Updates in Therapeutics® 2012:

The Pharmacotherapy Preparatory Review & Recertification Course
Neurology
Melody Ryan, PharmD, MPH
University of Kentucky College of Pharmacy

Conflict of Interest Disclosures

Melody Ryan –no conflicts of interest to disclose

Learning Objectives

- Differentiate between various antiepileptic drugs based on use and adverse effects
- Develop a treatment strategy for status epilepticus
- Identify appropriate treatment strategies for primary and secondary stroke prevention
- Determine the appropriateness of treatment with tissue plasminogen activator for acute stroke
- Examine common adverse effects associated with treatment of Parkinson disease
- Differentiate between regimens for acute and prophylactice treatment of migraine, tension, and cluster headaches
- Identify common adverse effects of disease-modifying therapies for multiple sclerosis

Page Number 1-326

Patient Case # 1

TM is an 18-year-old new patient in the pharmacy where you work. He presents a prescription for carbamazepine 100 mg 1 PO BID with instructions to increase to 200 mg 1 PO TID. Currently, he does not take any medications and does not have any drug allergies. During your counseling session, TM tells you he must have blood drawn for a test in 3 weeks.

Page Number 1-344

Patient Case # 1

Which of the following common potential adverse effects of carbamazepine is best assessed through a blood draw?

A. Leukopenia

B. Renal failure

C. Congestive heart failure

D. Hypercalcemia

Handout Page 1-344; Answer Page 1-371

Carbamazepine Adverse Effects

- Rash
- SIADH
- Aplastic anemia
- Thrombocytopenia
- Anemia
- Leukopenia

Page Number 1-330

Patient Case # 2

One month later, TM returns to your pharmacy with a new prescription for lamotrigine 25 mg with instructions to take 1 tablet daily for 2 weeks, then 1 tablet PO BID for 2 weeks, then 2 tablets PO BID for 2 weeks, then 3 tablets PO BID thereafter. He tells you that the carbamazepine is being discontinued because he developed a rash a few days ago.

Page Number 1-344

Patient Case # 2

Which one of the following choices should be your response?

A. The rash is likely caused by carbamazepine because carbamazepine rash often has delayed development

B. The rash is unlikely caused by carbamazepine because carbamazepine rash usually presents after the first dose

C. The rash is unlikely caused by carbamazepine because it is probably attributable to carbamazepine-induced liver failure

D. The rash is unlikely caused by carbamazepine because it is probably attriubutable to carbamazepine-induced renal failure

Handout Page 1-344; Answer Page 1-371

Dermatologic Adverse Effects

- Dermatologic reactions to anticonvulsants occur after a delay of 2-8 weeks
- May include rash, Stevens-Johnson syndrome, anticonvulsant hypersensitivity syndrome
- Recommendation for testing for the HLA-B*1502 allele in patients of Asian, including South Asian Indians, ancestry have a 10-time increased risk of rash
- Patients with HLA-A*3101 (usually Caucasian) are also at increased risk for rash

Page Number 1-330-331

Patient Case # 3

TM wants to know why it is necessary to increase the dose of lamotrigine so slowly.

Page Number 1-344

Patient Case # 3

Which one of the following replies is best?

A. It causes dose-related psychomotor slowing

B. It causes dose-related renal stones

C. It causes dose-related paresthesias

D. It causes dose-related rash

Handout Page 1-344; Answer Page 1-371

Lamotrigine Rash

- Related to starting dose
- Particular caution necessary in children
- Valproic acid inhibits lamotrigine metabolism and increases rash risk
- May be mild to serious in nature

Page Number 1-334

Patient Case # 4

JG is a 34-year-old patient who has been maintained on carbamazepine extended-release 400 mg orally 2 times/day for the past 2 years. She has had no seizures for the past 4 years. She presents to the emergency department in status epilepticus.

Page Number 1-344

Patient Case # 4

Which one of the following drugs is best to use first?

- A. Diazepam
- B. Lorazepam
- C. Phenytoin
- D. Phenobarbital

Handout Page 1-344; Answer Page 1-371

Status Epilepticus

- Always give a rapidly acting medication to stop seizures immediately (benzodiazepine)
- Follow with a longer-acting medication to prevent recurrence of seizures (phenytoin, fosphenytoin, phenobarbital, valproic acid)
- All medications for status epilepticus should be given parenterally
- Do not use a neuromuscular blocker

Page Number 1-340-1

Status Epilepticus

- Lorazepam is the drug of choice for first line therapy
- Lorazepam is less lipophilic than diazepam
  - Stays in the CNS longer rather than being re-distributed to other areas of the body

Page Number 1-340-1

Patient Case # 5

SR is a 37-year-old patient who began taking phenytoin 100 mg 3 capsules PO QHS 6 months ago. He has experienced several seizures since that time; the most recent occurred this past week. At that time, his phenytoin serum concentration was 8 mcg/mL. The treating physician increased his dose to phenytoin 100 mg 3 capsules PO BID.

Page Number 1-344

Patient Case # 5

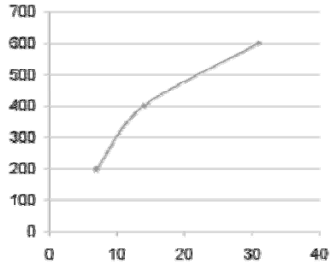
Today, which of the following best represents his expected serum concentration?

- A. 10 mcg/mL
- B. 14 mcg/mL
- C. 16 mcg/mL
- D. 20 mcg/mL

Handout Page 1-344; Answer Page 1-371

Phenytoin Pharmacokinetics

- Non-linear (Michaelis-Menton) kinetics
- Highly protein bound



Page Number 1-338

Patient Case # 6

SS is a 22-year-old woman who has always had episodes of "zoning out." Recently, one of these episodes occurred after an examination while she was driving home. She had a non-injury accident, but it prompted a visit to a neurologist. She is given a diagnosis of absence seizures.

Page Number 1-345

Patient Case # 6

Which of the following drugs is best to treat this type of epilepsy?

A. Phenytoin

B. Tiagabine

C. Carbamazepine

D. Ethosuximide

Handout Page 1-345; Answer Page 1-371

Medications for Absence Seizures

- First-line
  - Ethosuximide
  - Valproic acid
- Second-line
  - Clonazepam
  - Lamotrigine

Page Number 1-331

Patient Case # 7

JB is a 25-year-old man with a history of seizure disorder. He has been treated with phenytoin 200 mg orally 2 times/day for 6 months and his current phenytoin concentration is 6.3 mcg/mL. His neurologist decides to increase his phenytoin dose to 300 mg 2 times/day.

