Managing the Medication Portfolio and Avoiding Polypharmacy in the Older Adult

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Mrs. G is an 83-year-old woman whom you started seeing one month ago. Her previous medical records are still in transit from New York, following her move to RI in order in time to live near her daughter. She presented with a known history of chronic atrial fibrillation, managed on Coumadin and Digoxin; hypertension on Toprol, Diovan and Norvasc; reflux disease on Nexium; congestive heart failure on Lasix; insomnia on Trazadone; hypothyroidism on Synthroid; and depression on Zoloft. She also takes over the counter Tylenol as needed for osteoarthritis, Benadryl as needed, a daily multivitamin and Calcium with vitamin D. She is adjusting well to the move, likes being near her daughter, and enjoys her new apartment on the East Side of Providence. She remains very independent, only requiring transportation assistance to get to the store to do grocery shopping. You discuss wanting to make her medication regimen simpler, but decide to wait for records from her previous physician; she agrees and is to return to the office in one month. Two weeks later, after a record-breaking Rhode Island summer heat wave, you receive a panicked call from the patient’s daughter after finding her mother on the floor in her apartment confused and disoriented, and in a pool of urine. She is rushed to the Emergency Department for evaluation.

Managing medications in the older adult becomes more complex; causes include 1) multiple underlying illness requiring intricate medications regimens, 2) multiple physicians – primary, specialist and sub-specialist - prescribing medications, and 3) frequent use of over the counter or herbal remedies. In addition to large numbers of concurrently used drugs, prescribing medications for older adults is challenging due to the changes in pharmaco-kinetics (how the body handles drugs) and -dynamics (how drugs affect the body) that occur with aging. Finally, older adults are not often included in clinical trials of medications; those that are included tend to be younger and healthier than typical elderly patients, often making use of some medications a non-evidence-based practice. Numerous adverse reactions and dose adjustments for older adults are learned through trial and error use of medications in the clinical setting.

The basic principles of pharmaco-kinetics are important to remember when prescribing medications to the older adult. To start with, drug absorption appears to be mostly unchanged with aging; however, disease states and other medications can affect absorption (atrophic gastritis, delayed gastric emptying, decreased splanchnic blood flow). Changes in drug distribution do have clinical importance in older adults. Aging carries with it an increase in body fat content, a decrease in lean body mass, a decrease in total body water and a small decline in albumin concentration. Fat-soluble drugs will, therefore, have a larger volume of distribution, and water-soluble drugs will have a smaller volume of distribution. Drugs that bind to albumin may have less binding sites available, putting older adults at higher risk of toxicity from increased active drug concentrations; Dilantin is a common example. These factors combine to produce higher blood levels, earlier and more frequent occurrence of side effects and greater clinical impact at lower concentrations in older adults given standard doses of most drugs. Time to reach steady state is often prolonged several-fold. Accordingly, a geriatrics dictum when starting any new medication is “start low and go slow.”

Changes in renal clearance and hepatic function occur naturally with aging (the pure aging syndrome); common diseases and co-morbidities that increase in incidence with aging exacerbate these modest decrements. A gradual decline in glomerular filtration rate is seen in about 70% of the population, although there is variation in the degree of the decline from person to person; about 20% of persons seem not to show a decline in renal function with pure aging, and a smaller percentage (5-10%) show accelerated decline due to renal disease. On average, the decline is 1ml/min/yr after the age of 40. With the concomitant decline in creatinine production, serum creatinine is unchanged. For this reason, creatinine clearance should always be calculated and medications should be dosed accordingly; normal renal function should not be assumed based on a normal serum creatinine. Said another way, serum creatinine and BUN overestimate renal function in older persons because of decreased creatinine production in the first case, and decreased protein ingestion in the other. Both arise from decline in lean body mass with age. In the liver, the metabolism of medications, especially via phase I reactions (cytochrome-mediated) is delayed, leading to plasma and tissue concentrations that are usually increased. Dose reduction is generally required for hepatically metabolized medications.

