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Highlights:

Medication Dispensing Errors and Prevention

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A Message from the Editorial Board

Greetings Dear Readers,

It is with great pleasure to present to you Volume 1 of Hospital Permai Pharmacy Bulletin June 2024 issue (ISSN 2785-9274). We bring you a diverse selection of articles from our co-editors featuring a cover story on “Medication Dispensing Errors and Prevention”. We hope you find it both interesting and informative.

We would like to extend our appreciation to the advisor of this bulletin for her support to its publication. We are also beyond grateful to the reviewer for her time and effort in reviewing this publication.

We hope you will enjoy reading our bulletin. We welcome any feedback, constructive comments or enquiries you may have on the articles in this publication.

We look forward to seeing you again in the next issue. Happy reading.

The editorial board

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Medication Dispensing Errors and Prevention

By: Choe Kin Onn

Medication error is defined as:
"Any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the health care professional, patient, or consumer".

Medication errors are a leading cause of injury and preventable patient harm, which have an impact on both clinical care and economy worldwide. According to a meta-analysis, the pooled prevalence for overall medication harm was 9%. Medication errors can happen in any location and at any steps of the medication use process, such as prescribing, transcribing, dispensing, administration or monitoring. [3]

Statistics in Hospital Permai

A total of 18 medication errors were reported in the year 2023, 4 cases (22%) were of error category outcome B (near miss – did not reach patient), 12 cases (67%) were of error category outcome C (actual error – caused no harm) and 2 cases (11%) were of error category outcome D (additional monitoring is required to preclude harm).

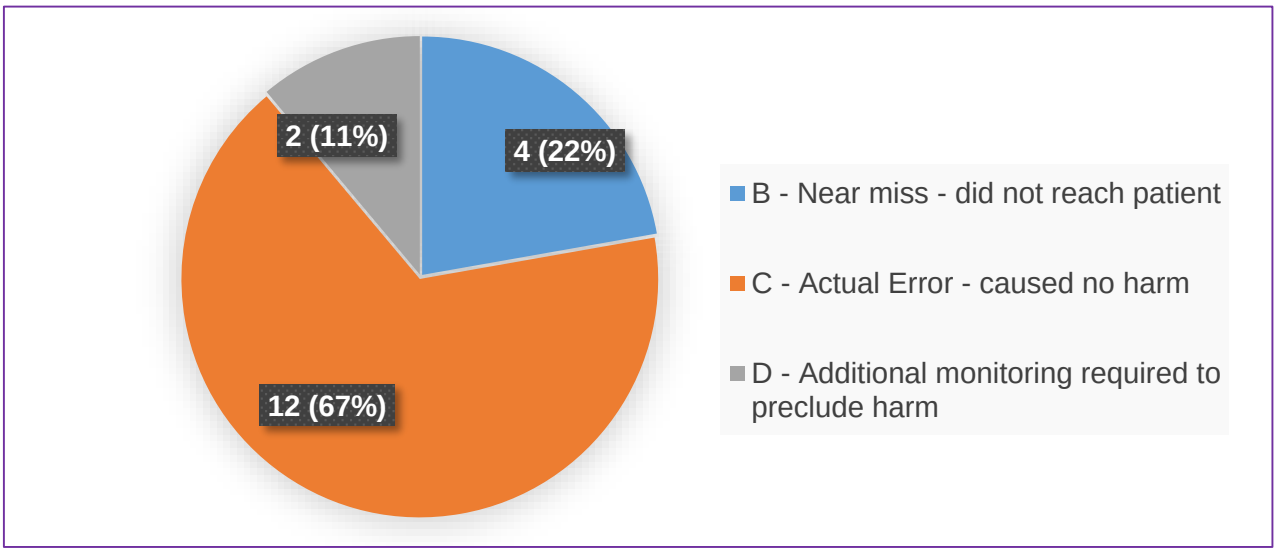

Diagram 1: Medications Error Reporting (MER), Jan – Dec 2023, n = 18

Dispensing medication involves a complex combination of processes, technologies, and human interactions. [3]

A dispensing error is defined as a discrepancy between a prescription and the medicine that the pharmacy delivers to the patient or distributes to the ward on the basis of this prescription, including the dispensing of a medicine with inferior pharmaceutical or informational quality. [1]

The most common reported dispensing errors were dispensing the medication for the wrong patient, incorrect medicine name, incorrect strength, and incorrect dosage. [3]

Among the 18 medication errors reported in the year 2023 in Hospital Permai, dispensing error accounts for 32% of all medication errors which is the highest process of error followed by administration error 27%, prescribing error 23% and filling error 18%.

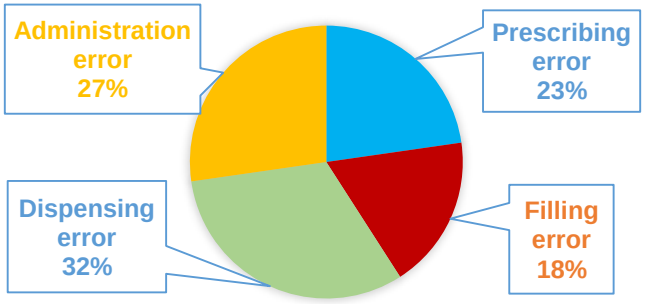

Diagram 2: Process of error, Jan – Dec 2023

In a research on hospital dispensing errors, it was found that wrong drug and strength were the most common unprevented errors, wrong directions on the label, wrong drug and wrong strength were the most common prevented errors and labelling errors were a common problem in automated dispensing. [5]

There were 3 main categories of dispensing error occurred in the year of 2023 in Hospital Permai. The highest dispensing error was wrong drug dispensed (57%) followed by wrong strength (29%) and wrong label (14%).

