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Association between physical function and the load pattern during stepping-up motion in community-dwelling elderly women

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Arch. Gerontol. Geriatr. 2016; 66: 205-210.

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DOI 10.1016/j.archger.2016.06.005 **PMID** 27367822

Abstract

OBJECTIVE: Stepping-up motion is challenging task for elderly people in daily life. The present study investigated the relationship between the load pattern during stepping-up motion at maximum speed and physical function in elderly women.

METHODS: The subjects comprised 109 community-dwelling elderly women (age 72.5±5.3years). The load pattern (maximum load, rate of load production, and stepping-up time) during ascending a 30cm step at maximum speed was measured, using a step up platform that measures the load at the lower and upper level. Physical function, including hip and knee extensor strength and performance on the vertical jump test, one-legged stance test, timed "Up & Go" (TUG) test, and stepping test were measured.

RESULTS: Pearson's correlation analysis showed that stepping-up time was correlated with the maximum load at the lower level ($r=-0.51$), but not with the maximum load at the upper level. A multiple regression analysis showed that hip extensor strength and performance on the vertical jump, TUG, and stepping tests were significant determinants of the load pattern during stepping-up motion in the elderly women.

CONCLUSIONS: Our study revealed that rapid stepping-up ability was more closely related to the maximum load during push-off at the lower level rather than that during weight loading on the upper level, and that the load pattern during stepping-up motion in elderly women was associated with various physical functions such as the hip extensor strength, leg muscle power, dynamic balance function, and agility.

PDF Y Endnote Y

Associations of guideline recommended medications for acute coronary syndromes with fall-related hospitalizations and cardiovascular events in older women with ischemic heart disease

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Abstract

BACKGROUND: Guidelines for acute coronary syndrome recommend statins, β -blockers, angiotensin-converting-enzyme inhibitors or renin-angiotensin system blockers, and antiplatelet agents for the secondary prevention of cardiovascular events. The aim was to examine associations between guideline recommended medications and fall-related hospitalizations and cardiovascular

events in robust and frail older women.

METHODS: 2002-2011 surveys from the Australian Longitudinal Study on Women's Health linked with administrative hospital, pharmaceutical and death registry data (2003-mid-2011) were used. Eight hundred eighty-five women (82.7 ± 2.7 years, range 76-90) had prior admission for ischemic heart disease and ≥ 1 claims for any of the four medication classes. Four hundred thirteen (46.7%) were robust and 472 (53.3%) were frail. Fall-related admissions; cardiovascular event-related admissions or death; and cardiovascular death were recorded. Associations between each of the exposures and outcomes were analyzed using survival analyses with noncardiovascular death as a competing risk.

RESULTS: There were 192 fall-related admissions and 314 cardiovascular events including 82 deaths. Using four recommended classes (compared to using one) was associated with increased risks of fall-related admissions (hazard ratio [HR] = 2.57, 95% confidence interval [CI] = 1.24-5.33), but not with cardiovascular events (HR = 1.41, CI = 0.97-2.05) or cardiovascular death (HR = 0.68, CI = 0.35-1.34). Associations for fall-related admissions were stronger in frail participants (HR = 5.46, CI = 1.34-22.30) than robust (HR = 1.37, CI = 0.48-3.95).

CONCLUSIONS: In older women with ischemic heart disease, the combination of the four recommended medication classes was associated with increased risk of falls, particularly among frail women, with no statistically significant gain in cardiovascular health. The risks of falls and consequential morbidity in women over 75 needs consideration when prescribing medications after myocardial infarction.

PDF Y Endnote Y

Comparison of trunk acceleration ratios during stair negotiation in old-old females

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(Copyright © 2016, Society of Physical Therapy Science)

DOI 10.1589/jpts.28.1922 **PMID**27390447

Abstract

PURPOSE: This study compared trunk acceleration ratios in old-old adult females during stair negotiation.

SUBJECTS AND METHODS: Twelve old-old adult females who could walk independently volunteered for this study. This study measured gait time and trunk acceleration ratios using an accelerometer during ascending and descending stairs

RESULTS: The trunk acceleration ratio when descending stairs was significantly higher than that when ascending stairs.

