Pharmacology III – CNS Module Practice Exam (Sample)

Study Guide

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Questions

1. What color does urine turn when taking Entacapone?

A. Bright green

B. Pale yellow

C. Brownish orange

D. Dark blue

2. Which drug, when used to treat myasthenia gravis, must be given on time to prevent muscle weakness?

A. Pyridostigmine

B. Neostigmine

C. Rivastigmine

D. Donepezil

3. Which benzodiazepine is commonly prescribed for anxiety disorders?

A. Flumazenil

B. Diazepam

C. Alprazolam

D. Lorazepam

4. Which types of seizures are treated with valproate?

A. Tonic clonic, absence, mixed

B. Myoclonic, clonic, atonic

C. Partial, febrile, tonic

D. Complex, simple, secondary

5. Which parenteral immunodilators are commonly used in the treatment of MS?

A. Glatiramer acetate, teriflunomide

B. Interferon beta-1a, interferon beta-1b

C. Edrophonium, atropine

D. Carbamazepine, phenytoin

6. Which inhalation anesthetic is considered a flammable option?

- **A. Cyclopropane**
- **B. Halothane**
- **C. Sevoflurane**
- **D. Desflurane**

7. What component of carbidopa-levodopa inhibits the enzyme dopa decarboxylase?

- **A. Levodopa**
- **B. Carbidopa**
- **C. Ropinirole**
- **D. Bromocriptine**

8. What class of drugs is primarily used to treat anxiety disorders?

- **A. Antidepressants**
- **B. Anxiolytics**
- **C. Stimulants**
- **D. Antipsychotics**

9. Which of the following is a contraindication for phenytoin?

- **A. Oral route**
- **B. IM route**
- **C. Intravenous route**
- **D. Topical application**

10. Which of the following is a notable side effect of barbiturates?

- **A. Tolerance**
- **B. Dry mouth**
- **C. Hyperactivity**
- **D. Priyapism**

Answers

1. C
2. B
3. C
4. A
5. B
6. A
7. B
8. B
9. B
10. A

Explanations

1. What color does urine turn when taking Entacapone?

A. Bright green

B. Pale yellow

C. Brownish orange

D. Dark blue

Entacapone is a COMT inhibitor that is primarily used in the management of Parkinson's disease, particularly in conjunction with levodopa therapy to prolong the effect of levodopa. One notable side effect of entacapone is that it can cause urine to change color, specifically turning it a brownish orange. This color change is attributed to the altered metabolism and excretion of catecholamines and their metabolites, which are impacted by the drug's action on the catechol-O-methyltransferase (COMT) enzyme. When entacapone inhibits the metabolism of levodopa, it leads to an accumulation of certain metabolites that can impart a darker color to the urine. Recognizing this side effect is important for both patients and healthcare providers, as it helps in differentiating between harmless side effects and those that may indicate a more serious condition. Understanding the pharmacological impact of entacapone on urine color is therefore crucial in managing patient expectations and monitoring.

2. Which drug, when used to treat myasthenia gravis, must be given on time to prevent muscle weakness?

A. Pyridostigmine

B. Neostigmine

C. Rivastigmine

D. Donepezil

Pyridostigmine is the drug that must be given on time to prevent muscle weakness in patients with myasthenia gravis. It is a reversible acetylcholinesterase inhibitor that increases the availability of acetylcholine at the neuromuscular junction, which is crucial for improving muscle strength. Since myasthenia gravis involves an autoimmune attack on acetylcholine receptors, timely administration of pyridostigmine helps maintain adequate muscle function. Neostigmine, while also an acetylcholinesterase inhibitor, has a shorter duration of action compared to pyridostigmine, making it less optimal for regular management of myasthenia gravis in terms of timing. Rivastigmine and donepezil are primarily used in the context of Alzheimer's disease and are not first-line treatments for myasthenia gravis. Their mechanism of action, while similar in inhibiting acetylcholinesterase, does not specifically address the neuromuscular problems associated with myasthenia gravis. Thus, to effectively manage symptoms and prevent muscle weakness in this condition, pyridostigmine's consistent and timely dosing is essential.