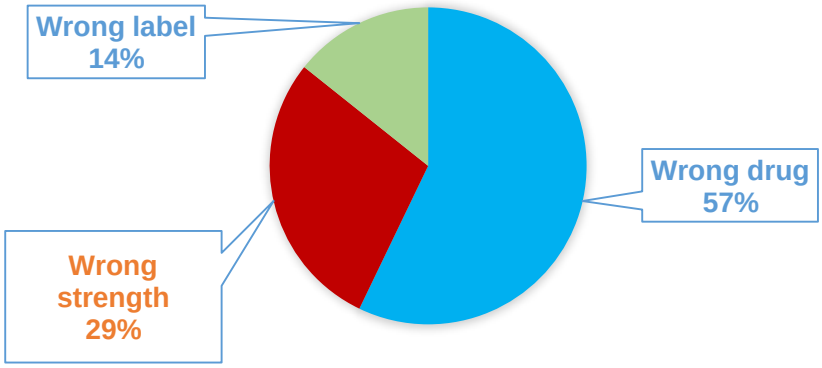

Diagram 3: Categories of dispensing error, Jan – Dec 2023

"A systematic review relating to dispensing errors in hospital pharmacies only, found dispensing error rates varied between 0.015 and 33.5%." [4]

Dispensing error incidents (Real case)

1) Wrong label

Description	Patient's medication (IV Actrapid) was wrongly labelled with T.Memantine 15mg OD. The error was detected by staff nurse in ward when she received the medication from pharmacy and returned to pharmacy for correct labelling.
Immediate action following Incident	The label was corrected and dispensed to ward.
Contributing factor(s)	Failure to adhere to proper work procedure, distraction
Preventive measure(s)	1) To ensure adherence to proper work procedure. 2) To counter check medication before dispensing.

2) Wrong drug

Description	T. Chlorpromazine 100mg was supplied instead of T. Clozapine 100mg. Error was detected by nurse before home visit. Then, patient was supplied the right medication.
Immediate action following Incident	Correct medication was supplied to patient.
Contributing factor(s)	Sound alike medication
Preventive measure(s)	1) To ensure sound alike medication to be placed in a different row. 2) To provide sufficient education / extra attention to the work /staff. 3) To ensure enough manpower for filling & counterchecking.

3) Wrong strength

Description	T. Clonazepam 0.5mg was supplied instead of 2mg. Error was detected by pharmacist while doing routine checking for psychotropic drugs. Patient was called to verify and to return the medication to pharmacy. The patient claimed she had not taken the medication yet.
Immediate action following Incident	Patient was supplied the right medication.
Contributing factor(s)	Distraction, peak hour
Preventive measure(s)	1) To provide sufficient and extra attention when filling, thoroughly counterchecking label and filled medication, thoroughly counterchecked before dispensing. 2) To ensure enough manpower for filling and counterchecking.

"Dispensing errors can be potentially dangerous for the patient. Pharmacists can take simple steps to help eliminate this problem." [2]

Dispensing error prevention

Error-prone systems and procedures are the common cause of dispensing errors made by individuals. Consequently, adopting a system-oriented approach is the primary strategy to lower dispensing errors. Here is a list of tactics to reduce the number of dispensing errors: [2]

1. Ensure correct entry of the prescription

By using at least 2 patient identifiers to verify patient identity while entering the prescription into the system, transcription can be minimized.

2. Confirm that the prescription is correct and complete

It is crucial to enquire the prescriber to clarify any uncertainties or doubts regarding the prescription. Any clarification from the prescriber should be documented promptly.

3. Beware of look-alike, sound-alike drugs

By including reminders about these frequently confused look-alike, sound-alike drug names in the computer system or on the stock bottle, such errors can be minimized.

4. Be careful with zeros and abbreviations

Computer alerts or keeping just one strength of the medication in the pharmacy can prevent interpretation error involving a zero or a decimal point. During patient counseling, these mistakes can be detected by checking the label instructions. Being familiar with a list of error-prone abbreviations, symbols, and dose designations can help prevent dispensing errors.

5. Organize the workplace

It has been shown that organizing the workspace, work environment and work flow significantly reduces dispensing errors. Developing procedure for transcription, filling and checking prescriptions will help organize the workflow.

6. Reduce distraction when possible

Dispensing errors by pharmacists is influenced by design of workflow and window services which may lead to multitasking and distraction during work. It is important to improve the internal environment and having pharmacy assistants to help pharmacist with routine tasks to reduce medication errors.

7. Focus on reducing stress and balancing heavy workloads

Sufficient staff, adequate workload and sharing of responsibilities by clearly assigning tasks to the staff helps them understand the workflow and can help reduce workplace stress.

8. Take the time to store drugs properly

Medications should be arranged properly with labels oriented forward. Regularly inspecting all medications on the shelf and getting rid of any expired medications is recommended. Drugs that have a high risk causing error should be isolated.

