

MOOC 15 Medication Management for Older Adults

Chapter 1 Common Challenges of Medication Management in Older Adults

No matter you are a formal caregiver who takes care of your older person, or you are a family caregiver who looks after your beloved family member, have you come across the below challenges on using medication in older adults?

- adverse drug effects
- self-adjustment on the dosage of the medication
- medication refusal
- poor medication adherence
- medication errors
- improper supplement and medication use


Let's watch the below videos to see if they are the real stories around you!

After watching the videos, can you guess how's the actual situation of medication use among older adults in Hong Kong?

- How many older people suffer from chronic diseases and require long-term medication?
- Do they have adequate knowledge about their medication?
- Can they take the medication properly on their own?
- Do they consult a doctor or seek help from pharmacist when they have questions about the medication?

Try to find the answer [here](#).

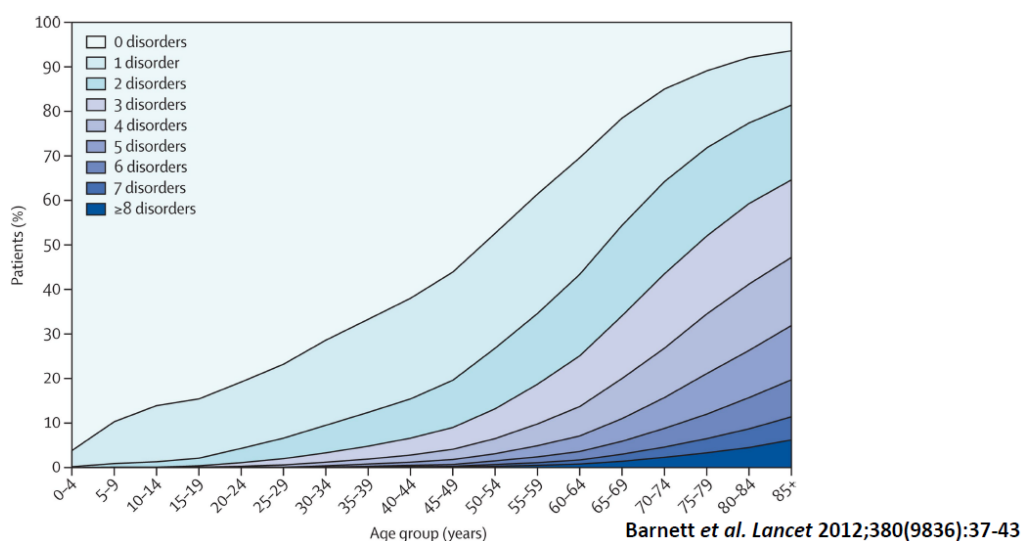
Now you should know why learning the medication management in older adults is important. Let's start the course to understand more about medication management in older adults.

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Introduction

- With the increased in elderly population in HK affected by multiple chronic diseases, the likelihood of increased medication use rises proportionally.
- The prevalence of drug use increases with age.
- Older adults are largest consumer of health supplements and over-the-counter medications.
- High prevalence of older adults using Chinese medicine.

Number of chronic disorders by age-group



Age Related Changes Related to Medication Management


Medications work differently in older adults.

Do you know how age-related changes affecting the action of medication when going into the older adult's body?

Pharmacokinetics (PK) - is the study of the changes in the **absorption, distribution, metabolism and excretion** of drugs in the body over time, and the quantification and prediction of the concentration, distribution and effects of drugs in the body.

Absorption:

- Age related changes do not seem to have significant effect on drug absorption.

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Distribution:

- It refers to where the drug goes after it enters the blood stream.
- As a consequence of decreased total body water, drugs that are predominantly confined to the water compartment tend to have smaller volume of distribution.
- Decreased albumin level is common in malnutrition and reduction in protein binding may contribute to increased free drug level and hence its toxic effects e.g. phenytoin toxicity can occur in frail elderly with hypoalbuminemia even total serum drug level is not high.

