

# Characteristics of pharmacotherapy in old age

Patients over 65 years of age represent approximately 14% of the population. Ageing brings with it many changes, some of which have implications for treatment.



- **polymorbidity** - a greater number of diseases, requiring a greater number of medications;
- **polypragmasia** - taking multiple drugs (4 or more), wrong combinations of drugs or prescribing non-indicated drugs;
- **underprescribing** - failure to prescribe drugs that have a demonstrable effect on disease progression and survival (typically statins,  $\beta$ -blockers (<https://www.wikilectures.eu/w/Beta-blockers>) after AIM, cholinesterase inhibitors in Alzheimer's dementia ([https://www.wikilectures.eu/w/Alzheimer%27s\\_disease](https://www.wikilectures.eu/w/Alzheimer%27s_disease)), sufficient analgothrapy in cancer patients, antidepressants);
- **decrease in compliance** - due to dementia or just due to overmedication.

## Changes in pharmacokinetics

### Decrease in absorption

In the gastrointestinal tract, there is a rise in pH in the stomach, atrophy of the mucosa and villi in the intestines (decrease in resorption area), decrease in blood flow and motility in the GIT. Overall, this leads to a slowing of the onset of action of drugs administered per os. Muscle atrophy and decreased peripheral blood flow contribute to the delay in the onset of action of drugs administered intramuscularly.

### Distribution

There is a physiological decline in total body water in old age, but this may be compounded by dehydration (typical of the elderly). Dehydration affects drugs that are hydrosoluble. Their plasma concentration is elevated, even toxic.

Conversely, the concentration of liposoluble drugs due to an increase in total body fat has a prolonged effect (drugs are stored in adipose tissue) → benzodiazepines.

Malnutrition contributes to a decrease in serum albumin - this increases the free plasma fraction of drugs that bind to albumin → PAD, antidepressants, beta blockers.

### Decrease in metabolism and excretion

Due to decrease in total liver weight and perfusion and decreased function of certain enzymes (CYP, glucuronyltransferase → benzodiazepines). Glomerular filtration, renal clearance, tubular secretion, renal hypoperfusion decrease in old age → aminoglycosides, lithium, digoxin, cimetidine, allopurinol, contrast agents.

## Changes in pharmacodynamics

- Increased amount or sensitivity of receptors to drugs (warfarin, heparin).
- Increased sensitivity to adverse effects of digoxin.
- Increased CNS sensitivity to benzodiazepines, morphine, which induce sedation, depression or delirium already at therapeutic doses.
- Decreased sensitivity of beta-receptors - reduced efficacy of  $\beta$ -blockers.

## Adverse drug interactions and effects

Up to 20% of deaths in the elderly are due to adverse drug reactions.

- **Warfarin + sulfonamides** - displacement of drug from binding to binding protein → higher free fraction of warfarin and risk of bleeding.

### Most common AEs:

- orthostatic hypotension (syncope, falls);
- Diarrhoea × constipation;
- Sedation, delirium, confusion.

## Unsuitable/less suitable drugs for the elderly

- tricyclic antidepressants - anticholinergic effect,
- spasmolytics - risk of urinary retention, delirium,
- barbiturates, benzodiazepines - risk of sedation, addictiveness,
- methyl dopa - depression, sedation, bradycardia,
- digoxin - high risk of side effects.

## Drugs where smaller doses are sufficient - evidence based:

- atorvastatin (standard 10 mg/day, 5 mg/day in the elderly),
- ibuprofen (norm 400-800 mg/3-4×/day, 200 mg/3-4×/day in the elderly),
- metoprolol (norm 100 mg/day, 50 mg/day for seniors),
- omeprazole (norm 20 mg/day, 10 mg/day for seniors),
- and others, ...

## Links

### Related articles

- Mental disorders in the elderly
- Peculiarities of diseases in old age
- Principal Geriatric Syndromes

### References

1. TOPINKOVÁ, Eva, Rudolf ČERVENÝ a Ivana DOLEŽELOVÁ, et al. *Geriatric : Doporučený diagnostický a léčebný postup pro všeobecné praktické lékaře* [online] . 1. vydání. 2007. Dostupné také z <[https://www.svl.cz/Files/nastenka/page\\_4766/Version1/Geriatric.pdf](https://www.svl.cz/Files/nastenka/page_4766/Version1/Geriatric.pdf)>. ISBN 80-86998-XX-X.
2. ↑ Skočit nahoru k:a b c d e f g TOPINKOVÁ, Eva. *Zvláštnosti farmakoterapie ve stáří* [online]. ©2005. [cit. 2012-02-13]. <<http://www.edukafarm.cz/c548>>.