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HOSPITAL SERI MANJUNG

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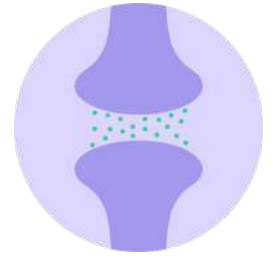
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BY: NUR FARHANA BINTI BAHARUDIN

WHAT IS SEROTONIN SYNDROME?

Serotonin is a hormone typically produced by nerve cells in the brain and spinal cord, and aids in controlling attention, behavior, and body temperature.

Serotonin Syndrome also referred to as **Serotonin Toxicity** is a **potentially life-threatening condition** associated with **increased serotonin activity** in the central nervous system (CNS), usually related to medication use. It classically presents as part/all of a triad of mental state changes, autonomic hyperactivity, and neuromuscular abnormalities.



CAUSES / RISK FACTORS

Excessive accumulation of serotonin in the body creates toxicity symptoms. Serotonin syndrome can arise when only one medicine causes an increase in serotonin levels. However, this condition is **most common when specific medications are combined**, such as taking an antidepressant with a migraine medication or an antidepressant with an opioid pain medication.

Another cause of serotonin syndrome is an **intentional overdose of antidepressant medications**. Illicit drugs and dietary supplements also may be associated with the condition. The drugs and supplements that could potentially cause serotonin syndrome include:

- **Selective serotonin reuptake inhibitors (SSRIs)** antidepressants such as citalopram, and fluoxetine.
- **Serotonin and norepinephrine reuptake inhibitors (SNRIs)** antidepressants such as duloxetine and venlafaxine
- **Pain medications**, such as opioid pain medications including codeine and fentanyl.
- **Herbal supplements**, including St. John's wort and ginseng

DIAGNOSIS

Serotonin syndrome is diagnosed on the basis of clinical findings. Generally, there are two ways to diagnose serotonin syndrome by using **Hunter Toxicity Criteria Decision Rules** (most often used) or when a patient presented with serotonin symptoms.

To fulfill the Hunter Criteria, a **patient must meet one of the following conditions**:

- Spontaneous clonus
- Inducible clonus plus agitation or diaphoresis
- Ocular clonus plus agitation or diaphoresis
- Tremor plus hyperreflexia
- Hypertonia plus temperature above 38°C PLUS ocular clonus or inducible clonus

CLINICAL PRESENTATION

Serotonin syndrome encompasses a spectrum of diseases where the intensity of clinical findings is thought to reflect the degree of serotonergic activity.

Mental status changes can include **anxiety and restlessness**. Patients may startle easily. Autonomic manifestations can include **tachycardia, hypertension, and diarrhea**. Neuromuscular hyperactivity can manifest as **tremors and myoclonus**.

Even though hyperreflexia and clonus are common, they fall in the **lower extremities case**.

In **severe cases**, muscle rigidity may mask myoclonus and hyperreflexia. While uncommon, **fatal cases** of serotonin syndrome are associated with hyperthermia and seizure, the latter of which is often a preterminal event.



PHARMACOLOGICAL TREATMENT

Different treatments will be given depending on the symptoms presented. A **muscle relaxant** may be given to control agitation, seizures, and muscle stiffness. For example, lorazepam and diazepam.

Breathing oxygen through a mask helps maintain oxygen levels in the blood, and **IV fluids** are used to treat dehydration and fever.

BY: NUR FARHANA BINTI BAHARUDIN

PHARMACIST'S ROLE

Pharmacists should become familiar with the underlying principles and types of serotonergic drug(s) and characteristic of serotonin syndromes. This will allow pharmacists to better **identify any offending serotonergic drug**. If any signs and symptoms of serotonin toxicity were detected, pharmacists should discuss with doctors to gradually reduce the dose or withdraw the offending drug(s) to avoid further serotonin toxicity.



Pharmacists also play a vital role in **increasing patient's awareness of serotonin syndrome**, by educating patient on signs and symptoms of serotonin toxicity and the risk of untreated serotonin toxicity. Pharmacists can also ask patients how they are taking their medication and whether they have experienced side effects from their prescription in the past. In this way, patients will become more alert if they begin to experience any side effects.

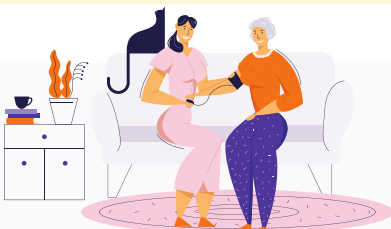
Lastly, if a patient is transitioning between serotonergic agents, pharmacists should **observe a safe washout period to prevent overlap of serotonergic agents**. Washout periods may differ among medications depending on medication half-lives. For example, sertraline has a washout period of 2 weeks, while fluoxetine requires a washout period of 5 to 6 weeks.

