CHAPTER

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Approach to Frequent Falls in Elderly People

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INTRODUCTION

Elderly population is about 8 % of total population in India and is increasing every year. The basic marker of old age is "slowing of behaviour" resulting in slowness of reaction and task performance. Ageing leads to decreased strength, vision, hearing, proprioception and reaction time. These changes lead to reduced balance and altered gait leading to falls. Falls may be due to extrinsic factor (external hazards) or intrinsic factors like diseases, medications or combination of both. Falls may have a very serious consequences like fractures, soft tissue injury, head injury and even death. There are many causes for recurrent falls and falls with injury should be evaluated thoroughly to find out the cause and prevent future falls. Prevention of frequent falls is by multicomponent intervention as suggested by AGS (American Geriatrics society) and BGS (British Geriatrics society) 2010 guidelines.

ELDERLY

Elderly or old age means nearing or surpassing the life expectancy of human beings. It denotes the end of human cycle. The various terms used to denote elderly are seniors, senior citizens and the older adults. The basic mark for old age is "slowing of behaviour". This "slowing down principle" finds a correlation between advancing age, slowness of reaction and task performance.[1] In India according to ministry of statistics and programming the size of elderly population over age of 60 years is fast growing and constitutes about 8 % of total population according to 2011 census.[2]

FALLS IN ELDERLY

As a person gets older a number of age related changes takes place in the body. There is decrease in muscle mass resulting in decreased strength, decreased visual and hearing acuity, decreased proprioception and reaction time. Because of all these changes there is reduced balance and altered gait in an elderly person leading to falls even when performing routine activities.[3]

A fall is defined as an event that results in the patient or a body part of the patient coming to rest inadvertently on the ground or other surface lower than the body.[4]

Falls are common in elderly and it can lead to devastating consequences. It can result in fractures, soft tissue injuries, head injuries and even death. Fractures account for 70 % of serious injuries due to falls, with hip fractures being the most common. It leads to significant morbidity and mortality. While most falls do not result in significant injury, the fear of fall could result in serious psychological impact. This leads to restriction of activities by the individual and quality of life decreases.[5]

RECURRENT FALLS

Recurrent falls is defined as 2 or more falls within 6 months. In more active persons fall may result in more serious injury than in a less active person. Frail elderly persons tend to fall and injure themselves during course of routine activities. A fall with injury should be evaluated immediately.[5] Recurrent falls are due to multiple disorders superimposed on ageing changes. Recurrent falls may have different etiology and if risk factors are high then there is increased chance of recurrent falls.

Majority of elderly people fall at home (70%) and about 20 % requires hospitalisation. Accidental falls due to environmental hazards (tripping, slippery floors, inadequate lighting) are the most common cause of falls among elderly people living independently. Most of these accidental fall occurs during routine activities like walking or changing position like sitting to standing.[3] Falls in elderly are usually due to more than one cause, because of intrinsic deficits like disease and medications, activities at time of fall and extrinsic causes (environmental obstacles).[6]

EPIDEMIOLOGY

A cross sectional study of elderly people with falls over 1year period done from Chandigarh showed the following results

- 31 % of the recruited people had 1 or more falls.
- Risk of fall was higher among females.
- Majority of falls (68%) happened in home and most (75%) of them occurred while carrying out activities like bathing, toileting, sleeping, walking and change in position.
- 67 % of the patients sustained injuries and among them 8 % had fractures.[7]

TYPES OF FALLS

Different types of falls in the elderly are

1. Mechanical falls due to tripping and slipping.
2. Drop attacks due to orthostatic hypotension, colloid cyst of third ventricle with intermittent obstruction of foramen monro.
3. Toppling falls and gait freezing due to parkinsonism

4. Falls due to reeling or staggering gait of cerebellar ataxia and alcohol.
5. Falls due to high steppage gait in sensory ataxia.
6. Falls due to neuromuscular diseases producing high stamping gait and waddling gait.
7. Falls due to drugs.
8. Psychogenic gait disorder.
9. Antalgic gait due to osteoarthritis, podiatric disorders and other painful conditions of lower limb.[8]