9. Thoroughly check all prescriptions

Counterchecking the written prescription with the data in system, with the label being printed, and with the medications filled helps in minimizing dispensing errors. It is advisable to have the counterchecking done by another pharmacist if possible. If this is not possible, an alternative strategy is delay self-checking by pharmacist rather than continuous self-checking.

10. Always provide thorough patient counseling

It is important to provide counseling for each patient. In order to minimize medication error, counseling should include the instructions on how to take the medication, appropriate route of administration and educating patients about safe and effective use of medication.

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Medication Safety: Handling High Alert Medications

By: Ariff Bin Adzahar

Introduction to Handling High Alert Medications [1]

- HAMs are medications that bear a heightened risk of causing significant patient harm when these medications are used in error.
- The inherent risk of using HAMs, work environment, organizational culture and clinical scenarios could impose difficulties for healthcare professionals in ensuring patient safety while delivering health services. Similarly, there are also some conditions inherent to vulnerable groups, such as pregnant women, children and elderly, and clinical risk areas such as cancer patients.
- Specific high-risk medications list has been drawn up based on reported cases submitted to National Medication Error Reporting System (MERS).
- HAMs warrant special safeguards to reduce the risk of unnecessary patient harm associated with adverse medication events such as preventable medication errors.

Four Domains that Influences Safe Uses of HAMs:

1) Patients and the public
2) Medicines
3) Healthcare professionals
4) System and practices of medication

Figure 1. Strategic Framework of the Global Patient Safety Challenge Source: The Third WHO Global Patient Safety Challenge: Medication Without Harm.
Available at: https://www.who.int/patientsafety/medication-safety/en/

Categories of High Alert Medications according to
Guideline on Safe Use of High Alert Medications (HAMs), 2nd Edition, 2020.

1	Adrenergic agonists, IV (e.g. adrenaline, phenylephrine, noradrenaline)
2	Adrenergic antagonists, IV (e.g. propranolol, labetalol)
3	Anaesthetic agents, general, inhaled and IV (e.g. propofol, ketamine)
4	Antiarrhythmics, IV (e.g. lignocaine (lidocaine), amiodarone)
5	Antithrombotic agents (e.g. warfarin, heparin, enoxaparin, dabigatran, rivaroxaban, apixaban, fondaparinux, tirofiban, tenecteplase)
6	Antivenom (e.g. sea snake, cobra, pit viper antivenom)
7	Chemotherapeutic agents, parenteral and oral
8	Epidural and intrathecal medications
9	Glyceryl Trinitrate Injection
10	Immunosuppressant agents (e.g. azathioprine, cyclosporine, tacrolimus)
11	Inotropic medications, IV (e.g. digoxin, dobutamine, dopamine)
12	Insulin, subcutaneous and IV
13	Magnesium sulfate injection
14	Moderate and minimal sedation agents, oral, for children (e.g. chloral hydrate, midazolam, ketamine [using the parenteral form])
15	Moderate sedation agents, IV (e.g. dexmedetomidine, midazolam, lorazepam)
16	Neuromuscular blocking agents (e.g. pancuronium, atracurium, rocuronium, vecuronium)
17	Opiods, including: • IV • oral (including liquid concentrates, immediate- and sustained-release formulation) • transdermal
18	Oxytocin, IV
19	Parenteral Nutrition preparations
20	Potassium salt injections
21	Sodium Chloride for injection, hypertonic (greater than 0.9% concentration)
22	Dextrose, Hypertonic (20% or greater)

High Alert Medications list in Hospital Permai Johor Bahru

No.	Category	Medications
1	Adrenergic agonist IV	Adrenaline acid (Epinephrine) tartrate 1mg/ml injection Noradrenaline 4mg/4ml injection
2	Anaesthetic agents, general, inhaled and IV	Propofol 1% 200mg/20ml injection Lignocaine HCl 2% injection (10ml) with preservative IM only
3	Antiarrhythmias IV	Lignocaine HCl 2% 100mg/5ml preservative-free Adenosine 6mg/2ml injection Amiodarone 150mg/3ml injection
4	Antithrombotic agents	Warfarin Sodium Tab
5	Dextrose, hypertonic, 20% greater	Dextrose 50% w/v (10ml) injection
6	Glyceryl Trinitrate injection	Glyceryl trinitrate 50mg/10ml injection
7	Inotropic medications IV	Digoxin 0.5mg/2ml injection Dobutamine 250mg/20ml injection Dopamine HCl 200mg/5ml injection
8	Insulin, subcutaneous and IV	Insulin recombinant neutral human short-acting 100IU/ml (Actrapid) Insulin recombinant synthetic human intermediate-acting 100IU/ml (Insulatard) Insulin recombinant synthetic human premixed 100IU/ml (Mixtard)
9	Magnesium Sulphate injections	Magnesium Sulphate 49.3% w/v (2.465g/5ml) injection
10	Moderate sedation agents, IV	Diazepam 10mg/2ml injection Midazolam 5mg/ml injection
11	Neuromuscular blocking agents	Suxamethonium Chloride 100mg/2ml injection
12	Opiates and narcotics	Methadone 5mg/ml syrup
13	Potassium salt injections	Potassium chloride 10% 10ml injection
14	Sodium chloride solution (greater than 0.9%)	Sodium chloride 3% (500ml) injection Sodium chloride 20% (10ml) injection

Common Risk Factor Associated with HAMs [1]

