AJK Medical College, Muzaffarabad

Neuroscience & Behavior Module
(NEU-0210)
Class of 2017 (3rd Year)

Pre-requisite: Cell Injury, IHI, LM, Genetics & Neoplasia, GIT-I, Reproduction & endocirne, RES & CVS Modules

Duration: 3-weeks

Starting on:

DEPARTMENT OF MEDICAL EDUCATION

CONTENTS

Module Team

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NEURO MODULE THEMES

1. **Hallucinations and Delusions**
2. **Prolonged Apnea**
3. **Tremors**
4. **Fever with Altered Consciousness**

Table Specifications (TOS)

Sr. No.	THEME	Weightage %
1	**Hallucinations and Delusions**	45
2	**Prolonged Apnea**	30
3	**Tremors**	10
4	**Fever with Altered Consciousness**	15

Rationale:

The Central and peripheral nervous systems constitute an important mean to control all voluntary and involuntary body activities. In addition it also differentiates Human beings from other living worlds in terms of higher mental facilities.
This important module comprises of 4 themes and 1 PBL. The Themes and PBL are so designed that major chunks of the subject are covered in each theme. The behavioral aspects of the nervous system are covered in a separate theme and carries significant weight. In other themes we have tried to cover important clinical aspect, of CNS disorders, Pathology, Therapeutics and Medico Legal issues. Due mention of important drugs of abuse and CNS, toxin and poisons will also be touched in relevant themes.

Organization of Module:

The module consists of 4 Themes and 1 PBL each based on a real life situation. Each theme has clear learning object. Major emphasis will be on real Patient Examination, Discussion, Laboratory and Imaging investigation and Interpretation, Case analysis, diagnosis and management plan will be made by student under the guidance of faculty supervisors.
The Theme one real life scenarios, and will give a fair idea to the student that how patients present in day to day clinical practices. Your daily activities would be divided into different states. Please refer to time table for more details regarding organization of learning objectives.

Teaching Strategies:

The content of this module will be delivered by a combination of different teaching strategies. These include small group discussions (SGD), large group interactive sessions (LGIS), history taking, patient examination, laboratory investigations and tests interpretation, Clinico-pathological conferences (CPCs), discussions and journal club. Entire curriculum will be delivered by clinical case scenarios each covering a theme. Read the cases and the objectives of the theme which you are supposed to encounter next day, understand and explain the case to yourself and study the relevant information. The students will present clinical cases based on scenarios themselves and display the relevant radiological and pathological features. Following learning/teaching strategies will be used in Neuro Module:

Small Group Discussion (SGD):

Main bulk of the course content will be delivered in small group sessions. Each theme has an associated case. The case will be centered around which learning will take place. Every group will have a facilitator assigned to it. The facilitator will be there to keep you on track, giving you maximum liberty to discuss and achieve the objectives as a group. Small groups will be followed by a wrap up session to standardize learning. Rest of the information will be in the schedule/ time table.

Large Group Interactive Sessions (LGIS):

LGIS will be employed at times to augment small groups. By and large they will be used to pass on general concepts regarding the theme. Large group instruction will be employed at times sparingly. Attend large group sessions with the following focus:

- Identify important points.
- Ask questions on concepts not well understood in the text books.
- Measure your learning comprehension

Clinico-pathological Conferences (CPCs):

The students will be required to present cases related to the themes in groups. They will collect the information about the different facets of patient's disease and present to the whole class with the help of appropriate histopathological, radiological and clinical slides. It will be followed by question, answer and discussion.

Practical Skills:

Selection of tests, collection of the specimen, examination and interpretation of specimens/test reports, microscopic slides, culture plates/media examination and radiological images.

Self-Directed Learning (SDL):

A task will be given in SDL regarding the theme to be discussed before PBL. This will help to prepare you a bit before the theme is under discussion. A few SDLs have been added in between to create an environment for you to search literature as well as to deduce and synthesize information from different sources to meet the learning objectives.

Assessment:

In this module, you will have formative and summative assessment. This will give you an idea about the format of the examination that you will go through at the end of the year. This will be followed by feedback on your performance in the exam. Marks obtained in the module examination will contribute 30% (internal assessment) towards end of year Professional University Examination. **There is no re-sit exam for module written assessment and block IPE** under any circumstances. If you miss them, your internal assessment will be recorded as zero. No excuse of any kind is permissible for absence in module or IPE assessment.

