

Fractures and Head Injury

This document contains all abstracts for publications relating to fractures and head injuries for 2021 so far and will be updated quarterly. These abstracts have been sourced from [SafetyLit.org](https://www.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

Fall from heights: possible factors influencing the onset of complications

Faggiani M, Petruccelli E, Conforti LG, Masse A. Musculoskelet. Surg. 2021; ePub(ePub): ePub.

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DOI 10.1007/s12306-021-00701-2 PMID unavailable

Abstract

PURPOSE: Fall from a height is high energy trauma. The causes include both accidental falls and suicide attempts. The literature and also our previous study demonstrated that this kind of patients, during their recovery time, need a high multidisciplinary workload with significant costs. The present study is the first researching the patterns of the non-acute orthopedic complications after a trauma precipitation that required a new hospitalization and surgical procedure.

METHODS: Retrospective study and analysis of orthopedic complication characteristics of patients fallen from height. We researched the possible relation between the complication pattern (soft tissue or bone involvement) and the case character (psychiatric or non-psychiatric patients, type of fracture and kind of fixation).

RESULTS: The 18.83% of all patients (154 cases included) needed a new admission to perform further surgical procedures (9.74% of psychiatric patients and 9.09% of involuntary victims). Our data showed that patients with psychiatric disorder were associated with a statistically significant ($p < 0.05$) increase in soft tissue complications (46.67%) and onset of non-union after internal osteosynthesis and external fixation (72.72%), respectively.

CONCLUSION: According to the results obtained, we can conclude that osteosynthesis in psychiatric patients is related to well-defined and predictable complications.

Language: en

Keywords

Trauma; Non-union; Complications; Falls from a height; Fracture-related infection; Malunion

Mortality, falls and fracture risk are positively associated with frailty: a SIDIAP cohort study of 890,000 patients

Middleton R, Poveda JL, Orfila Pernas F, Martinez Laguna D, Diez Perez A, Nogués X, Carbonell Abella C, Reyes C, Prieto-Alhambra D. J. Gerontol. A Biol. Sci. Med. Sci. 2021; ePub(ePub): ePub.

(Copyright © 2021, Gerontological Society of America)

DOI 10.1093/gerona/glab102 PMID unavailable

Abstract

BACKGROUND: Frail subjects are at increased risk of adverse outcomes. We aimed to assess their risk of falls, all-cause mortality, and fractures.

METHODS: We used a retrospective cohort study using the SIDIAP database (>6 million residents). Subjects ≥ 75 years old with ≥ 1 year of valid data (2007- 2015) were included. Follow-up: from (the latest of) date of cohort entry up to migration, end of the study period or outcome (whichever came first). The eFRAGICAP classified subjects as Fit, Mild, Moderate or Severely Frail. Outcomes (ICD-10) were incident falls, fractures (overall/hip/vertebral) and all-cause mortality during the study period. Statistics: Hazard Ratios (HR), 95% CI adjusted (per age, sex and socio-economic status) and un-adjusted cause-specific Cox models, accounting for competing risk of death (Fit group as the reference).

RESULTS: 893,211 subjects were analyzed. 54.4% were classified as Fit, 34.0% as mild, 9.9% as moderate and 1.6% as severely frail. Compared with the fit, frail had an increased risk of falls (adjusted HR of 1.55 (1.52-1.58), 2.74 (2.66-2.84) and 5.94 (5.52-6.40)), all-cause mortality (adjusted HR of 1.36 (1.35-1.37), 2.19 (2.16-2.23) and 4.29 (4.13-4.45)) and fractures (adjusted HR of 1.21(1.20-1.23), 1.51(1.47-1.55) and 2.36 (2.20-2.53)) for mild, moderate and severe frailty respectively. Severely frail had a high risk of vertebral (HR of 2.49 (1.99-3.11)) and hip fracture (HR of 1.85 (1.50-2.28)). Accounting for competing risk of death unchanged results.

CONCLUSION: Frail subjects are at increased risk of death, fractures and falls. The eFRAGICAP tool can easily assess frailty in electronic primary-care databases in Spain.

Language: en

Keywords

Epidemiology; risk factors; frailty

Differences in the baseline characteristics, management and outcomes of patients with hip fractures depending on their pre-fracture place of residence: the Spanish National Hip Fracture Registry (RNFC) cohort

Ríos-Germán PP, Gutierrez-Misis A, Queipo R, Ojeda-Thies C, Sáez-López P, Alarcón T, Puime AO, Gómez-Campelo P, Navarro-Castellanos L, González-Montalvo JI. *Eur. Geriatr. Med.* 2021; ePub(ePub): ePub.

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Abstract

PURPOSE: One in four hip fracture patients comes from an aged care facility. This study aimed to compare the characteristics of these subjects with their community-dwelling counterparts at baseline, during hospitalization and 1-month post-fracture.

METHODS: We analyzed data from a cohort of older adults admitted with hip fractures to 75 Spanish hospitals, collected prospectively in the Spanish National Hip Fracture Registry between 2016 and 2018. We classified participants according to pre-fracture residence: community dwellers vs. aged care facilities residents. We collected demographic records at baseline, along with variables relating to in-hospital evolution and discharge to geriatric rehabilitation units. Patients or relatives were interviewed at 1-month follow-up.

RESULTS: Out of 18,262 patients, 4,422 (24.2%) lived in aged care facilities. Aged care facilities residents were older (median age: 89 vs. 86 years), less mobile (inability to walk independently: 20.8% vs. 9.4%) and had more cognitive impairment (Pfeiffer's SPMSQ > 3, 75.3% vs. 34.8%). They were more likely to receive conservative treatment (5.4% vs. 2.0%) and less likely to be mobilized early (58.2% vs. 63.0%). At discharge, they received less vitamin D supplements (68.5% vs. 72.4%), less anti-osteoporotic medication (29.3% vs. 44.3%), and were referred to geriatric rehabilitation units less frequently (5.4% vs. 27.5%). One-month post-fracture, 45% of aged care facilities residents compared to 28% of community dwellers experienced a severe gait decline. Aged care facilities residents had a higher one-month mortality (10.6% vs. 6.8%).

CONCLUSION: Hip fracture patients from aged care facilities are more vulnerable than their community-dwelling peers and are managed differently both during hospitalization and at discharge. Gait decline is disproportionately higher among those admitted from aged care.

Language: en

Keywords

Rehabilitation; Aged care facilities; Functional decline; Hip fracture; National audit

Outcomes after hip fractures sustained in hospital: a propensity-score matched cohort study

Khawar H, Craxford S, Marson BA, Rahman HP, Ollivere B. *Injury* 2021; ePub(ePub): ePub.

(Copyright © 2021, Elsevier Publishing)

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Abstract

AIMS: The aim of this study was to compare outcomes following hip fracture for patients who sustained their fracture whilst in hospital (inpatients) with those who sustained their fracture in the community (outpatients).

PATIENTS AND METHODS: Data on all hip fracture admissions aged 65 years or over between 1(st) May 2007 and 31(st) March 2018 was analysed from a prospectively collected hip fracture database. Patient demographics, co-morbidities, and discharge information were analysed. Outcome measures included mortality (inpatient, 30-day and one year), surgical site infection (SSI) rate and mean length of stay (LOS). Baseline characteristics were used to generate propensity-match scores for each patient, with inpatients matched to outpatients in a 1:1 ratio. Outcomes were compared after matching.

RESULTS: 7,592 patients were included in the study. 338 were identified as having an inpatient hip fracture. There was a significantly greater level of comorbidity in the inpatient group at baseline. After propensity-score matching, there were 229 patients in the inpatient group and 222 in the outpatient group, with no significant difference in baseline co-morbidities. In this propensity score matched cohort, 30-day mortality was significantly higher in the inpatient group (16%) compared to the outpatient group (10%), $P = 0.049$. 1-year mortality was also significantly higher in the inpatient group (44%) compared to the outpatient group (34%), $P = 0.03$. There was no significant difference in inpatient mortality, mean LOS and SSI rates between the two groups.

CONCLUSION: Patients who suffer a hip fracture whilst in hospital have significantly poorer outcomes than those who suffer a hip fracture whilst an outpatient, even after adjusting for co-morbidities. Dedicated guidelines are needed for this particularly vulnerable group.

Language: en

Keywords Mortality; Outcomes; Inpatient; Hip fractures; Matching; Outpatient; Propensity; Score

The role of fall biomechanics in the cause and prevention of bone fractures in older adults

Komisar V, Robinovitch SN. *Curr. Osteoporos. Rep.* 2021; ePub(ePub): ePub.

(Copyright © 2021, Current Science)

DOI 10.1007/s11914-021-00685-9 PMID unavailable

Abstract

PURPOSE OF REVIEW: Adults over age 65 experience the highest rates of bone fracture, and 90% of fractures in older adults are caused by falls from standing height or lower. Advances in fracture prevention rely on our ability to prevent falls, reduce the severity of falls, and enhance the resistance of bone to trauma. To help guide these efforts, we need improved understanding on the types of falls that cause fractures. **RECENT FINDINGS:** In this review, we describe recent evidence on how the mechanics of falls in older adults influence the risk for fractures to the hip, wrist, vertebrae, and humerus. We discuss how fracture risk depends on fall height, fall direction, and landing configuration. We also review the benefits of exercise, wearable protective gear, and environmental modifications in preventing fractures in older adults. Our findings highlight promising new directions in fracture prevention, and the need for collaboration between the bone and falls research communities to implement proven strategies and generate new solutions.