Metabolism:


- Drug clearance by liver depends on the liver blood flow.
- Impaired liver blood flow may affect metabolism of drugs depending on liver metabolism e.g. propranolol, verapamil etc.
- Hepatic clearance also reduced due to reduction of liver enzyme (cytochrome p450).
- Dosage adjustment is needed in patients with liver function impairment.

Elimination:

- Due to reduction in kidney function (glomerular filtration rate- GFR), even in the absence of kidney disease, GFR may reduce by 35 to 50% in older adults.
- Drugs heavily dependent on renal clearance include digoxin, aminoglycosides, angiotensin-converting-enzyme inhibitors (ACEi) and diuretics.

Altered Pharmacodynamics

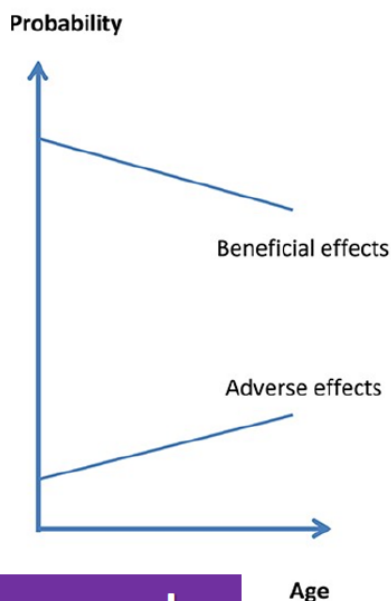
- Different drugs have specific pharmacological mechanisms of action in the body.
- The ageing process may induce more or less sensitivity to specific medications through changes in the no. of receptors, affinity to receptors and /or post-receptor responses.
- Older adults are prone to the unwanted effects of cardiovascular and CNS drugs.

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Common Adverse Drug Reactions (ADRs) in Older Adults

Increased ADRs With Age

Woodford *et al. Age Ageing* 2019;48(6):768–775



Drug-aging paradox

- ADRs are defined as any noxious, unintended, and undesired effects of a drug, excluding therapeutic failures, intentional and accidental poisoning and drug abuse.
- ADRs that result in hospital admissions are usually dose dependent and can be predicted by understanding the drug actions e.g. NSAID leading to GIB.
- In a study of 513 patients, in hospital ADRs were found in 135 patients:
 - Acute kidney injury/electrolyte disturbance due to diuretics (25%)
 - Falls due to benzodiazepine (18%)
 - Acute confusion/falls/sedation/constipation due to opiates (18%)
 - Bradycardia due to beta blockers (9%)
- In a large cross-sectional study, 4 medications implicated alone or in combination with hospitalization were:
 - Warfarin (33%)
 - Insulins (13.9%)
 - Anti-platelet agents (13.3%)
 - Oral hypoglycaemic agent (10.7%)