Theme 1: (Hallucinations and Delusions)

Learning Objectives

At the end of the module the students will be able to:

1. History taking and mental state examination
2. Differentiate schizophrenia, Depression, anxiety and Bipolar Affective disorder, Psychosis and Neurosis.
3. Differentiate Delusion, Delusion of Persecution, Hallucination, Abstract thinking and insight, Tranquility.
4. Define psychopharmacology.
5. Classify groups of medicine used in psychosis, anxiety and mood disorders, major and minor tranquilizers.
6. Discuss Neurotransmitters and Receptor types involved in function of Sedatives, Hypnotics, Anxiolytics.
7. Discuss Neurotransmitters and Receptor types involved in function of Antidepressants.
8. Discuss Neurotransmitters and Receptor types involved in function of Antipsychotics.
9. Discuss Neurotransmitters and Receptor types involved in function of Mood stabilizers.
10. Classify sedative-hypnotics, Anxiolytics.
11. Discuss the pharmacokinetics, mechanism of action and actions of benzodiazepine.
12. Explain clinical uses, adverse effects, contraindications/precautions and drug interactions of benzodiazepine.
13. Discuss are the pharmacokinetics, mechanism of action and actions of barbiturates.
14. Discuss the clinical uses, adverse effects, contraindications/precautions and drug interactions of barbiturates.
15. Compare the pharmacology of other drugs used as sedative-hypnotics, anxiolytics.
16. Explain tolerance/dependence of sedative-hypnotics, anxiolytics.
17. Explain neurotrophic hypothesis & its integration with Depression.
18. Classify anti-depressant agents.
19. Explain pharmacokinetics, mechanism of action and actions of selective serotonin reuptake inhibitors (SSRIs).
20. Explain SSRIs in terms of their clinical indications, contra-indications / precautions, adverse effects and drug interactions.
21. Discuss are pharmacokinetics, mechanism of action and actions of Monoamine oxidase inhibitors (MAOIs).
22. Explain MAOIs with respect to their their clinical indications, contra-indications/precautions, adverse effects and drug interactions.
23. Explain pharmacokinetics, mechanism of action and actions of serotonin norepinephrine reuptake inhibitors (SNRIs).
24. Explain SNRIs in terms of their clinical indications, contra-indications/precautions, adverse effects and drug interactions.
25. Discuss are pharmacokinetics, mechanism of action and actions of tricyclic antidepressants (TCAs).
26. Explain TCAs with respect to their their clinical indications, contra-indications/precautions, adverse effects and drug interactions.
27. Explain pharmacokinetics, mechanism of action and actions of tetracyclics and unicyclic.
28. Explain tetracyclics and unicyclic in terms of their clinical indications, contra-indications/precautions, adverse effects and drug interactions.
29. Discuss pharmacokinetics, mechanism of action and actions of 5-HT2 antagonists.
30. Explain 5-HT2 antagonists with respect to their their clinical indications, contra-indications/precautions, adverse effects and drug interactions.
31. Explain serotonin, dopamine and glutamate hypothesis of schizophrenia.
32. Classify anti-psychotics.
33. Discuss the pharmacokinetics, mechanism of action and actions of typical anti-psychotics.
34. Explain typical anti-psychotics in terms of their clinical indications, contra-indications/precautions, adverse effects and drug interactions.
35. Discuss pharmacokinetics, mechanism of action and actions of atypical anti-psychotics.
36. Explain atypical anti-psychotics with respect to their their clinical indications, contra-indications/precautions, adverse effects and drug interactions.
37. Define neuroleptic malignant syndrome with its etiology, signs & symptoms (both early & late) and its drug management.
38. Compare and contrast benefits and limitations of anti-psychotic treatment.
39. Enlist drugs used for bipolar disorder.
40. Classify Mood stabilizers.
41. Discuss pharmacokinetics, mechanism of action and actions of lithium.

42. Explain lithium with respect to its clinical indications, contra-indications/precautions, adverse effects and drug interactions.
43. Define Psychoactive substance use.
44. Classify Psychoactive substance use.
45. Discuss the groups of psychoactive substances.
46. Compare Pharmacology of CNS Stimulants.
47. Define Withdrawal, Dependence, Abstinence
48. Discuss Reward pathway.
49. Discuss the basic neurobiology of drugs of abuse.
50. Classify drugs of abuse on the basis of mechanism of action.
51. Enumerate G_io coupled receptors activators.
52. Explain pharmacology of G_io coupled receptors activators.
53. Enumerate drugs that mediate their effects through inotropic receptors .
54. Explain pharmacology of inotropic receptor agonists.
55. Enumerate various classes of alcohols.
56. Explain pharmacokinetics, mechanism of action & actions of ethanol.
57. Discuss are the adverse effects, contraindications/precautions & drug interactions of ethanol.
58. Discuss the management of acute alcohol intoxication.
59. Explain management of alcohol withdrawal syndrome.
60. Enumerate drugs used in the treatment of chronic alcoholism.
61. Explain clinical pharmacology of drugs used in the treatment of chronic alcoholism.
62. Explain pharmacology of alcohols other than ethanol (methanol & Ethylene Glycol).
63. Enumerate drugs that bind to transporters of biogenic amines. (cocaine, amphetamines, MDMA).
64. Explain pharmacology of drugs that bind to transporters of biogenic amines.
65. Explain clinical pharmacology of dependence & addiction.
66. Enumerate drugs used to treat dependence & addiction.
67. Explain pharmacokinetics, mechanism of action & actions of these drugs.
68. Discuss the clinical uses, adverse effects, precautions/contraindications & drugs interactions of these drugs.
69. Classify opioid analgesics.
70. Explain pharmacokinetics, mechanism of action and actions of strong opioid agonists.
71. Discuss the clinical uses, adverse effects, precautions/ contraindications and drug interactions of strong opioid agonists.
72. Explain pharmacokinetics, mechanism of action and actions of mild to moderate opioid agonists.
73. Discuss the clinical uses, adverse effects, precautions/ contraindications and drug interactions of mild to moderate opioid agonists.
74. Explain pharmacokinetics, mechanism of action and actions of partial opioid agonists / agonist-antagonists.
75. Discuss the clinical uses, adverse effects, precautions/ contraindications and drug interactions of partial opioid agonists / agonist-antagonists.
76. Explain the tolerance, dependence and addiction associated with the use of opioid analgesics.
77. Enumerate various types of opioid antagonists.
78. Explain pharmacokinetics, mechanism of action and actions of opioid antagonists.
79. Discuss the clinical uses, adverse effects, precautions / contraindications and drug interactions of opioid antagonists.
80. The active principles of daturah and nuxvomica.
81. Mode of action and treatment of datrah poison.
82. Mode of action and treatment of strychnine poisoning.
83. Various statives, tranqlizers and Hypuotics.
84. Postmortem findings in above poisons.
85. Medico-legalimportance of above poisons.
86. How to preserve the samples in above poisons.
87. Types of Alcohol.
88. Mode of Action & detoxification of Alcohol.
89. Saturday night paralysis.
90. Macevan signs (Alcoholic coma).
91. Drunkness (Alcohol intoxication).
92. Defferent types of pioids & their mode of action