Different routes of administration

Confusion between IM, IV, intrathecal, epidural preparations

Incorrect preparation of drug

Incorrect dilution, diluent, dose/strength or calculations

Misinterpretation of medications order

Use of abbreviations (“U”vs“units”) and trailing zeros (5.0 vs .50)

Wrong infusion rates

Miscalculation of infusion rates or incorrect infusion rate programmed on the infusion pumps

Look Alike Sound Alike

Look alike or sound alike product and similar packaging

Availability of products variation

Confusion of different strengths/ multiple formulations/ brands/colours of the same drug

Ambiguous labelling

Unclear concentration and total volume information on the container/ syringe label

Management of HAMs [1]

1. List of HAMs

- List of high alert medications used within the facility shall be identified.
- List of high alert medications shall be disseminated to all healthcare personnel in the facility.
- Any changes of brand/ colour/ preparation of high alert medications must be informed to the users as soon as possible.

2. Cautionary label

- High alert medications should have HIGH ALERT MEDICATION labels on storage shelves, containers, product packages or loose vials/ ampoules.
- Use either HAM sticker/label or HAM envelope.

3. Policy

- Medications identified as high alert shall be targeted for specific error prevention strategies.
- Review and evaluate the checklist for high alert medications in Medication Safety Self – Assessment Form.
- High alert medications will be prescribed, dispensed, and administered using practices that are proven safe.
- Identify and keep apart look alike sound alike of high alert medications.

4. Counterchecking

- High alert medication must be counterchecked before they are prepared, dispensed and administered to the patients.
- A system shall be established whereby one healthcare professional prepares the medication and another person counterchecks it.
- All high alert medications issued from the pharmacy must be counterchecked and verified by another pharmacy staff prior to dispensing for the purpose of medication safety and accuracy.

5. Safety controls

- All equipment or devices used in the preparation and/or administration of medications shall be calibrated and maintained according to Standard Operating Procedure (SOP).
- Utilize engineering safety controls when appropriate. i.e. use of oral syringe for liquid (oral) medications, computerized system.

6. Monitoring

- Monitor and report adverse drug reaction and medication error related to high alert medications.

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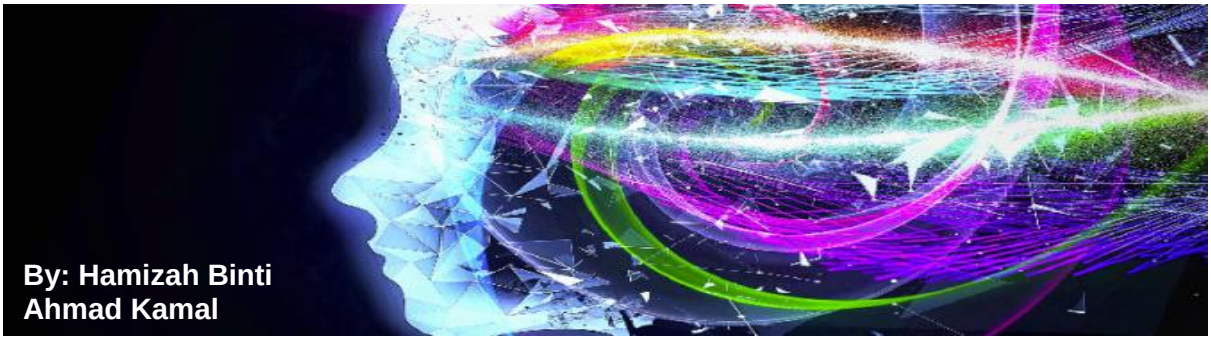
1. Guideline on Safe Use of High Alert Medications (HAMs), 2nd Edition, 2020. https://www.pharmacy.gov.my/v2/sites/default/files/document-upload/guideline-safe-use-high-alert-medications-hams-2nd-edition_1.pdf

Know Your Medicine:
Tetrabenazine Treatment for Tardive Dyskinesia



By: Hamizah Binti Ahmad Kamal

Introduction

Tardive dyskinesia (TD) is a medication-induced hyperkinetic movement disorder associated with the use of dopamine receptor-blocking agents, including first- and second-generation antipsychotic drugs, metoclopramide, and prochlorperazine.

The most common manifestations of TD involve spontaneous movements of the mouth and tongue, but the arms, legs, trunk, and respiratory muscles can also be affected. Less commonly, the prominent feature is dystonia involving a focal area of the body such as the neck. TD can be irreversible and lifelong, with major negative impacts on psychologic health and quality of life.

TD is important to recognize, since early discontinuation of the offending drug offers the best chance of recovery. However, in patients who require ongoing antipsychotic drug therapy for management of psychiatric disorders, symptomatic therapies for TD can help lessen movements, if only partially.

Indication

Tetrabenazine is indicated for the treatment of chorea associated with Huntington's disease. But due to the treatment of TD is often unsatisfactory, especially in severe cases, Tetrabenazine is a drug of choice and has been used off-label for the treatment of TD.

Pharmacokinetic

Absorption:	Bioavailability low and erratic. Time to peak plasma concentration within 1-1.5 hours (metabolites).
Distribution:	Rapidly distributed to the brain (IV). Plasma protein binding 82-85% (tetrabenazine), 59-68% (metabolites).
Metabolism:	Rapidly and extensively metabolized in the liver by carbonyl reductase to active metabolites.
Excretion:	Via urine (approximately 75% as metabolites), faces (approximately 7-16%).