Language: en

Keywords

Falls; Injury prevention; Older adults; Biomechanics; Bone fracture

Cardiovascular outcomes and rates of fractures and falls among patients with brand-name versus generic L-thyroxine use

Brito JP, Ross JS, Deng Y, Sangaralingham L, Graham DJ, Qiang Y, Wang Z, Yao X, Zhao L, Smallridge RC, Bernet V, Shah ND, Lipska KJ. *Endocrine* 2021; ePub(ePub): ePub.

(Copyright © 2021, Holtzbrinck Springer Nature Publishing Group)

DOI 10.1007/s12020-021-02779-x PMID unavailable

Abstract

PURPOSE: To compare cardiovascular outcomes and rates of fractures and falls among patients with persistent brand-name versus generic L-thyroxine use.

METHODS: Retrospective, 1:1 propensity-matched longitudinal study using a national administrative claims database to examine adults (≥ 18 years) who initiated either brand or generic L-thyroxine between 2008 and 2018, censored at switch or discontinuation of L-thyroxine formulation or disenrollment from the health plan. Main outcome measures included rates of hospitalization for atrial fibrillation, myocardial infarction, congestive heart failure, stroke, spine and hip fractures, and rate of falls in the outpatient or inpatient setting. Hospitalizations for pneumonia were used as a negative control.

RESULTS: 195,046 adults initiated treatment with L-thyroxine between 2008 and 2017: 87% generic and 13% brand formulations. They were mostly women (76%), young (94.6% under age 65), white (66%), and 47% had baseline thyroid stimulating hormone levels between 4.5 and 9.9 mIU/L. Among 35,667 propensity-matched patients, there were no significant differences between patients treated with brand versus generic L-thyroxine in atrial fibrillation (HR 0.96, 0.58-1.60), myocardial infarction (HR 0.66, 0.39-1.14), congestive heart failure (HR 1.30, 0.78-2.16), stroke (0.72, 0.49-1.06), spine (HR 0.87, 0.38-1.99) and hip fractures (HR 0.86, 0.26-2.82), or fall outcomes (HR 1.02, 0.14-7.32). Hospitalization rates for pneumonia (used as negative control) did not differ between groups (HR 0.85, 0.61-1.19). There were no interactions between brand versus generic L-thyroxine, these outcomes, and thyroid cancer, age, or L-thyroxine dose subgroups.

CONCLUSIONS: We found no significant differences in cardiovascular outcomes and rates of falls and fractures for patients who filled brand versus generic L-thyroxine.

Language: en

Keywords

Brand; Generic; Hypothyroidism; Levothyroxine

Established trauma triage score predicts risk of falling after femoral neck fracture arthroplasty surgery

Konda SR, Perskin CR, Parola R, Littlefield CP, Egol KA. *J. Healthc. Qual.* 2021; ePub(ePub): ePub.

(Copyright © 2021, National Association for Healthcare Quality, Publisher John Wiley and Sons)

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Abstract

INTRODUCTION: The purpose of this study is to determine whether the Score for Trauma Triage in the Geriatric and Middle-Aged (STTGMA) patients is able to predict fall, fracture, periprosthetic fracture, or dislocation risk after femoral neck fracture arthroplasty surgery.

METHODS: Four hundred one patients who underwent hip arthroplasty surgery after a femoral neck fracture at one urban academic medical center were stratified into groups based on their risk scores assigned at femoral neck fracture presentation. The cohort was reviewed for the occurrence of postdischarge falls, secondary fractures, and prosthetic dislocations that resulted in a presentation to the emergency department (ED) after discharge from their hip fracture surgery. The incidence and timing of these complications after discharge were compared between the low-risk and high-risk groups.

RESULTS: The low-risk group included 201 patients, and the high-risk group included 200 patients. The high-risk group had significantly more postdischarge falls resulting in ED presentation (49 vs. 32, $p = .035$) that occurred significantly sooner (12.6 vs. 18.3 months, $p = .034$) after discharge.

CONCLUSIONS: The STTGMA model was able to successfully stratify patients who are at a higher risk of sustaining a fall after an arthroplasty procedure for a femoral neck fracture.

Language: en

Excess mortality after hip fracture: fracture or pre-fall comorbidity?

Liow MHL, Ganesan G, Chen JDY, Koh JSB, Howe TS, Yong EL, Kramer MS, Tan KB. *Osteoporos. Int.* 2021; ePub(ePub): ePub.

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Abstract

Comorbidity and hip fracture independently increased mortality risk for 9 years in both sexes, with a significant additive interaction in the first year among women and through 6 years among men.

INTRODUCTION: Hip fracture is associated with a persistently elevated mortality risk, but it is unknown whether the elevated risk is due to the fracture or to pre-fracture comorbidity.

METHODS: In a population-based study in Singapore with 9 years of follow-up, patients age > 50 with first hip fracture from 2008 to 2017 were pair-matched to a cohort without hip fracture by age, sex, ethnicity, and pre-fracture Charlson Comorbidity Index (CCI). We investigated additive interaction using the relative excess risk due to interaction (RERI) and multiplicative interaction using the ratio of relative risks.

RESULTS: Twenty-two thousand five hundred ninety of 22,826 patients with a first hip fracture in 2008-2017 were successfully matched. Hip fracture and comorbidity independently increased mortality risk for 9 years in both sexes. After adjustment for comorbidity, excess mortality risk continued to persist for 9 years post-fracture in both men and women. Women with a hip fracture and pre-fracture CCI > 4 had a higher relative risk (RR) of mortality at 9 years of 3.29 [95% confidence interval (CI) 3.01, 3.59] than those without comorbidity (RR 1.51, 95%CI 1.36, 1.68) compared to the referent without hip fracture or comorbidity. An additive interaction between hip fracture and pre-fracture CCI > 4 was observed in the first post-fracture year' [relative excess risk due to interaction (RERI) 1.99, 95%CI 0.97, 3.01]. For men with CCI ≥ 4, the positive additive interaction was observed through 6 years.

CONCLUSIONS: Excess mortality risks post-fracture are attributable to both the fracture and pre-fracture comorbidity. Early interventions in hip fracture patients with high comorbidity could reduce their excess mortality.

Language: en

Keywords

Mortality; Hip fracture; Interaction effect; Matched cohort study

The analysis of osteosarcopenia as a risk factor for fractures, mortality, and falls

Teng Z, Zhu Y, Teng Y, Long Q, Hao Q, Yu X, Yang L, Lv Y, Liu J, Zeng Y, Lu S. Osteoporos. Int. 2021; ePub(ePub): ePub.

(Copyright © 2021, Holtzbrinck Springer Nature Publishing Group)

DOI 10.1007/s00198-021-05963-x PMID unavailable

Abstract

Osteosarcopenia is defined as the concomitant occurrence of sarcopenia and osteoporosis/osteopenia. This study aimed to clarify whether osteosarcopenia implies a greater risk of fractures, mortality, and falls and to draw attention to osteosarcopenia.

INTRODUCTION: Osteosarcopenia, which is characterized by the co-existence of osteoporosis/osteopenia and sarcopenia, is one of the most challenging geriatric syndromes. However, the association between osteosarcopenia and the risk of falls, fractures, disability, and mortality is controversial.

METHODS: We searched PubMed, Embase, and the Cochrane Central Register of Controlled Trials, from their inception to March 18, 2021, for cohort studies on the relationship between osteosarcopenia and fractures, falls, and mortality. Two reviewers independently extracted data and assessed study quality. A pooled analysis was performed to calculate odds ratios (ORs) and 95% confidence intervals (CIs) using fixed or random-effects models.

RESULTS: Eight cohort studies including 19,836 participants showed that osteosarcopenia significantly increased the risk of fracture (OR 2.46, 95% CI 1.83-3.30, $P(\text{heterogeneity}) = 0.006$, $I(2) = 63.0\%$), three cohort studies involving 2601 participants indicated that osteosarcopenia significantly increased the risk of mortality (OR 1.66, 95% CI 1.23-2.26, $P(\text{heterogeneity}) = 0.214$, $I(2) = 35.2\%$), and three cohort studies involving 3144 participants indicated that osteosarcopenia significantly increased the risk of falls (OR 1.62, 95% CI 1.28-2.04, $P(\text{heterogeneity}) = 0.219$, $I(2) = 34.1\%$). No publication bias existed among the studies regarding the association between osteosarcopenia and fractures. The findings were robust according to the subgroup and sensitivity analyses.

CONCLUSIONS: This pooled analysis demonstrated that osteosarcopenia significantly increased the risk of fractures, falls, and mortality, thus highlighting its relevance in daily life. Therefore, we suggest that elderly persons should be aware of the risks associated with osteosarcopenia.

Language: en

Keywords

Mortality; Falls; Fractures; Osteosarcopenia

Risk factors for incident falls and fractures in older men with and without type 2 diabetes mellitus: the Concord Health and Ageing in Men Project

Mesinovic J, Scott D, Seibel MJ, Cumming RG, Naganathan V, Blyth FM, Le Couteur DG, Waite LM, Handelsman DJ, Hirani V. J. Gerontol. A Biol. Sci. Med. Sci. 2021; ePub(ePub): ePub.

(Copyright © 2021, Gerontological Society of America)

DOI 10.1093/gerona/glab062 PMID unavailable

Abstract

BACKGROUND: Type 2 diabetes mellitus (T2DM) increases falls and fracture risk. Our objective was to compare incidence and risk factors for falls and fractures in community-dwelling older men with and without T2DM.