COUNSELLING POINTS

It is important for pharmacists to **educate patients** about serotonin syndrome management, especially if they are taking serotogenic medications. This is **to minimize any adverse drug reactions** resulting from serotonin toxicity.

There are several counselling points that pharmacist can provide to patients:

1. Encourage patients to **take their medications as prescribed**. Do not take more than instructed even when health worsens, unless as advised by doctors.
2. Have patient keep an **updated medication list** (especially if patient is under multiple-disciplinary follow-ups) as this will help pharmacists to identify potential drug interactions.
3. Patients and caregivers to seek pharmacist's advice before consuming **herbal or supplement products** such as ginseng and St. John's wort, as this supplement may elevate serotonin levels in the blood.
4. Encourage patients to **report worsening depression or suicidal ideation**, especially during the initiation of therapy (children and adolescents are at higher risk for these effects during the first few months of therapy).



BY: AISYAH BINTI ZAINALABIDIN

Afatinib 30mg Tablet



QUOTA HSM

*Now open to non-pensioners

Prescriber category: A *

Indication:

First-line monotherapy for the treatment of Epidermal Growth Factor Receptor (EGFR) TKI-naïve adult patients with locally advanced or metastatic non-small cell lung cancer (NSCLC) with activating EGFR mutation(s)

Dosage:

40mg once daily to be taken without food. (Maximum dosage: 50mg once daily)

Prescribing restriction:

- i) Adenocarcinoma histology
- ii) Patient's ECOG Performance Status 0-1

Calcium Carbonate 500mg Capsule

QUOTA HSM



Prescriber category: B

Indication:

- i) Hyperphosphatemia (phosphate binder) in chronic kidney disease patients
- ii) Calcium supplementation

Dosage:

- i) Total dose of elemental calcium from calcium-based phosphate binder not to exceed 1,500 mg/day. Dosing is individualized based on serum phosphate level and according to product insert/protocol
- ii) 500 mg to 4g per day as calcium carbonate in 1-3 divided doses (500mg capsule contains 200mg elemental calcium). Dosing is individualized based on serum calcium level and according to product insert/protocol

Restriction:

To be used for hemodialysis or CAPD patients only

Ribociclib 200mg Tablet



Prescriber category: A *

Indication:

In combination with an aromatase inhibitor for the treatment of postmenopausal women, with hormone receptor (HR)-positive, human epidermal growth factor receptor 2 (HER2)-negative advanced or metastatic breast cancer, as initial endocrine-based therapy.

Dosage:

600 mg daily for 21 consecutive days followed by 7 days off treatment. Can be taken with or without food.

Trastuzumab 440mg Injection

Indication:

- (i) HER-2 over-expressed breast cancer
- (ii) HER-2 positive metastatic breast cancer



Prescriber category: A *

Dosage:

Initial loading dose of 8mg/kg body weight induction (2 vials), then 6mg/kg 3-weekly (1 vial/cycle x 3 cycles).

Paliperidone 350mg/1.750ml, 525mg/2.625ml

QUOTA HSM



Prescriber category: A *

Indication:

Maintenance treatment of schizophrenia in adult patients who have been adequately treated with the 1-month paliperidone palmitate injectable product for at least four months.

Dosage:

Apply 3.5 as a dose multiplier to the previous 1-month injection dose, and administer every 3 months.

BY: AISYAH BINTI ZAINALABIDIN

Factor IX, II, VII & X in combination injection (Octaplex 500 IU)

Indication: Treatment and perioperative prophylaxis of bleeding in:

(i) Acquired deficiency of the prothrombin complex coagulation factors, such as deficiency caused by treatment with vitamin K antagonists, or in case of an overdose of vitamin K antagonists, when rapid correction of the deficiency is required.

ii) Congenital deficiency of any of the vitamin K-dependent coagulation factors only if purified specific coagulation factor product is not available.

Dosage:

The amount and frequency of administration will be given based on an individual patient basis. The approximate doses required for normalization of INR (≤ 1.2 within 1 hour); dosage is expressed in units of factor IX activity.



Prescriber category: A*

QUOTA HSM

** For Transfusion Medicine Unit & Emergency Dept. only

Initial INR	2 - 2.5	2.5 - 3	3 - 3.5	> 3.5
Appropriate dose (IU Octaplex/kg body weight)	22.5-32.5	32.5-40.0	40.0-47.5	>47.5
Approximate dose (mL Octaplex/kg body weight)	0.9 - 1.3	1.3 - 1.6	1.6 - 1.9	> 1.9

Budesonide & Formoterol Inhalation (Symbicort) Turbuhaler 160 mcg/4.5mcg/Dose (30 doses)



Indication:

As a reliever treatment for mild asthma patients who do not adhere to regular inhaled corticosteroid

Dosage:

160 mcg as needed, but no more than 960 mcg to be taken on any single occasion.

