DRUGS- A SIGNIFICANT FACTOR FOR FALLS RISK IN THE ELDERLY

Falls are a leading cause of injury and injury-related deaths in the elderly nursing home population. Falls and related complications have been reported to be the fifth leading cause of death in older adults. Over 30% of elderly adults (i.e., over the age of 65) will fall at least once annually; the rate increases to 60 percent for residents in nursing homes. Falls are also responsible for 85 percent of all injury-related hospital admissions and more than 40 percent of nursing home admissions. While falls are a common occurrence among the elderly, they are not a part of the normal aging process. Nevertheless, advanced age represents probably the most common risk factor for falls. The majority of falls in the elderly, however, is typically multifactorial and involve more than a single underlying cause.

Basically, anything that causes muscle weakness, especially in the legs, poses an important (age-related) risk factor for falls. Likewise, anything adversely affecting balance or gait, impairing one's ability to walk would predispose a person to falls. Anything causing abrupt drops in blood pressure (e.g., postural or orthostatic hypotension), resulting in dizziness or syncope would represent a huge falls risk. Anything impairing one's sensorium (i.e., affecting vision, touch, or hearing) would place a person more at risk for falls. Anything causing a person to become sedated, confused, disoriented, or agitated would increase a person's likelihood for falling. Frequently, comorbid conditions such as Depression, Parkinson's disease, Dementia, Diabetes, Arthritis, visual problems such as Cataracts and Glaucoma, and Seizure Disorders, because of their own unique characteristics, will place persons at greater risk for falls. And, then, there are a multitude of environmental factors that promote the occurrence of falls. Thus, as one can see, the risk factors for falls are numerous and far-reaching, and this list of factors is far from being "all-inclusive"! In fact, one of the most significant and common falls risk factors would be medications. Fortunately, the drug factor is one that can often be modified in an effort to reduce the falls risk. Thus, the remainder of this article will be completely focused on the falls risk that drugs pose for elderly individuals.

It has been a long agreed-upon principal that, the greater the number of medications a person receives, the greater will be the risk for the person to experience an adverse drug consequence. CMS defines an adverse drug consequence as "an unpleasant symptom or event that is due to or associated with a medication, such as impairment or decline in an individual's mental or physical condition or functional or psychosocial status. It may include various types of adverse drug reactions and interactions (e.g., medication-medication, medication-food, and medication-disease)." CMS goes on to describe an

adverse drug reaction (ADR) as “a form of adverse consequence” and that “it may be either a secondary effect of a medication that is usually undesirable and different from the therapeutic effect of the medication, or any response to a medication that is noxious and unintended and occurs in doses for prophylaxis, diagnosis, or treatment”, categorizing the five types of ADRs as the common “side effect, hypersensitivity reaction, idiosyncratic response, toxic reaction, and adverse medication interaction.” Thus, common adverse consequences produced by various medications such as drowsiness, dizziness, ataxia, hypotension, hypoglycemia, EPS, confusion, blurred vision, etc. could manifest as a falls risk.

From a general standpoint, the concept of “polypharmacy” has been recognized for many years as a significant problem, especially as applying to the frail, elderly population living in nursing homes. The general feeling is that, the more medications used by an individual, regardless of the class of the medication, the greater the risk for experiencing an ADR, and possibly sustaining a fall. However, there seems to be no agreed upon definition of the term, polypharmacy. While some sources may describe polypharmacy as the use of “multiple medications by an individual”, other sources define it as the use of “3”, “4”, or “6” medications by a single individual. Polypharmacy has been defined as “the administration of more medications than are clinically indicated, representing unnecessary drug use”. For many years, CMS has implied polypharmacy to be the simultaneous use of “nine or more medications” by a single resident. The term polypharmacy is sometimes used to describe the simultaneous use of two or more medications to treat a single condition. When considering the concept of polypharmacy, it is important to remember that, in certain conditions such as heart failure or hypertension, a combination of two, three, or perhaps more medications is quite common and clinically indicated.

