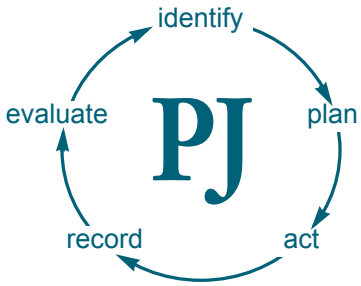
NSF FOR OLDER PEOPLE

(2) THE OLDER PATIENT

By Susan Livingston, PhD, MRPharmS

This article looks at changes in the ageing body that need to be considered when advising on drug therapy for old people



identify gaps in your knowledge

1. Who is considered to be an "older person" ?
2. List four changes that occur in the ageing body that could affect drug therapy.
3. Name three drugs that need to be carefully monitored in the elderly because of their greater potential to cause adverse drug reactions.

This article relates to the Royal Pharmaceutical Society's core competencies of "appropriate advice, referral or selection of treatment" and "principles of pharmacokinetics" (see "Medicines, ethics and practice — a guide for pharmacists", number 26, July 2002, pp105–6). You should consider how it will be of value to your practice.

The number of people aged over 65 years has doubled since the 1930s and, today, one fifth of people in the United Kingdom are over 60. The National Service Framework for Older People[1] groups older people into three classes:

- ***Entering old age*** "People entering old age" have completed their career in paid employment or child rearing, or both. This is a socially constructed definition of old age, which can include people as young as 50. These "older people" are described as active and independent and many remain so late into old age

- ***Transitional phase*** One group of older people will be in transition between healthy, active life and frailty. This transition usually occurs in the seventh or eighth decade but can happen at any stage during older age

- ***Frail older people*** "Frail older people" have health problems. They may have suffered a stroke or have dementia. Frailty is more likely to be experienced in late old age

However, there are other significant groups of older person. For example, although the proportion of older people from minority ethnic communities in the UK is small, it is growing. Between 1981 and 1991, the number of people of pensionable age from the ethnic minority population of just over three million increased from 61,200 to 164,306.[1] In this group of older people there may be complicating factors, including language barriers and increased prevalence of some illnesses such as hypertension and stroke among African-Caribbeans and diabetes among South Asians.

In general, older people are more likely to have a disability than younger people. Figures show that almost half of all disabled people are aged 65 or older. The most common problems relate to movement and sensory impairment. The NSF points out that around 80 per cent of people over 60 suffer from some sort of visual impairment, 75 per cent of people over 60 have a hearing impairment and 22 per cent suffer from both.

THE AGEING BODY

As a person ages his or her skin gets thinner, bone density decreases and he or she is more likely to lose teeth. Other changes that occur include decreased postural stability and impaired thermoregulation. There may be changes to cognitive state and nutritional status that can affect drug therapy.[2] For example, old people can be more confused about taking their medicines and intramuscular injections can be more difficult because of lower muscle mass. Older patients with disabilities such as visual impairment will need special care when dispensing their medicines.

The pharmacokinetics of many drugs is different in the old person compared with in a young adult. As the body ages, there is a reduction in splanchnic circulation and changes occur to major organs, which in turn will affect the way that drugs are handled.

Absorption The following changes occur in the gastrointestinal tract with age:

- Reduced gastric acid secretion (increase in gastric pH)
- Impaired intestinal motility
- Reduced total surface area of absorption
- Decreased gastric emptying

These factors alone do not usually alter drug absorption enough to necessitate avoiding medication or adjusting doses, but if combined with problems such as diarrhoea, achlorhydria (absence of hydrochloric acid in the stomach due to atrophy of acid-secreting cells) or malabsorption syndromes, doses may need to be increased.

The risk of one drug impairing the absorption of another is greater in old people because polypharmacy is more common. For example, antacids containing magnesium, calcium or aluminium can affect the absorption of quinolones, tetracyclines, iron preparations, ketoconazole and isoniazid. These problems can be avoided by leaving two to four hours between taking these drugs.[2]

Distribution Many drugs bind to plasma proteins once they are absorbed and enter the blood. The unbound fraction of a drug is responsible for its pharmacological effects while the bound drug is inactive until it is released from the protein. Production of albumin by the liver declines with age, resulting in an age-related rise in the free fraction of highly protein-bound drugs. Although this change alone is not usually clinically significant, if other factors that reduce drug binding to albumin are present, there is potential for adverse reactions. Conditions that might reduce protein binding can be divided into three main categories:

- Decreased albumin production, eg, cancer, malnutrition or liver disease

Dr Livingston is a freelance pharmaceutical writer from London

- Reduced drug binding affinity to albumin, eg, in renal disease uraemia can decrease drug binding to albumin
- Increased albumin catabolism or excretion, eg, burns, surgery or nephrotic syndrome

Clinical effects from decreased drug binding to albumin are most likely to occur with drugs that are usually at least 90 per cent protein bound. Highly protein bound drugs such as phenytoin and warfarin require careful monitoring if an old person develops an illness that reduces protein binding. Old people generally require lower maintenance doses of warfarin. Other drugs that are highly protein bound include aspirin, diflunisal, naproxen, tolbutamide and sodium valproate. When any of these drugs is prescribed in an older patient it is advisable to start with a low dose.

Body composition also changes with age. There is a loss in muscle mass leading to a lower body mass overall. The percentage of body water decreases but the amount of body fat increases with age. These factors will affect the distribution of drugs throughout the body. Generally, plasma levels of fat-soluble drugs decrease and plasma levels of water-soluble drugs increase leading to decreased or increased pharmacological effects.