93. Postmortem finding in case of opiod poisoning
94. Insecticndes; pesticides (organhosploses poisoning) & their treatment, fatal dose etc.
95. Define and describe the pathogenesis of each of the following
    a) Cerebral edema
    b) Hydrocephalus
96. Herniation

Theme-2: Prolonged Apnea

Learning Objectives

1. Classify general anesthetics.
2. Discuss the primary effects produced by general anesthetics in human body.
3. Discuss the mechanism of General anesthetic action?
4. Enlist inhaled anesthetics. Write their pharmacologic properties.
5. Discuss uptake, distribution & elimination of inhaled General anesthetics along with factors affecting them.
6. Discuss the organ system effects, Adverse effects (both acute & chronic), contra-indications/precautions & drug interactions of inhaled general anesthetics.
7. Enlist intravenous anesthetics with their pharmacokinetic properties.
8. Explain chemistry, pharmacokinetics, mechanism of action & organ-system effects of PROPOFOL & FOSPROPOFOL.
9. Discuss the clinical indications, Contra-indications/precautions, adverse effects and drug interactions of PROPOFOL & FOSPROPOFOL.
10. Discuss the role of Barbiturates and Benzodiazepines in General anesthesia..
11. Explain Etomidate with respect to its Pharmacokinetics, mechanism of action & its organ-system effects.
12. Explain therapeutic uses, contra-indications/precautions, adverse effects and drug interactions of ETOMIDATE.
13. Explain KETAMINE in term of its pharmacokinetics, mechanism of action & its organ system effects.
14. Enlist indications, Contraindications/Precautions adverse effects & drug interactions of KETAMINE.
15. Describe DEXMEDETOMIDINE, in term of its pharmacokinetics, mechanism of action & organ system effects.
16. Discuss indications, contra-indications/precautions, adverse effects & drug interactions of DEXMEDETOMIDINE.
17. Explain the role of opioid analgesics in general anesthesia with their difference from other general anesthetics & hypnotics. Also mention their adverse effects which limit their use in anesthesia care.
18. Classify local anesthetics.
19. Explain chemistry, Pharmacokinetics, mechanism of action organ system effects of local anesthetic agents.
20. Explain structure-activity characteristics of local anesthetics & the neuronal factors affecting their Blockade.
21. Discuss the routes/method of administration of local anesthetics. Describe their clinical block characteristics.
22. Discuss the significance of adding vasoconstrictor to local anesthetic agent.
23. Rational the intentional systemic use of local anesthetic agents.
24. Explain localized & systemic toxicity of local anesthetic with their reversal.
25. Enlist commonly used local anesthetics in our clinical settings.
26. Explain commonly used amides as local anesthetic agents in term of their pharmacokinetics, mechanism of action, & organ system effect.
27. Discuss the clinical uses, contra-indications/Precautions, adverse effects & drug interaction of commonly used amides as local anesthetic agents.
28. Explain commonly used esters as local anesthetic agents with respect to their pharmacokinetics, mechanism of action & their organ-system effects.
29. Discuss clinical indications, contra-indication / precautions, adverse effects & drug interaction of commonly used esters as local anesthetic agents.
30. Classify the skeletal muscle relaxants.
31. Explain chemistry, pharmacokinetics, mechanism of action and actions of neuromuscular blocking drugs.
32. Discuss the uses, adverse effects, contraindications/precautions and drug interactions of neuromuscular blocking drugs.
33. Compare & contrast the pharmacology of depolarizing & nondepolarizing neuromuscular blockers.
34. Explain effects of diseases & aging on the neuromuscular response.
35. Discuss reversal of nondepolarizing neuromuscular blockade.
36. Enumerate drugs used as centrally acting spasmolytic drugs.
37. Discuss pharmacokinetics, mode of action and actions of centrally acting spasmolytic drugs.