Page Number 1-345

Patient Case # 7

Which of the following adverse effects is JB most likely to experience related to the dose increase?

A. Drowsiness

B. Acne

C. Gingival hyperplasia

D. Rash

Handout Page 1-345; Answer Page 1-371

Phenytoin Adverse Effects

Dose-related
- Nystagmus
- Ataxia
- Drowsiness
- Cognitive impairment

Non-Dose-related
- Gingival hyperplasia
- Hirsutism
- Acne
- Rash
- Hepatotoxicity
- Coarsening of facial features

Page Number 1-338

Patient Case # 8

MG is a 15-year-old male with a diagnosis of juvenile myoclonic epilepsy. He has been prescribed sodium divalproate.

Page Number 1-345

Patient Case # 8

On which of the following adverse effects is it best to counsel MG?

A. Oligohidrosis

B. Renal stones

C. Alopecia

D. Word-finding difficulties

Handout Page 1-345; Answer Page 1-371

Valproic Acid Adverse Effects

- Hepatotoxicity
- Nausea/vomiting
- Weight gain
- Interference with platelet aggregation
- Pancreatitis
- Alopecia

Page Number 1-339

Patient Case # 9

GZ, a 26-year-old woman, presents with a 6-month history of "spells." The spells are all the same, and all of them start with a feeling in the abdomen that is difficult for her to describe. This feeling rises toward the head. The patient believes that she will then loose awareness. After a neurologic work-up, she is given a diagnosis of focal seizures evolving to a bilateral, convulsive seizure. The neurologist is considering starting either carbamazepine or oxcarbazepine.

Page Number 1-345

Patient Case # 9

Which one of the following is the most accurate comparison of carbamazepine and oxcarbazepine?

A. Oxcarbazepine causes more liver enzyme induction than carbamazepine

B. Oxcarbazepine does not cause rash

C. Oxcarbazepine does not cause hyponatremia

D. Oxcarbazepine does not form an epoxide intermediate in its metabolism

Handout Page 1-345; Answer Page 1-371

Oxcarbazepine

- Does not form an epoxide intermediate in its metabolism
- Enzyme inducer, but no autoinduction
- Hyponatremia more common than with carbamzepine
- Blood dyscrasias less common than with carbamazepine

Page Number 1-338

Patient Case # 10

When you see GZ 6 months later for follow-up, she tells you that she is about 6 weeks pregnant. She has had no seizures since beginning drug therapy.

Page Number 1-345

Patient Case # 10

Which one of the following is the best strategy for GZ?

A. Immediately discontinue her antiepileptic drug

B. Immediately discontinue her antiepileptic drug and give folic acid

C. Continue her antiepileptic drug

D. Change her antiepileptic drug to phenobarbital

Handout Page 1-345; Answer Page 1-371

Pregnancy Recommendations

- Women of childbearing potential
  - Have the best medication for their seizure type
  - Be treated with monotherapy, if possible
  - Discuss the possible decrease in oral contraceptive effectiveness with enzyme-inducing antiepileptic medicines
    - 50 mcg of ethinyl estradiol or mestranol
  - Folic acid supplementation of at least 0.4 mg/day

Page Number 1-341-2

Pregnancy Recommendations

- During/after pregnancy
  - Medications optimized before conception
    - Withdrawals accomplished at least 6 months before
  - Avoid valproic acid
  - Avoid polytherapy, if possible
  - Allow breastfeeding
  - Monitor serum concentrations
    - Before, at the beginning of each trimester, last month, during first 8 weeks post-partum
    - Lamotrigine, carbamazepine, phenytoin, levetiracetam, oxcarbazepine

Page Number 1-341-2

Patient Case # 11

LR is a 78-year-old man who presents to the emergency department for symptoms of right-sided paralysis. He states these symptoms began about 5 hours ago and have not improved since then. He also has hypertension, benign prostatic hypertrophy, diabetes mellitus, erectile dysfunction, and osteoarthritis.

Page Number 1-350

Patient Case # 11

Which of the following is the most accurate assessment of LR's risk factors for stroke?

A. Erectile dysfunction, age, osteoarthritis

B. Sex, diabetes mellitus, osteoarthritis

C. Benign prostatic hypertrophy, diabetes mellitus, age, sex

D. Age, diabetes mellitus, sex, hypertension

Handout Page 1-350; Answer Page 1-371

Stroke Risk Factors

Non-modifiable
- Age
- Race
- Male sex
- Low birth weight
- Family history

Somewhat modifiable
- Diabetes mellitus

Modifiable
- Hypertension
- Smoking
- Estrogens
- Atrial fibrillation
- Coronary artery disease
- Carotid stenosis
- Dyslipidemia
- Obesity
- Physical inactivity
- Sickle cell anemia

Page Number 1-346

Stroke Risk Factors

Modifiable
- Peripheral artery disease
- Pregnancy
- Patent foramen ovale
- Depression

Less well documented
- Alcohol abuse
- Hyperhomocysteinemia
- Drug abuse
- Hypercoagulability
- Periodontal disease
- Acute systemic inflammation and infection
- Sleep disordered breathing
- Metabolic syndrome
- Migraine with aura

Page Number 1-346

Patient Case # 12

Is LR a candidate for tissue plasminogen activator for treatment of stroke?

Page Number 1-350

Patient Case # 12

Which one of the following options is the best response?

A. Yes

B. No, he is too old

C. No, his stroke symptoms began too long ago

D. No, his diabetes mellitus is a contraindication for tissue plasminogen activator

Handout Page 1-350; Answer Page 1-371

Tissue Plasminogen Activator

- Within 3 hours of symptoms
- 3 month outcome significantly improved
- Intracerebral hemorrhage increased, but no increase in mortality or disability
- Dose 0.9 mg/kg IV (max 90 mg with 10% as a bolus, remainder over 1 hr)

Page Number 1-348

TPA Exclusion Criteria

- Intracranial or subarachnoid bleeding or hx
- Other active internal bleeding
- Recent intercranial surgery, head trauma, stroke
- Blood pressure > 185/110 mm Hg
- Seizure at stroke onset
- Intracranial neoplasm, AV malformation, aneurysm
- Active treatment with warfarin, heparin, platelets < 100,000

Page Number 1-348

Time Window for TPA

- Expanded to 4.5 hours with additional exclusion criteria
  - Taking any oral anticoagulant
  - Baseline NIHSS score greater than 25
  - Previous stroke combined with diabetes
  - Age older than 80

Page Number 1-348

Patient Case # 13

He was previously taking no drugs at home.