Metabolism The liver reduces in size with age and, in combination with an age-related reduction in hepatic blood flow and a reduction in hepatic enzyme activity, this results in a decreased capacity to metabolise drugs and metabolites.[2] This means that a drug may stay in the body for longer and toxicity can occur with repeated doses.

According to the British National Formulary, along with the change in drug distribution, the net result of pharmacokinetic changes is that the tissue concentration of a drug is commonly increased by over 50 per cent and patients who are debilitated may show even larger changes.

Elimination The BNF advises that the most important effect of age on the pharmacokinetics of drugs is a reduction in renal clearance — both glomerular filtration and renal tubular function are reduced. It says that many old people excrete drugs slowly and are highly susceptible to nephrotoxic drugs. It also points out that any acute illness can lead to rapid reduction in renal clearance, especially if accompanied by dehydration. So if a patient is stabilised on a drug with a narrow therapeutic index (eg, digoxin), he or she can rapidly develop toxic effects after events such as myocardial infarction or respiratory tract infection. Digoxin is generally given as a maintenance dose of 125µg in the elderly and this is halved in those with renal impairment.

Renal function is often expressed in terms of creatinine clearance. In a healthy young adult, creatinine clearance is usually around 100 to 120ml/L while a 70-year-old will typically have a value of around 70ml/L. Concomitant illnesses such as diabetes, heart failure and hypertension may further reduce renal function. Drugs such as the aminoglycoside antibiotics are completely excreted by the kidneys and require careful monitoring in old people to avoid adverse effects.

Other factors With age, there may also be changes in drug receptor sensitivity and receptor population, so old people can be more, or less, sensitive to certain drugs. For example, the ageing central nervous system shows increased susceptibility to opioid analgesics, benzodiazepines, antipsychotics and antiparkinsonian drugs and these need to be used with caution in old people.

ADVERSE DRUG REACTIONS

Adverse drug reactions (ADRs) are implicated in between 15 and 17 per cent of hospital admissions and, in hospital, between 6 and 17 per cent of older patients experience ADRs. Old people are more susceptible to ADRs and these tend to be more severe. Gastrointestinal and haematological adverse reactions seem to be particularly common in this group.

The NSF points out that many ADRs could be prevented by processes such as regular medication review. However, some ADRs in the elderly often present in a vague and non-specific fashion. For example, confusion is a common ADR that can be caused by many of the drugs prescribed for old people. Constipation can also be a problem, especially when antimuscarinic drugs and tranquillisers are taken. Postural hypotension is associated with psychotropic drugs and diuretics and can be a cause of falls in old people.

Hypnotics Hypnotic drugs with long-half lives (eg, nitrazepam) can have hangover effects (eg, drowsiness, unsteady gait, slurred speech and confusion) the following day. Hypnotics with shorter half-lives (eg, temazepam) are therefore the drugs of choice in old people but they can also sometimes present problems because of the propensity for dependence to develop. In general, hypnotics should be avoided in the elderly if possible, with short courses recommended to get the person through an acute crisis.

Diuretics Although diuretic therapy is of proven value for a number of conditions, the BNF advises that diuretics are not used for long-term treatment of gravitational oedema in old people. Patients usually respond well to increasing movement, leg raising and support hosiery. If oedema needs to be cleared quickly, treatment should not be given for more than a few days.

Non-steroidal anti-inflammatory drugs The gastrointestinal bleeding associated with non-steroidal anti-inflammatory drugs is more common in the elderly and is more likely to have a fatal or other serious outcome. These drugs are also hazardous in old people with heart disease or renal impairment.

The BNF makes alternative recommendations for osteoarthritis, soft tissue injuries and back pain in old people. These conditions should be treated with warmth and exercise rather than with medication. Obese patients should be advised to lose weight. For these conditions, and for rheumatoid arthritis, paracetamol should be the first-choice analgesic. Alternatively, a low-dose NSAID such as ibuprofen up to 1.2g a day can be prescribed. If these drugs do not provide adequate pain relief, a full daily dose of paracetamol plus a low-dose NSAID is the next step. Then, if necessary, the NSAID dose can be increased or a low-dose opioid analgesic with paracetamol given (eg, co-codamol or co-dydramol). No more than one NSAID should be used at a time.

Other problem drugs ADRs are also common in old people taking antiparkinsonian drugs, antihypertensive drugs and digoxin. Drug-induced blood disorders are more common in the elderly, so drugs with a tendency to cause bone marrow depression (eg, co-trimoxazole and mianserin) should be avoided.

action : practice points

1. Identify an old person from your patient medication records and apply the guidelines for prescribing for the elderly printed in the BNF (BNF, 45 March 2003, p18).
2. Make a list of drugs that should be used with caution in older people. Visit www.pjonline.com/noticeboard/tips/patients and pick out the tips for dispensing drugs commonly prescribed for old people.
3. Obtain materials that might help older people from ethnic minorities manage their medicines more appropriately.

evaluate

How could your learning have been more effective?
What will you do now and how will this be achieved?

REFERENCES

1. National Service Framework for Older People. London: Department of Health, March 2001. Available at www.gov.uk/nsf/olderpeople (accessed on 28 May 2003).
2. Lee M. Drugs and the elderly: do you know the risks? Am J Nursing 1996;96:25–31.