38. Explain uses, adverse effects, contraindications/precautions centrally acting spasmolytic drugs.
39. Discuss pharmacokinetics, mode of action, action, uses, adverse effects and contraindications/precautions of Dantrolene.
40. Discuss pharmacokinetics, mode of action, actions, uses, and adverse effects of botulinum toxin.
41. Enumerate drugs used to treat acute local muscle spasm.
42. Discuss pharmacokinetics, mode of action, actions, uses and adverse effects of these drugs.
43. Classify seizures.
44. Differentiate between different types of seizures.
45. What are different causes epilepsy.
46. Plan of investigations in patients with seizures.
47. Explain pharmacokinetics, mechanism of action and actions of drugs used in partial seizures and tonic-clonic seizures.
48. Discuss clinical uses, adverse effects, contraindications/precautions and drug interactions of drugs used in partial seizures.
49. Explain pharmacokinetics, mechanism of action and actions of drugs used in generalized seizures.
50. Discuss the clinical uses, adverse effects, contraindications/precautions and drug interactions of drugs used in generalized seizures
51. Explain pharmacokinetics, mechanism of action and actions of conventional antiseizure drugs.
52. Discuss clinical uses, adverse effects, contraindications/precautions and drug interactions of conventional antiseizure drugs.
53. Explain pharmacokinetics, mechanism of action and actions of recently developed antiseizure drugs.
54. Discuss the clinical uses, adverse effects, contraindications/precautions and drug interactions of recently developed antiseizure drugs.
55. Explain pharmacokinetics, mechanism of action and actions of benzodiazepines and acetazolamide.
56. Discuss the clinical uses, adverse effects, contraindications/precautions and drug interactions of benzodiazepines and acetazolamide.
57. Explain special aspects of toxicology of antiseizure drugs.
58. Discuss management of simple partial seizures.
59. Discuss the management of complex partial seizures.
60. Discuss the management of partial with secondarily generalized tonic clonic seizures.
61. Discuss the management of absence seizures.
62. Discuss the management of myoclonic seizures.
63. Discuss the management of tonic clonic seizures.
64. Enumerate the types of intracranial hemorrhages with examples.
65. Define and Describe vascular malformations.

Theme-3: Tremors

Learning Objectives

1. Classify drugs used in the treatment of Parkinsonism.
2. Explain pharmacokinetics, mechanism of action and actions of Levodopa.
3. Discuss the clinical uses, adverse effects, precautions/ contraindications and drug interactions of Levodopa.
4. Explain pharmacology of carbidopa.
5. Explain pharmacokinetics, mechanism of action and actions of dopamine receptor agonists.
6. Discuss the clinical uses, adverse effects, precautions/ contraindications and drug interactions of dopamine receptor agonists.
7. Explain pharmacokinetics, mechanism of action and actions of monoamine oxidase inhibitors.
8. Discuss the clinical uses, adverse effects, precautions/ contraindications and drug interactions of monoamine oxidase inhibitors.
9. Explain pharmacokinetics, mechanism of action and actions of catechol-o-methyl transferase inhibitors.
10. Discuss the clinical uses, adverse effects, precautions/ contraindications and drug interactions of catechol-o-methyl transferase inhibitors.
11. Explain pharmacology of apomorphine.
12. Explain pharmacology of amantadine.
13. Explain pharmacology of Anti-muscarimic.
14. Explain pharmacology of drugs used in the treatment of Huntington's disease.
15. Explain pharmacology of drugs used in the treatment of Tourette's syndrome.

16. Explain pharmacology of drugs used in the treatment of other movement disorders (tics, ballismus, athetosis and dystonias).
17. Discuss drugs inducing various types of dyskinesias.
18. Explain pharmacology of drugs used in the treatment of Wilson's disease.
19. Explain pharmacology of drugs used in the treatment of restless leg syndrome.
20. Classify the cerebrovascular diseases
21. Write down the causes of brain injury due to Hypoxia, Ischemia, and Infarction.
22. Compare and contrast the etiology, pathogenesis and microscopic features of global cerebral Ischemia and Focal cerebral Ischemia.