3. Which benzodiazepine is commonly prescribed for anxiety disorders?

A. Flumazenil

B. Diazepam

C. Alprazolam

D. Lorazepam

Alprazolam is commonly prescribed for anxiety disorders because of its pharmacokinetic profile and efficacy in quickly alleviating anxiety symptoms. It belongs to the class of benzodiazepines, which are known for their anxiolytic (anxiety-reducing), sedative, and muscle-relaxing properties. Alprazolam has a relatively fast onset of action, making it particularly useful for individuals experiencing acute episodes of anxiety, such as panic attacks. Due to its moderate to high potency and its ability to produce a rapid therapeutic effect, alprazolam is often selected in clinical settings when addressing anxiety disorders, including generalized anxiety disorder (GAD) and panic disorder. It also aids in stabilizing mood and reducing excessive apprehension. While other benzodiazepines like lorazepam and diazepam can also be used for anxiety management, alprazolam is specifically effective for panic disorder, which sets it apart in terms of clinical preference. Flumazenil, on the other hand, is an antagonist for benzodiazepine receptors and is used primarily in overdose situations, which is not applicable when treating anxiety disorders.

4. Which types of seizures are treated with valproate?

A. Tonic clonic, absence, mixed

B. Myoclonic, clonic, atonic

C. Partial, febrile, tonic

D. Complex, simple, secondary

Valproate is an anticonvulsant medication that is effective in managing a broad range of seizure types. It is particularly known for its efficacy in treating tonic-clonic seizures, which are characterized by both tonic (stiffening of the body) and clonic (repetitive jerking movements) phases. Additionally, valproate is effective in treating absence seizures, which are brief episodes of loss of consciousness typically seen in children. The term "mixed" indicates that valproate can also effectively address multiple types of seizures, showcasing its versatility in seizure management. The ability of valproate to manage different seizure types stems from its mechanism of action, which includes increasing the availability of the inhibitory neurotransmitter GABA in the brain and modulating cell excitability. As such, it is a cornerstone in the treatment regimens for epilepsy due to this broad spectrum of action, making it suitable for patients with mixed seizure disorders also. In contrast, other choices include seizure types that either do not respond as effectively to valproate or represent classifications that better correspond with other antiepileptic agents. This highlights the importance of knowing the specific seizure types treated by valproate to optimize therapeutic strategies in clinical practice.

5. Which parenteral immunodilators are commonly used in the treatment of MS?

A. Glatiramer acetate, teriflunomide

B. Interferon beta-1a, interferon beta-1b

C. Edrophonium, atropine

D. Carbamazepine, phenytoin

The choice of interferon beta-1a and interferon beta-1b as parenteral immunodilators in the treatment of multiple sclerosis (MS) is rooted in their established mechanisms of action and clinical efficacy. These agents are classified as disease-modifying therapies aimed at reducing the frequency of relapses and delaying the progression of disability in patients with relapsing forms of MS. Interferon beta products work by modulating the immune system. They help to inhibit the inflammatory response that contributes to the demyelination of neurons in MS. Specifically, interferons can alter the balance of pro-inflammatory and anti-inflammatory cytokines, reducing the recruitment of immune cells to the central nervous system, and thus limiting the damage to myelin and nerve fibers. In the context of MS, these therapies have been shown through numerous clinical trials to effectively decrease relapse rates and slow down disease progression, making them a cornerstone in the management of this condition. Points such as the route of administration (typically via intramuscular or subcutaneous injections) further emphasize their categorization as parenteral immunodilators. Conversely, other options such as glatiramer acetate (which, although effective, is not classified with interferons) and teriflunomide (

6. Which inhalation anesthetic is considered a flammable option?

A. Cyclopropane

B. Halothane

C. Sevoflurane

D. Desflurane

Cyclopropane is considered a flammable inhalation anesthetic due to its chemical structure and properties. It has a low flash point, which means it can ignite easily when exposed to an ignition source. This characteristic makes it a significant safety concern during anesthetic procedures, particularly in settings that may have sources of ignition or flammable gases. Halothane, sevoflurane, and desflurane are all non-flammable and have been widely used in clinical practice without such risks. Halothane, although no longer commonly used, is known for its anesthetic properties without flammability; similarly, both sevoflurane and desflurane are contemporary agents that provide effective anesthesia and have good safety profiles with respect to fire hazards. Understanding the flammability of anesthetics is crucial for ensuring patient safety and maintaining a secure operating environment.

