Drug therapy in Geriatric patients

Course Name: Pharmacy Practice-2

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Learning Objectives

- To identify problems in the use of medicines in the elderly patients.

- To develop skills required in medicines management in older persons.

Background

- Ageing is characterized by an inability to maintain homeostasis under conditions of physiological stress.
- This situation predisposes to health-related problems.
- Theories to describe the process of ageing describe a deterioration of the protein-synthesizing mechanism.

Examples of conditions associated with Age

- Osteoarthritis
- Osteoporosis
- Foot deformities
- Atherosclerosis
- Cerebral ischaemia
- Myocardial infarction
- Alzheimer's disease
- Parkinsonism.

Problems in the elderly that may interfere with drug therapy and disease progression

- Mental confusion
- Incontinence
- Postural instability
- Immobility
- Skin and muscle wasting

Factors responsible for increased incidence of adverse drug reactions in the elderly

- Multiple disease states
- Increased use of medicines
- Over-prescribing
- Alterations in drug handling by the body
- Increased sensitivity to the effects of some drugs.

Pharmacist actions in geriatric patient care

- Participate in appropriate drug selection:

consider other drugs being taken by patient, assess pharmacokinetic profile and impact of unwanted drug effects

- Ensure optimum use of medicines by patient:

provide patient counselling, facilitate drug taking

using medication reminder aids

- From time to time run medication reviews:

examine all medications taken by patient to identify any duplication, conflicting therapy or drugs that may be

withdrawn or doses that can be adjusted

Pharmacist actions in geriatric patient care

- Identify drug-related problems: patient problems with drug or occurrence of side-effects.
- Facilitate access to medications: provide domiciliary care.

Appropriate drug selection

When selecting drug therapy for the elderly, preference of one drug over another may be based on the pharmacokinetic profile of the drugs (e.g. lorazepam is preferred to diazepam because of its shorter half-life) or pharmacodynamic changes (e.g. calcium channel blockers preferred to beta-blockers in the management of hypertension in the elderly due to decreased responsiveness to beta-blockers).

Pharmacokinetic profile

Absorption

Age-related changes in upper gastro-intestinal function include altered gastric pH, diminished blood flow and changes in motility.

However, the significance of these changes on clinical outcomes is minimal.

Pharmacokinetic profile

Distribution

- In older people, there is a decreased cardiac output which may lead to a decreased hepatic and renal blood flow.
- Changes in the body composition occur leading to a decrease in lean body mass and an increase in adipose tissues.
- These changes will result in a decreased volume of distribution for drugs that are distributed primarily in water or lean body mass (e.g. digoxin –requires lower dose in geriatric patients).

Pharmacokinetic profile

Distribution

- The volume of distribution of drugs that are primarily distributed in fat may be increased (e.g. diazepam – results in increased risk of accumulation with repeated use).

- There is also a decrease in serum albumin concentration which may affect degree of protein binding (e.g. phenytoin).

Pharmacokinetic profile

Metabolism

- In older people, the total liver weight and the number of functioning liver cells are decreased.
- In addition, disease states and nutritional status may adversely affect liver function.
- This may result in a decrease in the elimination rate of drugs that are excreted in the liver (e.g. warfarin, long-acting benzodiazepines).

Pharmacokinetic profile

Elimination

- Renal function decreases with age because there is a decline in glomerular filtration rate, tubular secretion, re-absorptive capacity and renal blood flow.
- Drugs that are eliminated by the kidney such as aminoglycosides, atenolol, digoxin, enalapril, fluconazole, fluoroquinolones, furosemide, lisinopril, methotrexate, spironolactone and thiazides may have reduced clearance in the elderly.
- Drugs where this factor may lead to side-effects and drug-related problems require dose adjustment (lower doses) in older people.

Pharmacodynamic changes

- Changes in receptor sensitivity (e.g. decreased responsiveness to agonists and antagonists at β-adrenoceptors)
- Increased sensitivity to drug effects (e.g. anticoagulant effects of warfarin)
- Decline in some pathways: decreased cholinergic neurons in areas of the brain lead to a higher risk of drugs with anticholinergic properties (e.g. benzatropine, trihexyphenidyl, sedating antihistamines, tricyclic antidepressants, neuroleptics) inducing mental confusion
- Orthostatic hypotension: may be aggravated by α-adrenergic blocking drugs, diuretics, nitrates, phenothiazines, tricyclic antidepressants.

Use of drugs in the older patient

ACE inhibitors	Small initial doses to reduce risk of hypotension
Analgesics – opioids	Increased occurrence of side-effects: nausea, hypotension, central nervous system effects
Analgesics – NSAIDs	Avoid products with long half-life (e.g. piroxicam); increased risk of renal failure and gastrointestinal toxicity; may cause fluid retention
Beta-blockers	Increased risk of bradycardia and precipitation of heart failure
Benzodiazepines	Medicines with short half-life preferred to reduce risk of confusion and ataxia
Diuretics	Side-effects more common (hyponatraemia, postural hypotension, incontinence)
H_2-receptor antagonists	Excretion is reduced, increased risk of confusional states
Phenothiazines	Increased risk of tardive dyskinesia, anticholinergic symptoms
Warfarin	Smaller starting dose since anticoagulant effect is increased

Use of medicines in the elderly

The occurrence of side-effects is higher in older patients. The reasons include:-

- poly pharmacy
- doses used are sometimes too high in
- relation to reduced elimination
- doses used are sometimes too high in relation to decreased physiological responses (e.g. hypotensive drugs).

