

Prescribing errors

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Bruce Way talks to Chi Tran, Senior Pharmacist, about common prescribing errors, [medication](#) interactions, and side-effects. Because medication prescribing errors are serious, yet preventable, we want you to learn how to avoid them. Furthermore, these errors significantly impact on patient care.

Common errors include, for example, failure to specify modified-release vs immediate-release formulations, transcription errors, electronic prescribing problems, and lack of concentration and focus.

In this podcast, we will also go through an example case to familiarise yourself with these common errors.

You will also learn about important factors, such as which patients are at a higher risk of medication errors? What are 3 drug interactions that most commonly cause problems?

Summary writer: Cynthia Yang

Editor: Bruce Way

Interviewee: Chi Tran

About Chi Tran

Chi Tran is a Senior Pharmacist in Projects at Prince of Wales Hospital. She studied pharmacy at [Monash University](#) (Victorian College of Pharmacy). Moreover, she has a particular interest in projects related to the quality use of medicines.

An approach to prescribing: common errors, interactions and side effects

With Chi Tran, Senior Pharmacist, and Dr Bruce Way, Emergency Physician and Director of Prevocational Education and Training, at Prince of Wales Hospital, New South Wales, Australia

Introduction

Medication prescribing errors are serious, yet preventable errors that significantly impact on patient care.



1. What are the common medication errors in chart prescribing?

- Failure to specify modified release vs immediate release formulations (such as oxycodone and oxycontin). For oxycodone and oxycontin, it is recommended to

write the brand name as well as the generic name and to tick the slow release box in the medication chart when appropriate

- Transcription errors – rewriting charts is a good opportunity to review medications rather than just copy
- Electronic prescribing also has unique problems:
 - Alert fatigue – it is important to read the alerts, especially regarding drug interactions
 - Avoid clicking on the similar looking drug or preparation in drop down boxes on the electronic prescribing system
- Concentration and focus are important in avoiding error

2. What patient groups are particularly at risk of medication errors?

- Groups vulnerable to prescription error include:
 - The elderly with comorbidities and polypharmacy, with greater risk of adverse reaction, drug interactions and the need for dose adjustment
 - The paediatric population need weight-adjusted dosage
 - Patients on greater than 5 drugs are also at risk
- High-risk drugs can be remembered with the acronym A PINCH:
 - antimicrobial
 - potassium/electrolytes
 - insulin
 - narcotics/sedatives
 - chemotherapy and
 - heparin/anticoagulants

3. What are 3 drug interactions that most commonly cause problems?

- Drugs with a narrow therapeutic index, such as digoxin. The dose needs to reduce in renal impairment
- “Triple whammy” combination with ACEI/ARB, diuretic and NSAID can cause acute kidney injury, secondary to reduced glomerular blood flow and the filtration rate
- An uncommon but potentially fatal combination is allopurinol and azathioprine. Allopurinol inhibits the metabolism of azathioprine, causing accumulation of toxic metabolites, which can lead to granulocytosis and bone marrow toxicity. This combination is best avoided. Otherwise, azathioprine dose should be reduced by 25-33%.

If there is any uncertainty, a ward pharmacist can be consulted.

Case

An 87-year-old non-English speaking lady from home BIBA is admitted after an unwitnessed fall and long lie at home. She has suffered a fracture of the greater trochanter, awaiting orthopedic review for potential surgery. She also suffered AKI secondary to dehydration and rhabdomyolysis and could only convey a part of her medications during ED.

You have just received the GP's complete list of medications for the patient and asked to chart her regular medications: Avapro HCT for hypertension, aspirin, and warfarin (for metallic mitral valve), metformin for type 2 diabetes, atorvastatin for cardiovascular protection, pantoprazole for GORD, long term diazepam and fluoxetine initially prescribed for sleeping and anxiety. The patient's warfarin dose for the day was withheld at ED in view of potential surgery. The INR just came back as 2.1.

4. What are the issues in this case?

- Acute kidney injury, requiring medication review to withhold and dose-adjust certain medications
- Consider stopping metformin and bridging anticoagulation before surgery
- Possible risk factors for her fall include benzodiazepine and the antihypertensive if her blood pressure is low
- Statin can cause muscle wasting, although this is a rare adverse effect. Given she has rhabdomyolysis and does not need to have the statin acutely, especially given her age.
- Dehydration and diuretic
- Reviewing indication for both warfarin and aspirin
- Indication for PPI in an elderly

5. What should we do about the anticoagulation, given the patient has a subtherapeutic INR for the indication and may be going for surgery?