Page Number 1-350

Patient Case # 13

Which one of the following choices is the best secondary stroke prevention therapy for this patient?

A. Sildenafil

B. Celecoxib

C. Aspirin

D. Warfarin

Handout Page 1-350; Answer Page 1-372

Secondary Stroke Prevention

- Reduction of risk factors
- Carotid endarterectomy
- Aspirin
- Aspirin/dipyridamole
- Ticlopidine
- Clopidogrel
- Warfarin

Page Number 1-348-9

Patient Case # 14

You are the pharmacist at a community pharmacy and receive a call from MW, a 64-year-old man recently given a diagnosis of atrial fibrillation. He is concerned about his risk for having a stroke because his friend, who also has atrial fibrillation, asked him what dose of warfarin he is taking. MW called you because he is not taking warfarin and he wants to know if he should. He has no other medical conditions and takes atenolol 50 mg/day orally for ventricular rate control.

Page Number 1-350

Patient Case # 14

After encouraging him to discuss this with his doctor, which one of the following choices best describes what you should tell him?

A. You need warfarin treatment to prevent a stroke

B. You do not need warfarin, but you should take aspirin and clopidogrel

C. You do not need drug therapy at this time

D. Because you have atrial fibrillation, nothing can reduce your risk of stroke

Handout Page 1-350; Answer Page 1-372

$CHADS_2$ Score

Congestive heart failure, hypertension, age >75 years, diabetes mellitus, and prior stroke or transient ischemic attack stratification scheme

- Assign 1 point each for CHF, HTN, age ≥ 75 years, or diabetes
- Assign 2 points for previous stroke or TIA
- If total=0, no therapy or aspirin 75-325 mg/day
- If total≥1, give either oral anticoagulant (alternative aspirin 75-325 mg/day and clopidogrel 75 mg BID)
- Dabigatran 150 mg BID recommended over warfarin

Page Number 1-347

$CHADS_2$ Score

Congestive heart failure, hypertension, age >75 years, diabetes mellitus, and prior stroke or transient ischemic attack stratification scheme

- Assign 1 point each for CHF, HTN, age ≥ 75 years, or diabetes
- Assign 2 points for previous stroke or TIA
- If total=0, no therapy or aspirin 75-325 mg/day
- If total≥1, give either oral anticoagulant (alternative aspirin 75-325 mg/day and clopidogrel 75 mg BID)
- Dabigatran 150 mg BID recommended over warfarin

Page Number 1-347

Patient Case # 15

L.S. is a 72-year-old woman with a medical history of hypertension, type 2 diabetes mellitus, renal failure, and atrial fibrillation. She presents to the anticoagulation clinic for her initial visit.

Page Number 1-350

Patient Case # 15

Which one of the following best reflects her target INR?

A. 1.5

B. 2.0

C. 2.5

D. 3.0

Handout Page 1-350; Answer Page 1-372

Patient Case # 16

SF is a 64-year-old woman who presents to the ED complaining of numbness in her left hand and face for about 2 hours. The ED doctor suspects a stroke.

Page Number 1-351

Patient Case # 16

Which one of the following choices best describes why streptokinase is or is not an appropriate choice for acute therapy in this patient?

A. Streptokinase is not appropriate; steptokinase should not be used in stroke treatment

B. Streptokinase is not appropriate; streptokinase must be used within 1 hour of symptom onset

C. Streptokinase is appropriate; streptokinase must be used within 3 hours of symptom onset

D. Streptokinase is appropriate; it is the drug of choice for the treatment of stroke not involving paralysis

Handout Page 1-351; Answer Page 1-372

Acute Stroke Treatment

- Heparin
  - Good outcome data not available
  - Avoid in hemorrhagic stroke
  - aPTT 1.5-2.0 times control
- Streptokinase
  - Avoid due to excess mortality
- Tissue plasminogen activator

Page Number 1-348

Patient Case # 17

You work as the clinical pharmacist in a small hospital. Several of the physicians with whom you work want to use aspirin and clopidogrel together after stroke, similar to what they are doing for MI. You access the MATCH study and obtain the following results:

Page Number 1-351

Patient Case # 17

	ASA + Clopidogrel (n)	Placebo + Clopidogrel (n)	RRR (95% CI)
Primary outcome	596	636	6.4% (-4.6-6.3)
Secondary outcomes			
MI	73	68	-7.7% (-8.5-20.4)
Ischemic stroke	309	333	7.1% (-8.5-20.4)
Death, all cause	201	201	0.1% (-21.5-17.8)

Page Number 1-351

Patient Case # 17

Which one of the following is the best interpretation of this information?

A. Aspirin plus clopidogrel is more effective than placebo plus clopidogrel only for the primary outcome

B. Aspirin plus clopidogrel is more effective than placebo plus clopidogrel for all the secondary outcomes.

C. Aspirin plus clopidogrel is more effective than placebo plus clopidogrel for prevention of myocardial infarction.

D. Aspirin plus clopidogrel is no more effective than placebo plus clopidogrel for any of the listed outcomes.

Handout Page 1-351; Answer Page 1-372

Relative Risk Reduction

- RRR of 1 indicates no difference between groups
- The 95% CI also cannot contain 1

Page Number 1-372

Patient Case # 18

LS is taking levodopa/carbidopa 25 mg/100 mg orally 4 times/day and trihexyphenidyl 2 mg orally 3 times/day for his Parkinson disease. LS's wife reports that he is often confused and experiences constipation; he has trouble talking because of his dry mouth.

Page Number 1-356

Patient Case # 18

Which one of the following changes is best to resolve these symptoms?

A. Increase carbidopa/levodopa

B. Increase trihexyphenidyl

C. Decrease carbidiopa/levodopa

D. Decrease trihexyphenidyl

Handout Page 1-356; Answer Page 1-372

Anti-Parkinson Adverse Effects

- Dopaminergic
  - Nausea/vomiting
  - Orthostatic hypotension
  - Hallucinations
- Anticholinergic
  - Dry mouth
  - Urinary retention
  - Dry eyes
  - Constipation
  - Confusion

Page Number 1-352-3

Patient Case # 19

Six months later, LS returns to the clinic concerned that his levodopa/carbidopa dose is wearing off before his next dose is due.

Page Number 1-356

Patient Case # 19

Which one of the following is best to suggest?