Theme-4: Fever with Altered Consciousness

Learning Objectives

Students will Insha Allah be able to

1. Classify major pathologies of CNS & PNS
2. Enumerate types of CNS cerebrovascular diseases
3. Draw different CNS hemorrhages in relation to site, etiology & consequences
4. Classify types of Nervous system infections in terms of etiology, location & consequences
5. Explain the CSF Formation circulation and normal values of its constant
6. Define, explain and classify the hydrocephalus with its differential diagnosis.
7. Recognize the meningomylocele and its complication and outcomes.
8. Define meningitis and encephalitis their etiologies, clinical features, diagnosis and differential diagnosis.
9. Define meningitis and describe its pathophysiogy
10. Enumerate Causative organism of meningitis
11. Appraise Complications of meningitis
12. Perform lumber puncture and Interpret CSF lab report
13. Differentiate tuberculous and pyogenic meningitis?
14. Enumerate parasites affecting brain parenchyma
15. Interpret lab diagnosis of parasites
16. Evaluate the role of ancillary AIDS in cerebral parasitic disease
17. Discuss the treatment of meningitis and other infections of CNS
18. Enlist the drugs used to treat migraine.
19. Explain pharmacokinetics, mode of action and actions of antimigraine drugs.
20. Explain clinical uses, adverse effects, contraindications/precautions & drug interactions of anti-migraine drugs.
21. Explain the difference b/w treatment of acute migraine attack and drugs used for prophylaxis of migraine.
22. Classify poisonous snakes
23. Discuss different constituents of snake venum.
24. Discuss the First aide treatment of snake bite.
25. Discuss the modern line of treatment of snake bite.
26. Discuss the different signs and symptoms of snake bite.
27. Discuss the drunkenness.
28. Discuss the clinical and lab findings in a case of examination of drunkenness.
29. Discuss different stages of alcohol poisoning.
30. The students will be able to differentiate between different signs and symptoms of ischemic stroke.
31. What are different causes of ischemic stroke like AF HTN etc.
32. Chart out the plan of investigations in patients with focal neurological deficit.
33. Discuss the clinical features, treatment and postmortem appearances in case of alcohol poisoning.
34. Give the etiology, pathogenesis and lab diagnosis of
    a) Viral meningitis
    b) Fungal meningitis
    c) Tuberculous meningitis
    d) Bacterial meningitis
35. Define encephalitis.
36. Correlate the causes with pathogenesis of encephalitis.

Theme 1: (Hallucinations & Delusions)

Clinical Case:

A 45 years old male, married, unemployed utilizing psychiatric services off and on for last 7 years is brought to mental health facility with predominant complaints of suspiciousness, aggressive outbursts, remaining alone, self talk and disturbed sleep for last six months. He experiences sadness of mood and becomes anxious and fearful on occasions. He believes that CIA is continuously observing him and will kill him if he goes out of room. He hears voices instructing him that you are criminal and you need to be punished. He denies any physical or mental illness at same time.

Past history revealed h/o psychiatric hospitalization about 5 years ago on account of his underlying episodic illness. He was treated then with Tab Amitryptalline 25 mg X 5 Tabs once/day, Tab Alprazolam 1 mg X once/day, Tab Sodium Valproic Acid 500 mg twice /day Tab Stelazine 5 mg TDS/day. Though his psychiatric symptoms resolved but he discontinued medication due to side effects in which he developed tremors of his hands, and restlessness initially and abnormal movements of his oro-facial muscles. He was then given course of 4 Electroconvulsive therapies under General Anesthesia in which Thiopental Na and succinylcholine were used. His tremors and restlessness disappeared but oro-facial movements care still persistent.

Before start of psychiatric symptoms he was treated for psychoactive substance use about 27 years ago when he used to take Cannabis and alcohol. Reportedly he strated taking alcohol 50 ml initially in reaction to breakup of a love affair at age of 18 years. Gradually his intake of alcohol increased to 300 ml to achieve the same pleasurable effects which he earlier used to achieve from 50 ml of alcohol and he also started smoking cannabis also. He would be irritable and restless if adequate amounts of alcohol were not taken. He was taken to a drug rehabilitation unit 27 years ago where he was detoxified. Since then he is not taking alcohol or any other psychoactive substance use.

Detailed history reveled history of psychosis in one aunt and h/o of taking Lithium Carbonate by his cousin on advise of psychiatrist on account of mood symptoms.

On examination:

General physical examination

Temperature: 37.2c

Pulse: 72 bpm with normal peripheral pulses

Respiratory: NAD

Gastrointestinal: NAD

Genital/Reproductive: NAD

Musculoskeletal: Oro-facial chewing movements

CNS: NAD

Psychiatric (Mental State Examination) : He is young male of average build and height. He is conscious, not so communicative, partly cooperative and oriented in time place and person.

His talks easily with pressure of speech.

His mood is depressed.

He harbors Delusions of Persecution.

He experience Auditory hallucinations.

Cognitive functions: His memory is intact.

Abstract thinking is impaired.

He lacks insight into his illness.

Management: He was admitted in psychiatry ward and Tab Resperidone 2mg BD, Tab Loarazepam 1 mg at night, and Tab Esitalopram 10 mg in morning was strated along with other Non-pharmacological intervention.

Critical Questions:

- What is Schizophrenia, Bipolar Affective disorder, Depression and Anxiety?
- What are antipsychotics?
- What are Mood Stabilizers?
- What are Antidepressants?
- What are Anxiolytics?
- What is Delusion,Hallucination,Social Withdrawal, Abstract thinking and insight?
- What is psychoactive substance use?
- Groups of Psychoactive substance use??
- How the drugs of dependence work on thoughts, moods and behavior?