Restriction:

Not recommended for children below 12 years old

Prescriber category: A/KK

IV Levothyroxine 200mcg/ml (1ml ampoules)

Indication:

Myxedema crisis, severe hypothyroidism. Not tolerating & poor response to tablet levothyroxine.

Dosage:

200mcg STAT and 100mcg OD for 5 days



KPK ITEM

Benralizumab (Fasenra) 30mg/ml solution for injection



**QUOTA HSM
KPK ITEM**

Indication:

Severe eosinophilic asthma. As add-on maintenance therapy in patients with inadequately controlled condition despite high-dose inhaled corticosteroids plus long-acting β -agonists

Dosage: 1 s/c Injection 30mg every 4 weeks x 3 doses, then 1 s/c injection every 8 weeks

REFERENCES:

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- Formulari Ubat Kementerian Kesihatan Malaysia (FUKKM). (2022). Laman Portal Rasmi Program Perkhidmatan Farmasi, Kementerian Kesihatan Malaysia. <https://www.pharmacy.gov.my/v2/ms/dokumen/formulari-ubat-kementerian-kesihatan-malaysia.html>

Cernevit, lyophilisate for Reconstitution



** For patients on Total Parenteral Nutrition (TPN) only

Prescriber category: B

Indication: Additional vitamins when oral administration is either contraindicated, impossible, or insufficient, due to malnutrition, gastrointestinal malabsorption, etc.

Dosage: One vial per case

Restriction: To be used for children over 11 years ages and adults only

BY: NUR IZZAH BINTI MOHD KHAIRUDDIN

NPRA

The National Pharmaceutical Regulatory Agency (NPRA) was set up in October 1978 under the quality control activity of Pharmacy and Supply Programme, Ministry of Health (MOH) Malaysia. This institution was established to implement quality control on pharmaceutical products.

SAFETY ALERT

Safety alert is relating to the "collection, detection, assessment, monitoring, and prevention" of adverse effects with pharmaceutical products as well as advise healthcare professionals to be aware of the potential adverse drug reactions since 2014. This is to ensure that therapeutic substances approved for the local market are safe, effective and of quality and also to ensure that cosmetic products approved are safe and of quality.

This section presents the summary of NPRA safety alerts published by MOH Malaysia, from **April 2023** to **May 2023**.

Medication	Risk associated	Adverse drug reaction reported	Advice for healthcare professional
Diclofenac	<p>Acute necrotising encephalopathy of childhood (ANEC)</p> <p>Mechanism: Excessive production of proinflammatory cytokines causes vascular endothelial injury and cell death, resulting in edematous lesions in the brain and systemic organ damage. In severe cases, this condition can rapidly progress to disseminated intravascular coagulation (DIC) or multiple organ failure (MOF).</p>	Two (2) reports of suspected ANEC potentially related to the off-label use of diclofenac suppository for treating fever in children	<ol style="list-style-type: none"> 1. Be aware of the safety concern associated with the use of diclofenac suppositories in children, which could potentially aggravate or trigger ANEC. 2. Do not prescribe diclofenac, including in the form of suppositories, for the treatment of fever in children. Instead, recommend appropriate doses of paracetamol along with tepid sponging and adequate fluid intake for hydration. 3. It is important to carefully recognize ANEC, especially in children with suspected influenza. Consider early initiation of appropriate management for ANEC, given the potential for severe neurological sequelae and high mortality rates.
Azacitidine	<p>Risk of Differentiation Syndrome</p> <p>Mechanism: A severe systemic inflammatory response resulting from the secretion of chemokines and cytokines during massive cell differentiation.</p>	No local reports of differentiation syndrome or any symptoms related to differentiation syndrome received.	<ol style="list-style-type: none"> 1. Advise patients to be cautious while receiving azacitidine therapy and to inform healthcare professionals if they experience any signs and symptoms of differentiation syndrome. 2. When the first sign or symptom suggestive of differentiation syndrome appears, consider: <ul style="list-style-type: none"> • initiating treatment with high-dose intravenous corticosteroids and • haemodynamic monitoring • temporarily discontinuing azacitidine treatment until the resolution of symptoms. Caution is advised if treatment is resumed.

