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Orthopaedic complications of falls in elderly patients: a brief review



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ABSTRACT

Background: Falls are frequent and often cause morbidity, mortality, and disability that require regular nursing. Most of these falls are associated with one or more identifiable risk factors, such as weakness, unsteady gait, confusion and medication use. Our objective was to review existing literature regarding prevention, orthopaedic complications, and risk factor of falls in the elderly.

Methods: A total of 14 relevant literature were reviewed regarding orthopaedic complications of fall in elderly patients. The data collection for eligible articles were conducted from 1988-2015. Different database and manual search methods were used to find the topic-related articles.

Results: Falls in elderly occurs due to a combination of multiple risk factors, such as imbalance, degenerative diseases, porotic bone, and metabolic disturbances. Though in the orthopaedic field, falls

will most often result in injury such as femoral neck and proximal humerus fractures, all other parts of the body may also be affected due to various mechanisms of injury. As a disabling phenomenon, fractures due to falls in elderly may then proceed to series of complications, from early to late complications, from local (such as nonunion, muscle atrophy, disuse osteoporosis, etc) to systemic complications (such as pressure sores, pneumonia, ulcers, urinary tract infection, ileus, etc). Therefore, prevention will play a critical role in this particular situation.

Conclusion: Data from the most recent studies suggest the apparent effectiveness of several interventions in preventing falls, including fall risk assessments tied to interventions, exercise, environmental inspection and modification, and combined interventions.

Keywords: complication, elderly, falls, risk factors

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INTRODUCTION

Falls are the foremost cause of traumatic injury in a geriatric patient. It happens in up to two-thirds of the population every year, and up to a fifth of these incidents will end in morbidity, mortality, and acute-chronic health impairment. Falls may mitigate function by causing injury, limiting activities, fear of falling, and mobility loss. Up to a third of them who fall will suffer moderate to severe injuries such as fractures.¹ Fractures of hip, forearm, humerus and pelvis usually result from the effect of falls in elderly. Fractures itself will result in many complications such as deep vein thrombosis, paralytic ileus, pressure sores, pneumonia, in which these complications will lead to increased length of stay and even death. Therefore, prevention of falls must reach out to the spectrum of ages and health status within the elderly population.²⁻⁵

RISK FACTOR OF FALLS

Risk factors for falls can be separated into two categories, intrinsic risk factors such as geriatric, female gender, Caucasian ethnicity, postmenopausal

status, height, low body mass, cognitive impairment, musculoskeletal diseases, chronic arthritis, gait and balance disorders, sensory impairments, postural hypotension, history of previous falls, use of certain medications such as benzodiazepines, sedative-hypnotic drugs, antidepressants, anti-hypertensive medication, anti-arrhythmic drugs, diuretics and anti-seizure medications. Extrinsic factors play a progressively milder role for fall risk as age advances, mainly because of the intrinsic factors, such as chronic illnesses, get more important in this age group. Extrinsic risk factors in the old occur primarily due to environmental home hazards.^{6,7}

COMPLICATION OF FRACTURES DUE TO FALLS IN ELDERLY

The systemic complications of fractures due to falls in elderly such as integumentary system (skin), genitourinary system, respiratory system and digestive system are similar to the complication of fractures generally. In the integumentary system, bed sore and pressure sore is common complication found in the patient with a fracture in the elderly. Bedsores occur in elderly or paralyzed patients.