Mechanism of action

Tetrabenazine acts primarily as a reversible high-affinity inhibitor of mono-amine uptake into granular vesicles of presynaptic neurons by binding selectively to Vesicular Monoamine Transporter-2 (VMAT-2). As a result of this inhibition, monoamine degradation in the neuron is augmented, leading to depletion of the monoamines, particularly dopamine. Clinical studies have shown that tetrabenazine can be effective in reducing the severity of TD symptoms. However, response to the medication can vary among individuals.

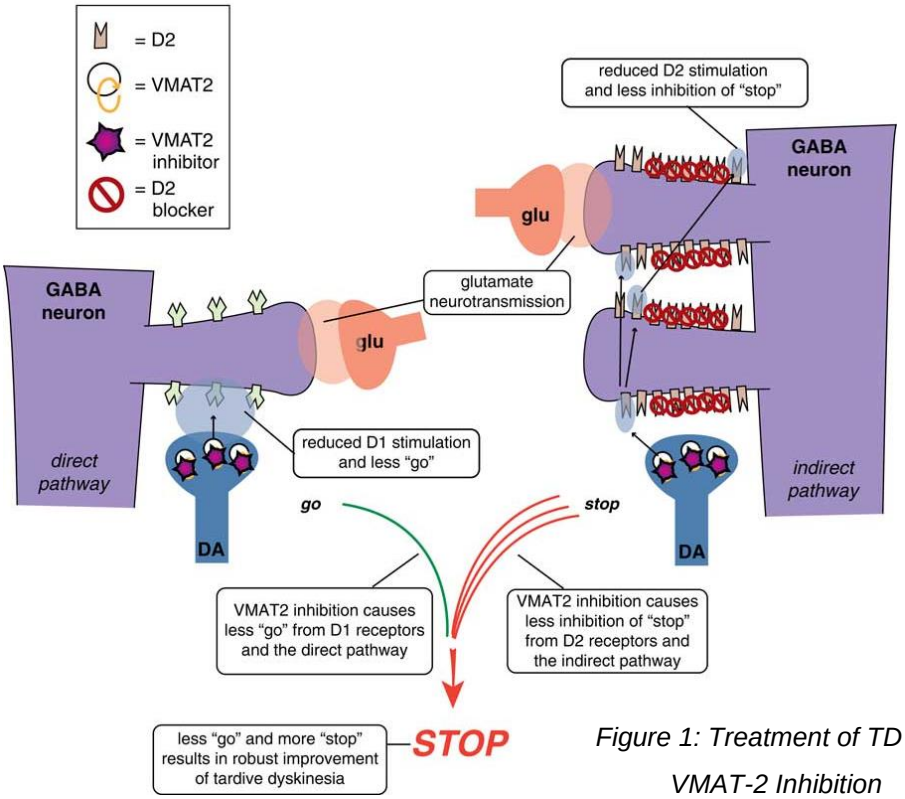


Figure 1: Treatment of TD with VMAT-2 Inhibition

The dosing of tetrabenazine for Tardive dyskinesia (off-label use) (alternative agent):

Oral: Initial: 50 mg/day in divided doses; may increase daily dose by 50 mg increments every 2 weeks up to maximum of 150 mg/day in divided doses. Alternatively, an initial dose of 25 to 37.5 mg/day in 2 or 3 divided doses has been recommended with increases or decreases in increments of 12.5 mg/day at weekly intervals. Usual maximum tolerated dose: 75 mg/day in 3 divided doses; in very rare cases, doses up to 200 mg/day have been use.

There is no dosage adjustment for renal impairment patients. This medicine is contraindicated in hepatic impairment; active suicidality or untreated or inadequately treated depression; coadministration of monoamine oxidase inhibitors (MAOIs) or use of tetrabenazine within 2 weeks of discontinuation of MAOI therapy; coadministration with reserpine, more than 20 days should pass after discontinuing reserpine before initiating tetrabenazine therapy; coadministration with deutetrabenazine or valbenazine.

Diagram 1: Tetrabenazine 25mg tablet available in Outpatient Pharmacy Department, Hospital Permai

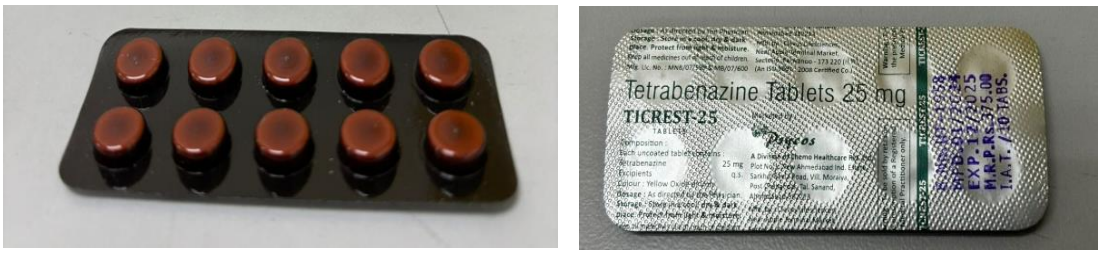


Diagram 2: The blister packaging of Tetrabenazine 25mg tablet (Ticrest-25®).