CONCLUSION: These findings suggest that old-old females have greater deterioration of upper trunk control function for descending than for ascending stairs, regardless of task time. In addition, the trunk acceleration ratio during stair negotiation is a useful clinical marker to predict function and balance control ability in old-old females.

PDF Y Endnote Y

Embodying transition in later life: 'having a fall' as an uncertain status passage for elderly women in southeast London

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DOI 10.1111/maq.12320 **PMID** 27380715

Abstract

In their 2013 report, the charity AgeUK states that one third of older people (over 3 million) fall each year. This article takes a focused look at falling by describing four women's accounts of 'having a fall' in Walworth, southeast London which sheds light on the experience of personal and corporeal change in later life. While some experiential studies of falling have made reference to a loss of embodied control and changes in identity, these aspects have not been explored in sufficient depth. Attending closely to the embodied experience of falling for particular older women in the context of everyday activity reveals the uncertainty surrounding what it actually signifies and the powerful effect this uncertainty has on their everyday lives and sense of self. This in-depth phenomenological account speaks to important gaps in the literature on falls given the current research emphasis upon the management of falls risk. This article is protected by copyright. All rights reserved.

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Evaluation of the clinical utility of the Home Falls and Accidents Screening Tool (HOME FAST)

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DOI 10.1080/09638288.2016.1204015 **PMID** 27385656

Abstract

PURPOSE: The HOME FAST was developed and trialled in Australia as a screening tool designed to be used by any health professional to identify older people at increased risk of falls and to facilitate referral for more detailed assessment and intervention. This study aimed to evaluate the clinical utility of the HOME FAST from the perspective of users.

METHOD: A mixed-methods approach using survey data (n = 32), focus group data (n = 46) and interview data (n = 5) from occupational therapists, physiotherapists, community nurses and other health professionals working in hospitals, community services and private practice, located in the UK, Canada and Australia. Data were integrated using a matrix of quantitative and qualitative data that aligned the findings with established theoretical constructs of clinical utility.

RESULTS: Findings across the data sources provide evidence of the clinical utility of the HOME FAST, and these findings align with theoretical constructs about how a tool such as the HOME FAST is adopted in practice.

CONCLUSION: The HOME FAST can be used in a variety of international setting in developed countries and by different health professionals as a screening tool. A manual would assist in the consistent application of the HOME FAST. Implications for Rehabilitation Hazards in the home environment are a key contributor to falls risk for older people The Home Falls and Accidents

Screening Tool (HOME FAST) was designed for any health professional to screen older people at increased risk of falling because of home hazards. Even with psychometric evidence of the reliability and validity of a tool, it is critical that the tool can be easily adopted by clinicians (clinical utility), otherwise its applicability to practice and research is limited. An international mixed-method study has provided evidence of the clinical utility of the HOME FAST.

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Falls and Wrist Fracture: Relationship to Women's Functional Status after Age 50

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(Copyright © 2016, Cambridge Press)

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Abstract

Women experience a rapid rise in the incidence of wrist fracture after age 50. Accordingly, this study aimed to (1) determine the internal and environmental fall-related circumstances resulting in a wrist fracture, and (2) examine the relationship of functional status to these circumstances. Women aged 50 to 94 years reported on the nature of the injury (n = 99) and underwent testing for physical activity status, balance, strength, and mobility (n = 72). The majority of falls causing wrist fracture occurred outdoors, during winter months, as a result of a slip or trip while walking. Half of these falls resulted in other injuries including head, neck, and spine injuries. Faster walking speed, lower grip strength, and higher balance confidence were significantly associated with outdoor versus indoor falls and slips and trips versus other causes. This study provides insights into potential screening and preventive measures for fall-related wrist fractures in women.

PDF Y Endnote Y

Identifying non-pharmacological risk factors for falling in older adults with type 2 diabetes mellitus: a systematic review

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Abstract

PURPOSE: To identify the non-pharmacological risk factors for falling in older adults with type 2 diabetes mellitus (DM2).