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The skin over the sacrum and heels is especially susceptible. Plaster sores occur where surface presses directly onto the bone. The pressure distributed to the soft tissues around the bony points by padding the bony points and by moulding the wet plaster so that. While a plaster sore is developing, the patient feels localized burning pain.⁸ Infection in the urinary tract is found associated with a fracture in elderly patient. A study from Japan said that there is a significant correlation between the incidence of urinary tract infection due to vertebral fracture in elderly patient.⁹ Among these comorbidities and complications, pneumonia during therapy for hip fracture was the second-highest hazard for death. Furthermore, an increased death rate from infection persists for at least two years after hip fracture, so the incidence of pneumonia during treatment is considered to be one of the most important critical factors for mortality following hip fracture.¹⁰ A digestive complication also found in fracture patient, especially paralytic ileus. Ileus following elective spine surgery is a relatively common adverse event, occurring in approximately 3.5% of patients undergoing lumbar spine surgery. Spine surgery is exclusive among orthopaedic procedures because the anterior approach around the peritoneal cavity and into the retroperitoneal space commonly performed. Ileus also found in lower extremity surgery. The rate of ileus following lower extremity arthroplasty has reported between 0.3% and 4% after primary arthroplasty, and up to 5.6% after revision surgery.^{8,11}

Local complications can be separated into *early* (those that arise during the first few weeks following injury) and *late*. Early complications may present as part of the primary injury or may appear only after a few days or weeks such as visceral injury, vascular injury, nerve injury, compartment syndrome, hemarthrosis and infection. Fracture often associated with damage to a major artery are those around the knee and elbow and those of the humeral and femoral shafts. The artery may be cut, torn, compressed or contused, either by the initial injury or subsequently by jagged bone fragments. Fractures of the arm or leg can give rise to severe ischaemia, even if there is no damage to a major vessel. Bleeding, oedema or inflammation (infection) may increase the pressure within one of the osseofascial compartments; there is reduced capillary flow, which results in muscle ischaemia, further oedema, still more significant pressure and yet more profound ischaemia – a vicious circle that ends, after 12 hours or less, in necrosis of nerve and muscle within the compartment.⁷⁻⁹

If the fracture was inadequate for the

management, a late complication such as delayed union, malunion, nonunion, avascular necrosis, osteoarthritis, muscle contracture and atrophy could happen. The factor causing delayed union can be summarised as biological (inadequate blood supply, severe soft tissue damage, periosteal stripping) and biomechanical (imperfect splintage, over-rigid fixation, infection). The causes of the malunion bone in a fracture in elderly are a failure to reduce a fracture adequately, inability to hold reduction while healing proceeds, or gradual collapse of comminuted or osteoporotic bone.⁸

PREVENTION OF FALLS IN ELDERLY

Practical approaches include multidimensional risk factor assessment tied to targeted interventions, exercise programmes (which include balance, strength and endurance training), and environmental assessment and modification.⁶ The significant risk factor for falls in elderly individuals is balance impairment. Importantly, it known that exercise interventions can improve balance in healthy individuals.¹² Both interventions that were successful in reducing fall or fracture incidence contained balance exercises. Most of the interventions in which balance exercises were included have shown to be effective in the improvement of balance. However, it should be noted that outcome measures for balance were very diverse.¹³

Muscle strength is one of the aspects of mobility that is important in the reduction of falls and fractures is. It has been shown that there is an inverse relationship between muscle strength and fracture risk. Furthermore, a determinant for static and dynamic balance in individuals with osteoporosis is knee extension strength. Therefore, lower extremity strength in individuals with low BMD will be improved by interventions with strength training. Another clinically relevant finding is that programs with strengthening exercise can improve trunk muscle strength in individuals with low BMD.¹⁴

Environment modification is essential to reduce the incidence of falls in the elderly. Type of footwear may impact the risk of falling. The oldest persons, mostly hang around indoors, have the highest likelihood to fall inside their household. This risk is thus more associated with intrinsic risk factors, such as severe medical problems and reduced functional ability. Several European trials of hip protector pads mainly in nursing home settings have reported dramatic reductions in hip fractures. Compliance has been an issue but appears to be surmountable, especially with more comfortable newer models.¹⁵

CONCLUSION

Data from the most recent studies suggest the apparent effectiveness of several interventions in preventing falls, including fall risk assessments tied to interventions, exercise, environmental inspection and modification, and combined interventions. The future looks bright in this area, as in so many areas of geriatrics. Therefore, systematic attention to fall prevention is a vital part of the comprehensive care of the older adult.

CONFLICT OF INTEREST

Author declares that there is no conflict of interest regarding all aspect of the study.

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