Patient Counseling Information:

Tetrebenzaine may cause dizziness, sedation or somnolence, if affected, do not drive or operate machinery

Overdosage:

Symptoms: Acute dystonia, oculogyric crisis, nausea, vomiting, diarrhoea, confusion, hallucinations, somnolence, sweating, hypotension, hypothermia, rubor, tremor.

Management: Symptomatic and supportive treatment. Monitor cardiac rhythm and vital signs.

Monitoring Parameters:

Monitor for signs or symptoms of depression or suicide ideation, parkinsonism, neuroleptic malignant syndrome, orthostatic hypotension. Perform CYP2D6 genotyping for evaluation of metabolism status (doses >50 mg/day).

Warning & Precautions:

No.	Concern	Elaboration
1.	Concerns related to adverse effects	• CNS depression: May cause CNS depression, which may impair physical or mental abilities; patients must be cautioned about performing tasks that require mental alertness (eg, operating machinery or driving). If sedation occurs during treatment, dosage reduction or discontinuation may be necessary. • Depression/suicidal ideation: Use can increase risk for depression and suicidal thoughts and behavior in patients with Huntington disease. Dosage reduction, treatment of depression, or discontinuation may be necessary. • Esophageal dysmotility/aspiration: Use has been associated with esophageal dysmotility, dysphagia, and aspiration; use with caution in patients at risk of aspiration pneumonia. • Neuroleptic malignant syndrome: Use may be associated with neuroleptic malignant syndrome (NMS). Discontinue with confirmed NMS; may recur with reintroduction of treatment; monitor carefully. • Ophthalmic effects: Binds to melanin-containing tissues in animal studies; may result in accumulation and toxicity with extended use and long-term ophthalmic effects. Clinical relevance and monitoring recommendations are unknown. • Orthostatic hypotension: May cause orthostatic hypotension; monitor patients at risk closely. • Parkinsonism: May cause parkinsonism symptoms (ie, bradykinesia, hypertonia, rigidity). Dose reduction, treatment of parkinsonism, or discontinuation of therapy may be necessary. • Psychomotor stimulation: Use has been associated with akathisia, restless, and agitation.

		Dosage reduction, treatment of psychomotor effects, or discontinuation may be necessary. • QT prolongation: Has been shown to prolong the QT interval alone (minimal) and with other drugs with comparable effects on the QT interval (additive). Avoid use in patients with congenital QT prolongation, a history of cardiac arrhythmias, or concomitant drugs known to cause QT prolongation.
2.	Disease-related concerns	• Prolactin-dependent tumors: Elevates prolactin levels; use with caution in patients with breast cancer or other prolactin-dependent tumors; dose discontinuation may be considered.
3.	Special populations	• CYP2D6 poor metabolizers: CYP2D6 poor metabolizers have increased levels of primary drug metabolites. Patients should be tested for the CYP2D6 gene prior to initiating doses >50 mg/day. • Huntington disease: May worsen mood, cognition, rigidity, and functional capacity in patients with Huntington disease, which can be difficult to differentiate from progression of the underlying disease. Underlying chorea may improve over time in some patients, thereby decreasing the need for therapy. Re-evaluate patients need for treatment by periodically assessing the effect on chorea and possible adverse effects. Dose reduction or discontinuation of therapy may be necessary.
4.	Other warnings/precautions	Appropriate use: Should not be used to treat levodopa-induced dyskinesia.

References:

1. UpToDate Lexidrug: Tetrabenazine
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Adverse Drug Reaction: Ocular Adverse Effects with Aripiprazole

By: Deborah Ng Pei Jia

Introduction

All antipsychotic medications have the potential risk to cause unwanted ocular adverse effects such as blurred vision, myopia as well as diplopia. Literature review revealed few cases of aripiprazole-induced myopia in patients.

Aripiprazole is a second-generation antipsychotic and is used in treatment of schizophrenia, depression, bipolar mood disorder and other psychotic disorder. Common general adverse effects include akathisia, insomnia, constipation, fatigue, headache, nausea and vomiting. Meanwhile ocular side effects of aripiprazole, such as transient myopia, diplopia, acute angle closure, and chorioretinopathy, have been reported although rarely. [1]

Case reports 1

Bulgu and Genc [2] reported a case of a 34-year-old female patient who was prescribed oral escitalopram and aripiprazole for major depressive disorder. After a week of starting the use of adjunctive aripiprazole therapy, the patient complained of painless blurred vision in both eyes. Her uncorrected visual acuity (UCVA) was 4/10 and her best corrected visual acuity was 10/10 in both eyes with a refractive error of -2.00 diopters. She did not have have any other systemic disease and optical prescription previously. The diagnosis was aripiprazole-induced, acute transient myopia. Aripiprazole was discontinued and the UCVA score had improved to 20/20 after two weeks.

Case reports 2

Kumar et al. [3] reported a case of a 22-year-old female patient who presented with worsening symptoms of schizophrenia and was started on aripiprazole. A week later she returned with blurred vision in both eyes that started on the third day of the aripiprazole treatment. The medication was stopped and her vision improved to 20/20 UCVA score in both the eyes after two weeks.

Case reports 3

Kaya et al. [4] reported the case of a 21-year-old female who had been diagnosed with bipolar mood disorder and was prescribed sodium valproate and oral aripiprazole 15 mg. A week after the introduction of aripiprazole, she developed myopia in both eyes. The myopia resolved in 10 days after stopping aripiprazole.