METHODS: A systematic review of randomized controlled trials, prospective cohort studies, cross-sectional studies and before/after studies was conducted. Eligible studies identified non-pharmacological risk factors for falling in older adults with DM2. Medline, Embase, Pubmed and CINAHL were searched for relevant studies published through December 2015. Reference lists were also searched for relevant studies. Search terms were DM2, risk factors, falls and falling, older adults, aging, non-insulin dependent diabetes mellitus, accidental falls and trip. Publication language was restricted to English.

RESULTS: Thirteen studies met the inclusion criteria: four cross-sectional, six prospective cohorts, two randomized controlled trials and one before/after study. These studies included a total of

13,104 participants, ≥ 50 years. The most common risk factors for falling were impaired balance, reduced walking velocity, peripheral neuropathy and comorbid conditions. However, lower extremity pain, being overweight and comorbid conditions had the greatest impact on fall risk. CONCLUSION: Interventions to reduce falling in older adults with type 2 diabetes mellitus should focus on reducing lower extremity pain, reducing body weight and managing comorbid conditions.

Implications for Rehabilitation

Diabetes mellitus:

- Older adults with type 2 diabetes mellitus (DM2) have a higher risk for falling than older adults without.
- Older adults with DM2 are more likely to suffer serious injuries when they fall.
- Comprehensive risk factor identification is necessary for rehabilitation professionals to accurately determine whether their clients are at risk for falling.
- Rehabilitation professionals also need to tailor interventions based on the client's risk factors in order to effectively reduce falls and fall-related injuries.

PDF Y Endnote Y

Injury characteristics and outcomes in elderly trauma patients in Sub-Saharan Africa

Citation

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DOI 10.1007/s00268-016-3622-y **PMID** 27386866

Abstract

BACKGROUND: Traumatic injury in the elderly is an emerging global problem with an associated increase in morbidity and mortality. This study sought to describe the epidemiology of elderly injury and outcomes in sub-Saharan Africa.

METHODS: We conducted a retrospective analysis of adult patients (≥ 18 years) with traumatic injuries presenting to the Kamuzu Central Hospital (KCH) in Lilongwe, Malawi, over 5 years (2009-2013). Elderly patients were defined as adults aged ≥ 65 years and compared to adults aged 18-44 and 45-64 years. We used propensity score matching and logistic regression to compare the odds of mortality between age groups using the youngest age group as the reference.

RESULTS: 42,816 Adult patients with traumatic injuries presented to KCH during the study period. 1253 patients (2.9 %) were aged ≥ 65 years with a male preponderance (77.4 %). Injuries occurred more often at home as age increased (25.3, 29.5, 41.1 %, $p < 0.001$) and falls were more common (14.1, 23.8, 36.3 %, $p < 0.001$) for elderly patients. Elderly age was associated with a higher proportion of hospital admissions (10.6, 21.3, 35.2 %, $p < 0.001$). Upon propensity score matching and logistic regression analysis, the odds ratio of mortality for patients aged ≥ 65 was 3.15 (95 % CI 1.45, 6.82, $p = 0.0037$) compared to the youngest age group (18-44 years).

CONCLUSIONS: Elderly trauma in a resource-poor area in sub-Saharan Africa is associated with a significant increase in hospital admissions and mortality. Significant improvements in trauma systems, pre-hospital care, and hospital capacity for older, critically ill patients are imperative.

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Patterns of perspectives on fall-prevention beliefs by community-dwelling older adults: a Q method investigation

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DOI 10.1186/s12877-016-0307-1 **PMID** 27388194

Abstract

BACKGROUND: Falling has high incidence and reoccurrence rates and is an essential factor contributing to accidental injury or death for older adults. Enhancing the participation of community-dwelling older adults in fall-prevention programs is crucial. Understanding fall-prevention beliefs will be beneficial for developing a community-based fall-prevention program. The aim of the present study was to identify the distinct types of subjective views on the fall-prevention beliefs of community-dwelling older adults aged 80 years and older by applying the Q method.

METHODS: The Q method was adopted to investigate the pattern of perception on fall-prevention beliefs. Forty-two older adults aged 80 - 92 years from a community care center in Northern Taiwan were recruited and requested to complete a Q-sorting. A series of Q-sorts was performed by the participants to rank 30 statements into a normal distribution Q-sort grid. The Q-sorts were subjected to principal component analysis by using PQMethod software Version 2.35.