A. Increase the dose of carbidopa/levodopa

B. Decrease the dose of carbidiopa/levodopa

C. Increase the dosing interval

D. Decrease the dosing interval

Handout Page 1-356; Answer Page 1-372

Anti-Parkinson Adverse Effects

- Levodopa/carbidopa
  - Wearing off
    - Use controlled release formulation
    - Give doses more frequently
    - Add COMT inhibitor
    - Add dopamine agonist
  - On-off
    - Add COMT inhibitor, selegiline, rasagaline, pramipexole, ropinirole, apomorphine
    - Redistribute dietary protein

Page Number 1-353

Patient Case # 20

PJ is a 57-year-old man with an 8-year history of Parkinson disease. His current drugs include carbidopa/levodopa 50/200 orally 4 times/day, entacapone 200 mg orally 4 times/day, and amanatadine 100 mg orally 3 times/day. He presents to the clinic with a reddish blue discoloration on his lower arms and legs.

Page Number 1-356

Patient Case # 20

Which, if any, of his drugs is the most likely cause of this condition?

A. Carbidopa/levodopa

B. Entacapone

C. Amantadine

D. None; likely represents venous stasis

Handout Page 1-356; Answer Page 1-372

Anti-Parkinson Adverse Effects

- Dopamine agonists
  - Ergot derived agents (bromocriptine and pergolide) rarely have retroperitoneal, pleuropulmonary, or cardiac fibrosis
  - Pergolide is associated with valvular heart disease
- Amantadine
  - Livedo reticularis
- COMT inhibitors
  - Diarrhea
  - Urine discoloration (entacapone)

Page Number 1-353-4

Patient Case # 21

LL is a 47-year-old man with Parkinson disease. He takes carbidopa/levodopa 50/200 orally 4 times/day. He recently noticed an involuntary twitching movement of his left foot.

Page Number 1-356

Patient Case # 21

Which one of the following is the best therapy to treat LL's dyskinesia?

A. Add ropinirole

B. Add selegiline

C. Increase carbidopa/levodopa

D. Decrease carbidopa/levodopa

Handout Page 1-356; Answer Page 1-372

Anti-Parkinson Adverse Effects

- Levodopa/carbidopa
  - Dyskinesias
    - Decrease dopaminergics
    - Add amantadine

Page Number 1-353

Patient Case # 22

CA, a 57-year-old white man who just retired from the NYC Fire Department, has been experiencing tremors in his right hand that have become progressively worse for the past 6 months. He has difficulty walking. He also has backaches and no longer plays golf. In addition, he is losing his sense of taste. He is given a diagnosis of Parkinson disease.

Page Number 1-356

Patient Case # 22

Which one of the following is the best treatment for this man?

A. Trihexyphenidyl

B. Entacapone

C. Apomorphine

D. Ropinirole

Handout Page 1-356; Answer Page 1-372

Treatment Choice in Parkinson Disease

- Anticholinergics work best for tremor
- COMT inhibitors currently available do not cross the blood-brain barrier and must be given with carbidopa/levodopa
- Apomorphine is only for severe on-off symptoms

Page Number 1-354

Patient Case # 23

MR, a 34-year-old pharmacist, has throbbing right-sided headache. She experiences nausea, sonophobia, and photophobia with these headaches, but no aura. She usually has headaches 2 times/ month. She is hypertensive and morbidly obese. She takes an ethinyl estradiol/ progestin combination oral contraceptive daily and hydrochlorothiazide 25 mg/day orally. She has a diagnosis of migraine headaches.

Page Number 1-361

Patient Case # 23

Which one of the following medications is best for prophylaxis of her headaches?

A. Propranolol

B. Valproic acid

C. Amitriptyline

D. Lithium

Handout Page 1-361; Answer Page 1-372

When to Use Prophylactic Agents

- Recurrent migraines that interfere with daily routine
- Frequent migraines
- Inefficacy or inability to use acute therapy
- Patient preference
- Cost of acute medications problematic
- Adverse effects with acute therapies
- Uncommon migraine presentation

Page Number 1-357

Prophylactic Agents

- Use lowest effective dose
- Give adequate trial (2-3 months)
- Consider other disease states
  - Additional treatment
  - Contraindications

Page Number 1-357

Migraine Treatment

- Prophylaxis page 1-357-8
  - Amitriptyline
  - Propranolol
  - Timolol
  - Valproic acid
  - Topiramate
- Acute treatment pages 1-358-9

Page Number 1-357-9

Patient Case # 24

SR is a 54-year-old female homemaker with squeezing, bandlike headaches that occur 3 or 4 times/week. She rates the pain of these headaches as 7 of 10 and finds acetaminophen, aspirin, ibuprofen, naproxen, ketoprofen, and piroxicam only partially effective. She wishes to take a prophylactic medication to prevent these tension headaches.

Page Number 1-361

Patient Case # 24

Which one of the following drugs is best for prophylaxis of her headaches?

A. Propranolol

B. Valproic acid

C. Amitriptyline

D. Lithium

Handout Page 1-361; Answer Page 1-372

Tension Headache Treatment

- Prophylaxis
  - Tricyclic antidepressants
  - Botulinum toxin
- Acute treatment
  - Acetaminophen
  - NSAIDs

Page Number 1-359

Patient Case # 25

DS is a 49-year-old male computer programmer who describes lancinating right eye pain and tearing several times a day for 2-3 days in a row. He will then have no episodes for 2-3 weeks but then will have recurrent episodes. In the office, he receives oxygen by nasal cannula during an episode, and his pain is relieved. He has a diagnosis of cluster headaches.

Page Number 1-361

Patient Case # 25

Which one of the following drugs is best for prophylaxis of his headaches?

A. Propranolol

B. Valproic acid

C. Amitriptyline

D. Lithium

Handout Page 1-361; Answer Page 1-372

Cluster Headache Treatment

- Prophylaxis
  - Verapamil
  - Melatonin
  - Suboccipital injection of betamethasone
  - Lithium
- Acute Treatment
  - Triptans
  - Oxygen
  - Intranasal lidocaine

Page Number 1-359

Patient Case # 26

MK is a 44-year-old woman with right-sided headaches of moderate intensity that are accompanied by severe nausea and vomiting.

Page Number 1-361

Patient Case # 26

Which one of the following triptans is best to treat MK's migraine headaches?

A. Almotriptan

B. Naratriptan

C. Rizatriptan

D. Sumatriptan

Handout Page 1-361; Answer Page 1-373

Patient Case # 27

One of the neurologists you work with recently read a meta-analysis of migraine treatments. He is most interested in the outcome of sustained relief at 24 hours, but he is confused by the number needed to treat analyses. He shows you the following table:

Page Number 1-362

Patient Case # 27

Drug	NNT
Ergotamine + caffeine	6.6
Eletriptan 80 mg	2.8
Rizatriptan 10 mg	5.6
Sumatriptan 50 mg	6.0

Page Number 1-362

Patient Case # 27

Which one of the following is the best interpretation of these data?

