Psychopharmacology

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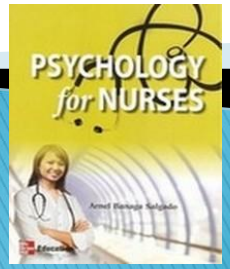

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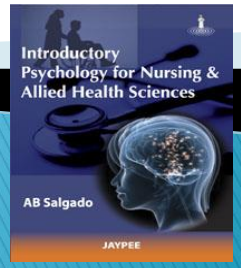

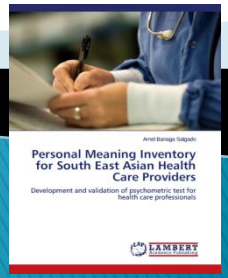

Learning Objectives

- Discuss different steps of pharmacokinetics
- Describe the relevant issues in pharmacodynamics
- Describe the mechanism of action and interactions of various psychotropic drugs

Learning Objectives (cont.)

- Discuss the indications and contraindications of various psychotropic drugs
- Describe the side effects of different psychotropic drugs and their management

Definition

- Psychopharmacology:

  The study of drugs used in the treatment of psychiatric disorders

Mechanism of Action

- Psychotropic drugs attach to various receptors in the brain and alter the synaptic transmission.
- These drugs not only act in problematic areas but also in other healthy areas of the brain that control other bodily functions.
- Thus, although psychotropic drugs improve the symptoms of the mental illness, they may cause new dysfunctions called side effects.

Principles of Psychopharmacology

- Pharmacological actions are divided into two broad categories:

  i. Pharmacokinetics

     It is concerned with the absorption, distribution, metabolism and excretion of a drug from the body.

Principles of Psychopharmacology (cont.)

ii. Pharmacodynamics

It measures the effects of a drug on the cells in the brain and other tissues of the body.

The major considerations are molecular site of action, dose–response curve, therapeutic index and development of tolerance, dependence and withdrawal phenomena.

Major Groups of Psychotropic Drugs

i. Antipsychotics
ii. Antidepressants
iii. Mood stabilizers
iv. Anti-anxiety drugs

Nursing Assessment

Nursing assessment for a particular drug should include:

- Indications
- Mechanism of action
- Absolute contraindications
- Relative contraindications
- Caution for usage
- Interactions

Antipsychotic Drugs

- Antipsychotic drugs are also known as major tranquillizers.
- Antipsychotic drugs are subdivided into:
  - typical antipsychotic (neuroleptics)
  - atypical antipsychotic

Indications for Antipsychotics

- Schizophrenia and other psychotic disorders (such as schizoaffective disorders, schizophreniform disorders and delusional disorders)
- Acute manic episode
- Psychotic symptoms in organic brain disorders (dementia, delirium) and depressive disorders

Indications for Antipsychotics (cont.)

- Other indications include tic disorders, intractable
- hiccoughs and vomiting

These agents are also used to control over-excitation and violence associated with various psychiatric conditions.

Indications for Antipsychotics (cont.)

- Contraindications for the use of antipsychotics
  - Hypersensitivity to a drug and CNS depression are the only absolute contraindications.
- Relative contraindications include:
  - Pregnancy and lactation
  - Parkinson's disease
  - Blood dyscrasias

Indications for Antipsychotics (cont.)

- Antipsychotics should be used with caution in clients with following conditions:
  - Epilepsy
  - Prostatic hypertrophy
  - Intestinal obstruction
  - Obesity
  - Diabetes mellitus
  - Old age

Antipsychotics: Mechanism of Action

- These drugs exert their effects by blocking postsynaptic dopamine (D_2) receptors in the basal ganglia, limbic system and frontal cortex.
- Atypical antipsychotic drugs affect serotonin and other neurotransmitters as well.

Antipsychotics: Mechanism of Action (cont.)

- The blockade of dopamine receptors causes motor side effects such as acute dystonias, akathisia, Parkinsonism and tardive dyskinesia.