METHODS: A total of 1,705 men (471 with T2DM; 1234 without T2DM) aged ≥ 70 years were assessed at baseline. Men were contacted every 4 months for 6.0 ± 2.2 years to ascertain incident falls and fractures, with the latter being confirmed by radiographic reports. Hip fractures were ascertained via data linkage (follow up: 8.8 ± 3.6 years). Risk factors for falls and fractures included physical activity and function, body composition, medications and vision measures.

RESULTS: Men with T2DM had similar fall (IRR: 0.92 [95%CI: 0.70, 1.12], n=1246) and fracture rates (HR: 0.86 [95%CI: 0.56, 1.32], n=1326) compared to men without T2DM after adjustment for significant risk factors. In men with T2DM, depression (IRR: 1.87 [95%CI: 1.05, 3.34], n=333), sulphonylurea usage (IRR: 2.07 [95%CI: 1.30, 3.27]) and a greater number of prescription medications (IRR: 1.13 [95%CI: 1.03, 1.24]) were independently associated with increased fall rates, and higher total hip BMD was independently associated with lower fracture rates (HR: 0.63 [95%CI: 0.47, 0.86], n=351). Interaction terms demonstrated that better contrast sensitivity was independently associated with lower fracture rates (HR: 0.14 [95%CI: 0.02, 0.87]) in men with T2DM compared to men without T2DM.

CONCLUSION: Fall and fracture rates were similar in men with and without T2DM after adjusting for significant risk factors. Vision assessments including contrast sensitivity measures may improve fracture prediction in older men with T2DM.

Language: en

Keywords

falls; sarcopenia; fractures; body composition; bone; type 2 diabetes

Postmenopausal women with sarcopenia have higher prevalence of falls and vertebral fractures

Zanchetta MB, Abdala R, Massari F, Rey P, Spivacow R, Miechi L, Longobardi V, Brun LR. *Medicina (Argentina)* 2021; 81(1): 47-53.

(Copyright © 2021, Fundacion Revista Medicina (Buenos Aires))

DOI unavailable PMID unavailable

Abstract

Recently, a new consensus of the European Working Group on Sarcopenia in Older People (EWSOP2) recommended new cut-off points for the diagnosis of sarcopenia. The aim of the present manuscript was to assess the prevalence of sarcopenia in postmenopausal women and its relationship with bone mineral density, falls and fragility fractures according to EWGSOP2. In this cross-sectional study, 250 ambulatory postmenopausal women over 60 years of age were included. Lumbar spine and hip bone mineral density (BMD) and whole-body composition were assessed by dual-energy X-ray absorptiometry (DXA). Muscle strength was evaluated by handgrip dynamometry and physical performance by a 4-m walk gait speed and five-repetition sit-to-stand test. Sarcopenia was defined according to EWGSOP2 as low muscle strength (handgrip) and low muscle mass (appendicular skeletal muscle mass index by DXA). A sarcopenia prevalence of 4% was found in the whole group increasing with age being 12.5% in = 80- year-old. A higher percentage of falls, prevalence of osteoporosis and vertebral fractures were found in the sarcopenic group. Sarcopenia increased 6.0-fold the likelihood of having a fragility fracture. Women with sarcopenia had significantly lower femoral neck BMD and higher frequency of falls and vertebral fractures. According to our results, identifying patients with sarcopenia might be a useful tool to detect adults at higher risk of falls and fractures.

Language: en

Keywords

falls; sarcopenia; fractures; muscle strength; physical performance

Validation of the minimum data set items on falls and injury in two long-stay facilities

Mintz J, Lee A, Gold M, Hecker EJ, Colón-Emeric C, Berry SD. J. Am. Geriatr. Soc. 2020; ePub(ePub): ePub.

(Copyright © 2020, John Wiley and Sons)

DOI 10.1111/jgs.16974 PMID unavailable

Abstract

Falls are common among nursing home (NH) residents with 4% to 11% of falls resulting in fracture or other serious injury.^{1, 2} Injurious falls have a higher incidence and mortality in NH residents than falls among community dwellers.^{1, 3, 4} Therefore, it is important to accurately identify falls in NH residents.

The Minimum Data Set (MDS) was developed as a means to assess the health status of NH residents.⁵ In 2010, the MDS v3.0 was deployed in the United States, with considerable changes in how falls and injuries are assessed.⁶ The purpose of our study was to validate the MDS v3.0 items on falls and injuries with chart review in two facilities.

Our study was conducted in two long-term care facilities (MA&NC). Both facilities employ software that auto-populates items using the prior MDS assessment, including falls reporting. Eligible residents had at least two valid MDS assessments between January 2016 and April 2019. From the first facility we randomly selected 50 residents with an MDS indicator for an injurious fall, 50 with an MDS indicator for a fall without injury, and 50 without fall. Only two major injuries were initially selected, and so we identified an additional 23 residents with an indicator of major or minor injury. From the second facility, we sampled all residents with an injurious fall indicator ($n = 10$), all residents with a fall without injury ($n = 18$), and a random sample of 50 residents without fall.

The MDS v3.0 queries whether a fall has occurred since admission or since the last MDS assessment. If a fall occurred, staff categorize the number of falls with no injury, minor injury, or major injury. A major injury is defined as falls resulting in fracture, dislocation, concussion, or intracranial hemorrhage. Minor injuries are defined as falls resulting in pain, or a skin tear, abrasion, laceration, bruise, hematoma, or sprain...

Language: en

Prevalence of falls and fractures in Alzheimer's patients compared to general population

Dev K, Javed A, Bai P, Murlidhar, Memon S, Alam O, Batool Z. Cureus 2021; 13(1): e12923.

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DOI 10.7759/cureus.12923 PMID 33656497

Abstract

Introduction Alzheimer's disease (AD), found in the aging elderly population, is a progressive neurodegenerative disorder that leads to worsening memory loss and cognitive impairment. Falls and fractures are common in the overall elderly population. Hence, the purpose of this study is to determine the prevalence of falls and fractures in Alzheimer's patients compared to the general population.

METHODology This longitudinal study was conducted at the neurology outpatient department (OPD) in a tertiary healthcare setup in Pakistan from November 2019 till April 2020. Previously confirmed diagnosed Alzheimer's patients from neurology OPD were included in one group. Equal number of gender and age-matched healthy participants were included in the reference group. Participants were followed for 12 months to determine the incidence of falls and non-vertebral fractures.

RESULTS The incidence of fall was significant in the Alzheimer group compared to the reference group (22.8% vs. 10.9%; relative risk (RR): 2.08; P-value: 0.01). Fractures were also significantly more common in the Alzheimer group compared to the reference group (12.8% vs. 5.1%; RR: 2.51; P-value: 0.03).

CONCLUSION This study demonstrated a higher incidence of falls and fractures in Alzheimer's patients compared to healthy non-Alzheimer individuals. Management of AD should include measures to reduce falls and fractures in addition to standard therapy.

Language: en

Keywords

falls; fractures; alzheimer's

Falls and fractures associated with type 2 diabetic polyneuropathy; a cross-sectional nationwide questionnaire study

Khan KS, Christensen DH, Nicolaisen SK, Gylfadottir SS, Jensen TS, Nielsen JS, Thomsen RW, Andersen H. J. Diabetes Investig. 2021; ePub(ePub): ePub.

(Copyright © 2021, John Wiley and Sons)

DOI 10.1111/jdi.13542 PMID unavailable

Abstract

AIM: To examine the prevalence of falls and fractures and the association with symptoms of diabetic polyneuropathy (DPN) in patients with recently diagnosed type 2 diabetes.

RESEARCH DESIGN AND METHODS: A detailed questionnaire on neuropathy symptoms and falls was sent to 6,726 patients enrolled in the DD2 cohort (median age 65 years, diabetes duration 4.6 years). Complete data on fractures and patient characteristics were ascertained from population-based health registries. We defined possible DPN as a score ≥ 4 on the Michigan Neuropathy Screening Instruments questionnaire (MNSIq). Using Poisson regression analyses, we estimated the adjusted prevalence ratio (aPR) of falls and fractures, comparing patients with and without DPN.

RESULTS: In total, 5,359 (80%) answered the questions on MNSIq and falls. Within the year preceding questionnaire-response, 17% (n=933) reported at least one fall and 1.4% (n=76) suffered from a fracture. The prevalence ratio of falls was substantially increased in patients with possible DPN compared to those without: aPR: 2.33 (95% confidence interval [CI] 2.06-2.63). The prevalence ratio increased with the number of falls from aPR: 1.51 (95% CI: 1.22-1.89) for one fall to aPR: 5.89 (95% CI: 3.84-9.05) for ≥ 4 falls within the preceding year. Possible DPN was associated with a slightly although non-significantly increased risk of fractures: aPR: 1.32 (95% CI: 0.75-2.33).

CONCLUSIONS: Patients with recently diagnosed type 2 diabetes and symptoms of DPN had a highly increased risk of falling. These results emphasize the need for preventive interventions to reduce fall risk among patients with type 2 diabetes and possible DPN.

Language: en

Keywords

Falls; Fractures; Diabetic polyneuropathy; Type 2 diabetes

Critically appraised paper: Screening for fall risk and a targeted exercise or multifactorial intervention do not reduce fracture rate in older adults more than advice only [commentary]

Haines TP. J. Physiother. 2021; ePub(ePub): ePub.

(Copyright © 2021, Australian Physiotherapy Association)

DOI 10.1016/j.jphys.2021.01.003 PMID unavailable

Abstract

Commentary: Provenance: Invited. Not peer reviewed.

