search were "fracture" AND "fall" AND "exercise". Randomized controlled trials involving community-dwelling elderlies older than 60 years old with physical exercises as intervention were included. A systematic review and meta-analysis was performed. The primary outcomes were falls and fractures.

Results: Twelve studies were included and 4784 participants were involved with a mean age of 75.4. The most common exercise interventions were strength and balance exercises. The results of meta-analysis of 11 studies showed that exercise intervention had beneficial effect on fall prevention (RR = 0.71, 95% CI, 0.62-0.82; I2 = 24%, p < 0.0001). The effect was better when exercise intervention applied to women participants (RR = 0.64, 95% CI, 0.49-0.83; I2 = 28%, p = 0.00009) compared to men and women participants (RR = 0.75, 95% CI, 0.64-0.89; I2 = 24%, p = 0.001). The results of meta-analysis of seven studies showed that physical exercise had significant effect on fracture prevention (RR = 0.54, 95% CI, 0.35-0.83; I2 = 25%, p = 0.005). However, the effect was significant when exercise intervention applied to women participants only (RR = 0.37, 95% CI, 0.20-0.67; I2 = 0%, p = 0.001) but not significant when exercise intervention applied to both genders (RR = 0.80, 95% CI, 0.58-1.09; I2 = 0%, p = 0.15).

Conclusion: Exercise interventions, especially the combination of strength and balance training, were effective in preventing falls. Resistance exercises and jumping exercises were effective for fracture prevention among community-dwelling older population. The effectiveness of exercise interventions on fracture prevention have more significant effect on women. Further studies are needed to test the effectiveness of exercise interventions in men.

Translational potential: The use of effective exercises or biophysical interventions including vibration therapy can be incorporated into Fracture Liaison Services to prevent future fall and fracture.

Language: en

Keywords

Prevention; Systematic review; Exercise; Fall; Fracture

Non-pharmacological interventions towards preventing the triad osteoporosis-falls risk-hip fracture, in population older than 65. scoping review

Peraza-Delgado A, Sánchez-Gómez MB, Gómez-Salgado J, Romero-Martín M, Novo-Muñoz M, Duarte-Clíments G. J. Clin. Med. 2020; 9(8): e2329.

DOI 10.3390/jcm9082329 **PMID** 32707829

Abstract

Osteoporosis leads to increased risk of falls, and thus an increase in fractures, highlighting here hip fractures, that result in high mortality, functional disability, and high medical expenditure. The aim is to summarise the available evidence on effective non-pharmacological interventions to prevent the triad osteoporosis/falls risk/hip fracture. A scoping review was conducted consulting the Scientific Electronic Library Online (Scielo), National Institute for Health and Care Excellence (NICE), Cumulative Index to Nursing & Allied Health Literature (CINAHL) y PubMed.databases. Inclusion criteria were articles published between 2013 and 2019, in Spanish or English. In addition, publications on a population over 65 years of age covering non-pharmacological interventions aimed at hip fracture prevention for both institutionalised patients in long-stay health centres or hospitals, and patients cared for at home, both dependent and non-dependent, were included. Sixty-six articles were selected and 13 non-pharmacological interventions were identified according to the Nursing Interventions Classification taxonomy, aimed at preventing osteoporosis, falls, and hip fracture. The figures regarding the affected population according to the studies are alarming, reflecting the importance of preventing the triad osteoporosis, falls risk, and hip fracture among the population over 65 years of age. The most effective interventions were focused on increasing Bone Mineral Density through diet, exercise, and falls prevention. As a conclusion, primary prevention should be applied to the entire adult population, with special emphasis on people with osteoporosis.

Language: en

Keywords

accidental falls; risk factors; primary prevention; osteoporosis; hip fractures

Femoral intertrochanteric fractures of the patients in the emergency department due to minor falls: special consideration in the middle-old to oldest-old patients

Jang JM, Choi HS, Lee JS, Jeong KY, Hong HP, Ko SH. Ann. Geriatr. Med. Res. 2019; 23(3): 125-132.