- Consider bridging therapy with unfractionated heparin or LMWH. In the context of kidney injury, we would prefer heparin IV infusion and ceased 6 hours prior to surgery
- Most hospitals have a local heparin policy, which should be referred for dosage adjustment and APTT monitoring

6. What are some common medications that interact with warfarin that we should know and review?

- Warfarin is made out of two isomers: R-isomer and S-isomer. The S-isomer is 5 times more potent than the R isomer. S-isomer is metabolised by the CYP450C29 coenzyme. Anything that interacts with the P450C29 coenzyme will result in a significant change in INR. R-isomer is metabolised by the CYP3A4 and anything that interacts with the CYP3A4 coenzyme will have a modest effect on the INR
- Anything that affects both pathways will increase the INR significantly, such as amiodarone. Antibiotics, particularly macrolides, can cause increase in INR, which are often overlooked
- Pharmacokinetic interaction with any hepatic enzyme inducers can cause a reduction in INR, such as carbamazepine
- Pharmacodynamic interactions refer to how the body reacts to the medication. Antiplatelet medications such as fish oils, aspirin and clopidogrel have additive effects of antiplatelet, which increase the risk of bleeding without changing the INR

7. When the patient is in AKI, what common medications in the medication chart should be withheld until the AKI resolves, or is ceased?

- If the patient is hypovolemic, we should be concerned about withholding diuretics and antihypertensive
- Nephrotoxic drugs should be withheld, such as ACE-inhibitors
- Metformin increases the risk of lactic acidosis in patients with impaired renal function and old age
- Cease statin in view age and rhabdomyolysis

8. In people with renal impairment, what are some common medication dosage adjustments that we should be aware of?

- The estimated creatinine clearance rate (eCCr) can be calculated using the Cockcroft-Gault equation using serum creatinine level and the body weight. The estimated GFR can be used to determine the dose adjustment, which can be found in the Therapeutic Guidelines
- Antibiotics
- Common drugs that are renal excreted include metformin and enoxaparin
- Some drugs can, with renal impairment, reach toxic levels, such as sulphonylurea and digoxin
- Some drugs have altered effects in impaired renal function, such as frusemide, which requires larger dose for the same effect
- The NOACs, such as dabigatran, apixaban, rivaroxaban, also require dose adjustment in renal impairment

9. In the elderly population, polypharmacy is a big risk factor for falls and other complications. What are some common medications that don't necessarily benefit in the elderly and that could be ceased?

- Anticholinergic drugs, such as oxybutynin and tricyclic antidepressants, can cause confusion, delirium, dry eyes/mouth, urinary retention, tachycardia and orthostatic hypotension
- Benzodiazepine causes drowsiness, memory loss and affects vision. Dependence may also develop quickly.
- Opioids can cause orthostatic hypotension and dizziness. Prescription should start low and go slow in the elderly population
- Statins may have questionable long-term cardio protection benefit in the elderly
- Antihypertensive may need to be reconsidered, especially if they are causing hypotensive episodes
- Overall, if there is no value, stop it. If there is value, revise for dose adjustment

10. What other common drug interactions should we be aware of?

- Serotonin syndrome, caused by the increase in the level of 5HT in the central nervous system
- This is usually due to different mechanisms, commonly involving two or more drugs that increase serotonin by different mechanisms. E.g. MAO inhibitor, SSRI, St Johns wart and venlafaxine
- It is important to ask about OTC medications additional to prescribed medications

Take home messages

- When prescribing, take an accurate medication history, know the drugs you are prescribing
- Consider potential drug interactions and recognise early signs of adverse effects. Is it side effect or another symptom? Avoid adding another drug to fix a side effect
- Be aware of how drugs work, e.g. in Parkinson's disease, do not give a dopamine antagonist, such as metoclopramide, which will make their symptoms worse
- Communication of medication changes to other healthcare professions, especially on discharge, is especially important
- Make sure to include how many days of opioids are prescribed and the next review date
- There is always a ward/department pharmacist for extra help

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