Cases for public policy to introduce community-based falls prevention programs rely on the belief that preventing falls will prevent the negative sequelae of falls, such as fractures.¹ This belief is well grounded in data, with a recent Cochrane review indicating that falls prevention exercise programs reduce the risk of fall-related fracture.² Therefore, what could explain the null findings reported by Lamb et al for both exercise and multifactorial falls prevention interventions?

The primary outcome for this trial was fractures, captured using multiple data reporting systems. This approach is superior to previous trials included in the Cochrane meta-analysis that relied on self-reported falls and fractures and were vulnerable to obsequious response bias. However, this was a pragmatic trial of a targeted approach to delivering these interventions, so direct inferences should not be drawn from the overall results about the efficacy of these interventions. In this study, 39% of all fractures occurred in people who were not assessed as high risk and were not eligible for intervention, which renders the employed screening approach questionable. Only 22% attended one or more exercise sessions, and 19% attended a multifactorial intervention session. There was also a near 4-month delay from randomisation until the commencement of the intervention. Figure S3 illustrates discrepancies in fracture rate across low-risk subgroups in each cohort, even though they all received advice only, and that exercise may have delayed time to first fracture among high-risk individuals. Despite these issues, it is still clear that this large-scale, very real-life roll-out of these targeted falls-prevention interventions failed to reduce fracture rates. Although clinicians can justifiably still trust in these interventions, it would be fair for policy-makers to question whether falls and fracture prevention in community-dwelling adults observed in efficacy trials can successfully be translated into real-life contexts...

Language: en

Low dietary calcium intake does not modify fracture risk but increases falls frequency: the results of GO Study

Pluskiewicz W, Adamczyk P, Drozdowska B. Endokrynol. Pol. 2021; ePub(ePub): ePub.

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DOI 10.5603/EP.a2021.0021 PMID unavailable

Abstract

The aim of the study was to verify the thesis that dietary calcium intake influences the risk of osteoporotic fractures established by online available calculators. MATERIAL: The study was performed in 521 postmenopausal women aged over 55 years recruited in one osteoporotic outpatient clinic. Mean age was 67.7 ± 8.6 years.

METHODS: Fracture risk was established using FRAX (major and hip fractures, 10 years), Garvan calculator (any and hip fractures, 5 and 10 years) and Polish algorithm available at www.fracture-risk.pl (any fractures, 5 years). Bone densitometry at femoral neck was performed using a device Prodigy (Lunar, GE, USA) to calculate fracture risk by each of those calculators. Calcium intake was established based on dietary questionnaire.

RESULTS: Mean values of fracture risk for all three calculators and T-score value for DXA measurement at femoral neck did not correlate with calcium intake. A tendency to insignificantly lower calcium intake was observed in subgroup with high hip fracture risk by FRAX ($\geq 3\%$) versus low hip FRAX ($< 3\%$): 744 ± 328 mg/day vs. 765 ± 299 mg/day. The same analysis for FRAX major fracture risk revealed similar tendency: 700 ± 299 mg/day and 760 ± 311 mg/day in high ($\geq 20\%$) and low ($< 20\%$) fracture risk groups, respectively. Calcium intake did not influence at all the results obtained in two others calculators. Calcium intake did not differ between subjects with prior falls and those ones without falls. However, if the number of falls was taken into account, the women who reported three and more falls had significantly lower calcium intake (621 ± 275 mg/day) than subjects with no falls (767 ± 304 mg/day; $p < 0.05$) or with one fall (766 ± 317 mg/day; $p < 0.05$). Concluding, calcium intake does not correlate with fracture risk established by calculators available on-line but low calcium intake may increase the risk of falls.

Language: en

Keywords

falls; calcium intake; fracture risk

Hospitalisations for falls and hip fractures attributable to vitamin D deficiency in older Australians

Neale RE, Wilson LF, Black LJ, Waterhouse M, Lucas RM, Gordon LG. [Br. J. Nutr.](#) 2021; ePub(ePub): ePub.

(Copyright © 2021, Nutrition Society, Publisher CABI Publishing)

DOI 10.1017/S0007114521000416 PMID unavailable

Abstract

Vitamin D deficiency is associated with increased risk of falls and fractures. Assuming this association is causal, we aimed to identify the number and proportion of hospitalisations for falls and hip fractures attributable to vitamin D deficiency [25 hydroxy D (25(OH)D) <50 nmol/L] in Australians aged 65 years and over. We used 25(OH)D data from the 2011/12 Australian Health Survey and relative risks from published meta-analyses to calculate population attributable fractions for falls and hip fracture. We applied these to data published by the Australian Institute of Health and Welfare to calculate the number of events each year attributable to vitamin D deficiency. In men and women combined, 8.3% of hospitalisations for falls (7991 events) and almost 8% of hospitalisations for hip fractures (1315 events) were attributable to vitamin D deficiency. These findings suggest that even in a sunny country such as Australia vitamin D deficiency contributes to a considerable number of hospitalisations as a consequence of falls and for treatment of hip fracture in older Australians; in countries where the prevalence of vitamin D deficiency is higher the impact will be even greater. It is important to mitigate vitamin D deficiency but whether this should occur through supplementation or increased sun exposure needs consideration of the benefits, harms, practicalities, and costs of both approaches.

Language: en

Keywords

Australia; falls; vitamin D; hip fractures; population attributable fraction

Domains of balance training delivered in rehabilitation programs following hip fracture surgery in older adults: a systematic review

Lima CA, Perracini MR, Funabashi M, Weber S, Beaupre L. J. Geriatr. Phys. Ther. 2021; ePub(ePub): ePub.

(Copyright © 2021, American Physical Therapy Association)

DOI 10.1519/JPT.000000000000286 PMID unavailable

Abstract

BACKGROUND AND PURPOSE: The aim of this systematic review was to assess the domains and characteristics of balance training (BT) interventions delivered in rehabilitation programs following hip fracture to identify potential treatment gaps.

METHODS: Manual and electronic searches (Web of Science, Medline, EMBASE, CINAHL, and ProQuest) were conducted. We selected randomized controlled trials with older adults following hip fracture surgery that included either specific BT or gait, mobility, or transfer training. Two independent reviewers extracted data and rated the methodological quality using the Physiotherapy Evidence Database scale. A third reviewer provided consensus. Extracted BT data included balance domain, progression, frequency, duration, intensity, level of supervision, setting, and rehabilitation phase.

RESULTS AND DISCUSSION: We included 17 trials from 19 studies; 11 studies were rated as moderate to high methodological quality, but only 8 were considered to have high-quality BT components. Half of the interventions included only one balance domain, with stability during movement being the most commonly included domain. The primary balance progression utilized was reducing hand support. Dual task, anticipatory postural adjustment, reactive strategies, and perceptual training domains were rarely included. Balance training duration and intensity were poorly described. Although most programs were home-based with minimal levels of supervision, a few extended beyond postacute phase of rehabilitation.

CONCLUSION: Further consideration should be given to include more challenging BT domains with planned progressions to maximize patient recovery through hip fracture rehabilitation programs.

Language: en

Postmenopausal women with sarcopenia have higher prevalence of falls and vertebral fractures

Zanchetta MB, Abdala R, Massari F, Rey P, Spivacow R, Miechi L, Longobardi V, Brun LR. *Medicina (Argentina)* 2021; 81(1): 47-53.

(Copyright © 2021, Fundacion Revista Medicina (Buenos Aires))

DOI unavailable PMID unavailable

Abstract

Recently, a new consensus of the European Working Group on Sarcopenia in Older People (EWSOP2) recommended new cut-off points for the diagnosis of sarcopenia. The aim of the present manuscript was to assess the prevalence of sarcopenia in postmenopausal women and its relationship with bone mineral density, falls and fragility fractures according to EWGSOP2. In this cross-sectional study, 250 ambulatory postmenopausal women over 60 years of age were included. Lumbar spine and hip bone mineral density (BMD) and whole-body composition were assessed by dual-energy X-ray absorptiometry (DXA). Muscle strength was evaluated by handgrip dynamometry and physical performance by a 4-m walk gait speed and five-repetition sit-to-stand test. Sarcopenia was defined according to EWGSOP2 as low muscle strength (handgrip) and low muscle mass (appendicular skeletal muscle mass index by DXA). A sarcopenia prevalence of 4% was found in the whole group increasing with age being 12.5% in = 80- year-old. A higher percentage of falls, prevalence of osteoporosis and vertebral fractures were found in the sarcopenic group. Sarcopenia increased 6.0-fold the likelihood of having a fragility fracture. Women with sarcopenia had significantly lower femoral neck BMD and higher frequency of falls and vertebral fractures. According to our results, identifying patients with sarcopenia might be a useful tool to detect adults at higher risk of falls and fractures.

Language: en

Keywords

falls; sarcopenia; fractures; muscle strength; physical performance

The effectiveness of a recurrent fall prevention program applied to elderly people undergoing fracture treatment

Gürler H, Bayraktar N. Int. J. Orthop. Trauma Nurs. 2020; ePub(ePub): ePub.

(Copyright © 2020, Elsevier Publishing)

DOI 10.1016/j.ijotn.2020.100820 PMID unavailable

Abstract

BACKGROUND: Worldwide 30-40% of people aged of 65 and over fall each year. It is important to develop preventive interventions for falls in the elderly to prevent injuries leading to mortality and morbidity.

OBJECTIVES: This study evaluated the effectiveness of a recurrent fall prevention program in elderly individuals undergoing fracture treatment.