A. Eletriptan 80 mg is the most effective agent

B. Ergotamine plus caffeine is the most effective drug

C. Eletriptan has the most adverse effects

D. Ergotamine plus caffeine has the most adverse effects

Handout Page 1-362; Answer Page 1-373

Number Needed to Treat

- Way to express the number of patients it would be necessary to treat to have one patient with benefit/adverse effect

$$NNT = \frac{1}{\text{\% improved on active therapy - \% improved on placebo}}$$

Page Number 1-373

Patient Case # 28

SF is a 33-year-old African American woman of Cuban descent living in the Miami area. This morning, her right leg became progressively weaker over about 3 hours. She was previously healthy except for a broken radius when she was 13 years old and a case of optic neuritis when she was 25 years old.

Page Number 1-367

Patient Case # 28

Which one of the following is the best method for treating SF's exacerbation?

A. Interferon beta-1a

B. Glatiramer acetate

C. Mitoxantrone

D. Methylprednisolone

Handout Page 1-367; Answer Page 1-373

Treatment of Acute Relapses

- Intravenous methylprednisolone: The usual dose is 1 g/day as one or divided doses for 3–5 days
- Oral prednisone: The usual dose is 1250 mg/day given every other day for five doses
- Intravenous adrenocorticotropic hormone
- Neurologic recovery is the same with or without an oral prednisone taper

Page Number 1-363

Patient Case # 29

Which one of the following therapies is best for SF to prevent further exacerbations?

A. Interferon beta-1a

B. Interferon beta-1b

C. Glatiramer acetate

D. Any of the above

Handout Page 1-367; Answer Page 1-373

Patient Case # 30

S.F. elects to start beta interferon-1b and wants to know whether there is any way she can prevent or minimize some of the adverse effects.

Page Number 1-367

Patient Case # 30

Which one of the following is the best advice?

A. Always give the injection at the same time of day

B. Lie down for 2 hours after the injection

C. Rotate injection sites

D. Use a heating pad on the injection sites

Handout Page 1-367; Answer Page 1-373

Injection Site Reactions

- More common with subcutaneous products
- Bring medication to room temperature before injection
- Ice injection site
- Rotate injection sites

Page Number 1-363

accp American College of Clinical Pharmacy

Updates in Therapeutics® 2012:

The Pharmacotherapy Preparatory Review & Recertification Course
General Psychiatry
Kelly C. Lee, Pharm.D., BCPP, FCCP
University of California, San Diego

Conflict of Interest Disclosures

No conflict of interest to disclose.

Learning Objectives and/or Agenda

1. Describe pharmacotherapeutic options for managing the following psychiatric disorders: major depression, bipolar disorder, schizophrenia, anxiety disorders, insomnia, and alcohol withdrawal/dependence.
2. Describe the drugs used to treat the above disorders with respect to unique pharmacologic properties, therapeutic uses, adverse effects, and cognitive and behavioral effects.
3. Formulate a pharmacotherapeutic treatment plan when presented with a patient having depression, bipolar disorder, schizophrenia, anxiety disorder, insomnia, and alcohol withdrawal/dependence.

Page Number (Page number that the answer to Patient Case is located if applicable)

Outline

- Major Topics
  - Major Depression
  - Bipolar Disorder
  - Schizophrenia
- Minor Topics
  - Anxiety Disorders
  - Insomnia
  - Alcohol Dependence

103

Major Depression
Patient Case Page 1-380

- A.Z. is a 45-year-old woman with sleep apnea, hypertension, diabetes mellitus type 2, and chronic pain.
- She endorses sad mood, poor appetite (lost 15 lb), poor concentration, and feelings of hopelessness and worthlessness for the past 3 weeks.

Major Depression
Patient Case Page 1-380

- Also stopped going to her book club due to lack of motivation to get out of the house, and has frequent mid-nocturnal awakening.
- Denies SI/HI, ETOH, tobacco, or illicit drugs.
- Currently taking HCTZ, metformin, hydrocodone/acetaminophen, and aspirin. You decide that A.Z. should receive a selective serotonin reuptake inhibitor (SSRI) to treat her depressive symptoms.

Patient Case # 1

Which of the following SSRIs would most likely interact with her current medications?

A. Citalopram

B. Fluvoxamine

C. Paroxetine

D. Sertraline

Handout Page 1-380 ; Answer Page 1-415

Patient Evaluation

- Target symptoms
- Comorbidities, past medical history
- Family and personal psychiatric history
- Rating Scales (patient-rated, clinician-rated)
  - Hamilton Rating Scale for Depression (HAM-D)
  - Quick Inventory of Depressive Symptoms (QIDS)
  - Beck Depression Inventory (BDI)
  - Clinical Global Impression (CGI)
- Laboratory findings

107

DSM-IV Diagnostic Criteria

- **Depressed mood** or **anhedonia** (loss of interest or pleasure) and four (4) or more target symptoms (below) for at least two (2) weeks
- Weight change (loss or gain)
- Sleep disturbance (insomnia or hypersomnia)
- Decreased energy
- Feelings of worthlessness or guilt
- Decreased concentration
- Psychomotor agitation or retardation
- Recurrent thoughts of death or suicide

108

DSM-IV Diagnostic Criteria

- Rule out medical conditions or medications that could contribute to symptoms
  - Medical conditions
    - Hypothyroidism, Cushing's disease, pregnancy/postpartum, diabetes mellitus, Parkinson's, MS, Alzheimer's disease, CVA, MI, CHF, AIDS, menopause, RA, FM, IBS
  - Medications
    - High probability: Benzodiazepines, barbiturates, ETOH, corticosteroids, contraceptive implants, interferon alpha, interleukin-2, mefloquine, GnRHA, stimulant withdrawal
    - Low probability/uncertain: Reserpine, BB (propranolol), interferon beta, tamoxifen, digitalis

109

Patient Case # 2

Which one of the following antidepressants would be most appropriate for A.Z.'s depressive symptoms?

A. Bupropion

B. Fluoxetine

C. Mirtazapine

D. Venlafaxine

Handout Page 1-380; Answer Page 1-415

Selecting an Antidepressant

- Indication
- Previous response or familial response
- Severity and type of depression and symptoms
- Patient preference
- Financial consideration
- Side effect profile
- Suicidal ideation or risk of overdose
- Comorbidities (medical/psychiatric disorders, substance abuse history)
- Demographics: age, ethnicity

111

Patient Case # 3

A.Z. has been treated with citalopram 20 mg/day QAM x4 weeks. Still has sad mood, but her insomnia, concentration and appetite have improved. Still has feelings of hopelessness and worthlessness, lack of motivation, and anhedonia. At this point, which one of the following is the best recommendation to optimize her therapy?