7. What component of carbidopa-levodopa inhibits the enzyme dopa decarboxylase?

A. Levodopa

B. Carbidopa

C. Ropinirole

D. Bromocriptine

Carbidopa is the component of the combination carbidopa-levodopa that inhibits the enzyme dopa decarboxylase. This inhibition is crucial because dopa decarboxylase is responsible for converting levodopa into dopamine outside of the brain, particularly in the periphery. By blocking this enzyme, carbidopa ensures that more levodopa is available to cross the blood-brain barrier and be converted into dopamine within the central nervous system. This pharmacological strategy enhances the effectiveness of levodopa therapy in treating conditions such as Parkinson's disease while minimizing side effects associated with peripheral dopamine production, such as nausea and cardiovascular effects. The other options refer to different medications and their mechanisms of action. Ropinirole and bromocriptine are dopamine receptor agonists and do not inhibit dopa decarboxylase. Levodopa is the precursor to dopamine and does not have any effect on the decarboxylation process itself. Thus, carbidopa's role is essential in maximizing the therapeutic effects of levodopa in the treatment of Parkinson's disease.

8. What class of drugs is primarily used to treat anxiety disorders?

A. Antidepressants

B. Anxiolytics

C. Stimulants

D. Antipsychotics

Anxiolytics are specifically designed to alleviate symptoms of anxiety disorders. This class of drugs, which includes benzodiazepines and buspirone, acts by enhancing the effects of a neurotransmitter called gamma-aminobutyric acid (GABA), leading to a calming effect on the brain and central nervous system. They are effective for the short-term relief of anxiety symptoms. In contrast, while antidepressants can also be used for anxiety disorders—particularly selective serotonin reuptake inhibitors (SSRIs) and serotonin-norepinephrine reuptake inhibitors (SNRIs) that may help in treating longer-term anxiety—they are primarily designed to treat depression and may take several weeks to show their full effect. Stimulants are typically used to treat attention deficit hyperactivity disorder (ADHD) and can increase anxiety in some individuals, and antipsychotics are used primarily for psychotic disorders or mood stabilization, not primarily for anxiety disorders. Therefore, anxiolytics are the most direct and commonly prescribed class of drugs for the treatment of anxiety.

9. Which of the following is a contraindication for phenytoin?

A. Oral route

B. IM route

C. Intravenous route

D. Topical application

Phenytoin, an antiepileptic medication, is primarily used to manage seizures. The administration routes for this medication have specific considerations. The intramuscular (IM) route is a contraindication for phenytoin due to its poor absorption and the risk of local tissue irritation. Phenytoin is known to cause infiltration and potential necrosis if administered through the IM route, which can lead to serious complications. In contrast, the oral, intravenous (IV), and topical routes may be utilized in specific clinical contexts. The oral route is commonly used for long-term management, the IV route is appropriate for acute scenarios where rapid action is required, and topical formulations can be used for localized effects in certain situations. Thus, the IM administration of phenytoin is avoided to ensure patient safety and the effectiveness of the drug.

10. Which of the following is a notable side effect of barbiturates?

A. Tolerance

B. Dry mouth

C. Hyperactivity

D. Priyapism

Tolerance is a notable side effect of barbiturates because prolonged use of these medications leads to a decreasing effect over time. The body adapts to the presence of the drug, resulting in the need for higher doses to achieve the same therapeutic effect. This phenomenon is particularly important for barbiturates, as they have a narrow therapeutic index and the development of tolerance can lead to an increased risk of overdose and related complications. In the context of the other options, while dry mouth may occur as a side effect due to anticholinergic properties in some medications, it is not as significant or characteristic of barbiturate use. Hyperactivity is generally not associated with barbiturates, as they are primarily depressants of the central nervous system. Priapism, although a serious condition, is more commonly linked to medications such as PDE5 inhibitors or certain antidepressants, rather than barbiturates. Therefore, tolerance stands out as a prominent and concerning side effect in the context of barbiturate usage.