METHODS: A pretest-posttest intervention study. A recurrent fall prevention program including assessment of fall risk factors, education on falls and home modifications was developed for elderly people undergoing fracture treatment for 52 patients.

RESULTS: In the first evaluation before the delivery of the recurrent fall prevention program, the number of risk factors was 17.63 ± 3.40 as mean \pm standart deviation. Following implementation of the fall prevention program, the number of risk factors decreased to 15.73 ± 3.19 in the first follow-up and decreased to 14.92 ± 3.06 in the second follow-up. Knowledge scores increased to 6.09 ± 1.65 in the first follow-up and to 6.71 ± 1.53 in the second follow-up, while it was 5.50 ± 1.54 in first evaluation. The differences between follow-ups were statistically significant. During the 3-month study period, 15.4% of participants experienced fall.

CONCLUSION: The recurrent fall prevention program was effective in reducing fall-related risk factors and increase fall knowledge. Health care professionals should assess older people for fall risk factors and increase their awareness for falls.

Language: en

Keywords

Falls; Fall prevention; Aging

Comments on: Psychometric properties of the German version of the Fear of Falling Questionnaire-revised (FFQ-R) in a sample of older adults after hip or pelvic fracture

Özden F. Aging Clin. Exp. Res. 2021; ePub(ePub): ePub.

(Copyright © 2021, Editrice Kurtis)

DOI 10.1007/s40520-020-01759-x **PMID** unavailable

Abstract

[Abstract unavailable]

Language: en

Situational risk factors for fall-related vertebral fractures in older men and women

Yu WY, Hwang HF, Chen CY, Lin MR. *Osteoporos. Int.* 2021; ePub(ePub): ePub.

(Copyright © 2021, Holtzbrinck Springer Nature Publishing Group)

DOI 10.1007/s00198-020-05799-x PMID unavailable

Abstract

Situational factors might help explain why most vertebral fractures occur in older people without a previous osteoporosis diagnosis. After adjusting for predisposing risk factors, the activity before the fall, type of fall, and falling direction remained as strong determinants of fall-related vertebral fractures in older men and women.

INTRODUCTION: A matched case-control study was conducted to investigate the effects of situational factors, in addition to predisposing factors, on clinical vertebral fractures in older men and women in Taiwan.

METHODS: Cases were community-dwelling individuals aged ≥ 65 years who visited emergency departments (EDs) of two university-affiliated hospitals due to a fall and had a primary diagnosis of a vertebral fracture during a 1-year period in 2017. Five control patients per case, matched by the time of falling, gender, and age, who sought care in the same ED due to a fall resulting in a soft tissue injury were selected. A total of 64 men (age range: 65 ~ 99 years) and 194 women (age range: 65 ~ 100 years), diagnosed with a vertebral fracture, participated in the study.

RESULTS: Multivariable logistic models were conducted separately for men and women. RESULTS suggested that the following factors were significantly associated with an increased risk of vertebral fractures in men: a low educational level (adjusted odds ratio [OR] = 1.95; 95% confidence interval (CI), 1.02 ~ 3.71), asthma (OR = 2.96; 95% CI, 1.35 ~ 6.92), depression (OR = 4.31; 95% CI, 1.03 ~ 17.5), toileting (OR = 2.30; 95% CI, 1.04 ~ 4.94), slipping (OR = 5.27; 95% CI, 1.80 ~ 15.4), stepping down (OR = 3.99; 95% CI, 1.40 ~ 11.4), sudden leg weakness (OR = 3.73; 95% CI, 1.13 ~ 12.4), and falling backwards (OR = 3.78; 95% CI, 1.83 ~ 7.80); and in women: a fracture history (OR = 2.00; 95% CI, 1.07 ~ 3.76), osteoporosis (OR = 1.94; 95% CI, 1.15 ~ 3.49), getting in/out of the bed/chair (OR = 1.90; 95% CI, 1.07 ~ 3.39), stepping down (OR = 2.10; 95% CI, 1.17 ~ 3.77), and falling backwards (OR = 4.00; 95% CI, 2.39 ~ 6.68) and sideways (OR = 2.61; 95% CI, 1.38 ~ 4.96).

CONCLUSIONS: The combination of predisposing and situational risk factors may display a more comprehensive risk profile for the occurrence of VFs, and thus, interventions that add both types of risk factors may result in greater risk reduction of VFs, although those specifically targeted at situational risk factors during falls are limited and their effectiveness and efficiency remained to be explored.

Language: en

Keywords: Injury; Falls; Osteoporosis; Situational factor; Vertebral fracture

Numerical analysis of hip fracture due to a sideways fall

Mohammadi H, Pietruszczak S, Quenneville CE. *J. Mech. Behav. Biomed. Mater.* 2020; 115: e104283.

(Copyright © 2020, Elsevier Publishing)

DOI 10.1016/j.jmbbm.2020.104283 PMID unavailable

Abstract

The primary purpose of this paper is to outline a methodology for evaluating the likelihood of cortical bone fracture in the proximal femur in the event of a sideways fall. The approach includes conducting finite element (FE) analysis in which the cortical bone is treated as an anisotropic material, and the admissibility of the stress field is validated both in tension and compression regime. In assessing the onset of fracture, two methodologies are used, namely the Critical Plane approach and the Microstructure Tensor approach. The former is employed in the tension regime, while the latter governs the conditions at failure in compression. The propagation of localized damage is modeled using a constitutive law with embedded discontinuity (CLED). In this approach, the localized deformation is described by a homogenization procedure in which the average properties of cortical tissue intercepted by a macrocrack are established. The key material properties governing the conditions at failure are specified from a series of independent material tests conducted on cortical bone samples tested at different orientations relative to the loading direction. The numerical analysis deals with simulations of experiments involving the sideways fall, and the results are compared with the experimental data. This includes both the evolution of fracture pattern and the local load-displacement characteristics. The proposed approach is numerically efficient, and the results do not display a pathological mesh-dependency. Also, in contrast to the XFEM approach, the analysis does not require any extra degrees of freedom.

Language: en

Keywords

Failure criterion; Cortical bone; Finite element analysis; Inherent anisotropy; Microstructure tensor approach

Patient and hospital factors influencing discharge destination following hip fracture

Ryder T, Close J, Harris I, Cameron ID, Seymour H, Armstrong E, Bell J, Hurring S, Mitchell R. *Australas. J. Ageing* 2021; ePub(ePub): ePub.

(Copyright © 2021, Australian Council on the Ageing, Publisher John Wiley and Sons)

DOI 10.1111/ajag.12905 PMID unavailable

Abstract

OBJECTIVE: To compare demographics, treatment and health outcomes for individuals hospitalised with a hip fracture and examine predictors of postacute discharge destination.

METHODS: A retrospective analysis of data from the Australian and New Zealand Hip Fracture Registry of individuals aged ≥ 50 years hospitalised with a hip fracture from 2015 to 2018 ($n = 29\,881$). Multinomial logistic regression was used to examine factors associated with discharge destination for individuals from private residences.

RESULTS: Advancing age, impaired cognition, reduced walking ability and poorer pre-operative health were predictors for discharge to residential aged care. The odds of discharge to a rehabilitation unit were higher for individuals with extracapsular fractures, treated at major trauma centres or at hospitals with home-based rehabilitation. Individuals in rural areas had higher odds of discharge to another hospital or ward.

CONCLUSION: In addition to well-known demographics, injury and treatment factors, non-clinical factors including geographic area of residence also affect discharge destination.

Language: en

Keywords

older adults; hip fractures; discharge destination

Knee extension strength measures indicating probable sarcopenia is associated with health-related outcomes and a strong predictor of 1-year mortality in patients following hip fracture surgery

Kristensen MT, Hulsbæk S, Faber LL, Kronborg L. *Geriatrics (Basel)* 2021; 6(1): e8.

(Copyright © 2021, MDPI: Multidisciplinary Digital Publishing Institute)

DOI 10.3390/geriatrics6010008 PMID unavailable

Abstract

To examine if knee-extension strength (KES) measures indicating probable sarcopenia are associated with health-related outcomes and if KES and hand grip strength (HGS) measures are associated with 1-year mortality after hip fracture. Two groups of older patients with hip fracture had either HGS (n = 32) or KES (n = 150) assessed during their acute hospital stay. Cut-points for HGS (<27 kg for men and <16 kg for women), and cut-points for maximal isometric KES (non-fractured limb), being the lowest sex-specific quintile (<23.64 kg for men and <15.24 kg for women), were used to examine association with health-related outcomes and 1-year mortality. Overall, 1-year mortality was 12.6% in the two strength groups, of which 47% (HGS) and 46% (KES) respectively, were classified as probable sarcopenia. Probable sarcopenia patients (KES) had lower prefracture function, performed poorly in mobility measures and expressed a greater concern of falling compared to their stronger counterparts. Hazard ratio for 1-year mortality was 2.7 (95%CI = 0.49-14.7, p = 0.3) for HGS and 9.8 (95%CI = 2.2-43.0, p = 0.002) for KES for probable sarcopenia patients compared to those not. Sex-specific KES measures indicating sarcopenia is associated with health-related outcomes and a strong predictor of 1-year mortality after hip fracture.

Language: en

Keywords

mortality; sarcopenia; fear of falling; health-related outcomes; hip fractures; muscle strength

Reply to the letter: "Psychometric properties of the German version of the Fear of Falling Questionnaire-revised (FFQ-R) in a sample of older adults after hip or pelvic fracture"

Dautel A, Becker C, Pfeiffer K. Aging Clin. Exp. Res. 2021; ePub(ePub): ePub.