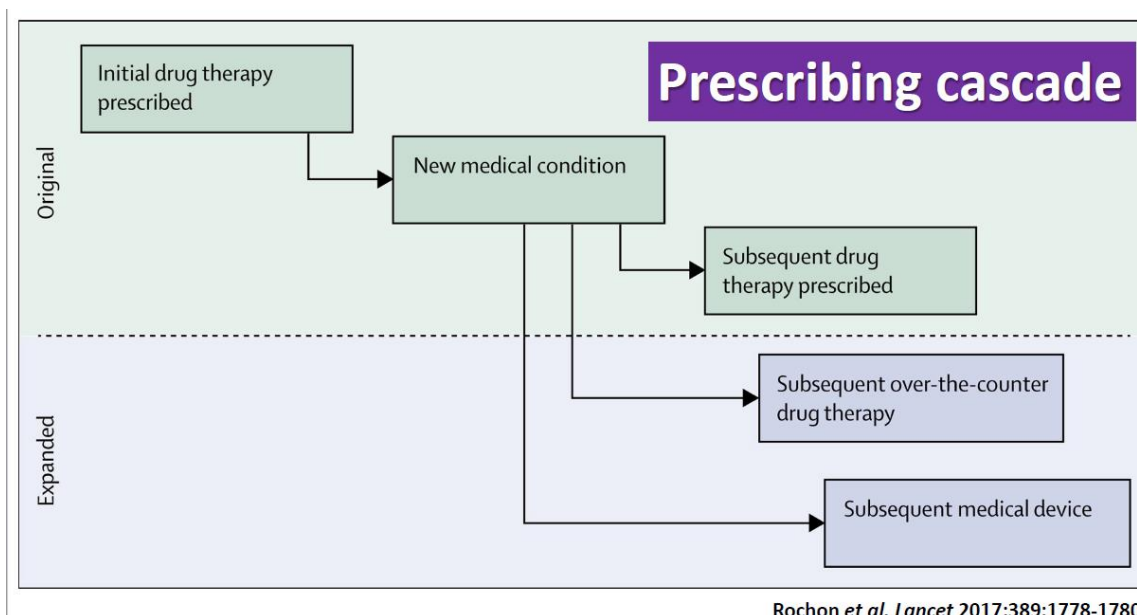
Prescribing Cascade

- A prescribing cascade happens when a side effect of one medication is mistaken for a new medical condition and is treated with another medication.
- It can increase the risk of having more side effects and drug interactions.
- Polypharmacy increases the possibility of a “prescribing cascade”.
- Examples of prescribing cascade is shown in below table:

Table 1. Examples of prescribing cascade²⁸

Initial treatment	Adverse effect	Subsequent treatment	Subsequent ADR
NSAID	Gastrointestinal bleeding	Proton pump inhibitors	Diarrhoea and <i>Clostridium difficile</i> infection
Thiazide diuretics	Hyperuricaemia	Allopurinol	Stevens-Johnson syndrome
Phenothiazine antipsychotic drugs	Extrapyramidal symptoms	Levodopa	Nausea, hypotension, delirium

Abbreviations: ADR = adverse drug reaction; NSAID = non-steroidal anti-inflammatory drugs



Drug-disease Interactions

- **Cardiovascular drugs and cardiac diseases**
 - Bradycardia is common in older adults due to conduction defect.
 - Can be orientated by drugs that slow heart rate e.g. beta-blockers digoxin, some Ca channel blockers, or combinations of these drugs.
 - Digoxin has a narrow therapeutic window and is renally excreted. In the older adults, digoxin toxicity is more frequent due to prevalence of renal impairment.

- **Anticholinergic drugs and cognitive impairment**

- Patients with cognitive impairment or dementia are more susceptible to drugs that affect the brain, leading to delirium.
- These include anti-cholinergic drugs or drugs with such properties.
- E.g. older generations of antihistamines, dopamine agonists, antipsychotics, tricyclic antidepressants, artane, oxybutynin, tolterodine, steroids.....

Anticholinergics: spot side effects & review regularly

It is likely that the people you treat or care for are taking at least one anticholinergic medicine.

Anticholinergics include some medicines used to treat:

- **Allergies** (e.g. chlorphenamine)
- **Depression** (e.g. paroxetine)
- **Urinary incontinence** (e.g. oxybutynin)
- **Psychosis** (e.g. olanzapine)

Side effects shown in callouts:

- Decreased memory & thinking skills
- Dizziness
- Blurred vision
- Dry eyes

- **Narcotics**

- Narcotics given to older people with dementia can lead to delirium.

- **DM drugs**

- SGLT2 inhibitors may lead to increased risk of ketoacidosis if patient is suffering from dehydration due to acute illness e.g., Gastroenteritis with diarrhoea and reduced appetite.
- Hence, we need to educate patient to withhold SGLT2 inhibitors if they are suffering from acute illnesses.

Drug-drug Interactions

- **Cardiovascular system**

- All drugs that slow heart rate can potentiate the problem.
- E.g. combination of betablockers (metoprolol, propranolol, atenolol) with digoxin or some Ca channel blockers
- Acute renal failure may occur if ACEi is added to a diuretic which the patient is already dehydrated or has impaired renal function.
 - ➔ The dose of diuretics needs to be reduced before adding ACEi. Monitoring of RFT is important.
- Combination of anti-HT may lead to lowish BP or postural hypotension.
 - ➔ Careful monitoring and titration are needed. *Start low and go slow* is important.