Interactions

- These drugs can cause additive CNS depression when taken with alcohol, antidepressants, anti-anxiety drugs, sedatives and hypnotics, and anti-histamines.
- Barbiturates may increase their metabolism and a higher dose may be required to keep the symptoms under control.

Interactions (cont.)

- Antacids and anti-diarrhoeal medications may decrease the absorption of antipsychotics.
- Concurrent use of beta-adrenergic blocking agents such as propranolol may potentiate the hypotensive effects of the antipsychotic drugs.

Nursing Diagnosis

- The following nursing diagnoses are applicable to the clients taking antipsychotic drugs:
  - Risk for injury related to sedative side effects, reduction of seizure threshold, photosensitivity, extrapyramidal symptoms, tardive dyskinesia, blood dyscrasias and neuroleptic malignant syndrome

Nursing Diagnosis (cont.)

- Risk for activity intolerance due to sedative effects, blurred vision, lethargy and hypotension
- Non-compliance with medication related to intolerable side effects, suspiciousness and mistrust of others

Side Effects of Antipsychotic Drugs

- Sedative effects
- Orthostatic hypotension
- Anticholinergic effects
- Hormonal effects
- Extrapyramidal symptoms (EPS)
- Acute dystonias
- Hypersalivation (with clozapine)

Side Effects of Antipsychotic Drugs (cont.)

- Agranulocytosis
- Seizures
- ECG changes
- Tardive dyskinesia
- Neuroleptic malignant syndrome (NMS)

Nursing Interventions

- Simple measures to control the side effects
- Early recognition and reporting to the doctor
- Psychoeducation
- Reassurance

Antidepressants

- Antidepressants are drugs used to treat various depressive and anxiety disorders.
- These drugs can be divided into the following groups:
  - Tricyclic antidepressants (TCAs)
  - Tetracyclic antidepressants
  - Monoamine oxidase inhibitors (MAOIs)

Antidepressants (cont.)

- Selective serotonin reuptake inhibitors (SSRIs)
- Selective norepinephrine reuptake inhibitors (SNRIs)
- Serotonin antagonist and reuptake inhibitors (SARIs)

Indications for Antidepressants

- Major depressive disorder
- Depressive phase of bipolar mood disorder
- Depressive symptoms in various psychotic disorders
- Schizo depressive disorder

Indications for Antidepressants (cont.)

- Generalized anxiety disorder
- Panic disorder
- Obsessive–compulsive disorder
- Post-traumatic stress disorder

Contraindications

- Hypersensitivity to the drug
- Pregnancy
- Prostatic hypertrophy
- Narrow angle glaucoma
- Recent myocardial infarction

TCAs and tetracyclics should not be used in these conditions but SSRIs are quite safe to use.

Interactions

Tricyclic Antidepressants

- Concurrent use with MAOIs may cause hyperpyretic crisis and hypertensive crisis.
- Therapeutic response of some anti-hypertensives (such as clonidine, guanethidine) may be attenuated when used with TCAs.
- TCAs have strong anticholinergic properties, so use of other drugs with the same properties may potentiate this effect.

MAO Inhibitors

- MAOIs interact with foods containing tyramine and with drugs such as methyldopa, amphetamines, dopamine, epinephrine, norepinephrine, vasoconstrictors, TCAs and SSRIs and can cause hypertensive crisis.
- MAOIs may enhance the effects of antihypertensive, insulin and oral hypoglycemic agents when taken together.

MAO Inhibitors (cont.)

- Use of MAOIs with narcotic analgesics may cause hypertension or hypotension, convulsions, coma and death.