In 1991, as the result of concerns over polypharmacy in the elderly, Dr. Mark Beers and colleagues devised a list of medications considered to be generally inappropriate for use by LTC residents; the list was referred to as the “Beers Criteria”. By about year 2000, CMS had adopted much of the Beers Criteria and incorporated it into its guidelines under 483.25(l) Unnecessary Drugs (F329) in the form of “Tables I and II”. The tables included approximately thirty categories of medications which were deemed generally inappropriate for use by the elderly because they placed residents at risk for various types of adverse drug consequences, the most frequent one of which was increased risk for falls. Even though CMS ultimately deleted Tablets I and II from the guidelines by early

year 2016, the current Beers Criteria remains an important reference for both LTC facilities as well as for surveyors.

What, then, are the medications or groups of medications that pose the highest risk for falls in nursing home residents? There is probably no one universally agreed upon list of such medications. A search of the internet reveals numerous articles and lists of pertinent medications, but it is unusual to find two lists that are identical. However, most sources agree on one general drug category to "head" their lists of 'high risk" drugs…..the broad category known as "psychoactive medications". The consensus appears to place **Antidepressants** as the most risky of the psychoactives in terms of falls. The older, first generation tricyclic antidepressants (TCAs) have traditionally been deemed more likely to cause falls due to the high sedative and anticholinergic effects, and the orthostasis associated with their use, but other sources noted the more modern select serotonin reuptake inhibitors (SSRIs) were just as likely to cause falls as the TCAs. Virtually all antidepressants are considered to be "high risk". Several sources state antidepressants pose their highest falls risk during the first two weeks of therapy as well as up to two weeks following a dosage increase. Side effect profiles should be a major consideration when selecting an antidepressant.

Another "high risk" psychoactive group includes the **Sedative/Hypnotics**. High on the list of this group includes the benzodiazepine hypnotic/anxiolytic agents. For years, numerous sources touted the long-acting agents such as diazepam, flurazepam, & clonazepam as possessing a greater falls risk due to their longer half- lives than the shorter-acting agents such as lorazepam and oxazepam. However, some sources contend the long-acting agents and short-acting agents present about equal falls risk. Nevertheless, all benzodiazepines have the potential to impact falls risk. As with the antidepressants, individuals receiving benzodiazepines are reported to be most at risk for falls during the initial two weeks of therapy, as well as during the first few weeks following dosage increases. Although no longer as commonly used as the benzodiazepines, the sedative/hypnotic agents known as the barbiturates (e.g., phenobarbital) would be considered "high risk" and present similar concerns with regard to falls.

Also among the psychoactive group were the non-benzodiazepine hypnotics (aka, the "Z drugs"), eszopiclone, zaleplon, and zolpidem. Like other psychoactive categories, these drugs are considered "high risk" for falls, primarily due to their somnolence, dizziness, ataxia, impaired balance, and confusion.

Finally, it should come as no surprise to most readers that the **Antipsychotic** medications are included among the "high-risk" psychoactive medications. Because of their potential for sedation, extrapyramidal symptoms (EPS), orthostasis, and anticholinergic side effects, the older conventional antipsychotics such as chlorpromazine , haloperidol and others were thought to present a greater risk for falls than the more modern atypical agents such as risperidone, aripiprazole, olanzapine, and quetiapine. However, several sources contend the falls risk is about the same for both groups. The level of side effects associated with these agents will vary widely from agent to agent, so, just as with antidepressants, side effect profile needs to be a major consideration when choosing an antipsychotic agent. The use of "dual-antipsychotics" is traditionally considered a "red flag" when reviewing medication regimens. Likewise, the simultaneous use of multiple psychoactive drugs from the same or different classes (e.g., an antidepressant plus a benzodiazepine, or concurrent use of both a short-acting and long-acting benzodiazepine) should be viewed as a "red flag".