DOI 10.4235/agmr.19.0027 **PMID** 32743300

Abstract

BACKGROUND: The older population (≥65 years) has rapidly increased in size in recent years. Among them, the middle-to-oldest-old (≥75 years) tend to have a poor health status. Therefore, subdivision and evaluation of older patients with traumatic injury are required. We focused on the risk of femoral intertrochanteric fractures occurring in older adults due to minor falls and compared young-old and middle-to-oldest-old populations.

Methods: The medical records of patients who visited the emergency center due to hip injuries between March 2017 and March 2019 were retrospectively analyzed. Patients were divided into older adult (≥65 years) and non-older (age 18-64 years) groups; the older adult group was subdivided into young-old (65-74 years), middle-old (75-84 years), and oldest-old (≥85 years) groups. This study investigated the occurrence rate of femoral intertrochanteric fractures and related factors.

Results: The older adult group had a higher incidence of femoral intertrochanteric fractures than that in the non-older adult group (95.3% vs. 4.7%, $p<0.001$). However, there was no significant difference between young-old and non-older groups (58.8% vs. 41.2%, $p=0.145$). Middle-old to oldest-old age and osteoporosis were associated with an increased incidence of femoral intertrochanteric fractures ($p<0.001$, $p=0.004$).

Conclusion: A higher incidence of femoral intertrochanteric fractures from minor falls was found among middle-old to oldest-old patients compared to that in young-old patients. Therefore, physicians should perform more thorough physical examinations and radiograph reading in middle-old to oldest-old patients even if the patients do not complain of pain.

Language: en

Keywords

Accidental falls; Emergency; Older adults; Intertrochanteric fractures

Sarcopenia Definitions and Outcomes Consortium (SDOC) criteria are strongly associated with malnutrition, depression, falls, and fractures in high-risk older persons

Kirk B, Zanker J, Bani Hassan E, Bird S, Brennan-Olsen S, Duque G. J. Am. Med. Dir. Assoc. 2020; ePub(ePub): ePub.

DOI 10.1016/j.jamda.2020.06.050 **PMID** 32771358

Abstract

OBJECTIVES: Sarcopenia Definitions and Outcomes Consortium (SDOC) provides cut-points based on muscle weakness (low grip strength) and slowness (poor gait speed) for low-risk populations; however, it is unknown if these criteria apply to high-risk populations. We examined the association between SDOC criteria and important health status indicators in high-risk older persons.

DESIGN: Cross-sectional study.

SETTING AND PARTICIPANTS: 356 community-dwelling older persons (median age: 79 years, interquartile range: 73, 83; 75.2% women) attending a falls and fractures clinic in Melbourne, Australia.

METHODS: Grip strength (hydraulic dynamometer) and gait speed (over 4 m) were used to define sarcopenia using SDOC cut-points. Health measures included falls (past 1 year) and fractures (past 5 years) by self-report, and malnutrition, depression, balance confidence, fear of falling, static balance (limits of stability), dynamic balance (Four-Square Step Test), and body composition [body mass index and lean mass, fat mass, and bone density (via dual-energy x-ray absorptiometry)] were assessed using validated procedures. Fasting vitamin D and parathyroid hormone concentrations were measured by immunoassays. Participants were categorized as nonsarcopenic or sarcopenic based on the SDOC cut-points, and multivariate models were used to examine the association between sarcopenia and health status indicators while adjusting for confounding factors.

RESULTS: After adjusting for covariates, sarcopenic older persons (n = 162, 45.5%) were positively associated with malnutrition [odds ratio (OR) 3.21, 95% confidence interval (CI) 1.63, 6.32], depression (OR 4.11, 95% CI 2.31, 7.29), fear of falling (OR 1.08, 95% CI 1.06, 1.10) as well as recurrent (2 or more) falls (OR 1.62, 95% CI 1.01, 2.59) and fractures (OR 2.26, 95% CI 1.17, 4.36), and negatively associated with poor balance confidence (OR 0.96, 95% CI 0.95, 0.97) (P <.05 vs nonsarcopenic).