RESULTS: Four statistically independent perspectives were derived from the analysis and reflected distinct viewpoints on beliefs related to fall prevention. Participants in the Considerate perspective believed that health problems caused by falling were serious and fall prevention could decrease the burden they place on their family. Participants in the Promising perspective believed that existing health problems could cause a fall and that fall prevention contributed to their well-being.

Participants in the Adaptable perspective perceived low barriers to execute fall prevention and displayed self-confidence and independence in preventing falls. Participants in the Ignorance perspective believed that they could not prevent falls and perceived barriers to fall prevention.

CONCLUSIONS: By combining theoretical constructs and the Q methodology approach, this study identified four distinct perspectives on fall prevention among community-dwelling older adults. Critical reflection on older adult personal perspectives and interpretations of the required responsive approach is a key element for appropriating fall-prevention support.

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Posturographic limits of stability can predict the increased risk of falls in elderly patients with instability?

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DOI 10.1080/00016489.2016.1201591 **PMID** 27376710

Abstract

OBJECTIVE: To study the LOS of elderly patients with instability vs healthy subjects of the same age to try to explain the increased risk of falls in elderly patients with instability.

METHODS: Fifty individuals ≥ 65 years, 30 cases (at least one of the next inclusion criteria: ≥ 1 fall in the last 12 months, >15 s or some support in the timed up and go test, composite <68 in SOT, ≥ 1 fall during production of the SOT) compared to 20 controls. Postural study: SOT and LOS, Smart Equitest Neurocom(®) platform. **STATISTICAL ANALYSIS:** t-Student test ($p < 0.05$).

RESULT: Mean value of overall balance: patients with instability =56% vs controls =77.1% ($p < 0.001$). Movement velocity: cases =2243°/s vs controls =2860°/s ($p = 0.029$). The reaction time (cases =1217 s vs controls =1.077 s), excursion (56.95% vs 59.35%) and directional control (56.95% vs 59.35%) differences were not statistically significant.

CONCLUSIONS: There was a difference in average score of the sensory organization test (SOT) of the case group (elderly instability) compared to the control group (healthy subjects). Cases had worse scores on the limits of stability (LOS) than controls, but were only able to confirm statistically significant differences in the movement velocity.

PDF Y Endnote Y

Simple test of manual dexterity can help to identify persons at high risk for neurodegenerative diseases in the community

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Abstract

BACKGROUND: Early identification of individuals at high risk of developing neurodegenerative diseases is essential for timely preventive intervention. However, simple methods that can be used for risk assessment in general practice are lacking.

METHODS: Within the population-based Rotterdam Study, we used the Purdue Pegboard Test (PPT) to assess manual dexterity in 4,856 persons (median age 70 years, 58% women) free of parkinsonism and dementia between 2000 and 2004. We followed these persons until January 1, 2012 for the onset of neurodegenerative diseases (defined as first diagnosis of parkinsonism or dementia). We determined the association of PPT scores with incident neurodegenerative disease, adjusting for age, sex, study cohort, level of education, smoking, preferred hand, parental history, memory complaints, and Mini-Mental State Examination. Furthermore, we determined the incremental predictive value of PPT, expressed as change in risk classification and discrimination.

RESULTS: During follow-up (median 9.2 years), 277 participants were diagnosed with a neurodegenerative disease (227 with dementia and 50 with parkinsonism). Lower PPT scores were associated with higher risk of incident neurodegenerative diseases (hazard ratio [HR] = 1.28, 95% confidence interval [CI]: 1.18-1.41) and improved discrimination of incident neurodegenerative diseases. We also observed significant associations of PPT scores separately with incident dementia (HR = 1.25; 95% CI: 1.14-1.39) and incident parkinsonism (HR = 1.41; 95% CI: 1.19-1.67).

CONCLUSIONS: A rapid, nonlaboratory test of manual dexterity may help to identify persons at high risk for neurodegenerative diseases. This highlights the importance of motor function in the preclinical phase of both dementia and parkinsonism and may aid in selecting individuals for refined screening and neuroprotective trials.