(Copyright © 2021, Editrice Kurtis)

DOI 10.1007/s40520-021-01789-z **PMID** unavailable

Abstract

[The publisher has not provided an abstract for this article.]

Language: en

Falls, fractures, and areal bone mineral density in older adults with sarcopenic obesity: a systematic review and meta-analysis

Gandham A, Mesinovic J, Jansons P, Zengin A, Bonham MP, Ebeling PR, Scott D. *Obes. Rev.* 2021; ePub(ePub): ePub.

(Copyright © 2021, John Wiley and Sons)

DOI 10.1111/obr.13187 PMID unavailable

Abstract

Sarcopenia and obesity are common conditions in older adults that may have differing effects on falls and fracture risk. This systematic review and meta-analysis aimed to determine whether older adults with sarcopenic obesity have increased risk of falls and fractures or lower bone mass compared with older adults with sarcopenia, obesity, or neither condition. Twenty-six studies ($n = 37,124$) were included in the systematic review and 17 ($n = 31,540$) were included in the meta-analysis. Older adults with sarcopenic obesity had lower femoral neck areal bone mineral density (aBMD) compared with those with obesity alone but had higher femoral neck aBMD compared with counterparts with sarcopenia alone (both $P < 0.05$). Older adults with sarcopenic obesity had higher nonvertebral fracture rates (incidence rate ratio: 1.88; 95% confidence intervals: 1.09, 3.23; based on two studies), compared with those with sarcopenia alone, and also had higher falls risk compared with controls (risk ratio: 1.30; 95% confidence intervals: 1.10, 1.54) and obesity alone (risk ratio: 1.17; 95% confidence intervals: 1.01, 1.36). In conclusion, this systematic review and meta-analysis has demonstrated that older adults with sarcopenic obesity are at increased risk of adverse musculoskeletal outcomes compared with individuals with obesity, sarcopenia, or neither condition. These data support the need for developing interventions to improve bone health and physical function in this population.

Language: en

Keywords

falls; fracture; obesity; sarcopenia

Increased risk of falls and fractures in patients with psychosis and Parkinson disease

Forns J, Layton JB, Bartsch J, Turner ME, Dempsey C, Anthony M, Ritchey ME, Demos G. PLoS One 2021; 16(1): e0246121.

(Copyright © 2021, Public Library of Science)

DOI 10.1371/journal.pone.0246121 PMID unavailable

Abstract

OBJECTIVE: Evaluate whether the risk of falls and fractures differs between patients with Parkinson disease with psychosis (PDP) and patients with Parkinson disease (PD) without psychosis at similar disease stages.

METHODS: Patients with PD without psychosis were identified in the Medicare claims databases (2008-2018) and followed from the first PD diagnosis date during the study period. Patients with a subsequent diagnosis of psychosis were included in the PDP group. Patients with PDP and PD without psychosis were propensity score-matched based on characteristics within blocks of time since cohort entry. The incidence rates (IRs), expressed per 100 person-years, and 95% confidence intervals (CIs) of falls and fractures were evaluated as composite and separate outcomes. Incidence rate ratios (IRRs) were used to compare patients with PDP and PD without psychosis in the matched cohort.

RESULTS: 154,306 patients had PD without psychosis and no falls or fractures before cohort entry; the IR for falls and fractures was 11.41 events (95% CI, 11.29-11.53). 12,127 patients (7.8%) had a subsequent PDP diagnosis. PDP patients had a higher prevalence of most comorbidities and risk factors for falls and fractures than those without psychosis. The crude IR for falls and fractures among PDP patients was 29.03 events (95% CI, 28.27-29.81). PD without psychosis and PDP groups had more falls than fractures. After matching, 24,144 PD patients without psychosis (15.6%) and 12,077 PDP patients (99.6%) were retained. Matched PDP patients had a higher incidence of falls and fractures than PD patients without psychosis (IRR = 1.44; 95% CI, 1.39-1.49). The higher increased rate was noted separately for falls (IRR = 1.48; 95% CI, 1.43-1.54) and any fractures (IRR = 1.17; 95% CI, 1.08-1.27) as well as within specific types of fracture, including pelvis and hip fractures.

CONCLUSIONS: Our findings suggest a modest but consistently higher increased risk of falls and fractures in PDP patients compared with PD patients without psychosis.

Language: en

Fear of falling, recurrence of falls, and quality of life in patients with a low energy fracture-part ii of an observational study

van der Vet PCR, Kusen JQ, Rohner-Spengler M, Link BC, Houwert RM, Knobe M, Babst R, Henzen C, Schmid L, Beeres FJP. *Medicina (Lithuania)* 2021; 57(6): e57060584.

(Copyright © 2021, Lietuvos Gydytoju Sajunga Lithuania)

DOI 10.3390/medicina57060584

PMID unavailable

Abstract

Background and objective: Falls in elderly cause injury, mortality, and loss of independence, making Fear of Falling (FoF) a common health problem. FoF relates to activity restriction and increased fall risk. A voluntary intervention including fall risk assessment and prevention strategies was implemented to reduce falls in elderly patients with low energy fractures (LEF). The primary purpose of this study was to evaluate FoF and the number of subsequent falls in trauma patients one year after a LEF. The secondary aim was to examine how FoF affects patients' lives in terms of Quality of Life (QoL), mobility, and activity levels. Finally, participation in the voluntary fall prevention program (FPP) was evaluated.

MATERIALS AND METHODS: Observational cohort study in one Swiss trauma center. LEF patients, treated between 2012 and 2015, were analyzed one year after injury. Primary outcomes were Falls-Efficacy Score-International (FES-I) and number of subsequent falls. Secondary outcomes were EuroQoL-5-Dimensions-3-Levels (EQ5D-3L), mobility, activity levels, and participation in the FPP. Subgroup analysis was performed for different age categories.

RESULTS: 411 patients were included for analysis. Mean age was 72 ± 9.3 , mean FES-I was 21.1 ± 7.7 . Forty percent experienced FoF. A significant negative correlation between FoF and QoL ($R = 0.64$; $p < 0.001$) was found. High FoF correlated with lower activity levels ($R = -0.288$; $p < 0.001$). Six percent visited the FPP.

CONCLUSIONS: At follow-up, 40% suffered from FoF which seems to negatively affect patients' QoL. Nevertheless, participation in the FPP was low. Simply informing patients about their susceptibility to falls and recommending participation in FPPs seems insufficient to motivate and recruit patients into FPPs. We suggest implementing repeated fall risk- and FoF screenings as standard procedures in the follow-up of LEF, especially in patients aged over 75 years.

Language: en

Keywords fall prevention; fear of falling; low energy fractures

Bone microarchitecture decline and risk of fall and fracture in men with poor physical performance - the Strambo Study

Wagner PP, Whittier DE, Foesser D, Boyd SK, Chapurlat R, Szulc P. J. Clin. Endocrinol. Metab. 2021; ePub(ePub): ePub.

(Copyright © 2021, Endocrine Society)

DOI 10.1210/clinem/dgab506

PMID unavailable

Abstract

CONTEXT: High fracture risk in subjects with low muscle strength is attributed to high risk of fall.

OBJECTIVE: To study the association of muscle mass and physical performance with bone microarchitecture decline and risk of fall and nonvertebral fracture in men.

DESIGN: Prospective 8-year follow-up of a cohort. **SETTING:** General population.

PARTICIPANTS: 821 volunteer men aged ≥ 60 . **INTERVENTIONS:** Hip areal bone mineral density (aBMD) and appendicular lean mass (ALM) were assessed at baseline by DXA.

Lower limb relative ALM (RALM-LL) is $ALM-LL / (leg\ length)^2$. The physical performance score reflects ability to perform chair stands and static and dynamic balance. Bone microarchitecture was assessed by high resolution peripheral QCT (HR-pQCT) at baseline, after 4 and 8 years. Statistical analyses were adjusted for shared risk factors. **OUTCOMES:** Rate of change in the HR-pQCT indices, incident falls and fractures.

RESULTS: Cortical bone loss and estimated bone strength decline were faster in men with low vs. normal RALM-LL (failure load: -0.74 ± 0.09 vs. $-0.43 \pm 0.10\%/year$; $p < 0.005$).

Differences were similar between men with poor and those with normal physical performance (failure load: -1.12 ± 0.09 vs. $-0.40 \pm 0.05\%/year$; $p < 0.001$). Differences were similar between men having poor performance and low RALM-LL and men having normal RALM-LL and performance (failure load: -1.40 ± 0.17 vs. $-0.47 \pm 0.03\%/year$; $p < 0.001$). Men with poor physical performance had higher risk of fall (HR=3.52, 95% CI: 1.57-7.90, $p < 0.05$) and fracture (HR=2.68, 95% CI: 1.08-6.66, $p < 0.05$).

CONCLUSION: Rapid decline of bone microarchitecture and estimated strength in men with poor physical performance and low RALM-LL may contribute to higher fracture risk.

Language: en

Keywords

fall; aging; fracture; sarcopenia; bone microarchitecture; physical performance

Hip fracture risk in elderly with non-end-stage chronic kidney disease: a fall related analysis

Covino M, Vitiello R, De Matteis G, Bonadia N, Piccioni A, Carbone L, Zaccaria R, Cauteruccio M, Ojetti V, Franceschi F. Am. J. Med. Sci. 2021; ePub(ePub): ePub.

(Copyright © 2021, Lippincott Williams and Wilkins)

DOI 10.1016/j.amjms.2021.06.015

PMID unavailable

Abstract

BACKGROUND: The aim of this study was to evaluate the risk of fracture as a consequence of trauma and its association with kidney function status in a cohort of elderly patients.