Foods and Drugs to be Avoided with MAOIs

Foods to be avoided	Foods that may cause problems when consumed in large amounts	Drugs which are to be avoided
• Aged cheeses (cream and cottage cheese are allowed) • Italian green beans • Brewer's yeast • Beer, red wine • Smoked fish • Liver (beef or chicken)	• Alcohol • Yogurt • Ripe bananas • Soy sauce • Ripe avocado	• Mepridine • Epinephrine • Decongestants • Local anaesthetic (containing sympathomimetic agents) • Over the counter antihistaminics

Selective Serotonin Reuptake Inhibitors (SSRIs)

- Concurrent use of SSRI and MAOIs leads to hypertensive crisis. So SSRIs should not be used for at least 2 weeks after stopping MAOIs.
- Cimetidine increases the concentrations of SSRIs.

Selective Serotonin Reuptake Inhibitors (SSRIs) (cont.)

- SSRIs increase the levels of diazepam and warfarin leading to prolonged sedation and a tendency to bleed easily.
- Concurrent use of other drugs that increase the levels of serotonin such as other SSRIs, SARIs, lithium, psycho-stimulants and dopamine agonists (e.g., bromocriptine) may cause serotonin syndrome.

Nursing Diagnosis

- Risk to self (suicide) and other relevant diagnosis related to depressed mood
- Risk for injury related to the sedative side effects, blurred vision, orthostatic hypotension, lowered seizure threshold, arrhythmias and hypertensive crisis

Nursing Diagnosis (cont.)

- Risk for activity intolerance related to sedation, blurred vision and lethargy
- Non-compliance with treatment due to intolerable side effects

Nursing Planning and Implementation

- Side effects of TCAs

As in antipsychotics, antidepressants too cause many side effects. TCAs especially causes a lot of anti-cholinergic side effects. Nursing interventions are similar to the ones taken for clients taking antipsychotics.

Mood Stabilizers

- Mood stabilizers are the drugs used to prevent
  - relapse and recurrence of depressive and manic episodes in bipolar mood disorder.
  - depressive episodes in major depressive disorder. They are also used in the treatment of impulse control disorder.

Mood Stabilizers (cont.)

- Lithium carbonate was the first mood stabilizer to be used.
- Most of the newer mood stabilizers are anticonvulsants.

Mechanism of Action

- The exact mechanism of action of these drugs is not known.
- Lithium alters sodium transport in nerve and muscle cells and decreases the release of dopamine and norepinephrine resulting in decreased activity.
- Anticonvulsants probably work by affecting kindling. (Kindling is a process in which the brain becomes increasingly sensitive to stress and hence shows abnormal discharges continuously.)

Contraindications

- Hypersensitivity to drug
- Pregnancy
- In the case of lithium, the drug is contraindicated in clients with renal and cardiac disease, dehydration and hypothyroidism
- Mood stabilizers should be used with caution in:
  - The elderly
  - Clients with hepatic/renal/cardiac diseases
  - Lactating women
  - Pregnancy

Interactions

Lithium Carbonate

- Lithium carbonate may prolong neuromuscular blockage caused by succinyl choline (used in ECT).
- The combination of lithium and haloperidol can cause encephalopathy.

Interactions (cont.)

- Diuretics, methyldopa and nonsteroidal anti-inflammatory drugs may decrease the clearance of lithium and thus increase the risk of lithium toxicity.
- This Aminophyline, sodium chloride and phenothiazines may increase the clearance of lithium and decrease its blood levels.

Carbamazepine

- Carbamazepine should not be given concurrently with MAOIs as it may lead to hypertensive crisis.
- Phenytion and phenobarbitone can decrease the levels of carbamazepine.
- Carbamazepine can lower the levels of valproic acid, haloperidol, oral contraceptives and oral anticoagulants.
- Concurrent use of lithium and carbamazepine increases the risk of neurotoxicity.

Carbamazepine (cont.)

Valproic acid

- Valproic acid increases the blood levels of phenobarbitone, aspirin, warfarin, MAOIs, and decreases the levels of phenytion and clonazepam

Lamotrigine

- Risk of serious skin rashes increases when used with sodium valproate. Phenytion, carbamazepine, phenobarbitone and acetaminophen decrease the levels of lamotrigine.

