

An evaluation of the underlying causes of fall-induced hip fractures in elderly persons

İleri yaştaki olgularda kalça kırıklarına yol açan düşmelerde altta yatan nedenlerin değerlendirilmesi

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BACKGROUND

Falls are the major cause of hip fractures in elderly patients. The aim of this prospective study was to investigate the underlying causes of fall-induced hip fractures in the elderly.

METHODS

The study included 32 patients (18 males, 14 females; mean age 78 years; range 57 to 95 years) who had proximal femoral fractures following an unexpected and sudden fall from about a meter height at a moment of lying, sitting, or standing position. Underlying causes of falls were sought, including previous falls, stroke, polyneuropathy, motion disorders, dementia, vision problems, fainting, vestibular pathologies, and cardiac diseases.

RESULTS

Eight patients (25%) had a history of previous falls and 12 patients (37.5%) had a history of stroke. Polyneuropathy, Parkinson's Disease, and dementia were diagnosed in eight (25%), three (9.4%), and five (15.6%) patients, respectively. Twenty-one patients (65.6%) had neurologic diseases, 11 patients (34.4%) had cataract or other vision problems, eight patients (25%) had osteoarthritis and rheumatoid arthritis, 10 patients (31.3%) had vestibular pathologies, and 17 patients (53.1%) had cardiac diseases such as heart failure, orthostatic hypotension, ischemic heart disease, and arrhythmia.

CONCLUSION

In order to prevent recurrent falls, risk factors associated with falls should be determined and preventive treatment and measures should be put into practice in elderly patients who have fall-induced injuries.

Key Words: Accidental falls; aged; cerebrovascular accident; femoral fractures; hip fractures; osteoporosis; risk factors.

AMAÇ

Düşme, ileri yaşlarda görülen kalça kırıklarının ana nedenleridir. Bu çalışmada, ileri yaştaki hastalarda kalça kırığına yol açan düşmelerde altta yatan nedenler araştırıldı.

GEREÇ VE YÖNTEM

Çalışmaya yatar, oturur pozisyonda veya ayakta iken yaklaşık bir metre yükseklikten beklenmedik ve ani düşme sonrasında proksimal femur kırığı gelişen 32 hasta (18 erkek, 14 kadın; ort. yaş 78; dağılım 57-95) alındı. Bütün hastalar, önceki düşmeler, inme öyküsü, polinöropati, hareket bozuklukları, demans, görme bozuklukları, bayılma, vestibüler patoloji ve kalp hastalıkları açısından incelendi.

BULGULAR

Sekiz hastada (%25) daha önce yaşanmış bir düşme öyküsü; 12 hastada (%37.5) inme öyküsü vardı. Sekiz hastada (%25) polinöropati, üç hastada (%9.4) Parkinson, beş hastada (%15.6) demans hastalığı görüldü. Yirmi bir hastada (%65.6) nörolojik hastalık; 11 hastada (%34.4) katarakt ve diğer görme sorunları; sekiz hastada (%25) osteoartrit ve romatoid artrit; 10 hastada (%31.3) vestibüler sorunlar; 17 hastada (%53.1) kalp yetmezliği, ortostatik hipotansiyon, iskemik kalp hastalığı ve aritmi gibi kalp hastalıkları saptandı.

SONUÇ

Düşmeye bağlı yaralanması olan ileri yaştaki hastalarda, düşmelerin tekrarlamaması için düşmeye yol açan risk faktörleri araştırılmalı, koruyucu tedavi ve önlemlere başvurulmalıdır.

Anahtar Sözcükler: Düşme; ileri yaş; serebrovasküler olay; femur kırığı; kalça kırığı; osteoporoz; risk faktörü.

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Falls in the elderly population is an important public health problem associated with trauma and deaths. One-third of the population aged 65 years or over have a fall history and, in half of these cases, falls are recurrent. Fractures are frequent; they occur in 5% of individuals with a fall history and may be life-threatening in elder patients. In particular, hip fractures have a high prevalence with increasing age due to many contributing factors, including osteoporosis, a history of fall or an antecedent fracture, cognitive disorders, immobilization, poor health conditions, acute-chronic diseases, foot problems, neurologic problems, geriatric disorders such as postural instability, slowed motion, and vestibular problems.^[1,2]

On the other hand, stroke is one of the major causes of mortality and morbidity in the elderly. Stroke patients are susceptible to many early and late complications including fractures.^[3] The risk factors for stroke and hip fractures are usually common, such as age, smoking, and immobility. The risk for hip fractures is four times higher in patients with a history of stroke, the prevalence ranging from 3% to 19%.^[4] Stroke patients usually develop hemi-osteoporosis within a year, with rapid deterioration, resulting in fractures at the paralytic site.^[5]

In this study, we investigated the risk factors, in particular neurologic diseases underlying in the occurrence of hip fractures in elderly patients.