METHODS: This is an observational, cross-sectional study. We evaluated all fall-related trauma of patients ≥ 65 years in the emergency department (ED) between 2016 and 2018. According to CDK-EPI formula, we stratified the study population in different stages of chronic kidney disease (CKD) for glomerular filtrate rate (GFR) ≥ 15 and < 60 , not on hemodialysis. The hip fracture rate was adjusted at multivariate analysis for age, sex, comorbid conditions, and CKD status.

RESULTS: We enrolled 5620 patients: 3482 patients had GFR ≥ 60 , 1045 had GFR ≥ 45 and < 60 , 722 had GFR ≥ 30 and < 45 , and 371 had GFR ≥ 15 and < 30 . We recorded 636 (11.3%) hip fractures. After adjusting for significant covariates (age, sex, known osteoporosis, osteoporosis therapy, anemia, and dementia), patients with GFR ≥ 45 and < 60 and GFR ≥ 30 and < 45 exhibited an increased risk of femur fracture (odds ratio 2.01 [1.36-2.97] and 1.64 [1.08-2.48], respectively). Patients with GFR ≥ 15 and < 30 had a higher risk of fracture, although not reaching statistical significance.

CONCLUSIONS: Our study confirms that patients with non-end stage CKD have an increased risk of femur fracture after a fall. Our data supports the hypothesis that this risk could be associated with increased bone fragility in CKD patients. Active osteoporosis therapy was found to be an effective preventive factor in our cohort.

Language: en

Keywords

falls; Chronic kidney disease; fracture risk; hip fracture; osteoporosis

Survival bias may explain the appearance of the obesity paradox in hip fracture patients

Amin RM, Raad M, Rao SS, Musharbash F, Best MJ, Amanatullah DF. Osteoporos. Int. 2021; ePub(ePub): ePub.

(Copyright © 2021, Holtzbrinck Springer Nature Publishing Group)

DOI 10.1007/s00198-021-06046-7

PMID unavailable

Abstract

Patients with low-energy hip fractures do not follow the obesity paradox as previously reported. In datasets where injury mechanism is not available, the use of age >50 years (as opposed to commonly used >65 years) as a surrogate for a low-energy hip fracture patients may be a more robust inclusion criterion. **PURPOSE:** In elderly patients with a hip fracture, limited data suggests that obese patients counterintuitively have improved survival compared to normal-weight patients. This "obesity paradox" may be the byproduct of selection bias. We hypothesized that the obesity paradox would not apply to elderly hip fracture patients.

METHODS: The National Surgical Quality Improvement Project dataset identified 71,685 hip fracture patients ≥ 50 years-of-age with complete body mass index (BMI) data that underwent surgery. Patients were stratified into under and over 75-year-old cohorts ($n=18,956$ and $52,729$, respectively). Within each age group, patients were stratified by BMI class and compared with respect to preoperative characteristics and 30-day mortality. Significant univariate characteristics ($p<0.1$) were included in multivariate analysis to determine the independent effect of obesity class on 30-day mortality ($p<0.05$).

RESULTS: Multivariate analysis of <75-year-old patients with class-III obesity were more likely to die within 30-days than similarly aged normal-weight patients (OR 1.91, CI 1.06-3.42, $p=0.030$). Multivariate analysis of ≥ 75 -year-old overweight (OR 0.69, CI 0.62-0.77, $p<0.001$), class-I obese (OR 0.62, CI 0.51-0.74, $p<0.001$), or class-II obese (OR=0.69, CI 0.50-0.95, $p=0.022$) patients were less likely to die within 30-days when compared to similarly aged normal-weight patients.

CONCLUSIONS: Our data suggest that obesity is a risk factor for mortality in low-energy hip fracture patients, but the appearance of the "obesity paradox" in elderly hip fracture patients results from statistical bias that is only evident upon subgroup analysis.

Language: en

Keywords

Mortality; Risk factor; Hip fracture; Obesity; Obesity paradox

The effects of falls on the prediction of osteoporotic fractures: epidemiological cohort study

Liu IT, Liang FW, Wang ST, Chang CM, Lu TH, Wu CH. Arch. Osteoporos. 2021; 16(1): e110.

(Copyright © 2021, Holtzbrinck Springer Nature Publishing Group)

DOI 10.1007/s11657-021-00977-8

PMID Unavailable

Abstract

Fall is the major risk factor of fracture that has not been included in FRAX®. Whether different age may determine the effect of falls on FRAX® is still uncertain. This epidemiological cohort study reveals that history of fall is a significant predictor of incident fracture independent of FRAX probability, especially in subjects < 75 years old.

INTRODUCTION: The Fracture Risk Assessment Tool (FRAX) calculates 10-year fracture risk using 11 clinical risk factors and bone mineral density (BMD); however, it does not include fall history in its risk assessment. Here, we investigated whether fall history is an independent risk factor on fracture prediction after adjustment of FRAX scores in two age subgroups (40-75 and ≥ 75 years).

METHODS: Beginning in 2009 to 2010, 1975 people (914 men) from Taiwan were followed for 6.8 ± 1.1 years by matching them with their records in the 2008-2016 National Health Insurance databank. We validated FRAX predictive accuracy with or without fall history by Cox proportional hazards regression.

RESULTS: After adjusting for FRAX risk, a history of falling was still a significant predictor of major osteoporotic fractures (MOFs) (using BMD, hazard ratio [HR], 1.47; $p = 0.03$; without using BMD, HR, 1.54; $p = 0.01$). A history of recurrent falls was also a significant predictor of both incident MOFs and hip fractures. However, when the subjects were stratified based on age group, a history of falling and recurrent falls were strong predictors of MOFs and hip fractures in the younger but not the older subgroup.

CONCLUSION: A fall history can predict incident fracture independently of FRAX probability, particularly in subjects younger than 75 years old.

Language: en

Keywords

Older adult; Hip fracture; FRAX; Recurrent falls

Characteristics of fall-related fractures in older adults with cerebrovascular disease: a cross-sectional study

Fu M, Guo J, Zhao Y, Zhang Y, Zhang Y, Wang Z, Hou Z. Clin. Interv. Aging 2021; 16: 1337-1346.

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Abstract

PURPOSE: Limited information exists on fall-related fractures in older adults with cerebrovascular disease. This study aimed to determine the characteristics of older adults with cerebrovascular disease who sustained fall-related fractures and identify the associated risk factors for perioperative complications.

PATIENTS AND METHODS: This was a cross-sectional study, which included patients with cerebrovascular disease who sustained fractures between Jan. 2017 and Dec. 2019. The collected data included demographics (age and gender), time and place of fracture occurrence, mechanism of injury, fracture location, type of cerebrovascular disease, complications, and comorbidities.

RESULTS: A total of 768 patients with 815 fractures were included; there were 253 males and 515 females, with an average age of 78.3 years. For either males or females, 80-84 years was the most commonly involved age group. Most (61.0%) patients had their fractures occurring at home and most fractures (70.7%) occurred during the daytime. Most were hip fractures and limb weakness; instability-related falls were the most common cause of fracture, making a proportion of 34.5%. Patients who suffered falls were mainly combining ischemic cerebrovascular disease. Most (85.9%) patients presented with at least one comorbid disease and the perioperative complication rate was 76.9% in total cases. Age \geq 80 (OR: 1.772, 95% CI: 1.236-2.540) and the number of comorbidities \geq 3 (OR: 1.606, 95% CI: 1.035-2.494) were found independently associated with complications, while the type of cerebrovascular disease, fracture location, and comorbidities of prior fragility fracture and respiratory disease were not significantly correlated with complications.

CONCLUSION: Our findings highlighted that more focus on improved physical function explored in intervention setting and the importance of primary home prevention measures seems justified in China and maybe other countries as well. It is the first study that presented the epidemiological characteristics of older adults with cerebrovascular disease who later experienced a fracture.

Language: en

Keywords

epidemiology; older adults; cerebrovascular disease; cross-sectional study; fall-related fracture

Interventions for preventing falls and fall-related fractures in community-dwelling older adults: a systematic review and network meta-analysis

Dautzenberg L, Beglinger S, Tsokani S, Zevgiti S, Raijmann RCMA, Rodondi N, Scholten RJPM, Rutjes AWS, Di Nisio M, Emmelot-Vonk M, Tricco AC, Straus SE, Thomas S, Bretagne L, Knol W, Mavridis D, Koek HL. *J. Am. Geriatr. Soc.* 2021; ePub(ePub): ePub.

(Copyright © 2021, John Wiley and Sons)

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Abstract

OBJECTIVE: To compare the effectiveness of single, multiple, and multifactorial interventions to prevent falls and fall-related fractures in community-dwelling older persons.

METHODS: MEDLINE, Embase, and Cochrane Central Register of Controlled Trials were systematically searched for randomized controlled trials (RCTs) evaluating the effectiveness of fall prevention interventions in community-dwelling adults aged ≥ 65 years, from inception until February 27, 2019. Two large RCTs (published in 2020 after the search closed) were included in post hoc analyses. Pairwise meta-analysis and network meta-analysis (NMA) were conducted.