- **Electrolyte disturbances**

- Hyperkalaemia may occur if ACEi is given together with aldactone or amiloride.
- Hypokalaemia is common after given diuretics and if given digoxin or amiodarone, arrhythmia may occur.

- **Central nervous system**

- Antiepileptics ➔ potentiate the sedative effect of hypnosedative.
- Tricyclic antidepressants (TCA) ➔ potentiate the sedative effect of antiepileptics.
- Gabapentin or Lyrica ➔ cause more drowsiness when use with other antipsychotics.
- Bupropion ➔ cause serotonin syndrome if tramadol is given together.

- **Anticoagulant and other drugs**

- The anti-coagulant effect of warfarin, novel oral anticoagulants (NOACs) can be potentiated by aspirin, NSAID, and other anti-platelet drugs like Plavix.
- Warfarin effect can be affected by antibiotics.

Polypharmacy in Older Adults

- The term polypharmacy lacks universally consistent definition.
- Most define either qualitatively as the use of more than necessary and or inappropriate medications.
- Some define quantitatively the regular use of 5 or more medications.
- The provision of guideline-adherent medical care increasingly means the addition of more medications to reach disease specific targets, but this is at the risk of exposing an older adult to multiple drug-drug and drug-disease interactions.
- Polypharmacy has been linked to poor outcomes e.g. falls, hospitalizations, frailty etc.


BMJ Open Potential workload in applying clinical practice guidelines for patients with chronic conditions and multimorbidity: a systematic analysis

BMJ Open 2016;6:e010119. doi:10.1136/bmjopen-2015-010119

Céline Buffel du Vaure,^{1,2,3} Philippe Ravaud,^{2,3,4,5,6} Gabriel Baron,^{2,3,4,5}
Caroline Barnes,^{2,3} Serge Gilberg,^{1,2} Isabelle Boutron^{2,3,4,5}

In order to comply with all disease specific guidelines patients with 3 chronic conditions (any combination of COPD, IHD, T2D, OA, HT, depression) -> take 6-13 drugs per day;
In patients with all 6 conditions -> 18 drugs per day

- **Type 2 Diabetes Mellitus Is a Polypharmacy Condition**
 - Glycaemic control*
 - Cholesterol control*
 - BP control*
 - Neuropathy drugs
 - Aspirin
 - Non-DM drugs
- * Use different drugs with different mechanisms of action to achieve treatment goals

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Potentially Inappropriate Prescriptions

- It is defined as a therapy whose adverse risks exceed its health benefits.
- Inappropriate medication is a major cause of ADRs in older patients. It is also associated with increased risks of falls, hospital admissions and death.
- A local study in an extended hospital shows 52% of patients were discharged with one or more inappropriate drugs.
- The most common inappropriate drugs are those for respiratory and GI systems.
- The commonest reasons for inappropriateness were:
 - drug with no apparent indication
 - inappropriate dose, frequency or duration
 - use of duplicate drugs
 - use of contraindicated drugs

Clinical Tools to Combat Polypharmacy and Reduce Inappropriate Prescriptions

American Geriatrics Society (AGS) Beers Criteria

- Introduced in US in 1991.
- Use a Delphi consensus among geriatric and pharmacology experts who analyzed databases of frail, elderly nursing home residents in the US to identify potentially inappropriate medications.
- The latest Beers criteria were developed by AGS in 2015. It comprised of 5 sub-lists of medications that should be avoided in elderly.
- Limitations
 - Not applicable to palliative and hospice care because of the shift in benefit-to harm ratio in EOL decisions.
 - No reference to underuse of drugs.
 - Duplicate drug classes.

STOPP & START Criteria


- Developed in UK and Ireland.
- START – consists of 22 evidence based prescribing indicators for commonly encountered diseases in older people and addresses errors such as the omission of drug therapy likely to be beneficial to patients.
- STOPP – consists of 65 clinically significant criteria for potentially inappropriate prescriptions in older people and is classified according to physiological systems.
- STOPP/START significantly improved medication appropriateness in acute hospital.
- If applied within 72 hrs of admission, it reduces ADRs and shortened length of stay (LOS).