Also included among the "high risk" drugs would be the several diverse groups of medications that feature prominent **Anticholinergic** properties. This group encompasses several important categories including the above-mentioned antidepressants and antipsychotics, in addition to the older first generation antihistamines, many cardiovascular agents, skeletal muscle relaxants, gastrointestinal agents (e.g., antispasmodics), certain antiparkinson agents, and medications used for urinary incontinence. In general, these medications impact falls risk by various mechanisms such as causing drowsiness, lethargy, cognitive decline, confusion, dizziness, muscle weakness, urinary retention, blood pressure variations, and sensory impairment. The issue with the anticholinergic medications becomes much more problematic when a resident ends up receiving multiple medications that feature this side effect, resulting in what is referred to as "anticholinergic overload".

A final group of medications considered to be "high risk" for falls consists of certain anticholinergic drugs used to treat Parkinson's Disease (e.g., Benztropine and Trihexyphenidyl). These drugs usually create a falls risk through their anticholinergic side effects of urinary retention and confusion.

Several other medication groups are identified as representing a "moderate to low risk" for falls. For example, several categories of **Cardiovascular** medications are commonly used in LTC that pose a moderate falls risk through their potential for causing hypotension (orthostasis, etc.), drowsiness, dizziness and weakness. These include groups such as the ACE Inhibitors and Angiotensin Receptor Blockers, the Alpha Blockers,

and the Beta Blockers. Diuretics are also included in this category based on their propensity for causing orthostasis, dizziness, polyuria, and nocturia. Anti-arrhythmic agents are also included in this group as they may cause dizziness by virtue of their anticholinergic properties.

Calcium Channel Blockers and Nitrates are additional cardiovascular agents reported to pose a falls risk of a somewhat lower level, and they present their falls risk by causing hypotension along with dizziness.

Opiate analgesics are reported to present a "low risk" for falls due to their propensity to cause drowsiness during initiation of therapy. Generally, this side effect is reported to abate with continued use. Oral antihyperglycemic agents, primarily short-acting sulfonylureas, are known to present a "low risk" for falls due to their potential for producing hypoglycemia and resultant faintness, confusion visual disturbances and stupor. Practioners are warned to avoid long-acting sulfonylureas such as Chlorpropamide.

Anticonvulsant medications are also identified as presenting a "moderate risk" for falls, primarily due to their side effects of dizziness, drowsiness, and blurred vision. Phenytoin's side effects of dizziness and blurred vision may also be a sign of phenytoin toxicity. The reader should be reminded that, even though some agents may be viewed as "moderate risk" or "low risk" rather than "high risk", all continue to pose a falls risk for the individual and should be regarded with the same caution.

The above has been a brief synopsis of some of the drugs commonly used by nursing home residents that are known to raise the falls risk of this population. As previously explained, this article does not constitute an "all-inclusive" list of medications which predispose individuals toward falling. While facility staff cannot be expected to know all the drugs which pose falls risk, they should become familiar with those drugs of most concern. There are numerous information resources (e.g, current manuals or textbooks, professional organizations, professional journals, the internet) available to facilities that address the relationship of drug use to falls risk. However, the facility should consider its primary information resource on this subject to be its own consultant pharmacist.

Suggested reading on this subject includes:

- Medication-Related Elder Fall Prevention, Social Work Today, Vol.12 No.1 P.12, <socialworktoday.com/archive/012312p12.shtml
- Falls & Older Adults- Causes & Risk Factors, NHI Senior Health, Jan.2013 <nihseniorhealth.gov/falls/causesandriskfactors>
- Drug-Related Problems in the Elderly, Merck Manuals Professional Version, <merckmanuals.com/professional/geriatrics/drug-therapy-in-the-elderly>
- Medication & Risk of Falls in the Older Person, <bhps.org.uk/falls/documents>
- Balance Disorders, National Institute of Health, <nidcd.nih.gov/health/balance-disorders>
- American Geriatrics Society 2015 Updated Beers Criteria for Potentially Inappropriate Medication Use in Older Adults, <americangeriatrics.org/files/documents/beer>
- Medications & Falls in Older People, Zeimer, Henry <jppr.shpa.org.au/lib/pdf/gt/2008_06_zeimer_GT>
- What is Polypharmacy?, <express-scripts.com>