PDF Y Endnote Y

Social service robots to support independent living : experiences from a field trial

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Z. Gerontol. 2016; 49(4): 282-287.

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DOI 10.1007/s00391-016-1067-4 **PMID** 27220733

Abstract

BACKGROUND: Assistive robots could be a future means to support independent living for seniors.

OBJECTIVE: This article provides insights into the latest developments in social service robots (SSR) based on the recently finished HOBBIT project. The idea of the HOBBIT project was to develop a low-cost SSR which is able to reduce the risk of falling, to detect falls and handle emergencies in private homes. The main objective of the project was to raise the technology to a level that allows the robot to be fully autonomously deployed in the private homes of older users and to evaluate technology market readiness, utility, usability and affordability under real-world conditions.

METHOD: During the initial phase of the project, a first prototype (PT1) was developed. The results of laboratory tests with PT1 were used for the development of a second prototype (PT2), which was finally tested in seven households of senior adults (mean age 79 years) for 3 weeks each, i.e. in total more than 5 months.

RESULTS: The results showed that PT2 is intuitive to handle and that the functions offered meet the needs of older users; however, the robot was considered more as a toy than a supportive device for independent living. Furthermore, despite an emergency function of the robot, perceived security did not increase.

CONCLUSION: Reasons for this might be a lack of technological robustness and slow performance of the prototype and also the good health conditions of the users; however, users believed that a market-ready version of the robot would be vital for supporting people who are more fragile and more socially isolated. Thus, SSRs have the potential to support independent living of older people although the technology has to be considerably improved to reach market readiness.

PDF Y Endnote Y

Characterisation of foot clearance during gait in people with early Parkinson's disease: deficits associated with a dual task

Alcock L, Galna B, Lord S, Rochester L.

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Abstract

Tripping is a common cause of falls in older adults and people with Parkinson's disease (PD). Foot clearance during gait may be impaired when distracted by a dual task and thus inform trip risk. This study aimed to evaluate whether foot clearance is impaired in PD and is adversely affected by a dual task. 81 older adults and 76 PD walked at a comfortable pace for two minutes under single and dual task conditions (digit recall). Temporal spatial gait was measured using an instrumented walkway. Heel and toe trajectories were obtained bilaterally using 3-dimensional motion capture. Foot clearance was reduced in PD ($p < .001$) and under dual task ($p < .027$). The take-off (toe) gradient was reduced under dual task irrespective of group and the landing (heel) gradient was reduced in PD irrespective of task ($p < .001$). An increased proportion of unimodal toe distributions were observed for PD, particularly under dual task. Group differences were retained when controlling for step length (landing gradient and peak toe clearance in late swing) and gait velocity (landing gradient). Distinct differences in foot clearance were observed even in the early clinical stages of PD. Dual tasking may increase trip risk due to insufficient toe clearance (early swing) for both older adults and PD. Inadequate heel clearance (late swing) may increase falls risk in PD. Clearance deficits in PD are partially related to a reduced gait velocity and step length which may be targeted in tailored therapies. Further work is necessary to understand the mechanisms underlying this pathology-associated deficit.

PDF Y Endnote Y

Relationships between trunk performance, gait and postural control in persons with multiple sclerosis

Freund JE, Stetts DM, Vallabhajosula S.

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Abstract

BACKGROUND: Multiple sclerosis (MS) is a chronic progressive disease of the central nervous system. Compared to healthy individuals, persons with multiple sclerosis (PwMS) have increased postural sway in quiet stance, decreased gait speed and increased fall incidence. Trunk performance has been implicated in postural control, gait dysfunction, and fall prevention in older adults. However, the relationship of trunk performance to postural control and gait has not been adequately studied in PwMS.

OBJECTIVE: To compare trunk muscle structure and performance in PwMS to healthy age and gendered-matched controls (HC); to determine the effects of isometric trunk endurance testing on postural control in both populations; and to determine the relationship of trunk performance with postural control, gait and step activity in PwMS.