Drug Compliance and Adherence

What is the difference between “drug compliance” and “drug adherence”?

- Compliance means the patients follow and comply with the doctor’s prescription passively.
- Adherence means the informed patient will stick to taking their recommended treatment.
- It was estimated that adherence rates for prescribed medications are only about 50% in USA.

We usually use the term “medication adherence” nowadays.

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Types of non-adherence

<u>Intentional non-adherence</u>	<u>Unintentional non-adherence</u>
<ul style="list-style-type: none"> • It is the active decision occurring when the patient perceives a low health risk of an illness or has doubts about the drug benefit and or safety. • The characteristics of intentional non-adherence are: <ul style="list-style-type: none"> ○ Recognition / anticipation of side effects ○ Fears of prescribing errors ○ Lack of faith in the prescriber ○ Failure to accept diagnosis ○ Fears of addiction ○ Dislike for taking medicines ○ Perception of health risk ○ Testing medicines against symptoms 	<ul style="list-style-type: none"> • It is the passive process whereby patients fail to adhere to prescribing instructions through forgetfulness, carelessness, or circumstances out of their control e.g. acute illnesses. • The characteristics of unintentional non-adherent medication taking behaviour are: <ul style="list-style-type: none"> ○ Forgetfulness ○ Lifestyle change ○ Disruption of daily regimen ○ Period of illness ○ Drug related memory loss ○ Being asymptomatic

Dealing with non-adherence

- Open discussion is always encouraged to address the reason for non-adherence.
- Tool such as [8-item Morisky Medication Adherence Scale](#) can be applied to evaluate medication adherence in outpatient setting.

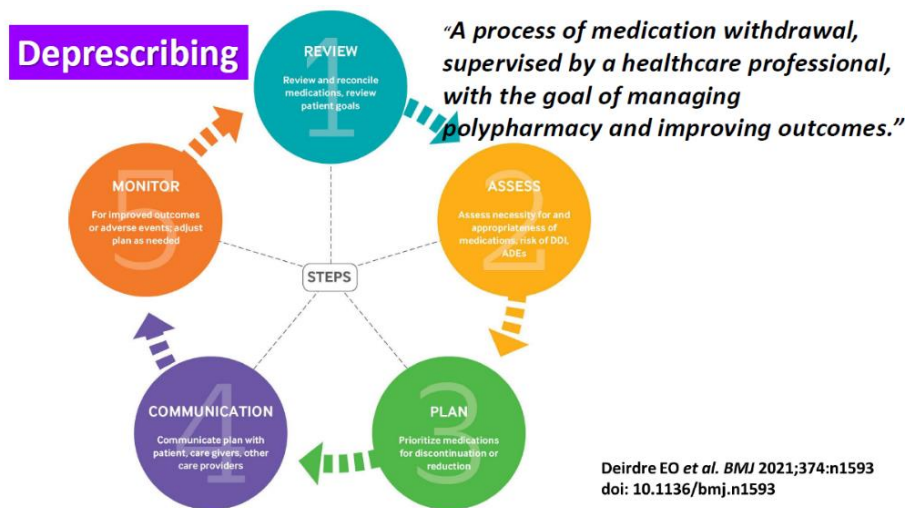
Strategies to improve adherence based on Cochrane system review


- Simplify drug regimen
- More thorough patient instruction and counselling
- Reminders
- Closer follow- up
- Couple focused therapy
- Psychological therapy
- Crisis intervention
- Manual telephone follow-up

Polypharmacy and drug non-adherence are the common medication issues among older adults. No matter a formal caregiver or family caregiver, we always encourage them to communicate with the doctors actively about their difficulties in managing the medication with the older adults. The doctor may consider “deprescribing”.

Deprescribing

- Inappropriate prescribing and polypharmacy in older persons are associated with increased risks of falls, adverse drug reactions, hospital admissions, and death.
- Deprescribing is the process of tapering, stopping, discontinuing, or withdrawing drugs, with the goal of managing polypharmacy and improving outcomes.
- Deprescribing can improve adherence, cost, and health outcomes but may have adverse drug withdrawal effects.



