



Drug Use in the Elderly

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Today, Thailand is the second most aged country in the region (next to Singapore) -- over 10% of population is now over 60. As predicted by Institute for Population and Social Research, Mahidol University, the proportion of older persons in total population will increase to 14% in 2015, 19.8% in 2025 and nearly 30% by 2050⁽¹⁾. This means that the population of older persons will increase from the current 6.4 million to 9.0 million in 2012, 12.9 million in 2025 and exceed 20 million in 2050^(1,2).

In a systematic survey conducted by UCSF Division of Geriatrics Primary Care in USA in May 2001, the following results with regard to prescription drugs were concluded⁽³⁾.

1. Elderly account for 1/3 of prescription drug use, while only 13% of the population.
2. Average of 5.7 prescription medicines per patient.
3. Average nursing home patient on 7 medicines.
4. Elder take average of 2-4 nonprescription drug daily.
5. Laxatives are used in about 1/3 to 1/2 of elders, many of whom are not constipated.
6. Non-steroidal anti-inflammatory medicines,

sedating antihistamines, and H-2 blockers are all available without a prescription, and all may cause major side effects.

Many changes in both pharmacokinetics and pharmacodynamics of several drugs have occurred as a result of physiologic alteration in the elderly. Decrease in total body water (due to decrease in muscle mass) and increase in total body fat affect volume of distribution. Thus, serum levels of water-soluble drugs such as lithium, aminoglycosides, alcohol and digoxin may go up due to decreased volume of distribution. Half-life of fat-soluble compounds such as diazepam, thiopental and trazadone may be increased because of the increase in body fat.

The pharmacodynamics (what the drug does to the body) of drugs may also be altered. For example, alcohol causes increase in drowsiness in older people more than in younger people at the same serum levels, and this is also true for fentanyl, diazepam, morphine and theophylline. In contrast, some drug effects are decreased, e.g., diminished heart rate (HR) response to isoproterenol and beta-blockers in the elderly.

Some drugs should be prescribed to the elderly with great caution, because they often cause undesirable adverse reactions. These include meperidine, diphenhydramine, most anticholinergic tricyclics (amitriptyline, doxepin, imipramine), long-acting benzodiazepines such as diazepam, long-acting NSAIDs such as piroxicam and high dose thiazides (>25 mg)^(3,4). Moreover, some medicines are absolutely to be avoided^(4,5).

- Flurazepam (Dalmadour[®]) and diazepam (Valium[®]) often cause prolonged sedation and higher rates of falls and femoral fracture in older people.

- Ketorolac (Toradol[®], Lixidol[®]) incurs risk of gastrointestinal bleeding even in the short term.

- Naproxen (Naprosyn[®]) and piroxicam incur risk of gastrointestinal bleeding, renal insufficiency and hypertension if used over a long term.

- Ticlopidina (Tiklid[®]) may cause neutropenia even in a short term use.

In summary, the following points should be borne in mind when using drugs in the elderly:

1. Compliance may be a problem in some older persons. Thus, prescribe the simplest possible dosage regimen (e.g., od or hs).

2. Adverse drug reactions should be anticipated, simply due to drug-interactions. Risks go up with the number of drugs used.

3. Use the drug rationally and only when necessary.

4. Remember that both pharmacokinetics and pharmacodynamics of drug may be significantly altered in the elderly, and this aspect must be considered when designing a dosage regimen.

References

1. American Geriatric Society Public Policy Committee. Drug Evaluation and Surveillance. The American Geriatrics Society Position Statement. April 2010.
2. UN Department of Economics and Social Affairs Division, In Hamilton SR (ed). World Population Aging 1950-2050. IARS, Lyon 2002:146-55.
3. Johnston (B): Drug and the elderly--Practical Consideration. UCSF Division of Geriatrics Primary Care Lecture Series. Med Educ 2004;38:1103-10.
4. Fick DM, Cooper JW, Walker JL, et al.: Updating the Beers criteria for potentially inappropriate medication use in older adults. Arch Intern Med 2003;163:2716-24.
5. Elliott RA.: Problems with medication use in the elderly. J Pharm Prac 2006;36:58-66.