Case reports 4

Selvi et al. [5] reported an aripiprazole-induced myopia in both eyes in a 19-year-old female with obsessive-compulsive disorder. She developed myopia 2 weeks after initiation of aripiprazole and it took ten days for the symptom to resolve after cessation of the medication.

Case reports 5

Nair et al. [6] reported an aripiprazole-induced myopia in a 33-year-old male with schizophrenia. Patient developed myopia in both eyes after one month of oral 15 mg aripiprazole. The myopia resolved after 10 days he stopped taking the medication.

Case reports 6

Karadag et al. [7] reported an aripiprazole-induced myopia case in a 30-year-old male with schizophrenia. Aripiprazole was prescribed at 20 mg daily. On the fifth day of the aripiprazole treatment, the patient reported that he had blurring of vision and developed myopia in both eyes. The blurred vision was completely resolved after discontinuation of aripiprazole.

Discussion

Aripiprazole is a second generation antipsychotic that functions as a partial agonist at dopamine D2, D3, serotonin (5-HT/5-hydroxytryptamine) 5-HT1A receptors and as an antagonist at the 5-HT2A receptors. Many drugs may cause acute transient myopia. Several reports have documented the mechanisms of drug-induced myopia, such as ciliary spasm, accommodation spasm, ciliary body effusion, peripheral uveal effusion and increasing thickness of the lens. [5]

Several mechanisms have been attributed to the development of transient myopia following the use of medications. Ciliochoroidal effusion and ciliary body swelling resulting due to an idiosyncratic reaction from the use of drugs can lead to the anterior rotation of the ciliary processes, narrowing the ciliary sulcus and forward displacement of the lens and iris which result in myopia. Another mechanism is the direct entry of drugs into the crystalline lens which alters the osmotic status, causing the swelling of the lens, thus, resulting in myopia and angle closure.

The rapid resolution of these conditions after discontinuation of the drug suggests an association between the use of aripiprazole and the adverse effect. It is important for healthcare professionals to recognize the signs and symptoms and warn patients about these ocular adverse effects when using aripiprazole. Ophthalmologists should be aware of this potential ocular adverse effect that may occur during drug therapy and should consult with the prescribing psychiatrist about changing the drug treatment.

Things to take note:

1. Counseling: Patients and caregivers should report any signs or symptoms of blurring of vision. If ocular side effects are suspected, refer to an ophthalmologist.
2. Report any adverse drug reactions suspected due to the use of medications to NPRA.

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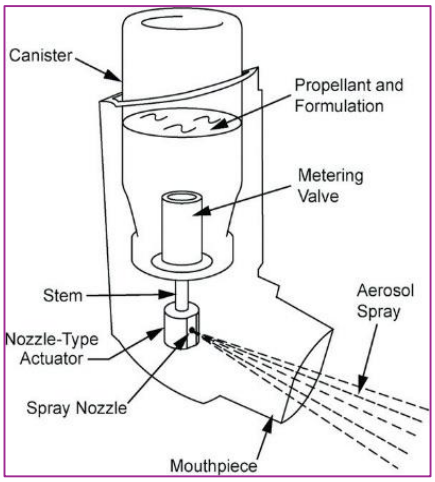
Counselling Points: Metered-Dose Inhaler (MDI)

By: Teng Yee Wai

An inhaler is a handheld medical device that delivers medication directly to the lungs in an aerosolised form. Inhalers are usually used by patients who have chronic lung conditions that affect their breathing, such as asthma, chronic obstructive pulmonary disease (COPD) and other respiratory conditions. There are three different types of inhalers, namely, metered-dose inhalers (MDIs), dry powdered inhalers, and soft mist inhalers. The most commonly used type of inhaler is the MDI which is used to administer bronchodilators that dilate airways and steroids which reduce inflammation in the lungs. [1] The users required the use of controller to help manage their symptoms daily, and reliever is required to help during an asthma attack or COPD exacerbation.

MDI consists of 2 major components which are the canister and an actuator. The canister itself consists of a metering dose valve with an actuating stem. The actuator contains the mating discharge nozzle and generally includes a dust cap to prevent contamination.



Inhalers are the preferred route of administration as it allows for direct and faster delivery of the medication into the airways. Apart from that, the chances of systemic side effects are decreased when using inhalers compared to oral medication. [2]

Although inhalers are the most efficient method of delivering medicine to the lungs, studies showed that incorrect inhaler technique may lead to a reduced amount of the medicine reaching the lungs preventing patients from receiving maximal benefits from medications. Poor medication delivery lead to reduced quality of life, more frequent and longer hospital stay and poor control of the symptoms.

Directions for use: [4]

Step 1

Remove the cap while holding the inhaler in an upright position.

Step 2

Each time before using the inhaler, shake it 3 to 5 times; each shake equals one up and down movement.

For new devices or those not used for a long time, priming should be done by actuating the canister until an even spray is observed.

Step 3

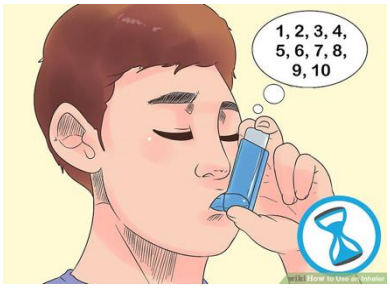
Face away from the inhaler and empty your lungs by exhaling slowly and completely using your mouth.