METHODS: Fifteen PwMS and HC completed ultrasound imaging of trunk muscles, 10m walk test, isometric trunk endurance tests, and postural sway test. Participants wore a step activity monitor for 7 days.

RESULTS: PwMS had worse isometric trunk endurance compared to HC. PwMS trunk flexion endurance negatively correlated to several postural control measures and positively correlated to gait speed and step activity.

CONCLUSIONS: Clinicians should consider evaluation and interventions directed at impaired trunk endurance in PwMS.

PDF N Endnote Y

Sensory Impairment, Functional Balance and Physical Activity with All-Cause Mortality

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J. Phys. Act. Health 2016; ePub(ePub): ePub.

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(Copyright © 2016, Human Kinetics Publishers)

DOI 10.1123/jpah.2015-0692 **PMID** 27172618

Abstract

OBJECTIVE: No study has comprehensively examined the independent and combined effects of sensory impairment, physical activity and balance on mortality risk, which was this study's purpose. **METHODS:** Data from the population-based 2003-2004 National Health and Nutrition Examination Survey was used, with follow-up through 2011. Physical activity was assessed via accelerometry. Balance was assessed via the Romberg test. Peripheral neuropathy was assessed objectively using a standard monofilament. Visual impairment was objectively assessed using an autorefractor. Hearing impairment was assessed via self-report. A 5-level index variable (higher score is worse) was calculated based on the participant's degree of sensory impairment, dysfunctional balance and physical inactivity.

RESULTS: Among the 1,658 participants (40-85 yrs), 228 died during the median follow-up period of 92 months. Hearing (HR=1.18; P=0.40), vision (HR=1.17; P=0.58) and peripheral neuropathy (HR=1.06; P=0.71) were not independently associated with all-cause mortality, but physical activity (HR=0.97; P=0.01) and functional balance (HR=0.59; P=0.03) were. Compared to those with an index score of 0, the Hazard Ratios (95% CI) for those with an index score of 1-3, respectively, were 1.20 (0.46-3.13), 2.63 (1.08-6.40) and 2.88 (1.36-6.06).

CONCLUSIONS: Physical activity and functional balance are independent contributors to survival.

PDF Y Endnote Y

Twenty-eight-day mortality of blunt traumatic brain injury and co-injuries requiring mechanical ventilation

Jovanovic B, Milan Z, Djuric O, Markovic-Denic L, Karamarkovic A, Gregoric P, Doklestic K, Avramovic J, Velickovic J, Bumbasirevic V.

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Abstract

OBJECTIVE: This paper aims to assess the impact of co-injuries and consequent emergency surgical interventions and nosocomial pneumonia on the 28-day mortality of patients with severe traumatic brain injuries (TBIs).

SUBJECTS AND METHODS: One hundred and seventy-seven patients with TBI admitted to the emergency trauma intensive care unit at the Clinical Center of Serbia for more than 48 h were

studied over a 1-year period. On admission, the Glasgow Coma Scale (GCS), Injury Severity Score (ISS) and Acute Physiology and Chronic Health Evaluation II score (APACHE II) were calculated. At admission, an isolated TBI was recorded in 45 of the patients, while 44 had three or more co-injuries. RESULTS: Of the 177 patients, 78 (44.1%) died by the end of the 28-day follow-up period. They had a significantly higher ISS score (25 vs. 20; $p = 0.024$) and more severe head ($p = 0.034$) and chest ($p = 0.013$) injuries compared to those who survived. Nonsurvivors had spent more days on mechanical ventilation (9.5 vs. 8; $p = 0.041$) and had a significantly higher incidence of ventilator-associated pneumonia (VAP) than survivors (67.9 vs. 40.4%; $p < 0.001$). A high Rotterdam CT score (OR 2.062; $p < 0.001$) and a high APACHE II score (OR 1.219; $p < 0.001$) were identified as independent predictors of early TBI-related mortality.

CONCLUSION: Patients who had TBI with a high Rotterdam score and a high APACHE II score were at higher risk of 28-day mortality. VAP was a very common complication of TBI and was associated with an early death and higher mortality in the subgroup of patients with a GCS ≤ 8 .

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