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Difficulties in deprescribing

- It is apparent that deprescribing in older persons likely results in reduced medication usage and cost and is unlikely to cause harm to patients.
- However, there is a lack of high-quality, long-term, prospective evidence to show that deprescribing results in clinically meaningful outcomes.
- For example:
 - Mortality not reduced in recent randomized control trial.
 - Deprescribing has been shown to reduce the number of falls, but not to change the risk of having the first fall.
- It is suggested that the absence in a change is a positive outcome as the medications can often be safely withdrawn without altering health outcomes.

Interventions to address polypharmacy in older adults living with multimorbidity

Review of reviews

Can Fam Physician 2022;68:e215-226.
doi.org/10.46747/cfp.6807e215


Muhammad Usman Ali MD CCRA Diana Sherifali RN PhD CDE
Donna Fitzpatrick-Lewis MSW Meghan Kenny MA Larkin Lamarche MA PhD
Parminder Raina PhD Derelle Mangin MBChB DPH FRNZCGP MCFP

- Significant reductions in PIMs
- Improvement in medication adherence

- No significant benefit in:
 - QoL outcomes
 - Hospitalization
 - Readmission
 - AED attendance
- No significant difference in ADRs

Guideline for deprescribe

- The current body of evidence yields little guidance for practitioners on exactly *how* to deprescribe.
- In people with multiple long-term conditions and polypharmacy deprescribing represents a complex challenge as clinical guidelines are usually developed for single conditions.
- In these cases, tools and guidelines like the Beers Criteria and STOPP/START could be used safely by clinicians.

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Risk of deprescribe

- It is possible for the patient to develop adverse drug withdrawal events (ADWE). These symptoms may be related to the original reason why the medication was prescribed, to withdrawal symptoms or to underlying diseases that have been masked by medications.
- For some medications, ADWEs can generally be minimized or avoided by tapering the dose slowly and carefully monitoring for symptoms.
- Doctors should be aware of which medications usually require tapering (such as corticosteroids and benzodiazepines), and which can be safely stopped suddenly (such as antibiotics and nonsteroidal anti-inflammatory drugs).

Resources to support deprescribing

Implicit tool

- The CEASE algorithm to prompt clinicians to consider if the treated condition remains a current concern for their patient.
- The ERASE algorithm prompts clinicians to consider if the treated condition is still requiring treatment. ERASE mnemonic stands for “evaluate diagnostic parameters”, “resolved conditions”, “ageing normally”, “select targets” and “eliminate”.


Explicit tool

- The Beers Criteria and the STOPP/START criteria.

Apart from the above issues, is that safe for the older adults to take both Western and Chinese medicine together? Are there any precautions?

Concomitant Use of Complementary Medicine

- Frequently overlooked issue is the use of complementary medicine in Chinese people.
- $\frac{3}{4}$ of the older adults take complementary medicine in the form of over-the-counter nutraceuticals, herbal or traditional Chinese medications, often in conjunction with, or as an alternative to, prescribed Western medicine.
- Adverse drug interactions including herb-drug interactions and drug adherence issues may arise as a result.

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Use of Chinese medicine in HK


- In 2007, a local study of 31762 non-institutionalized and institutionalized residents, among those reporting symptoms of medical problems in the 30 days preceding the survey:
 - 1.8% had used TCM regularly in past 6 months.
 - 8.8% had consulted a TCM practitioner.
 - 2.7% had used OTC TCM products.
- Another local study in 2001 showed widespread use of OTC drugs, health food and TCM in addition to prescription western medicines were noted in 285 community dwelling older people in Hong Kong West.