CONCLUSIONS AND IMPLICATIONS: SDOC criteria are strongly associated with important health status indicators in high-risk older persons, which strengthens the clinical utility of the SDOC in these populations.
Language: en

Keywords
falls; Sarcopenia; older adults; fear of falling; depression; fractures; malnutrition

Predictors of falls in patients during the first year after total hip arthroplasty: a prospective cohort study

Ninomiya K, Takahira N, Ikeda T, Suzuki K, Sato R, Hirakawa K. Health Sci. Rep. 2020; 3(3): e184.

DOI 10.1002/hsr2.184 **PMID** 32832704

Abstract

Background and Purpose: Since falls after total hip arthroplasty (THA) cause severe complications such as dislocation and fractures around the femoral stem, it is important to investigate what factors predict of falls. Thus, investigating predictors of falls in patients waiting for THA would be valuable as it lead to more strategic interventions to prevent these problems. The purpose of this study was to evaluate the predictors of falls in patients during the first year after THA.

Methods: This is a prospective cohort study. A total of 157 patients who underwent THA for unilateral hip osteoarthritis were analyzed. The incidence of falls during the first year after THA was monitored, and patients were classified into a "faller" and "non-faller" group. The following factors were compared between the two groups: demographic data (age, sex, body mass index, leg length discrepancy, length of hospital stay, and history of falling), preoperative hip abductor muscle strength, functional performance (single leg stance and maximum walking speed), pain during walking, and physical activity.

Results: On multivariate logistic regression analysis, preoperative hip abductor muscle strength on the affected side and a history of falling were predictors of falls during the first year after THA. On subsequent receiver operating characteristic curve analysis, preoperative hip abductor muscle strength on the affected side was retained as a significant predictor, with a cut-off strength of 0.46 Nm/kg differentiating the faller and non-faller groups with a specificity of 73.6%, specificity of 50.0%, and area under the curve of 70.2%.

Conclusions: Finding from the present study suggested that clinicians should focus on low preoperative hip abductor muscle strength on the affected side and a history of falling to prevent falls during the first year after THA.

Language: en

Keywords

falls; risk factor; muscle strength; joint replacement

Effects of an intervention to reduce fear of falling and increase physical activity during hip and pelvic fracture rehabilitation

Pfeiffer K, Kampe K, Klenk J, Rapp K, Kohler M, Albrecht D, Büchele G, Hautzinger M, Taraldsen K, Becker C. Age Ageing 2020; 49(5): 771-778.

DOI 10.1093/ageing/afaa050 **PMID** 32832985

Abstract

BACKGROUND: fear of falling and reduced fall-related self-efficacy are frequent consequences of falls and associated with poorer rehabilitation outcomes. To address these psychological consequences, geriatric inpatient rehabilitation was augmented with a cognitive behavioural intervention ("Step by Step") and evaluated in a RCT.

METHODS: one hundred fifteen hip and pelvic fracture patients (age = 82.5 years, 70% female) admitted to geriatric inpatient rehabilitation were randomly allocated to the intervention or control group. The intervention consisted of eight additional individual sessions during inpatient rehabilitation, one home visit and four telephone calls delivered over 2 months after discharge. Both groups received geriatric inpatient rehabilitation. Primary outcomes were fall-related self-efficacy (short falls efficacy scale-international) and physical activity as measured by daily walking duration (activPAL3™ sensor) after admission to rehabilitation, before discharge and 1-month post-intervention.

RESULTS: in covariance analyses, patients in the intervention group showed a significant improvement in fall-related self-efficacy (P = 0.025, d = -0.42), but no difference in total daily walking duration (P = 0.688, d = 0.07) 1-month post-intervention compared to the control condition. Further significant effects in favour of the intervention group were found in the secondary outcomes "perceived ability to manage falls" (P = 0.031, d = 0.41), "physical performance" (short physical performance battery) (P = 0.002, d = 0.58) and a lower "number of falls" (P = 0.029, d = -0.45).