A. Continue at current dose of 20 mg/day

B. Increase the current dose to 40 mg/day.

C. Add bupropion 150 mg twice daily

D. Switch to a different SSRI.

Handout Page 1-380; Answer Page 1-415

Major Depression Clinical Pearls

- Antidepressant are equally efficacious
- Selection is dependent on multiple patient and drug-related factors (next slide)
- Remission is primary goal of therapy
- Pharmacotherapy and psychotherapy produce best outcomes
- Onset of effect may take 4-6 weeks
- Single episode requires at least 7-12 months of antidepressant treatment

113

Black Box/Serious Warnings/ADR Guess the Antidepressant!

Warning	Antidepressant
Suicidality	
Insomnia/irritability	
Sedation	
Hepatotoxicity	
Seizures	
Hypertension	
Eating Disorders	
Withdrawal Syndrome	

114

Bipolar Disorder
Patient Case Page 1-389

- J.L. is a 26-year-old man with bipolar disorder I, who presents with delusions that the FBI is tracking his movements and that his thoughts are being recorded in a secret governmental database. He believes he has special powers to hide from the FBI by making himself invisible.
- He is hyperverbal and has not slept in the past 48 hours. He is placed on a 72-hour hold for control of his manic symptoms..

115

Bipolar Disorder
Patient Case Page 1-389

- He has a history of nonadherence to medications and is currently not taking any medications. J.L.'s last hospitalization was 2 months ago, when he had significant depressive symptoms and suicidal ideation.
- He has 3-4 hospitalizations per year, and his medication trials include carbamazepine, olanzapine, and lamotrigine (may be helpful but uncertain because of nonadherence). He has also received a diagnosis of hepatitis C.

Patient Case # 5

Which of the following statements is most applicable regarding selecting J.L.'s mood stabilizer at this time?

A. Carbamazepine should be tried again because it is effective for preventing rehospitalization.

B. Divalproex should be tried because it is good for maintenance treatment.

C. Lithium should be tried because it can effectively treat the manic phase and prevent future episodes.

D. Lamotrigine should be tried again because it is effective for bipolar maintenance.

Handout Page 1-389; Answer Page 1-415

Bipolar Disorder

- Cyclical disorder with recurrences of depressive episode and manic episode during patient's lifetime
- Episodic, long-term illness with variable course
- Bipolar disorder should be considered in differential diagnosis in patients presenting with depression

118

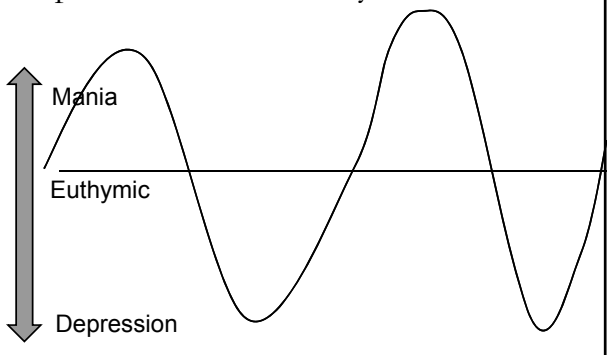
DSM-IV Diagnostic Criteria

- Manic episode
  - Distinct period of abnormally and persistently elevated, expansive or irritable mood, lasting at least 1 week (or any duration if hospitalization necessary)
  - Three or more* of following sx during mood disturbance: 1) inflated self-esteem or grandiosity, 2) decreased need for sleep, 3) more talkative than usual or pressured speech, 4) flight of ideas or racing thoughts (subjective), 5) distractibility, 6) increase in goal-directed activity (either socially, occupationally, sexually) or psychomotor agitation, 7) excessive involvement in pleasurable activities that have negative consequences (gambling, spending $$, sexual activity)

*Four or more sx required if only irritable mood

119

Bipolar Disorder Life Cycle



120

Mood Stabilizers: Uses

Lithium	Mania, depression, maintenance
Valproic acid	Mania, maintenance
Lamotrigine	Maintenance, depression
Carbamazepine	Mania, maintenance
Oxcarbazepine	Mania, maintenance
Antipsychotics	Olanz: mania, maintenance
	Quet: mania, depression, maint*
	Aripip: mania, maintenance
	Risp, zipras, asenapine: mania

*As adjunct

121

Mood Stabilizers
Therapeutic Efficacy

Lithium	1-2 weeks
Valproic acid	3-5 days
Lamotrigine	5 weeks to reach target dose
Carbamazepine	4 weeks for autoinduction
Oxcarbazepine	1-2 weeks
Antipsychotics	Few days

122

Patient Case # 6

Which of the following adverse effects would be of most concern and would require immediate evaluation if J.L. were prescribed lithium?

A. Hyperthyroidism.

B. Coarse tremor.

C. Severe acne.

D. Weight gain

Handout Page 1-389; Answer Page 1-415

Bipolar Disorder

- Lithium
  - Excreted 95% unchanged by glomerular filtration
  - Initial workup: CBC, electrolytes, renal function
  - Serum conc: 0.8-1.2 mEq/L (acute mania), 0.6-1.0 mEq/L (maintenance)
  - Other labs: thyroid function, urinalysis, poss. EKG, pregnancy test
  - Factors that ↑ Li: Drugs (discussed later), ↓ renal function, dehydration, salt restriction
  - Factors that ↓ Li: Drugs, pregnancy, aging

124

Patient Case # 7

J.L. has been stable on lithium 900 mg/day x 3mo. During a clinic visit, J.L. is confused and slurring his words. His other medications include lisinopril, ibuprofen, atorvastatin, and zolpidem. Which one of the following is best to recommend immediately?

A. Discontinue lisinopril because it interacts with lithium.

B. Discontinue zolpidem because it may increase confusion.

C. Obtain a lithium level because J.L. may have supratherapeutic levels.

D. Discontinue ibuprofen because it interacts with lithium.

Handout Page 1-389; Answer Page 1-415

Adverse Effects

- Lithium
- Valproic acid
- Lamotrigine
- Carbamazepine
- Oxcarbazepine
- Antipsychotics

126

Drug Interactions
Table 5, Page 1-391, 1-392

- Lithium
- Valproic acid
- Lamotrigine
- Carbamazepine
- Oxcarbazepine

127

Bipolar Disorder
Clinical Pearls

- Selection of treatment depends on acute phase vs maintenance phase
- Mood stabilizers are not equally efficacious
- Selection is dependent on efficacy and drug-related factors
- Euthymic state and avoidance of hospitalization are goal of therapy
- Onset of effect may occur within 1-2 weeks
- Patients may need life-long treatment

128

Schizophrenia
Patient Case Page 1-393

- L.M. is a 25-year-old man with recent diagnosis of schizophrenia, paranoid type. He frequently hears voices telling him that he is "stupid and worthless" and that he should "just jump off his apartment building." His parents became very concerned over his isolative behavior and brought him to the hospital.