Proprietary Chinese medicines (PCM)


- PCM refer to proprietary products composed solely of Chinese herbal medicines or any materials of herbal, animal or mineral origin, used as active ingredients, that are formulated in a finished dose form.
- Use of PCM is common in HK. It can be obtained in community pharmacies, Chinese medicine practitioners, or from mainland China.
- In a review in 2011 on patients admitted to hospital due to ADRs secondary to PCM, the causes of ADRs are:
 - Adulteration of the PCM
 - Misuse by the consumer
 - Misuse by the prescriber
 - Drug allergies

Toxicity related to use of TCM/PCM


- They are uncommon in clinical practice.
- Most dangerous ADR is dysrhythmia following herbs containing aconitum alkaloids such as Radix Aconiti (Chuan Wu), Radix Aconiti Kusnezoffii (Cao Wu) and Radix Aconiti Lateralis Preparata (Fu Zi). These herbs are commonly prescribed for musculoskeletal pain.
- Herb induced liver injury (HILI)
 - Many herbs have been reported to cause hepatotoxicity.
 - A local study showed 9 probably cases were identified among 99 cases admitted to local hospitals for suspected HILI from 2011 to 2013.
 - The causes of HILI can be idiosyncratic responses or dose response.

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TCM contaminated by anticholinergic herbs



醫院管理局
HOSPITAL
AUTHORITY



HATS | Hospital Authority
Toxicology Services

POISONING ALERT

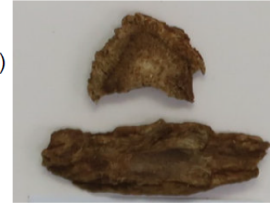
- an ad hoc alert for HA healthcare professions

Anticholinergic poisoning by tainted herb

15th August 2023

Cases

Two patients consumed Chinese herbal medicine (CHM) containing 木香 (Aucklandia Radix, prescribed by two HA Tripartite Chinese Medicine Clinics) presented with confusion in late July to early August. Solanaceous alkaloids (natural anti-cholinergic substances) were identified in the two samples of unused 木香, the patient's urine and the herbal remnants, confirming anticholinergic herb poisoning. As 木香 is not known to contain solanaceous alkaloids, contamination by anticholinergic herbs is suspected.




Messages

1. Anticholinergic herbs poisoning should be suspected in patients presenting with confusion and other anticholinergic symptoms shortly after taking CHM.
2. Patients presenting with acute onset of confusion should be evaluated specifically for history of recent herb use and the presence of other anticholinergic features (e.g. dilated pupils, dry and hot skin, tachycardia, sluggish bowel sounds, urine retention and fever).
3. For selected patients, a rapid recovery of consciousness with the use of physostigmine is diagnostic and may reduce unnecessary investigations.
4. Clinicians are advised to consult the Hong Kong Poison Information Centre or Prince of Wales Hospital Poison Treatment Centre for advice especially if the use of physostigmine is considered.
5. The herbal remnants, unused herbs, herbal formula and the patient's urine should be sent to HA Toxicology Reference Laboratory for confirmation.

When using TCM together with western medicine

- Both western doctors and Chinese medicine practitioners should ask carefully what drugs (western medicine and TCM) the patients are taking currently.
- Anti-coagulant like warfarin should be noted as TCM may interact with warfarin, leading to under or over warfarinization.
- In general, the advice is not to take the TCM and western drugs at the same time.
- Suggest spacing out the TCM and western medicine at least 2 to 3 hrs.

 <p>賽馬會流金館護老有道</p>	File	Handout – Medication Management for Older Adults - Chapter 1
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Further information for your interest to explore how a doctor prescribe medication to an older adult. What are the considerations?

Clinical Approach When Prescribing

To obtain a satisfactory history of drug use, and to assist in identifying adverse drug reactions and potential interactions, the following can be considered:

Adherence

- Is he taking the medications? Any drugs left in his pill box?
- How is he taking the drugs? (frequency, dosage etc.)
- Does he often forget to take the drugs? Has he got cognitive impairment? If yes, does he live with someone who can supervise medications?

Polypharmacy

- How many drugs is he taking including the prescribed drugs, Chinese medicine and OTC medications e.g. vitamins? (Please bear in mind the patient may not volunteer the information unless being asked specifically.)
- Ask patients to bring to you all the medications they are taking to review in the clinic.
- Check patient history and drug information in eHealth.
- Even if he is on relatively few drugs, it is important to assess if the indications are current and appropriate.
- Consider de prescribe when there is polypharmacy.

Review potential drug-drug interactions

- Review any chance of potential drug-drug interactions.