RESULTS: NMA including 192 studies revealed that the following single interventions, compared with usual care, were associated with reductions in number of fallers: exercise (risk ratio [RR] 0.83; 95% confidence interval [CI] 0.77-0.89) and quality improvement strategies (e.g., patient education) (RR 0.90; 95% CI 0.83-0.98). Exercise as a single intervention was associated with a reduction in falls rate (RR 0.79; 95% CI 0.73-0.86). Common components of multiple interventions significantly associated with a reduction in number of fallers and falls rate were exercise, assistive technology, environmental assessment and modifications, quality improvement strategies, and basic falls risk assessment (e.g., medication review). Multifactorial interventions were associated with a reduction in falls rate (RR 0.87; 95% CI 0.80-0.95), but not with a reduction in number of fallers (RR 0.95; 95% CI 0.89-1.01). The following single interventions, compared with usual care, were associated with reductions in number of fall-related fractures: basic falls risk assessment (RR 0.60; 95% CI 0.39-0.94) and exercise (RR 0.62; 95% CI 0.42-0.90).

CONCLUSIONS: In keeping with Tricco et al. (2017), several single and multiple fall prevention interventions are associated with fewer falls. In addition to Tricco, we observe a benefit at the NMA-level of some single interventions on preventing fall-related fractures.

Language: en

Keywords

falls; older adults; community-dwelling; fall-related fractures

Risk of hospitalised falls and hip fractures in working age adults receiving mental health care

Romano E, Ma R, Perera G, Stewart R, Tsamakakis K, Solmi M, Vancampfort D, Firth J, Stubbs B, Mueller C. *Gen. Hosp. Psychiatry* 2021; 72: 81-87.

(Copyright © 2021, Elsevier Publishing)

DOI 10.1016/j.genhosppsy.2021.07.006 **PMID** unavailable

Abstract

OBJECTIVE: This retrospective cohort study investigates risks of hospitalised fall or hip fractures in working age adults receiving mental health care in South London.

METHODS: Patients aged 18 to 64, who received a first mental illness diagnosis between 2008 and 2016 were included. Primary outcome was hospitalised falls, secondary outcome was hip fractures. Age- and gender-standardised incidence rates and incidence rate ratios (IRRs) compared to local general population were calculated. Multivariate Cox proportionate hazard models were used to investigate which mental health diagnoses were most at risk.

RESULTS: In 50,885 patients incidence rates were 8.3 and 0.8 per 1,000 person-years for falls and hip fractures respectively. Comparing mental health patients to the general population, age-and-gender-adjusted IRR for falls was 3.6 (95% CI: 3.3-4.0) and for hip fractures 7.5 (95% CI: 5.2-10.4). The falls IRR was highest for borderline personality and bipolar disorder and lowest for schizophreniform and anxiety disorder. After adjusting for multiple confounders in the sample of mental health service users, borderline personality disorder yielded a higher and anxiety disorder a lower falls risk.

CONCLUSION: Working age adults using mental health services have almost four times the incidence of hospitalised falls compared to general population. Targeted interventions are warranted.

Language: en

Keywords

Falls; Mental health; Hip fracture; Psychiatric populations; Working age

Hip fracture following a fall among older adults during the CoViD-19 pandemic

Steinfeld Y, Ben Natan M, Yonai Y, Berkovich Y. *Isr. Med. Assoc. J.* 2021; 23(8): 479-483.

(Copyright © 2021, Israel Medical Association)

DOI unavailable PMID unavailable

Abstract

BACKGROUND: Little is known regarding the impact of the coronavirus disease-2019 (COVID-19) pandemic on the incidence of hip fractures among older adults.

OBJECTIVES: To compare the characteristics of patients with a hip fracture following a fall during the COVID-19 pandemic year and during the preceding year.

METHODS: We conducted a retrospective cohort study of older patients who had undergone surgery for hip fracture repair in a major 495-bed hospital located in northern central Israel following a fall. Characteristics of patients who had been hospitalized in 2020 (pandemic year, n=136) and in 2019 (non-pandemic year, n=151) were compared.

RESULTS: During the pandemic year, patients were less likely to have fallen in a nursing facility, to have had muscle or balance problems, and to have had a history of falls and fractures following a fall. Moreover, the average length of stay (LOS) in the hospital was shorter; however, the average time from the injury to hospitalization was longer. Patients were less likely to have acquired a postoperative infection or to have died. During the pandemic year, postoperative infection was only associated with prolonged LOS.

CONCLUSIONS: The COVID-19 pandemic may have had a positive impact on the behavior of older adults as well as on the management of hip fracture patients. However, healthcare providers should be aware of the possible reluctance to seek care during a pandemic. Moreover, further research on the impact of the change in management during COVID-19 on hip fracture survival is warranted.

Language: en

Fractures and fall injuries after hospitalization for seasonal influenza-a national retrospective cohort study

Axelsson KF, Litsne H, Lorentzon M. Osteoporos. Int. 2021; ePub(ePub): ePub.

(Copyright © 2021, Holtzbrinck Springer Nature Publishing Group)

DOI 10.1007/s00198-021-06068-1 PMID unavailable

Abstract

In this retrospective cohort study of 6604 adults, 65 years or older, admitted with seasonal influenza at Swedish hospitals, and 330,200 age- and sex-matched controls from the general population admitted for other reasons, were included. Patients with influenza had increased risk of fall injuries and fractures compared to controls.

INTRODUCTION: Fractures and fall injuries often lead to disability, increased morbidity, and mortality. Older adults are at higher risk of influenza-related complications such as pneumonia, cardiovascular events, and deaths, but the risk of fractures and fall injuries is unclear. The primary objective of this study was to investigate the risk of fractures and fall injuries in older patients after admission with seasonal influenza.

METHODS: In this retrospective cohort study of 6604 adults, 65 years or older, admitted with seasonal influenza at Swedish hospitals (from December 1, 2015, to December 31, 2017) and 330,200 age- and sex-matched controls from the general population and admitted for other reasons, the risk of fracture or fall injury was investigated.

RESULTS: The mean (SD) age of the 6604 influenza patients was 80.9 (8.1) years and 50.1% were women. During the first year after hospital discharge, there were 680 (10.3%) patients suffering from a fracture or fall injury among the patients with influenza, and 25,807 (7.8%) among the controls, corresponding to incident rates of 141 (95% CI, 131-152) and 111 (95% CI, 110-112) fractures or fall injuries per 1000 person-years respectively, translating to a significantly increased risk of fracture or fall injury in a Cox regression model (hazard ratio (HR) 1.28 (95% CI, 1.19-1.38)), a risk that was maintained after multivariable adjustment (HR 1.22 (95% CI 1.13-1.31)).

CONCLUSIONS: Older adults admitted with influenza diagnosis have an increased risk of fracture or fall injury during the first year after discharge.

Language: en

Keywords

Fall injuries; Fracture; Seasonal influenza

Head Injury

Characteristics of fall-related head injury versus non-head injury in the older adults

Kim SH, Kim S, Cho GC, Lee JH, Park EJ, Lee DH. BMC Geriatr. 2021; 21(1): e196.

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DOI 10.1186/s12877-021-02139-4 PMID unavailable

Abstract

BACKGROUND: This study aimed to examine the characteristics of older adults patients who suffered a head injury after a ground-level fall in comparison to non-head injury patients as well as the factors associated with severity in those with head injury only.

METHODS: Patients were classified into two groups, the head injury group and the non-head injury group. The characteristics were compared and factors associated with head injury were evaluated. Factors relating to severe injury in the head injury group were also investigated.

RESULTS: The head injury group comprised 42 % of a study subjects. Male sex; fall time of 18:00-23:59; fall location of medical facility, transportation area, and public or commercial facility; fall in an outdoor area; fall during daily activity; alcohol ingestion; fall from stairs; non-slippery floor conditions; concrete flooring; sloped flooring; and presence of obstacles on the floor were risk factors for head injury in the older adults after a ground-level fall. Male sex and age over 70 years; fall time of 00:00-05:59; fall in a residential facility; fall in an indoor area; fall during daily activity; fall from stairs; non-slippery floor conditions; and presence of obstacles on the floor were factors associated with severe injury in the head injury group.

CONCLUSIONS: Male sex with advanced age, indoor fall, and the presence of obstacles on the floor were risk factors for severe injury in the head injury group in older adults individuals who suffered a ground-level fall. It is necessary to develop appropriate ground-level fall prevention programs by evaluating the individual and environmental characteristics of older adults patients.

Language: en

Keywords

Falls; Head injuries; Older adults; Emergency department-based Injury in-depth Surveillance

An experimental platform generating simulated blunt impacts to the head due to rearward falls

Neice RJ, Lurski AJ, Bartsch AJ, Plaisted TA, Lowry DS, Wetzel ED. *Ann. Biomed. Eng.* 2021; ePub(ePub): ePub.

(Copyright © 2021, Holtzbrinck Springer Nature Publishing Group)

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Abstract

Impacts to the back of the head due to rearward falls, also referred to as "backfall" events, represent a common source of TBI for athletes and soldiers. A new experimental apparatus is described for replicating the linear and rotational kinematics of the head during backfall events. An anthropomorphic test device (ATD) with a head-borne sensor suite was configured to fall backwards from a standing height, inducing contact between the rear of the head and a ground surface simulant. A pivoting swing arm and release strap were used to generate consistent and realistic head kinematics. Backfall experiments were performed with the ATD fitted with an American football helmet and the resulting linear and rotational head kinematics, as well as calculated injury metrics, compared favorably with those of football players undergoing similar impacts during games or play reconstructions. This test method complements existing blunt impact helmet performance experiments, such as drop tower and pneumatic ram test methods, which may not be able to fully reproduce head-neck-torso kinematics during a backfall event.

Language: en

Keywords

Traumatic brain injury; Concussion; Anthropometric test dummy; Backfall; Football