MATERIALS AND METHODS

This prospective study included 32 patients (14 females, 18 males; mean age 78 years; range 57 to 95 years) who underwent surgery for proximal

femoral fractures following a fall episode at the Department of Orthopedics and Traumatology of Medicine Faculty of Trakya University between June 2000 and June 2002.

The mechanism of fractures was defined as unexpected and sudden falls from about a meter height at a moment of lying, sitting, or standing position. All patients were evaluated with regard to previous fall episodes, a history of stroke, polyneuropathy, motion disorders, dementia, vision problems, fainting, vestibular pathologies, and cardiac diseases. After an inquiry into previous health problems, all patients were examined by a neurologist. Patients were asked whether the fall had been associated with vertigo, paralysis, vision field defects, diplopia, or else. Vestibular and ophthalmologic disorders were diagnosed on the basis of medical history, former or current drug use, and physical examination findings.

Statistical analyses were made with the use of the SPSS 10.0 software. Differences between males and females were evaluated with a two-tailed Fisher's exact test; categorical parameters and continuous parameters were evaluated by the chi-square test and Student's t-test, respectively.

RESULTS

No statistically significant differences were found between female and male patients in terms of risk factors and demographic features (Table 1). Eight patients (25%) had a history of a previous fall episode. Twelve patients (37.5%) had stroke; of these, eleven patients had experienced stroke before the fracture occurrence, while one patient fell during stroke incidence. Neurological examination and elec-

Table 1. Demographic features of the study group and accompanying conditions

	Total	Male (n=18) (Mean age 78.2)		Female (n=14) (Mean age 77.7)	
		n	%	n	%
Previous falls	8	5	27.8	3	21.4
Stroke history	12	9	50.0	3	21.4
Polyneuropathy	8	4	22.2	4	28.6
Parkinsonism	3	1	5.6	2	14.3
Vision disorders	11	7	38.9	4	28.6
Rheumatoid arthritis+osteoarthritis	8	4	22.2	4	28.6
Vestibular disease	10	6	33.3	4	28.6
Dementia	5	3	16.7	2	14.3
Cardiac disease	17	10	55.6	7	50.0

troneuromyography revealed polyneuropathy in eight patients (25%). Three patients had Parkinson's Disease. Five patients had dementia.

Overall, 21 patients (65.6%) had had neurologic diseases before the occurrence of proximal femoral fractures following a fall episode. Eleven patients (34.4%) had cataract or other vision problems. Osteoarthritis and rheumatoid arthritis were detected in eight patients (25%). Ten patients (31.3%) had a vestibular pathology while seventeen patients (53.1%) had cardiac diseases such as heart failure, orthostatic hypotension, ischemic heart disease, and arrhythmia.

DISCUSSION

Hip fractures most commonly affect the elderly, imposing a heavy burden on the health care system and society. Several studies investigated the relationship between neurologic problems and hip fractures. Elder patients with neurologic diseases have a high risk for hip fractures.

Ramnemark et al.^[3] reported that the risk of hip fractures increased 2 to 4 times after stroke. Hip fractures in stroke patients are usually caused by accidental falls and affect the paretic side.^[3,5,6] Dennis et al.^[4] stated in their study that the higher incidence of fractures in stroke patients might be due to weak bones or to an increased risk for falling. Most of the hip fractures occur after a fall.

Fuller^[1] emphasized the importance of a thorough evaluation in elderly patients presenting with a fall history so as to reduce the risk of recurrent falls through treatment of, and preventive measures against, the underlying causes. Kannus et al.^[2] stressed that preventive measures should be adopted to control and minimize the increased burden of fall-induced injuries.

Several studies showed decreased bone mineral density on the paretic side of hemiparetic patients.^[4,6-8] The loss in bone mineral density is

explained by an increase in osteoclastic activity and a decrease in osteoblastic activity. Most of the studies that investigated the relationship between stroke and fracture risk suggested that patients carried higher risks both for osteoporosis and recurrent fractures and should receive proper treatment for osteoporosis preferably with bisphosphonates.^[8]

Our investigation into the underlying causes of hip fractures occurring after a fall showed that all elderly patients had at least one underlying disease. Therefore, elderly patients with fall-induced injuries should undergo evaluation including neurologic examination for the risk factors of fall to decrease the incidence of recurrent fractures, in particular hip fractures. Considering the high prevalence of osteoporosis in elderly population, these patients may benefit from osteoporosis treatment and the use of mechanical hip protectors.

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