CONCLUSIONS: the intervention improved psychological and physical performance measures but did not increase daily walking duration. For the inpatient part of the intervention further research on the required minimum intensity needed to be effective is of interest. Duration and components used to improve physical activity after discharge should be reconsidered.

Language: en

Keywords

older people; fear of falling; physical activity; falls efficacy; hip fractures; pelvic fractures

Association between sarcopenia and fall characteristics in older adults with fragility hip fracture

Lim SK, Beom J, Lee SY, Kim BR, Chun SW, Lim JY, Shin Lee E. Injury 2020; ePub(ePub): ePub.

DOI 10.1016/j.injury.2020.08.031 **PMID** 32900471

Abstract

INTRODUCTION: Sarcopenia is known as a risk factor for falls and hip fracture, and understanding fall characteristics is important for the fall-prevention programs. The aim of this study is to investigate whether sarcopenia is associated with fall characteristics in older adults with fragility hip fracture.

METHODS: A cross-sectional study was conducted in 147 patients over 65 years of age who had undergone a two-week postoperative rehabilitation for hip fracture. Fall characteristics included the fall type, direction and location. Fall types were categorized into two groups: fragile falls, leg weakness during walking, changing positions or standing; non-fragile falls, slipping or tripping while walking. Correlations between sarcopenia and fall characteristics, and of fall type with sarcopenia and fall characteristics were analyzed. Logistic regression analyzes were used to identify independent risk factors for fragile falls.

RESULTS: Sarcopenia was significantly correlated with fragile falls (r = .222, p = .007) and was more prevalent in the fragile fall group than the non-fragile fall group (53.5% vs. 32.9%). Sarcopenia (OR = 2.354, 95% CI 1.177-4.709, p = .016), moderate comorbidities (OR = 3.572, 95% CI 1.109-11.501, p = .033) and severe comorbidities (OR = 5.396, 95% CI 1.476-19.729, p = .011) by the Charlson Comorbidity Index were significant independent risk factors for fragile falls.

CONCLUSIONS: Sarcopenia was correlated with fragile falls; moreover, it was a risk factor for all of these fall types in older adults with fragility hip fracture. Based on these associations, targeted fall-prevention programs for older adults with sarcopenia, a high risk factor of falls and fractures, could help reduce the incidence rates of falls and fragility hip fracture.

Language: en

Keywords

Falls; Sarcopenia; Older adults; Fall characteristics; Hip fracture

Head Injury

The risk of head injuries associated with antipsychotic use among persons with Alzheimer's disease

Tapiainen V, Lavikainen P, Koponen M, Taipale H, Tanskanen A, Tiihonen J, Hartikainen S, Tolppanen AM. J. Am. Geriatr. Soc. 2020; ePub(ePub): ePub.

Kuopio Research Centre of Geriatric Care, University of Eastern Finland, Kuopio, Finland.

DOI 10.1111/jgs.16275 **PMID** 31912482

Abstract

BACKGROUND/OBJECTIVES: Antipsychotic use is associated with risk of falls among older persons, but we are not aware of previous studies investigating risk of head injuries. We studied the association of antipsychotic use and risk of head injuries among community dwellers with Alzheimer's disease (AD).

DESIGN: Nationwide register-based cohort study. SETTING: Medication Use and Alzheimer's Disease (MEDALZ) cohort, Finland. PARTICIPANTS: The MEDALZ cohort includes Finnish community dwellers who received clinically verified AD diagnosis in 2005 to 2011. Incident antipsychotic users were identified from the Prescription Register and matched with nonusers by age, sex, and time since AD diagnosis (21 795 matched pairs). Persons with prior head injury or history of schizophrenia were excluded. MEASUREMENTS: Outcomes were incident head injuries (International Classification of Diseases, Tenth Revision [ICD-10] codes S00-S09) and traumatic brain injuries (TBIs; ICD-10 codes S06.0-S06.9) resulting in a hospital admission (Hospital Discharge Register) or death (Causes of Death Register). Inverse probability of treatment (IPT) weighted Cox proportional hazard models were used to assess relative risks.