Theme-2: Prolonged Apnea

Clinical Case:

A 61-year-old female was scheduled for a breast biopsy to rule out or verify a metastatic process from a previous breast carcinoma.

All preoperative laboratory test results were within normal limits. After her baseline vital signs were obtained on the operating table. The anesthesia was a sodium thiopental induction; succinylcholine facilitated intubation; and maintenance was with nitrous oxide, oxygen, fentanyl, and isoflurane, using controlled ventilation of 750 cc tidal volume at 8 breaths per minute.

No additional muscle relaxants were used, and there were no problems or complications throughout the surgery.

During the procedure, a sample of the breast mass was sent to pathology as a frozen section, and the tentative results were reported malignant.

At the completion of the surgical procedure, eduction was anticipated by turning off the isoflurane 15 minutes before the dressing was applied.

The nitrous oxide was turned off at the last suture, and oxygen was turned to 6 L/minute. There was no response to verbal or tactile stimulation during emergence, nor was there a response after reversing the narcotic with 0.4 mg of intravenous naloxone.

There was no residual of isoflurane in the reservoir bag, and 100% oxygen was continued. There was no response to peripheral nerve stimulation before or after the intravenous administration of 0.5 mg glycopyrrolate and 2.5 mg neostigmine.

The arterial blood gas was normal for the degree of ventilation, and the pupils were equal in size and not pinpoint.

Past Medical History:

No history of major illness or Hospitalization in past except Breast carcinoma and Less than a year before, the patient had undergone a left modified contralateral radical mastectomy under general anesthesia without any complications from the surgery or anesthesia.

General Physical Examination:

Temperature: 98.2 ^{o}F

Pulse: 84 bpm with normal peripheral pulses

Respiration: Patient is on Ventilator. Rate 14/min

BP: 150/90

General appearance: mild obesity (5 foot, 3 inches, and 82 kg)

Systemic Review:

CVS: Normal

Respiratory: Normal

GIT: Normal

Genital / Reproductive: Normal

Urinary: Normal

Musculoskeletal: Skeletal muscles shows flaccid paralysis.

Endocrine: Normal

Neuro: Normal

Psychiatric: Normal

Key words: General anesthetics, Skeletal muscle relaxants,

Critical Questions:

What is the most probable cause of Prolonged apnea in this case?

How the diagnosis can be confirmed.

How you manage this case.

What future advice will be given to the patient?

What is Pharmacogenetics and Pharmacogenomics and Examples of drugs in this regard.

What are Types of Cholinesterase enzymes and the Drugs metabolized by these enzymes and the Pharmacology of those drugs.

What conditions affect the activity of Cholinesterase enzyme.

How you Classify Skeletal Muscle relaxants? What are their Pharmacological differences and their advantages and disadvantages?

How you Classify General anesthetics? What are their Pharmacological differences, and their advantages and disadvantages?

What other drugs affect the Skeletal muscle tone and what is their Pharmacology.

Theme-3: TREMORS

Clinical Case:

A 55 years old truck driver admitted in AIMS medical ward with history of tremors in his both hands for the last 1 year. He stated that tremors seemed worse at rest. He also had generalized slowness of the movements for the last 8 months impairing his routing duty. In addition, he has had episodes of aggression for last three months .There is no history of Diabetes , Asthma or Hypertension.

On general physical examination, BP was 150/100 in lying position and 125/90 on standing. There was no goiter or thyroid bruit. On detailed examination, bilateral resting tremors more on right sided hand with dry skin was appreciated . In the motor system, tone is increased with normal power and reflexes and planters are bilateral down going. In the sensory system , pin prick, position and vibration senses were normal .There was no past pointing and heel shin plus Romberg were negative. On walking , there was stooped posture but no swaying. Rest of systemic examination was normal. His investigations include, Blood CP Hb 13, LFTs, RFTs, BSR and ESR all were normal. CT scan brain was also normal. On the basis of clinical signs symptoms, he was started on Levodopa , with procylidine and Olanzapine for occasional aggressive behavior. Five days after starting medicine, he developed high grade fever documented up to 103 F with dark color urine and marked body stiffness.

On examination,

BP 150/90 ; Temp 102 F ; O sat 89 % ; GPE: Unremarkable except profuse sweating ; CNS : Generalized rigidity ; CVS : S1 and S 2 audible ; Abdomen: Unremarkable.

Repeated investigations showed moderately elevated WBCs, ALT and CPK up to 9000 IU.

Critical Questions

.What is Parkinson Disease? .What are the features of Parkinson disease?

.Is there any diagnostic test for PD? .What are the drugs used to treat PD?

Mention common side effects of drugs used to treat PD?

.What are complications of PD? What is prognosis of this disease?

What is Neuroleptic Malignant syndrome? What are the supportive tests for its diagnosis?

Which are the culprit drugs causing NMS? How this condition can be managed?

Theme-4: Fever with Altered Consciousness

Clinical Case:

A 55 year old man came to OPD of AIMS with complaint of severe sore throat and high grade fever. He was given Amoxil 500mg TDS for five days and paracetamol to relieve the fever. About one month later the patient was brought to the emergency department in semiconscious state with high grade fever. After initial management, the patient was stable and further investigated.