Nursing Diagnosis

- The following nursing diagnoses may be considered for the clients receiving mood stabilizers:
  - Risk for violence directed towards self (due to depressed mood)
  - Risk for violence directed towards others related to irritability and anger

Nursing Diagnosis (cont.)

- Risk for injury related to mania, over-activity and overconfidence
- Risk for injury related to drug toxicity
- Risk for activity intolerance related to side effects of drowsiness and dizziness

Lithium Toxicity

- The therapeutic window for lithium is quite narrow. The therapeutic serum concentrations are:
  - for acute mania: 0.8 to 1.5 meq/l.
  - for maintenance: 0.6 to 0.8 meq/l.

Lithium Toxicity (cont.)

- Symptoms of lithium toxicity appear at blood levels greater than 1.5 meq/l and they include vomiting, diarrhoea, diuresis, mental confusion, seizures, cardiac arrhythmias and death.
- The nurse should report to the doctor if the patient develops sore throat, fever, bruises easily, has unusual bleeding and yellow skin or eyes.

Anti-anxiety Drugs

- Anti-anxiety drugs are also known as minor tranquillizers.
- They have a wide range of use and carry high abuse and dependence potential.
- Benzodiazepines have a quicker onset of action while buspirone may take 2 to 3 weeks to show its anti-anxiety effects.

Indications

- Various anxiety disorders
- Acute alcohol withdrawal
- As an adjunct to antidepressants and antipsychotic drugs, especially in the initial period of treatment till former drugs become effective.
- Violent and aggressive behaviour
- Insomnia
- Status epilepticus

Mechanism of action

- Benzodiazepines potentiate the effects of inhibitory neurotransmitter gamma-amino butyric acid (GABA) in the brain, especially in the limbic system and reticular formation and thus produce a calming effect. Buspirone, however, does not depress the CNS.

Contraindications

- Hypersensitivity to drug
- Pregnancy and lactation
- Coma
- Narrow angle glaucoma

These drugs should be used with caution in the following:

- Old age
- Hepatic and renal impairment
- Persons with history of drug abuse

Interactions

- CNS depressive effects of benzodiazepines can be heightened when taken concomitantly with barbiturates, alcohol, antipsychotics, antidepressants, cimetidine and disulfram.
- Smoking (nicotine) and caffeine can lower the level of benzodiazepines.

Nursing Diagnosis

- Possible nursing diagnoses for clients taking anti-anxiety drugs are as follows:
  - Risk for injury to self, related to marked anxiety and agitation
  - Risk for injury related to anxiety, seizure, overdose, confusion and abrupt withdrawal after long-term use
  - Risk for activity intolerance related to side effects of sedation, giddiness and lethargy

Nursing Planning and Implementation

- Drowsiness, lethargy and confusion
  - Advise the client not to drive or operate dangerous machinery when taking these drugs.
- Rebound anxiety: Usually with short acting benzodiazepines
  - This can be avoided by using longer acting drugs.

Nursing Planning and Implementation (cont.)

- Tolerance and dependence: (This does not apply to buspirone)
  - Instruct the client not to increase the dose of drug without consultation with the doctor and also not to stop the drugs abruptly.
- Withdrawal symptoms include: marked anxiety, insomnia, muscular cramps, tremors, vomiting, seizures and delirium.

Nursing Planning and Implementation (cont.)

- Paradoxical excitement
  - Stop the drug and inform the doctor.
- Dry mouth
  - Advise the client to chew sugarless gum, suck on ice or take frequent sips of water .
- Nausea and vomiting
  - Advise the client not to take the drug on empty stomach.

Nursing Planning and Implementation (cont.)

- Orthostatic hypotension
  - Monitor the blood pressure (lying and standing) at least twice a day.
  - Ask the client to arise slowly while changing positions and postures.
- The client should be advised not to take these drugs with alcohol and other CNS depressants and during pregnancy.