RESULTS: Antipsychotic use was associated with an increased risk of head injuries (event rate per 100 person-years = 1.65 [95% confidence interval {CI} = 1.50-1.81] for users and 1.26 [95% CI = 1.16-1.37] for nonusers; IPT-weighted hazard ratio [HR] = 1.29 [95% CI = 1.14-1.47]) and TBIs (event rate per 100 person-years = 0.90 [95% CI = 0.79-1.02] for users and 0.72 [95% CI = 0.65-0.81] for nonusers; IPT-weighted HR = 1.22 [95% CI = 1.03-1.45]). Quetiapine users had higher risk of TBIs (IPT-weighted HR = 1.60 [95% CI = 1.15-2.22]) in comparison to risperidone users.

CONCLUSIONS: These findings imply that in addition to previously reported adverse events and effects, antipsychotic use may increase the risk of head injuries and TBIs in persons with AD. Therefore, their use should be restricted to most severe neuropsychiatric symptoms, as recommended by the AGS Beers Criteria®. Additionally, higher relative risk of TBIs in quetiapine users compared to risperidone users should be confirmed in further studies.

Language: en

Keywords Alzheimer's disease; antipsychotics; dementia; risk factors; traumatic brain injury

Incidence of intracranial bleeding in seniors presenting to the emergency department after a fall: a systematic review

de Wit K, Merali Z, Kagoma Y, Mercier E. Injury 2019; ePub(ePub): ePub.

Affiliation

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DOI 10.1016/j.injury.2019.12.036 **PMID** 31901331

Abstract

INTRODUCTION: Seniors who fall are an increasing proportion of the patients who are treated in emergency departments (ED). Falling on level-ground is the most common cause of traumatic intracranial bleeding. We aimed to determine the incidence of intracranial bleeding among all senior patients who present to ED after a fall.

METHOD: We performed a systematic review. Medline, EMBASE, Cochrane, and Database of Abstracts of Reviews of Effects databases, Google Scholar, bibliographies and conference abstracts were searched for articles relevant to senior ED patients who presented after a ground-level fall. Studies were included if they reported on patients aged 65 or older who had fallen. At least 80% of the population had to have suffered a ground-level fall. There were no language restrictions. We performed a meta-analysis (using the random effects model) to report the pooled incidence of intracranial bleeding within 6 weeks of the fall.

RESULTS: We identified eleven studies (including 11,102 patients) addressing this clinical question. Only three studies were prospective in design. The studies varied in their inclusion criteria, with two requiring evidence of head injury and four requiring the emergency physician to have ordered a head computed tomography (CT). One study excluded patients on therapeutic anticoagulation. Overall, there was a high risk of bias for eight out of eleven studies. The pooled incidence of intracranial bleeding was 5.2% (95% CI 3.2-8.2%). A sensitivity analysis excluding studies with a high risk of bias gave a pooled estimate of 5.1% (95% CI 3.6-7.2%).

CONCLUSION: We found a lack of high-quality evidence on senior ED patients who have fallen. The available literature suggests there is around a 5% incidence of intracranial bleeding in seniors who present to the ED after a fall.

Language: en

Keywords

Falls; Seniors; Traumatic brain injury

Anticipatory and compensatory postural responses during perturbed standing in individuals with traumatic brain injury

Pilkar R, Ibironke O, Ehrenberg N, Nolan KJ. Conf. Proc. IEEE Eng. Med. Biol. Soc. 2019; 2019: 5080-5083.