129

Schizophrenia
Patient Case Page 1-393

- He was given haloperidol in the psychiatry unit and now presents with neck stiffness and feelings of extreme restlessness.
- Up to this point, he has not taken medications because he felt that he could control his symptoms on his own with vitamins and Red Bull drinks.

Patient Case # 8
Which one of the following is the most appropriate treatment of L.M.'s symptoms at this time?

A. Benztropine

B. Haloperidol.

C. Olanzapine.

D. Quetiapine.

Handout Page 1-393; Answer Page 1-415

Antipsychotic Agents

- Conventional "first generation", "typical"
  - Block postsynaptic D_2 receptors (mainly), α1, M1, H1
  - Alleviate positive symptoms of schizophrenia
  - Blockade of DA in nigrostriatal tract → movement d/o
  - Blockade of DA in tuberoinfundibular tract → ↑prolactin
- Atypical ("novel", "second generation")
  - Block D_2 and $5HT_2$, α1, M1, H1 receptors
  - Alleviate positive and negative symptoms, cognitive dysfunction
  - Minimal ↑ in serum prolactin, minimal risk of EPS, TD
- In each class, efficacy most likely similar for first episode schizophrenia; Exception: clozapine

132

Patient Case # 9

You and the psychiatric team decide to recommend risperidone for L.M. Which one of the following is the most likely reason for this selection?

A. Risperidone has less risk of causing EPS than haloperidol.

B. Risperidone is available in a long-acting injection for increasing adherence.

C. Risperidone is effective for decreasing L.M.'s negative symptoms.

D. Risperidone can be dosed once daily after titration to target dose.

Handout Page 1-393 ; Answer Page 1-415

Patient Case # 11

One year later, L.M. is no longer responding to risperidone, and you decide to switch him to another medication. He is only interested in oral medications. Which one of the following agents is most appropriate at this time?

A. Clozapine.

B. Fluphenazine.

C. Olanzapine.

D. Quetiapine.

Handout Page 1-393; Answer Page 1-416

First Generation Antipsychotics
Table 8, Page 1-396

Generic Name	Trade Name	Chemical Class	Dose Equivalence
Low Potency			
Chlorpromazine	Thorazine	Aliphatic phenothiazine	100
Thioridazine	Mellaril	Piperidine phenothiazine	100
Mid-Potency			
Perphenazine	Trilafon	Piperazine phenothiazine	10
Loxapine	Loxitane	Dibenzoxazepines	10
High Potency			
Haloperidol	Haldol	Butyrophenone	2
Fluphenazine	Prolixin	Piperazine phenothiazine	2
Thiothixene	Navane	Thioxanthenes	4

135

Second Generation Antipsychotics
Table 10, Page 1-401

Generic Name	Trade Name	Chemical Class	Dose Equivalence*
Clozapine	Clozaril	Dibenzodiazepine	50
Risperidone	Risperdal	Benzisoxazole	2
Olanzapine	Zyprexa	Thienobenzodiazepine	5
Quetiapine	Seroquel	Dibenzothiazepine	75
Ziprasidone	Geodon	Benzothizolylpiperazine	60
Aripiprazole	Abilify	Quinolinone derivative	7.5
Paliperidone	Invega	Benzisoxazole	--
Asenapine	Saphris	Dibenzo-oxepino pyrroles	--
Iloperidone	Fanapt	Piperidinyl-benzisoxazole	--
Lurasidone	Latuda	Benzoisothiazole	--

*Woods SW. Chlorpromazine equivalent doses for the newer atypical antipsychotics. J Clin Psychiatry 2003;64(6):663-7

136

Adverse Effects
Table 9, Page 1-400

	Anticholinergic	Sedation	EPS	Orthostasis
Clozapine	4	4	1	4
Risperidone	1	2	2-3	3
Olanzapine	3	3	1	1
Quetiapine	1	3	1	3
Ziprasidone	1	1	1	1
Aripiprazole	1	1	1	1
Paliperidone	1	1	2-3	1
Asenapine	2	4	1	4
Iloperidone	1	1	1	4
Lurasidone	1	1	1	1

1=none to minimal, 4=high; EPS=extrapyramidal symptoms

137

Adverse Effects
Guess the antipsychotic!

- Agranulocytosis
- Metabolic syndrome
- QT prolongation
- Cardiomyopathy
- Hepatitis
- Seizures
- Ophthalmic

138

Management of Adverse Effects

Dystonia	Anticholinergic
Akathisia	Anticholinergic, β-blockers
Parkinsonism	Anticholinergic, amantadine
Tardive dyskinesia	Prevention, reduce dose
Anticholinergic	Symptomatic
Sedation	Move dose to bedtime
Orthostasis	Hydration, split dose
Neuroleptic malignant syndrome	Dantrolene, hydration, symptomatic

139

Schizophrenia
Clinical Pearls

- All antipsychotics are equally efficacious except clozapine
- Second generation antipsychotics have better negative symptom control and less EPS
- Selection is dependent on multiple patient and drug-related factors
- Remission may never be achieved and primary goal is to control symptoms and minimize adverse

140

Schizophrenia
Clinical Pearls

- Positive and negative symptoms, functional outcomes and cognitive impairment are key target areas for treatment
- Avoidance of hospitalization is critical
- Onset of effect may take 4-6 weeks
- Most patients require life-long treatment

141

Anxiety Disorders
Patient Case Page 1-402

- C.P. is a recent Iraq war veteran who has been treated successfully with paroxetine for his major depression for the past 3 weeks. He presents to the clinic with nightmares, "feeling on edge all the time," and flashbacks of his time in the war. He is evaluated for and given a diagnosis of posttraumatic stress disorder (PTSD). He has no history of substance dependence and has no significant medical history.

Patient Case # 12

Which one of the following recommendations is most appropriate at this time?