CAUSES OF FALLS IN ELDERLY

1. Older age especially > 75 years
2. Females
3. Home bound state
4. Living alone
5. Use of walker
6. Previous falls
7. Acute illness like
   - Acute Myocardial infarction
   - Pneumonia
   - Stroke
   - Gastro Intestinal bleed
   - Hypoglycemia
   - Hyperglycemia
   - Hyponatremia
   - Hypokalemia
8. Chronic diseases like Chronic obstructive pulmonary disease (COPD), Obstructive sleep apnoea (OSA), Osteoporosis
9. Physical deficits
10. Accident fall from bed
11. Gait disturbances
12. Balance disorders like vertigo
13. Medications, alcohol
14. Neuromuscular disorders
15. Confusion and cognitive impairment
16. Postural hypotension
17. Visual disorders like
    - Cataract
    - Disturbances in accomadation
    - Myopia
    - Presbyopia
    - Decreased night vision
    - Decline in peripheral vision
    - Bifocal lenses
18. Decreased hearing
19. Painful arthritis and unstable joints
20. Syncope, drop attacks and epilepsy.[5]

EXTRINSIC CAUSES OF FALLS

1. Poor lighting
2. Unsafe stairways
3. Irregular floor surfaces
4. Slippery bathroom
5. Too low furniture and commode
6. Foot wears with high heels
7. Obstacles on the floor like rugs and Floor mats

MEDICATIONS INCREASING RISK OF FALLS

1. Sedative/hypnotic
2. Tricyclic antidepressants
3. Antihypertensives
4. Cardiac medications
5. NSAIDS
6. Anticholinergic drugs
7. Hypoglycemic agents
8. Any medication likely to affect balance[5]

EVALUATION OF FALLS HISTORY (FIGURE 1)

A detailed history is useful in understanding the mechanism and cause of fall but often it can be incomplete and cause may be difficult to ascertain. The points to be focussed in the history includes past history of falls, any person witnessed the fall, presence of any risk factors, circumstances of fall, review of medications taken by the patient with special attention given to intake of any new medications in the past 2 weeks.[5]

PHYSICAL EXAMINATION

The following points should be looked for in the physical examination

1. Visual acuity of the patient should be assessed.
2. Hearing should be tested
3. Neurological evaluation
   - Cognitive evaluation
   - Tests of cortical, extrapyramidal function
   - Cerebellar function and proprioception
   - Muscle power (especially of lower extremities)
   - Assessment of gait and balance
   - Assessment of peripheral nerves of lower extremities

Table 1: Interventions to be done for abnormal results of Timed Up and Go test

Observation	Significance	Intervention
Difficulty rising from chair	Proximal muscle weakness	PT referral for lower extremity strengthening
Staggering or reported dizziness upon rising	Possible orthostasis	Check orthostatic vital signs, review medications that may contribute to orthostasis
Pill rolling tremor, stooped posture, festinating gait	Possible parkinsonism	Consider neurology referral
Increased sway, magnetic gait	Possible normal pressure hydrocephalus	Ask about memory issues and urinary incontinence, if + consider CT
Path deviation	Peripheral neuropathy, CVA	Neuropathy work up, PT referral for assisted device
Slow, antalgic gait	Pain from osteoarthritis, peripheral neuropathy, podiatric disorders	Pain control, examination of feet

4 Mobility of joints

5. Cardiovascular evaluation

- Heart rate and rhythm
- Blood pressure and postural variation
- If necessary B.P and pulse variation to carotid sinus stimulation

6. Examination of feet and footwear[9]

SCREENING FOR FALLS

The American and British geriatrics societies (AGS and BGS) in the year 2010 gave a summary of recommendations for prevention of falls in elderly. It states that all persons aged 65 and greater should be asked about history of previous falls. If the patient had history of fall or gait/balance disorders, patient should undergo in office assessment tests like Timed Up and Go tests.[10]

TIMED UP AND GO TEST

It is a simple office room test where patient's gait and balance is tested for abnormality. In this test patient is initially asked to sit back in the chair with armrests. Then patient is asked to get up without using hands, walk for 3 meters without touching the wall, turn around, walk back to the chair and sit down. All these events are timed by the examiner. A normal person should be able to complete all these tasks within 10 seconds. If the person takes more than 30 seconds to complete the tasks, the test is considered as abnormal and the person needs assistance for mobility.[5,10]

PREVENTION

Elderly people with recurrent falls should have telephone or mobile phones at the reachable level or must have mobile phone in person. They should be taught how to get up from the fall. Use of hip protectors in reducing hip fracture is not clear.[6] Various single and multicomponent interventions have shown to decrease the risk and rate of falls.