DOI 10.1109/EMBC.2019.8857851 **PMID** 31947001

Abstract

Anticipatory postural adjustments (APA) and compensatory postural adjustments (CPA) are neuromuscular responses generated to stabilize the body and achieve balance during perturbations. The impaired sensory integration after a traumatic brain injury (TBI) can limit the ability to perceive perturbations and potentially affect the ability to generate APA and CPA responses. The main objective of this investigation is to explore the existence of APA and CPA generation in tibialis anterior (TA) and gastrocnemius (GAST) muscles during base of support perturbations in healthy controls (HC) as well as individuals with TBI. The secondary objective is to explore the effectiveness of a novel computerized biofeedback based intervention (CBBI) at improving APA and CPA responses in individuals with TBI. We observed that all three groups - HC (n=5), TBI-control (n=5), and TBI-Intervention (n=4) showed the presence of only CPA responses for the TA muscle, however, these responses were longer and variable for both TBI groups, compared to the short and consistent responses of the HC group. The GAST was involved in both APA and CPA for all groups. After the 4-week CBBI period, the TBI-I group showed increased APA responses for both TA and GAST. Further, the TBI-I group showed reduced CPA responses for both TA and GAST after the intervention. The elevated and longer CPA responses of TA and GAST and lower APA responses of GAST could suggest impaired postural control. Due to their significance and potential link to the balance dysfunction, these mechanisms need to be studied comprehensively in larger samples in order to effectively optimize the rehabilitation approaches for improving balance and avoiding falls in individuals with TBI.

Language: en

Clinical predictors of intracranial bleeding in older adults who have fallen: a cohort study

de Wit K, Parpia S, Varner C, Worster A, McLeod S, Clayton N, Kearon C, Mercuri M. J. Am. Geriatr. Soc. 2020; ePub(ePub): ePub.

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DOI 10.1111/jgs.16338 **PMID** 32010977

Abstract

OBJECTIVES: Emergency department (ED) visits among older adults are frequently instigated by a fall at home. Some of these patients develop intracranial bleeding. The aim of this study was to identify the incidence of intracranial bleeding and the associated clinical features in older adults who present to the ED after falling.

DESIGN: Prospective cohort study. SETTING: Three Canadian EDs. PARTICIPANTS: A total of 2 176 patients age 65 years or older who presented to the ED with a fall were assessed, and 1753 were included. Inclusion criteria were a fall on level ground, off a bed, chair, or toilet, or from one or two steps within 48 hours. MEASUREMENTS: Emergency physicians recorded predefined clinical findings on initial assessment. The primary outcome was intracranial bleeding, diagnosed either by computed tomography at the index visit or within 42 days. Associations between baseline clinical findings and the presence of intracranial bleeding were assessed with multivariable logistic regression.

RESULTS: A total of 1753 patients (median age = 82 y) were enrolled, of whom 39% were male, 35% were on antiplatelet therapy, and 25% were on an anticoagulant. The incidence of intracranial bleeding was 5.0% (95% confidence interval [CI] = 4.1-6.1). Overall, 76 patients were diagnosed at the index ED visit, and 12 were diagnosed during follow-up. Multivariable regression identified four clinical variables that were independently associated with intracranial bleeding: new abnormalities on neurologic examination (odds ratio [OR] = 4.4; 95% CI = 2.4-8.1), bruise or laceration on the head (OR = 4.3; 95% CI = 2.7-7.0), chronic kidney disease (OR = 2.4; 95% CI = 1.3-4.6), and reduced Glasgow Coma Scale from normal (OR = 1.9; 95% CI = 1.0-3.4).

CONCLUSION: The incidence of intracranial bleeding in our study was 5.0%. We found significant associations between intracranial bleeding and four simple clinical variables. We did not find significant associations between intracranial bleeding and antiplatelet or anticoagulant use.
Language: en

Keywords
diagnosis; falls; older adults; traumatic brain injury

Deaths from fall-related traumatic brain injury -- United States, 2008-2017

Peterson AB, Kegler SR. MMWR Morb. Mortal. Wkly. Rep. 2020; 69(9): 225-230.