Recent Medical History:

Sore throat with high grade fever one month back

Past medical history: Non contributory

Family Medical History: Not relevant

Physical examination: Oslar's nodes and splinter hemorrhages

CVS: On auscultation mid-diastolic murmur

Echocardiogram shows vegetations attached to both leaflets of mitral valve

Labs: Blood culture shows streptococci

All other systemic examination was non-conclusive

Critical questions

What are different types of infective endocarditis on the basis of causative organisms?

Which is the most frequently involved valve?

What are sign and symptoms of infective endocarditis?

What is the management plan of infective endocarditis?

PBL 1

A 23 years old male who has been brought in emergency with high grade fever, muscle rigidity and altered consciousness. Detailed history reveled that he was recently started with Tab Haloperidol 5 mg OD and Inj zuclopenthixol 200 mg I/M biweekly after prolonged discontinuity of antipsychotic medication previously advised by Consultant Psychiatrist.

There is h/o psychiatric hospitalization and taking of Tab Imipramine 25 mg 3 Tabs HS, Tab Quitiapine 50mg X HS, Tab Loarazepam 2 mg X HS, Tab Sodium Valproate 500 mg X TDS at different times.

There is H/o Cannabis use before the onset of illness and during initial two years of illness.
Family history reveled Bipolar Affective disorder in one of his maternal cousin who was taking Tab Carbamezepine and use of Tab Alprazolam in one of his uncles.
On Examination His fever is 102 Degree Faranheight. His pulse ranges from 100 - 120 BPM and BP from 90/60 to 150/100. There is generalized muscular rigidity.
On Mental State Examination his mood is irritable. He is hearing voices of individuals threatening to kill him and he believes Aliens are stabbing him in his abdomen.
His Serum CPK was markedly high and TLC and ALT was also deranged. Urine was of the dark color and on urine detailed examination there was myoglobinurea.

Learning Resources & Reference books

- Kaplon and sadock's synopsis of Psychiatry 11th edition (Psycho-pharmacology chapter)
- Robins Basic Pathology by vinay Kumar, Abdul K abbas, Nelson Fausto, Richard . Mitchell 8th Edition, 2010
- Tietz Fundamentals of clinical chemistry by Carl A. Burtis, Adward R. Ashwood, Vavid E. Burns, 6th Edition 2012
- Jawetz review of Medical Microbiology and immunology by warren Levinsion 11th Edition 2010.
- Muiris Texbook of Pathology by Levinson 14th Edition 2008 (textbook)
- Textbook of Forensic Medicine and toxicology by Nageshkumar G Rao, 2nd Edition 2010.
- Parikhs Textbook of Medical Jurispeudence forensic Medicine and Toxicology by C.K. Parikh, 6th Edition, 2012
- Textbook of Forensic Medicine and Toxicology by Dr. S. Saddique.
- Park's Textbook of Preventive and Social Medicine by K. park, 21st Edition 2011
- Public Health and Community Medicine by Muhammad Ilyas, Iftkhar Ahmed, Ghulam Qadir, Mecha Fhansotia, 7th Edition 2007
- Kaplan book of clinical chemistry
- Medscape.com
- Cleveland clinic.com
- Text Book of Forensic Medicine and Toxicology By Negash Kumar Rao.
- Parikh.
- Naseeb Awan.
- Saddique Hussan
- Basic and Clinical Pharmacology by Katzung BG, Masters SB, Trevor AJ, 13th Edition, 2012.
- Katzung & Trevor's Pharmacology by Trevor AJ, Katzung BG, Kruidering-Hall M, Masters SB, , 11th Edition, 2013
- Lippincott's Illustrated Reviews: Pharmacology, 6th Edition, 2015
- Goodman & Gilman The Pharmacological Basis of Therapeutics, Brunton LL, 12th Edition, 2012
- Pretest Pharmacology. MCQs with explanatory answer

AJK Medical College, Muzaffarabad

NEU Module - Class of 2018 (3rd Year)

Week-I

DATE→					
TIME↓	**MONDAY**	**TUESDAY**	**WEDNESDAY**	**THURSDAY**	**FRIDAY**
8:00am-09:00am				**LGIS** Introduction to NEU Module **Dr. Arif & Module Team**	**LGIS** Antidepressants-2 **Prof. Arif /Dr. Inayat**
9:00am-10:00am	**CLINICAL ROTATION**			**CLINICAL ROTATION**	**LGIS** Management Anxiety Disorder and depression **Dr. Hamid Rasheed**
10:00am-10:30am		**TEA BREAK**			**TEA BREAK**
10:30am-11:30am					**SGD** Sedative hypnotics and anxiolytics **Prof. Arif**
11:30am-12:30am					
12:30pm – 1:30pm				**LGIS** History taking and MSE **Dr. Hamid Rasheed**	**PBL-1A Prof. Arif & Team**
1:30pm – 2:00pm		**LUNCH BREAK**			
2-4 pm	**SDL**		**DSL**	**SGD** Antidepressants-1 **Prof. Arif /Dr. Inayat**	**SDL**

