Falls in Elderly

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Introduction

Falls is one of the major problems of elderly and is a significant cause of morbidity and mortality. It is usually multifactorial, requiring multidisciplinary approach for treatment and prevention of future falls. Recurrent falls is a marker of poor physical and cognitive status.

The incidence increases as age advances, and is a leading cause of death due to its complications like fractures, SDH, infection following soft tissue injury etc. The morbidity include restricted mobility and psychological trauma (post Fall syndrome). More than 80% of hip fractures in the elderly are due to falls. About 1/3 of the community living elderly fall in a year and 50% of them have multiple falling episodes.

Fall is best defined as a sudden unintentional change in position, causing a subject to land on the ground or on lower level not as a result of major intrinsic or extrinsic hazards. A recurrent fall is defined as two or more fall events occurring within a period of six months.

The human body is unstable with a very small base of support relative to its height. During physical activities the balance is maintained by complex neuromuscular feedback mechanism. Aging changes include impairment of vision and hearing, reduction of proprioceptive and vibratory sensation, increased sway, altered gait and slower righting reflexes. These physiological changes alone do not cause a fall but increase the liability to fall. Most often the cause for fall is multifactorial. It is due to multiple underlying problems like physical illness, cognitive decline, medications and environmental hazards. The risk factors include: a) Intrinsic Factors like 1. Old Age, Female sex, Low body mass index 2. Neurological – Cognitive impairment, Postural instability, Parkinsonism,

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CVA / Gait disorders, Peripheral neuropathy, Sleep disturbance 3. Vision problems 4. Musculoskeletal problems like Osteoarthritis and deformities of knee, muscular weakness of LL, foot disorders 5. Cardiac: Arrhythmia, postural hypotension, cardiac failure, 6. Medications: polypharmacy, sedatives, hypnotics, diuretics, antidepressants 7. Metabolic disturbances 8. Acute illness like pneumonitis, M.I etc. 9. Depressive illness (b). Extrinsic Factors like uneven ground surface, slippery floors, stair case 2. Poor lighting, Glare from lamps 3. Low ling furniture and chairs without arm rests 4. Improper walking aids and footwear

Assessment of Falls:

A patient brought to hospital with the h/o falls must be assessed in detail to prevent further episodes. It includes a complete detailed history regarding the fall, (symptoms at the time of fall, location, posture change), individual's fear of falling, the presence of acute or chronic illness and medications. Assessment of individual's fear of falling is done by self efficacy tests. Depression is assessed with Geriatric Depression Scale (GDS). Medication history is elicited in detail with specific attention given to newly started drugs or for which the dose has been increased recently. Functional assessment with ADL score is done.

Examination of vision, gait and balance and lower extremity joint function, neurological examination including cognitive screening using Mini Mental State Examination (MMSE) is done. Cardiovascular assessment and evaluation of various intrinsic and extrinsic factors are done. Assessment of gait & balance by various tests like (i) Functional Reach (FR) which measures dynamic balance (ii) Berg balance scale a measure of functional activity (iii) Timed get up and go test (TUG) and (iv) Performance oriented mobility assessment (POMA) can predict the risk of falls. The Central Sensory Organisation Test (SOT) measures the ability for selection and combination

of appropriate inputs and the orientation to the environment. The two tests used: 1. Computerised Dynamic Posturography (CDP) and 2.Clinical Test of Sensory Interaction and Balance (CTSIB)

Management:

Treatment of the injury and the associated illness After the patient is stabilized the treatment of the primary cause of fall should be implemented. These include physiotherapy (Balance training and muscle strengthening exercise including yoga & Tai chi of China)) use of elastic stockings for orthostatic hypotension and specific drug therapy, dose adjustment and review of medications. Home safety measures(environment modification) are useful.

Key points:

Falls occur frequently in elderly with increased morbidity. A number of intrinsic and extrinsic risk factors are associated with a fall. Falls are often multifactorial. Hence a detailed evaluation is mandatory, particularly in those with recurrent falls. Falls may be prevented by targeted, multifaceted interventions.

Pervasive Digital Technology in Geriatric Health

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Pervasive Digital technology is defined as Digital Technology which Pervades the lives of masses. Mobile Technology, Computer technologies, sensors can be extensively used for Geriatric Health Applications can vary from simple use of Technology like What`s app for remote management of patients to Physiotherapy Rehabilitation. Digital Technology has a great role in, physiotherapy, Psychotherpay, Dementia care, Home based care for Geriatric population. In this abstract we summarized Various applications for the care of the elderly at home or in nursing homes or care homes where expert staff may not be available .Several of these applications are available, however rarely used in India

Applications:

1. **Out of Clinic Stroke Rehabilitation**: Skype based physiotherapy may still need manpower. However limb motion tracker using specific points in the limbs can track movement and monitor home physiotherapy and give physiotherapy prompts according to the performance

2. **Dementia Care**-ADL assistive devices, tracking devices: Handwashing assistive device has been already developed. Multiple ADL assistive devices are under development

3. **Falls detection**: Risk of fall or falls can be detected through sensors

4. **Home safety monitoring**: Home of the Elderly can be completely monitored through remote control .Switch on the Gaeser, switch off the gas and put it off etc

5. **Tracking devices** Elderly can lose the way and wander .Tracking device with GPRS system can track the location

6. **Physiological sensors** to track physiological status: Vital signs can be regularly monitored through sensors and can alert the relatives staying elsewhere or a hospital.