DOI 10.15585/mmwr.mm6909a2 **PMID** unavailable

Abstract

What is already known about this topic?
Falls can cause serious injuries, including a traumatic brain injury (TBI). Unintentional falls represent the second leading cause of TBI-related death.
What is added by this report?
The national age-adjusted rate of fall-related TBI deaths increased by 17% from 2008 to 2017; rates increased significantly in 29 states and among nearly all groups, most notably persons living in noncore nonmetropolitan counties and those aged ≥75 years.
What are the implications for public health practice?
Health care providers can educate patients about falls and TBIs, assess fall risk, and encourage participation in evidence-based fall prevention programs. Annual wellness visits might serve as a time to review previously assessed fall risk factors and update personalized prevention plans.
One in 10 U.S. residents aged ≥18 years reports falling each year (1). Among all age groups, falls can cause serious injury and are the second leading cause of traumatic brain injury (TBI)-related deaths (2). TBI is a head injury caused by a bump, blow, or jolt to the head or body or a penetrating head injury that results in disruption of normal brain function.* CDC estimated national and state-specific rates and trends for TBI-related deaths (TBI deaths) caused by unintentional falls (fall-related TBI deaths) among U.S. residents during 2008-2017, by selected decedent characteristics. The national age-adjusted rate of fall-related TBI deaths increased by 17% from 2008 to 2017. Rate trends at the national level increased significantly for nearly all decedent characteristics, with the most notable increases observed among persons living in noncore (i.e., most rural), nonmetropolitan counties and those aged ≥75 years. Analysis of state-specific rate trends determined that rates of fall-related TBI deaths increased significantly in 29 states over the 10-year study period. A fall can happen to anyone of any age, but falls are preventable. Health care providers and the public need to be aware of evidence-based strategies to prevent falls, given that rates of fall-related TBI deaths are increasing. Health care providers can educate patients on fall and TBI prevention, assess their risk for falls, and when needed, encourage participation in appropriate evidence-based fall prevention programs.
One in 10 U.S. residents aged ≥18 years reports falling each year (1). Among all age groups, falls can cause serious injury and are the second leading cause of traumatic brain injury (TBI)-related deaths (2). TBI is a head injury caused by a bump, blow, or jolt to the head or body or a penetrating head injury that results in disruption of normal brain function.* CDC estimated national and state-specific rates and trends for TBI-related deaths (TBI deaths) caused by unintentional falls (fall-related TBI deaths) among U.S. residents during 2008-

2017, by selected decedent characteristics. The national age-adjusted rate of fall-related TBI deaths increased by 17% from 2008 to 2017. Rate trends at the national level increased significantly for nearly all decedent characteristics, with the most notable increases observed among persons living in noncore (i.e., most rural), nonmetropolitan counties and those aged ≥75 years. Analysis of state-specific rate trends determined that rates of fall-related TBI deaths increased significantly in 29 states over the 10-year study period. A fall can happen to anyone of any age, but falls are preventable. Health care providers and the public need to be aware of evidence-based strategies to prevent falls, given that rates of fall-related TBI deaths are increasing. Health care providers can educate patients on fall and TBI prevention, assess their risk for falls, and when needed, encourage participation in appropriate evidence-based fall prevention programs

Language: en

Effects of spatial working memory in balance during dual tasking in traumatic brain injury and healthy controls

Useros Olmo AI, Periañez JA, Martínez-Pernía D, Miangolarra Page JC. Brain Inj. 2020; ePub(ePub): ePub.

DOI 10.1080/02699052.2020.1792984 **PMID** 32658560

Abstract

OBJECTIVES: The aim of this research was to assess cognitive-motor interactions though dual tasks of working memory in patients with traumatic brain injury (TBI) and control subjects.

METHODS: Twenty patients with chronic TBI with good functional level and 19 matched healthy controls performed dual working memory tasks (1-back numeric and 1-back spatial (S)) while sitting, standing, and walking. The center of pressure (COP) displacement amplitude, cadence, and error percentage (PER) were recorded as dependent variables.

RESULTS: The results revealed main effects of Group (TBI, controls) ($p = .011$) and Task factors (Single, Dual Standing 1-back, Dual Standing 1-back (S); $p = .0001$) for the COP. Patients showed greater displacement than controls ($p = .011$), and an analysis of the Task factor showed a minor displacement for the dual 1-back (S) task compared with the 1-back and single task ($p = .002$ and $p = .001$, respectively).