BY: NUR IZZAH BINTI MOHD KHAIRUDDIN

Medication	Risk associated	Adverse drug reaction reported	Advice for healthcare professional
Comirnaty Vaccine	<p>Risk of Heavy Menstrual Bleeding</p> <p>Mechanism: The vaccine-induced activation of endometrial innate immune cells that regulate cyclic breakdown, regeneration and repair of the endometrium could lead to heavier and irregular menstrual bleeding. Other plausible hypotheses include vaccine-induced immunological changes, such as thyroid abnormalities that affects levels of hormones regulating menstruation. Additionally, vaccine-associated stress might temporarily affect the hypothalamic-pituitary-ovarian axis.</p>	<p>16 reports involved heavy menstrual bleeding following the administration of the Comirnaty vaccine. No reports of adverse events related to the use of the Comirnaty bivalent vaccine have been received by the NPRA.</p>	<p>1. Reassure vaccine recipients that current clinical evidence indicates that post-vaccination menstrual changes are mostly non-serious, transient, and of no long-term clinical consequences on female reproduction, fertility, or pregnancy.</p> <p>1. Advise vaccine recipients to seek medical attention if they experience any unusual menstrual changes, including postmenopausal bleeding, that worsen, persist over several cycles, or impact their daily activities.</p>
Griseofulvin	<p>Risk of Severe Cutaneous Adverse Reactions (SCARs)</p> <p>Mechanism: All types of SCARs belong to delayed type IV hypersensitivity reactions triggered by a T-cell-mediated drug-specific immune response, while their clinical heterogeneity could be attributed to the activation of different effector or regulatory cells that produce specific cytokines.</p>	<p>Stevens-Johnson syndrome (12 reports), toxic epidermal necrolysis (2 reports), and acute generalised exanthematous pustulosis (3 reports)</p>	<p>1. Educate patients to seek urgent medical attention if they encounter severe skin reactions, including bumps under the skin, blisters, redness and peeling with or without fever, and swollen glands.</p> <p>2. If a SCAR is suspected, discontinue griseofulvin and immediately refer patients to a dermatologist for diagnosis and treatment.</p>

REFERENCES:

1. National Pharmaceutical Regulatory Agency (NPRA). Safety alerts, 2022 [Internet]

BY: PUTERI HUZAINA BT HUSHAIRI
& LIM TSE MUN

ACTUAL MEDICATION ERRORS in HOSPITAL SERI MANJUNG 2023

Medication error is any **preventable event** that leads to inappropriate use of medication and patient harm while the medication is under the healthcare providers' control.

Actual error refers to where the medication error has occurred and reached the patient or the error is detected by the patient. In Hospital Seri Manjung, there are **ten actual errors** reported from January to May 2023 with prescribing errors (6) constituting the most followed by administration errors (3) and dispensing error (1).

Table below shows the summary of incidents of actual errors happened and hopefully all healthcare providers can learn from it and thus improving the awareness regarding medication safety.

PRESCRIBING ERROR

T. Risperidone was wrongly prescribed and dispensed to the patient. The intended dose was 2mg BD but endorsed as 2mg OM, 4mg ON.

The intended treatment plan was to stop Epilim and start patient on T. Quetiapine. However, the doctor did not stop T. Epilim rx resulting in Epilim being dispensed to the patient. T. Quetiapine was ordered an hour later without any notification. Error detected during patient's next monthly visit resulting in one-month delayed treatment of intended drug Quetiapine.

Inj. Magnesium sulphate was prescribed and administered for the wrong patient.

Different set of medications were wrongly prescribed and dispensed to patient, but patient was aware and did not consume the wrong medications.

Prescriber was unable to clarify intended medication and dose, resulting in delay of dispensing the correct medication to discharged patient for more than 48 hours.

Wrong NAC regimen was prescribed and administered to patient, resulting in overdose of NAC.

ADMINISTRATION ERROR

SN did not administer T. Mirtazapine 15mg ON for 3 day even though medication was endorsed in medication chart and PhIS, resulting in relapsed of psychotic symptoms.

Wrong body weight was documented upon admission (37kg instead of 16kg for a 6 year old patient), resulting in overdose of Syrup Paracetamol and Syrup Oseltamivir administered to patient.

SN wrongly administered Syrup Phenobarbitone as BD dosing for a day, intended dose in medication chart was OD dosing only.

DISPENSING ERROR

Inj. Basalog was not filled and dispensed to patient, resulting in wrong insulin administered to patient.



BY: AISYAH BINTI ZAINALABIDIN

Hospital Seri Manjung Ke Arah Pensijilan Akreditasi Edisi ke-6



Sambutan Hari Raya Aidilfitri 2023 di Farmasi Pesakit Luar & Farmasi Satelit



BY: AISYAH BINTI ZAINALABIDIN



Majlis Apresiasi Akreditasi Kakitangan & Sambutan Hari Lebaran 2023 Hospital Seri Manjung



BY: NUR FARHANA BINTI BAHARUDIN



APRIL 2023 - JULY 2023



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