Step 4

While holding the inhaler upright, tilt your head back slightly, put your lips on the mouthpiece and ensure a tight seal is formed to ensure no medication will escape.

Step 5

Breathe in slowly and deeply while simultaneously pressing down on the canister.



Step 6

Hold your breath for 5 to 10 seconds before removing the device from the mouth.

Step 7

Breathe out away from the inhaler

If additional doses are required, wait 30 seconds to 1 minute before repeating steps 1 to 7.

Step 8

Replace the cap on the mouthpiece.

Step 9

Gargle mouth and throat after using inhaled corticosteroids.

How To Clean It:

a. Remove the canister. Clean the plastic parts of the inhaler by rinsing it under running tap water for about 30 seconds.
b. Do not wash or put the canister in the water.
c. At least once a week or whenever necessary.

Determining The Remaining Contents:

a. Check the dose counter, if applicable.
b. Mark the date of opening on the new MDI and keep track of the doses (MDI without dose counter)

Common errors of inhaler technique [3]

Inhaler technique errors	Explanation
• Inhaler device is not shaken before use	Insufficient shaking of the canister can lead to inhaler malfunctioning and cause inconsistent dosing.
• Inhaler device is not primed before use	Before using an aerosol inhaler for the first time or after being inactive for a prolonged period of time (typically five to seven days), it must be primed to ensure that the inhaler is working.
• Not fully breathing out before using inhaler	Breathing out completely, or as much as is comfortable, helps opens up the airways to receive more air on the subsequent breath. This leads to a deeper inhalation than usual, which maximizes the drug's ability to reach its target site of action.
• Poor device positioning/posture	The inhaler should be used with the patient's chin up or head slightly inclined back. The mouthpiece needs to be properly positioned in the mouth, and the lips need to press tightly over it.
• Poor hand-mouth coordination	The patient must breathe in while pressing the canister simultaneously in order for the medication from the pMDI to reach the lungs.
• Not holding your breath after inhalation	Holding breath will help increase the lung deposition through sedimentation. Because of gravity, more particles will settle on the receptor sites once the air is quiet for a brief period of time.
• Multiple actuations without waiting in between actuations	The dosage provided per actuation may be decreased by extremely rapid actuations.
• Using an empty inhaler	It is common for patients to be unaware when their inhaler is empty, especially when they are using MDI.
• Poor maintenance of spacer device	Spacers should be examined every six to twelve months to ensure that the valve is working, the outside casing is clean, and the structure is intact (i.e., no fractures).

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Updates in Brand Changes: Approved Product Purchase List (APPL) items

By: Voon Poh Nee

Before

Metformin 500mg
Packaging size: 100's/box
Brand: Glumet DC

After

Metformin 500mg
Packaging size: 100's/box
Brand: Oralmet

Paracetamol 500mg
Packaging size: 100's/box
Brand: Idamol

Paracetamol 500mg
Packaging size: 100's/box
Brand: Redamol

Updates in Brand Changes

Approved Product Purchase List (APPL) items

Before

Atenolol 100mg

Packaging size: 100's/box

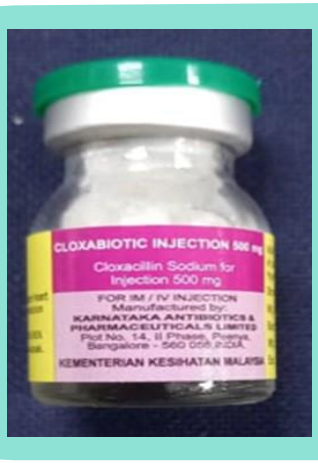
Brand: Ternolol 100

After

Atenolol 100mg

Packaging size: 100's/box

Brand: Atenol



Cloxacillin 500mg

Packaging size: 10vials/box

Brand: Cloxabiotic

Cloxacillin 500mg

Packaging size: 100vials/box

Brand: Monoclox

Updates in Brand Changes

Import Permit (IP) items

NOTICE

The principle company, Eli Lilly has ceased all manufacturing, packaging and distribution activities, therefore leading to the discontinuation of Strattera (Atomoxetine) in Malaysia in 2023.

As a result, Atomoxetine is required of import permit to bring it into Malaysia market

Before

Atomoxetine (all strengths)
Packaging size: 28 capsules/ box
Brand: Strattera

After

Atomoxetine (all strengths)
Packaging size: 100capsules/ box
Brand: Axepta / Atomoxet

Q&A Pharmacy Bulletin 2024 Hospital Permai

	QUESTIONS	TRUE	FALSE
1	It is advisable to have the counterchecking done by another pharmacist if possible. If this is not possible, an alternative strategy is delay self-checking by pharmacist rather than continuous self-checking.		
2	High Alert Medications are medications that bear a heightened risk of causing significant patient harm when these medications are used in error.		
3	Tetrabenazine can be used in hepatic impairment, active suicidality and untreated or inadequately treated depression patient.		
4	Transient myopia, diplopia, acute angle closure, and chorioretinopathy are common ocular side effects of aripiprazole.		
5	Before using an aerosol inhaler for the first time or after being inactive for a prolonged period of time (typically five to seven days), it must be primed to ensure that the inhaler is working.		

**This is a publication of the Pharmacy Department,
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