Adverse effects occurring in the elderly with antibacterial treatment

Drug	Adverse Events
Aminoglycosides	Nephrotoxicity, ototoxicity
Broad-spectrum agents	Antibiotic-associated pseudomembranous colitis
Co-amoxiclav	Acute liver injury
Co-trimoxazole	Blood dyscrasias, hyperkalaemia
Tetracyclines	Oesophageal ulcers
Quinolones	Seizures

Ensuring optimum drug use by an elderly patient

- Rationalize therapy: minimize number of medicines to be administered.
- Adopt simple dosage regimen: minimize frequency of drug administration
- Check that the patient understands how to take medication(s)
- Assess ability to comply:

– for prescription medicines, access to prescription

– access to pharmacy for getting medicines

Ensuring optimum drug use by an elderly patient

– ability to read label and instructions and handle container

– ability to administer medication: use of self injections, swallowing tablets or capsules, using an inhaler device.

•Consider preparing medicines in a pill box where medicines are prepared according to the dosage regimen (assess product stability); use a memory aid to prompt patient to take medicines; use printed leaflets to explain dosage regimen.

Factors to be considered when counselling on discharge medication/refill

- Identify literacy problems: ensure that patient knows clearly how to take medicines
- Number of prescribed and nonprescription medications administered: kept to a minimum
- Medication regimen: simple
- Identify administration problems: documentation necessary for patient to access medications on NHS where applicable, access to prescription.

Factors to be considered when counselling on discharge medication/refill

- Packaging and labelling: patient can access packaging and label is large, clear and can be read and understood by patient.
- Occurrence of side-effects and identification of interactions: check occurrence of unwanted effects, even insignificant ones, that are bothering the patient and interactions.
- Social functioning: patient requires social support and care at home to ensure adequate nutrition and independent living.

Medications review

- Identify indication for use of medicines
- Check suitability of dosage form and dose
- Assess outcomes of therapy
- Check for occurrence of side-effects
- Evaluate possibility of drug interacting with another drug or a medical condition

Identifying drug-related problems

I. Problems with dispensed medication:-

- Illegible and unclear label
- Formulation
- Packaging
- Side-effects
- Use of non-prescription medicines

Identifying drug-related problems

II. Problems associated with formulation:-

- Swallowing tablets
- Measuring suspensions
- Using inhalers
- Instilling eye drops
- Using suppositories
- Applying creams

Medicines management in older patients

Medications Appropriateness Index: evaluates process of prescribing and administration of medicines.

Indicators of Preventable Drug Related Morbidity: evaluates outcome measurement, quality-of-life outcomes.

Falls in older patients

- Common, devastating problem.
- Associated with identifiable risk factors: weakness, gait, confusion, medications.
- Fall prevention: assessment of fall risks by identifying risk factors and preparing a risk reduction strategy which includes patient support and home help.
- Fall management: in addition to looking into the physical damage, when falls in older people occur: pharmacist review of medications, physiotherapists to support patient in physical movements, social worker to assess patient needs at home.

Drugs and Falls

- Drugs causing hypotension (e.g. antihypertensives)
- Drugs causing hypovolaemia (e.g. diuretics)
- Drugs causing incontinence (e.g. diuretics)
- Drugs causing undue sedation (e.g. benzodiazepines, antidepressants).

Practice summary

- When starting treatment, use a low dose and increase slowly, if necessary.
- Keep treatment as simple as possible using the minimum number of different drugs.
- Ensure that the patient or a responsible person clearly understands the treatment schedule.
- Avoid childproof containers for those who are unable to open them.
- Drugs may precipitate a health condition particularly in elderly patients. When patient presents with a condition and there is no obvious reason for that, consider each drug used and identify any correlation.

Question:-

Why should diazepam be used with caution in elderly patients?

Answer:-

Diazepam has been shown to have an increased volume of distribution in the elderly due to the changes in the ratio of adipose tissue to lean tissue.

Also, rate of metabolism is slower leading to increased risk of side-effects such as drowsiness and light-headedness the next day, confusion and ataxia.

Question:-

What precautions are necessary when NSAIDs are used in the elderly?

Answer:-

- Elderly patients have an increased risk of developing gastrointestinal side-effects and renal toxicity with NSAIDs. NSAIDs also cause fluid retention and should not be given to patients suffering from hypertension and/or heart failure.
- Therefore in elderly patients products with a short half-life should be adopted, use enteric-coated preparations and advise patient to take drug with or after food.
- NSAIDs should be used for the short term.


Thank You!