CONCLUSIONS: Postural control during both standing and walking improved during performance of the spatial working memory task. In the dual task, both patients and controls showed a postural prioritization as an adaptive response to the increase in cognitive demand.

Language: en

Keywords

working memory; Brain injury; dual task; limited resources model; motor control

Effects of alcohol consumption on maxillofacial fractures in simple falls

Hino S, Yamada M, Iijima Y, Araki R, Kaneko T, Horie N. Clin. Exp. Dent. Res. 2020; ePub(ePub): ePub.

DOI 10.1002/cre2.308 **PMID** 32720445

Abstract

OBJECTIVES: This study aimed to investigate the effects of alcohol consumption (AC) on maxillofacial fractures caused by falls on a level surface (simple falls).

MATERIAL AND METHODS: Patients with maxillofacial fractures caused by falls who visited the Oral and Maxillofacial Surgery Clinic from January 2006 to December 2016 were evaluated. Patients with simple falls were subdivided into those who fell with AC (Falls with AC) and those who fell without AC (Falls without AC).

RESULTS: Of 180 patients with falls with maxillofacial fractures, 155 had simple falls, and 25 patients had falls from a height. Of the simple falls, 52 were Falls with AC, and 102 were Falls without AC. Falls with AC were significantly more frequent in males ($p = .0005$). The average number of fracture lines in the mandible was significantly higher in Falls with AC (2.13 ± 0.99 [mean ± SD]) than in Falls without AC (1.76 ± 0.91) ($p = .011$). The average Facial Injury Severity Scale was significantly higher in Falls with AC (3.08 ± 1.43) than in Falls without AC (2.43 ± 1.29) ($p = .007$).

CONCLUSIONS: Falls with AC were associated with more severe maxillofacial fractures than Falls without AC.

Language: en

Keywords

fall; alcohol consumption; maxillofacial fractures

Occurrence of traumatic brain injury due to short falls with or without a witness by a nonrelative in children younger than 2 years

Amagasa S, Uematsu S, Tsuji S. J. Neurosurg. Pediatr. 2020; ePub(ePub): ePub.

DOI 10.3171/2020.6.PEDS20314 **PMID** 32916651

Abstract

OBJECTIVE: There is disagreement about the occurrence of severe traumatic brain injury, especially subdural hematoma, caused by short falls in very young children. To verify intracranial injury due to these falls and examine its characteristics, the authors compared infants and toddlers with head trauma witnessed by a nonrelative with those whose injuries were not witnessed by a nonrelative.

METHODS: The authors retrospectively reviewed clinical records of children younger than 2 years with head trauma due to a short fall who visited the emergency department of the National Center for Child Health and Development in Japan between April 2015 and March 2018. Patients were classified into two groups: falls that were witnessed by a nonrelative and falls not witnessed by a nonrelative. The authors compared the age in months, sex, mechanism of injury, fall height, prevalence rate of intracranial injury, skull fracture, type of traumatic brain injury, retinal hemorrhage, rib or long-bone fracture, and outcomes between patients whose fall was witnessed by a nonrelative and those whose fall was not witnessed by a nonrelative.

RESULTS: Among 1494 patients included in the present analysis, 392 patients were classified into the group of falls witnessed by a nonrelative, and 1102 patients were classified into the group of falls that were not witnessed by a nonrelative. The prevalence rates of intracranial injury, skull fracture, epidural hematoma, and subarachnoid hemorrhage were equal between the groups. The prevalence rate of subdural hematoma in the group whose falls were witnessed by a nonrelative was significantly lower than that of the other group ($p = 0.027$). There were no patients with subdural hematoma, retinal hemorrhage, or neurological sequelae in the group whose fall was witnessed by a nonrelative.

CONCLUSIONS: Subdural hematoma, retinal hemorrhage, and neurological sequelae due to short falls were not seen after witnessed falls in the present study.

Language: en

Keywords

child; infant; abusive head trauma; AHT = abusive head trauma; EDH = epidural hematoma; ICI = intracranial injury; retinal hemorrhage; SAH = subarachnoid hemorrhage; SDH = subdural hematoma; subdural hematoma