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NEU Module - Class of 2018 (3rd Year)

Week-2

DATE→					
TIME↓	**MONDAY**	**TUESDAY**		**THURSDAY**	**FRIDAY**
8:00am-09:00am	**EID Holiday**	**EID Holiday**	**EID Holiday**	**Revision** Diabetes Mellitus **Team-4**	**Practical** Pathology Dept.
9:00am-10:00am				**CLINICAL ROTATION**	
10:00am-10:30am					**TEA BREAK**
10:30am-11:30am					**Practical** Forensic Medicine. **SDL**
11:30am-12:30am					
12:30pm – 1:30pm				**LGIS** Endocrinology and Reproduction system **Team-4**	
1:30pm – 2:00pm				**LUNCH BREAK**	
2:00pm – 3:00pm				**Practical** Pharmacology Dept.	**SDL**
3:00pm – 4:00pm					

AJK Medical College, Muzaffarabad

NEU Module - Class of 2018 (3rd Year)

Week-3

DATE→					
TIME↓	**MONDAY**	**TUESDAY**	**WEDNESDAY**	**THURSDAY**	**FRIDAY**
8:00am-09:00am	**LGIS** Bacterial & T.B Meningitis **Porf. Munir**	**SGD** CSF Examination **Prof. Munir & Team-3**	**SGD** Opioids **Prof. Arif/ Dr. Inayat & Team-4**	**LGIS** Intracranial Hemorrhages & Vascular malformation **Prof. Anwar**	**SGD** General Anesthetics **Prof. Brig. Ahsan ul Haque**
9:00am-10:00am	**CLINICAL ROTATION**			**CLINICAL ROTATION**	
10:00am-10:30am		**TEA BREAK**			**TEA BREAK**
10:30am-11:30am		**SGD** Anti. Psychotics **Prof. Arif & Team-4**	**SGD** Anti. Epileptics **Prof. Arif & Team-4**		**PBL-1B Prof. Arif & Team-4**
11:30am-12:30am					
12:30pm – 1:30pm	**LGIS** Cerebrovascular Disease **Prof. Anwar**	**LGIS** Neurotoxin Poisons-II **Prof. Humayun**	**LGIS** Hydrocephalus **Dr. Tahir Aziz**	**LGIS** Somniferous poisons-II **Prof. Humayun/ Dr. Naseer**	**LGIS** Fungal Meningitis **Dr. Mumtaz**
1:30pm – 2:00pm		**LUNCH BREAK**			
2:00pm – 3:00pm	**LGIS** Management of Psychosis & substance use **Dr. Hamid Rasheed**	**SGD** Opioids **Prof. Arif /Dr. Inayat**	**LGIS** Somniferous posions-I **Prof. Humayun/ Dr. Naseer**	**LGIS** General Anesthetics **Prof. Brig. Ahsan ul Haque**	**SDL**
3:00pm – 4:00pm	**LGIS** Neurotoxin Posions-1 **Prof. Humayun/ Dr. Naseer**		**LGIS** Cerebral Edema, Hydrocephalus herniation **Prof. Anwar**	**SDL**	

AJK Medical College, Muzaffarabad

NEU Module - Class of 2018 (3rd Year)

Week-2

DATE→					
TIME↓	**MONDAY**	**TUESDAY**	**WEDNESDAY**	**THURSDAY**	**FRIDAY**
8:00am-09:00am	**LGIS** Radiology of CNS **Dr. Nawaz**	**SGD** Local Anesthetics **Prof. Brig Ahsan Ul Haque**	**Practical** Pathology	**SDL**	**Written Assessment EMR + Reproduction + NEU Module**
9:00am-10:00am	**CLINICAL ROTATION**			**CLINICAL ROTATION**	
10:00am-10:30am		**TEA BREAK**			**TEA BREAK**
10:30am-11:30am		**LGIS** Degenerative Disease of Brain-II **Prof. Anwar**	**SGD** Drugs Used in the Treatment of Degenerative Disease of CNS-ll **Prof. Arif & Team-4**		**SDL**
11:30am-1:30pm	**LGIS** Local Anesthetics-1 **Prof. Brig. Ahsan ul Haque**	**SGD** Skeletal Muscle Relaxant **Prof. Arif and Team-4**	**LGIS** Medico legal aspects of Poising by neurotoxins **Prof. Humayun/ Dr. Naseer**	**SDL**	**SDL**
1:30pm – 2:00pm		**LUNCH BREAK**			
2:00pm – 3:00pm	**LGIS** Meningomylocele & its complication **Dr. Mateen**	**SGD** Drug Used in the Treatment of Degenerative disease of CNS **Prof. Arif**	**LGIS** Treatment of Migraine & Meningitis **Dr. Inayat ur Rahman**	**SDL**	**SDL**
3:00pm – 4:00pm	**LGIS** Degenerative Disease of Brain-1 **Prof. Anwar**		**LGIS** Encephalitis **Porf. Munir**		

Inquires & trouble shooting

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