Polypharmacy is a commonly discussed topic among practitioners who care for older adults. It is common for older adults to be on at least three daily medications, and many are on more. The risk of adverse drug reactions increases with the number of medications taken, and occur twice as often in older adults. In addition to the above physiologic changes that make medication use complex, drug-drug and drug-disease inter-
actions are commonly responsible for adverse drug effects. Polypharmacy can develop easily in the face of multiple practitioners prescribing for the same patient, old prescriptions that are kept and used on occasion, use of over the counter medications, and the common phenomenon of new prescriptions to treat side effects of other drugs. Unidentified non-adherence (resulting from financial hardship, sensory deficits, cognitive impairment, difficulty swallowing, complex regimens) can often lead to the use of additional medications when unnecessary (e.g., the addition of a second or third antihypertensive agent, when the original one is not being taken regularly or correctly).

Drug-related problems commonly seen include delirium, hypotension, incontinence, falls, loss of appetite and nephrotoxicity from high drug levels. Furthermore, many drugs have increased adverse effects in older adults—for example, the increased risk of gastrointestinal bleeding and fluid retention with non-steroidal anti-inflammatory drugs. Mrs. G., described above, is a classic example of this phenomenon. What are the likely contributory causes to her crisis event? Most likely her picture is due to the summer heat wave, during which Mrs. G had increased insensible losses, exacerbated by age-related decrease in thirst perception and baseline elevated ADH levels. These led to a clinical picture of dehydration and hypovolemia, worsened by Lasix. Diovan and Digoxin in the setting of hypovolemia most likely led to electrolyte disturbances, bradycardia or conduction disturbances, and acute renal failure. Any of these toxicities or a combination is a plausible explanation for her confusion.

In addition, the development of incontinence in a previously continent woman can be described as transient incontinence. Transient incontinence is often a manifestation of a problem in other organ systems—often acute illness or other stress. This was described in last month’s column as part of the concept of aging as a progressive restriction of the capacity to maintain homeostasis – “homeostenosis.” Homeostenosis, although a made up word, vividly describes how, in older adults, only modest severity of physical illness, drug toxicity or trauma often results in catastrophic declines, leading to a cascade of seemingly unrelated problems (pneumonia presenting with confusion, falling, urinary incontinence and loss of self-care capacity). One can expect that with resolution of her acute problems, the incontinence will also resolve.

In order to prevent such crises, laden with risk for irretrievable functional loss, it has become commonplace in many practices to request that patients “brown bag” their medications and supplements on the first, if not all visits to the practitioner. Reviewing in detail all medications, both over the counter and prescription will allow an accurate inventory of what the patient is taking. This review allows the practitioner to detect and prevent dangerous interactions or adverse effects. In addition, adherence can be assessed, as well as any reasons behind non-adherence. Finally, it is a good opportunity to review each medication for continued indication. If no reason for use is found, or if a medication is being used to treat the side effect of another, discontinuation should be pursued. When prescribing at any time in an older adult, consider cost, adherence and risk factors for non-adherence, and review current drugs before adding new ones to look for potential interactions. For the most part, in older adults, less is more, and stopping a medication is usually a better option than adding one.

For example, our patient would have benefited from a streamlining of her medications; most glaring is the use of Benadryl in an older adult. Due to its strong anticholinergic effects, Benadryl is a relatively contraindicated medication in the elderly patient population. Classes or particular medications to be aware of are described in the Beers criteria, updated in 2003. A useful website was designed at Duke University that provides a quick reference link to a summary of drugs to avoid, and a web-link to the original article. The link is: http://www.dcri.duke.edu/ccge/curtis/beers.html. It is useful to review this list before choosing drugs of certain classes for use in the older adult. Many drugs that are benign in younger patients can lead to significant adverse reactions in the older patient.

In summary, medication profiles should be reviewed regularly, in detail, with older patients as a part of routine office care. Managing the medication regimen of a patient with multiple conditions is complicated, and many drugs are necessary; however, less is often more. Remembering the basic pharmacologic principles and the usual changes that occur with aging, as well as reviewing the common danger drugs for older adults will be a useful start in keeping an older adult’s medication list optimally beneficial and least likely to produce harm. It is important to critically question each and every medication. This practice will diminish the likelihood of one’s older patient presenting with adverse drug reactions and complications such as those demonstrated by Mrs. G.

**REFERENCES**


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