A. Continue paroxetine because it treats both PTSD and major depression.

B. Discontinue paroxetine and start sertraline, which treats both PTSD and major depression.

C. Continue paroxetine and add lorazepam for the anxiety symptoms.

D. Discontinue paroxetine and start buspirone for the anxiety symptoms.

Handout Page 1-402; Answer Page 1-416

Guess the Anxiety Disorder

- Patient who is often labeled as a worrywart
- Patient who spends 2 hours every day making sure her towels are neatly folded
- Patient who startles easily and complains of nightmares about her time in combat
- Patient who has moments where she feels like she's dying and afraid to drive
- Patient who is afraid of snakes and can't go to the zoo

144

Patient Case # 13

C.P. has been adherent to the medication you recommended above, but he still feels very irritable and has been aggressive at times at work toward others. Which one of the following adjunctive medications is most appropriate in this patient?

A. Buspirone.

B. Clonazepam.

C. Divalproex.

D. Lithium.

Handout Page 1-402; Answer Page 1-416

Patient Case # 15

C.P. returns to the clinic and states that his depressive and anxiety symptoms have much improved. How-ever, he is concerned that his girlfriend, who has obsessive-compulsive disorder, is not doing well on her treatment with lorazepam. If you were also treating the girlfriend, which one of the following would be the most appropriate medication you would initiate?

A. Clomipramine.

B. Amitriptyline.

C. Imipramine.

D. Nortriptyline.

Handout Page ; Answer Page

Which agent is effective for different anxiety disorders?

- SSRI
- Venlafaxine
- Buspirone
- Benzodiazepines
- Duloxetine
- Mood stabilizers
- MAOIs
- Beta blockers

147

Insomnia
Patient Case Page 1-405

- C.D. is a 38-year-old kindergarten teacher who presents to clinic today with noticeable dark circles under her eyes. She has difficulty with sleep, mainly with staying asleep. It takes her about 20 minutes to fall asleep, but after about 2 hours, she wakes up and cannot fall asleep again for several hours. This pattern has taken a toll on her job, and she feels tired all the time.

148

Insomnia
Patient Case Page 1-405

- She once took diphenhydramine for sleep but had to miss work because of extreme drowsiness in the morning. She wonders whether there are any other medications that she can take. Her other medical problems include hypothyroidism (levothyroxine 125 mcg at bedtime), hypertension (HCTZ 25 mg in the morning), chronic back pain (ibuprofen 800 mg 3 times/day), and MDD (citalopram 20 mg in the morning).

Patient Case # 16

Which one of the following agents is most likely contributing to C.D.'s insomnia?

A. Citalopram.

B. Hydrochlorothiazide

C. Ibuprofen.

D. Levothyroxine.

Handout Page 1-405; Answer Page 1-416

Patient Case # 17

Which one of the following medications used for insomnia is most appropriate to recommend for C.D.?

A. Eszopiclone.

B. Trazodone.

C. Temazepam.

D. Zaleplon.

Handout Page 1-405; Answer Page 1-416

Insomnia Classification
Table 13, Page 1-407

Type	Duration	Likely Causes
Transient	<1 week	Acute situational or environmental stressors
Short term	< 4 weeks	Continued personal stress
Chronic	.> 4 weeks	Psychiatric illness, substance abuse
		Behavioral causes (poor sleep hygiene)
		Medical causes, primary sleep disorder (e.g. sleep apnea, restless legs syndrome)

152

Insomnia

- Sedative hypnotics are differentiated by
  - Pharmacokinetic properties
  - Efficacy in onset and duration
  - Adverse effects
  - Drug interactions
  - Abuse potential
  - Cost

153

Insomnia

Drug	Usual Dose (mg)	Half-life (hrs)	Duration
Triazolam	0.125-0.25	2-6	Short
Temazepam	15-30	8-20	Intermediate
Estazolam	1-2	8-24	Intermediate
Flurazepam	15-30	48-120	Long
Quazepam	7.5-15	48-120	Long
Zolpidem	5-10	1.5-4.0	Short
Zaleplon	5-10	1	Very Short
Eszopiclone	2-3	6	Short
Ramelteon	8	1-3	Short

154

Insomnia
Guess the Sedative-Hypnotic!

- No abuse potential
- Second dose can be taken at night
- Can cause anterograde amnesia
- Common OTC sedative

155

Substance Abuse – Alcohol
Patient Case Page 1-410

- L.M. is a 50-year-old man with a 25-year history of alcohol dependence who was found unconscious after his last drinking binge. He was first admitted to the medical unit for alcohol withdrawal symptoms before being transferred to the Substance Dependence Unit. His last drink was 6 hours ago, and fluids have been started.

156

Substance Abuse – Alcohol
Patient Case Page 1-410

- He has had three alcohol-withdrawal seizures in the past and an episode of delirium tremens.
- He also has significant hepatitis, and liver function tests show aspartate aminotransferase (AST) of 220 and alanine aminotransferase (ALT) of 200.

Patient Case # 19

Which one of the following symptoms are you most likely to observe in the medical unit?

A. Alcohol craving.

B. Delirium tremens.

C. Increased heart rate.

D. Seizures.

Handout Page 1-410; Answer Page 1-416

Patient Case # 20

Which one of the following agents is best for alcohol withdrawal symptoms in L.M. for intramuscular administration?

A. Chlordiazepoxide.

B. Clonazepam.

C. Diazepam.

D. Lorazepam.

Handout Page 1-410; Answer Page 1-416

Patient Case # 22

Which of the following medications is best to use in L.M. for alcohol dependence?

A. Acamprosate.

B. Diazepam.

C. Disulfiram.

D. Naltrexone.

Handout Page 1-410; Answer Page 1-416

Substance Abuse – Alcohol
Table 15, Page 1-411

Stage	Onset	Symptoms
1	0-8 hrs	Mild tremors, nervousness, tachycardia, nausea
2	12-24 hrs	Marked tremors, hyperactivity, tachycardia, insomnia, nightmares, illusions, alcohol craving
3	12-48 hrs	More severe symptoms than during stage 2, seizures may occur
4	3-5 days	Delirium tremens, confusion, agitation, tremor, insomnia, tachycardia, sweating, hyperpyrexia

161

Substance Abuse – Alcohol
Management

- Labs: tox screen, renal and liver function, folate, thiamine, B12 levels, electrolytes
- Nutrition: thiamine, magnesium, vitamins, fluid
- Seizures: benzodiazepines, other antiepileptics not as effective
- Hallucinations: benzodiazepines, haloperidol (caution with seizures)

162

Substance Abuse – Alcohol
Table 16, Page 1-412

Drug	Dose	Comments
Lorazepam	1-2 mg PO/IV/IM	Can use with liver disease
Diazepam	5-20 mg PO	Use lower dose with liver disease, can use loading-dose strategy
Chlordiazepoxide	25-100 mg PO/IV	Long acting; caution with liver disease

163

Questions?