Review any symptoms caused by drugs

- For example
 - Delirium caused by anti-cholinergic drugs – if so, remove the culprit drug rather than adding anti-psychotic to control delirium.
 - Dizziness due to postural hypotension caused by alpha blocker.
 - Syncope due to bradycardia caused by beta-blocker plus Ca channel blocker.
 - The list goes on and on.....

Remember atypical presentation of older adult is common. You may refer to [MOOC 14 Chapter 3](#) about atypical presentation.

Some more hints and considerations

- Are there any known drug allergies?
- Be aware of non-pharmacological treatment options.
- Be aware of age-related changes in pharmacokinetics and pharmacodynamics.
- Encourage self-management plan.
- Involve the patient or carers in the treatment plan to improve compliance.

Physical examinations

- General examination
- Some examples of specific examination:
 - Check for postural hypotension.
 - Check for gait disturbance.
 - Especially for patients on anti-psychotics, anti-depressant
 - Mental state.
 - Any delirium due to drug side effects?
 - Constipation leading to abdominal pain and distension.
 - Can be due to narcotics, anti-cholinergic, Calcium, Iron supplements.
 - Look for skin rash due to drug allergies.
 - Check for pallor (anaemia) due to use of NSAID or NOAC.

Investigations

- Renal function test (Na, Ka, urea, creatinine) is perhaps the most important test.
 - Many drugs may lead to hyponatremia, hypokalaemia or hyperkalaemia, acute kidney injury with rising creatinine.
 - Some drugs need to dose adjustment or stopped totally in renal impairment e.g. NOAC, SGLT2 inhibitors.
- A better estimation of renal function is eGFR or GFR calculated by serum creatinine, age, weight, and gender (e.g. Cockcroft-Gault equation).
- Liver function test
 - New abnormality in LFT may imply drug induced toxicity as many drugs are metabolized by liver.
 - Drug toxicity may conversely be due to pre-existing liver disease causing reduced drug metabolism and clearance.
- Thyroid function test
 - Drugs like amiodarone may cause thyroid dysfunction.
- CBP
 - Drugs like warfarin, aspirin, NOAC etc may lead to anaemia due to increase bleeding tendency e.g. in GI tract.
- INR
 - Monitor warfarin
- Serum drug levels
 - Drugs like anti-epileptics, digoxin, certain antibiotics e.g. vancomycin

Strategies in Drug Prescription

- Weigh up against harm (benefit/harm ratio).
- Is the drug necessary?
- Is there safer alternative?
- Start low and go slow.
 - Given the variability of pharmacokinetics and pharmacodynamics, the dosage increment should be cautious, balancing the need for an efficacious dose with patient tolerance of the drug.
- Dose adjustment for renal, hepatic impairment and frailty
 - The adjustment must be individualized. As a general guide, a dosage reduction of 30 to 40% is required in older adults.


Special Considerations in Ward Setting in Drug Prescription

- Obtain history of drug allergies e.g. antibiotic allergies.
- Advise patients to inform ward all the drugs they are taking (both HA and private drugs).
- If possible, all drugs to be given by ward staff instead of allowing patients to take their own medications in ward to avoid omission or duplication of drug doses.
- Avoid PRN regimen for hospitalized elderly patients as many may receive erratic regimens (as judged by staff unfamiliar with the patient condition).
- When discharge, ensure patients/formal and informal carers have adequate education and knowledge of the change of drug regimen. In particular, which drugs have been stopped or added.
- The common scenario is that patients continue to take the drugs (which have been stopped in ward) after discharge due to lack of communication.
- Ensure patients have adequate drugs, especially those newly prescribed, before attending the next OPD follow-up.

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– End of Chapter 1 –

 The logo for Jockey Club Cadenza e-Tools for Elder Care. It features the text 'Jockey Club' at the top, 'Cadenza' in a large, stylized font with a musical note, 'e-Tools' in a smaller font, and 'for Elder Care' below it. At the bottom, there is Chinese text: '賽馬會逾金箱護老有道'.	File	Handout – Medication Management for Older Adults - Chapter 1
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