VITAMIN D

Vitamin D supplementation given in doses of 800 IU/day or more have shown to decrease the incidence of falls in long term care.[4]

EXERCISE

Various exercise modalities have been studied to reduce falls. According to 2010 AGS and BGS guidelines individual exercise regimen like Tai chi or physiotherapy is recommended for all at risk patients (grade A recommendation).[9] Tai chi is a low impact rhythmic stretch cardiorespiratory exercise practised extensively helps in gait and balance disorders. Tai chi is a combination of strength and balance training, with a certain aerobic element.[11] A meta - analysis done in 2008 showed that the fall rates were greatly reduced following programs including combination therapy. This included a combination of greater than 50 hours of duration of exercise (during trial period), challenging balance exercises (e.g, standing with feet together or on one leg, minimising the use of hands to assist and practising controlled movements of the centre of mass) and it did not include a walking program.[12]

MEDICATIONS

Polypharmacy is very common in elderly due to prevalence of many chronic diseases and multiple providers. Many drugs increase the risk of falls in elderly population. So modification of these drugs results in reduction of falls. However one should be very cautious when weaning of certain medications suddenly which have been used chronically. According to 1 study a statewise policy to reduce benzodiazepine use did not reduce the fracture rates among that population. This emphasizes the fact that each patient should be managed on an individual basis.[11]

VISION

Visual impairment increases the risk of falls and early intervention is necessary. Cataract surgery should be done at the earliest. Screening for visual impairment and providing glasses should be done. However it has been found that prescription of new glasses resulted in increased rate of falls. This might be due to difficulty in adjusting to new glasses and increased activity. Also it has been found that people who wear multifocal lenses

Did the patient had recent fall or near fall? No → Stop

↓Yes

Cognitive impairment suspected ? Yes → Cognitive status evaluation

↓No

Any obvious immediate cause of fall Yes → Treat

↓No

History + physical examination + lab tests when indicated

↓

Cause determined ? Yes → Treat

↓No

Further diagnostic tests as indicated

↓

Cause determined ? Yes → Treat

↓No

Refer the patient to falls prevention program

Fig. 1: Algorithm for the Evaluation of Falls in the Elderly[5]

are twice more likely to sustain falls. So people who were provided single lens distance glasses experienced less falls. However those patients with limited outdoor activities had more incidence of falls with these glasses. Hence in patients with limited outdoor activities providing multifocal glasses are useful.[11]

ENVIRONMENT

Home safety interventions like home visits by occupational therapists are effective in secondary prevention (patients with falls previously). However its role in primary prevention is limited. Assisting devices such as canes and walkers are useful in elderly and they must be trained to use them properly.

MULTICOMPONENT INTERVENTIONS

Multicomponent interventions were useful if they actively provided treatment rather than giving knowledge or referrals alone. Multifactorial interventions were given a grade A recommendation by 2010 AGS and BGS guidelines.[11]

According to AGS and BGS 2010 guidelines the components most commonly included in various efficacious interventions were

- Modification or adaptation of home environment
- Recognising and managing postural hypotension
- Minimization or if possible withdrawl of psychoactive medications
- Minimization or if possible withdrawl of other medications
- Management of foot problems and footwear
- Balance, gait and strength training[9]

CONCLUSION

Falls in elderly especially with recurrent falls should be evaluated by meticulous history, careful clinical examination, Timed Up and Go test to test balance and gait to ascertain the cause for fall and take necessary steps to prevent future falls by single or multicomponent intervention as suggested by AGS and BGS. Screening and assessing for fall risk is very important to prevent falls. The patient, family members, health care team and the health care system will be largely benefited if you find out the cause of fall and prevent further falls because "prevention is better than cure".

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