Opioid Medications (Cases Only)

Goal

To prepare the learner to apply an understanding of the biology and pharmacology of opioids and in particular, buprenorphine, when treating patients with opioid use disorder.

After completing this module (didactic + cases), participants will be able to:

- Relate the functions of opioid receptors to the clinical effects and treatment of opioid use disorder
- Compare the pharmacology of opioid agonists, partial agonists, and antagonists
- Relate pharmacological properties of buprenorphine and naloxone to physiological effects in patients
- Apply concepts relevant to addiction, including overdose, tolerance, and withdrawal, to opioid use and buprenorphine treatment

Professional Practice Gap

Providers need to understand the pharmacology of opioids and buprenorphine so they can safely and effectively treat their patients with opioid use disorder. TIP 40[1] devoted an entire chapter to the pharmacology of opioids and specifically buprenorphine, including its safety and effectiveness for the treatment of opioid use disorder, demonstrating the importance of this topic for providers planning to prescribe buprenorphine[2]. The FSMB Model Policy for DATA 2000 described specific requirements for prescriptions and that the provider educate the patient adequately[3].

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EXAMPLE PATIENT ENCOUNTER

Overview

Mr. Samuels is a new patient to your clinic. He has come in complaining of flu-like symptoms, experienced over the past two days. Upon filling out the intake form, he states that he had a back injury six months ago, but no other medical issues to report.

Patient Interview

***Mr. Samuels**: I'm feeling really bad. I've had a fever and muscle aches for two days now. And I've been throwing up, too. Last night I couldn't sleep either, and I'm having a hard time concentrating today. Do you think I've got the flu?*

***Provider**: That's a possibility. Have you been around anyone who has had the flu recently?*

***Mr. Samuels:** Nobody that I know of. I started feeling bad right after I ran out of my oxycodone.*

***Provider**: I see that you had a back injury six months ago. Are you taking oxycodone for that?*

***Mr. Samuels:** Yes, but my prescription ran out. Then I got sick and I haven't had a chance to get a refill.*

***Provider**: And you've been on it for the entire six months?*

***Mr. Samuels**: Right. The pain was pretty bad for a while. It's better now, but I still have a little pain a couple of times a week. And I just don't feel right if I don't take it – I have low energy and get moody. That's why I keep getting it refilled.*

***Provider**: I think your body might be going through withdrawal from the oxycodone. Your system's become accustomed to the drug being in your system, so the sudden cessation has caused you to experience very common withdrawal symptoms such as fever, vomiting, muscle aches, and insomnia.*

***Mr. Samuels**: Can you give me a refill then? I'm feeling really bad.*

***Provider**: Let's do some further evaluation to determine what the best course of treatment is at this time.*

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OPIOID TOLERANCE

Repeated administration of opioid agonists and partial agonists leads to the neurological adaptation of **tolerance** for opioids.

TOLERANCE is a state of physiologic adaptation in which exposure to a drug induces changes that result in a diminution of one or more of the drug's effects over time[3].

Physiologically, this means that the opioid user requires increasingly larger opioid doses to get the same drug effects[8].

A consequence of this neurological adaptation is that habitual use of opioids, both illicit and licit, leads to physical dependence on opioids. The adapted neurological system is unable to function "normally" if there is a drop in levels of opioids, such as might occur if the dependent individual stops taking an opioid agonist or the actions of the opioid agonist are blocked by an opioid antagonist[9].

Mr. Samuels' Opioid Dose Trajectory

***Provider**: What dose do you usually take?*

***Mr. Samuels:** 20 mg. I started at 10 mg, but now I need more to feel right.*

***Provider**: It sounds like you're building up tolerance, which means that your body needs a higher dose to get the same effect. I actually recommend we try to taper that down, especially since you're no longer in pain.*

Quiz: Opioid Tolerance

Which Of The Following Is NOT A Feature Of Opioid Tolerance? (Choose All That Apply)

1. Must increase the dose of opioid taken to maintain level of opioid effect
2. Intense craving for opioids
3. Decrease in opioid receptor sensitivity
4. Can be brought on by repeated use of illicit or licit opioids

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OPIOID TOLERANCE QUIZ FEEDBACK

(1) Must Increase The Dose Of Opioid Taken To Maintain Level Of Opioid Effect
This IS a feature of opioid tolerance.

(2) Intense Craving For Opioids
Correct. This IS NOT a feature of opioid tolerance.

(3) Decrease In Opioid Receptor Sensitivity
This IS a feature of opioid tolerance.

(4) Can Be Brought On By Repeated Use Of Illicit Or Licit Opioids
This IS a feature of opioid tolerance.

Craving for opioids is a hallmark of addiction, which is a related but distinct phenomenon from tolerance.

Cravings and tolerance are among the criteria for the diagnosis of opioid use disorder.

Practice Action
Explain to patients that they will not develop tolerance to buprenorphine, as they may have experienced with opioids. Patients tend to be able to stay at a stable dose of buprenorphine for a long time.

Mr. Samuels Withdrawal Evaluation

Recall Mr. Samuels, who presented with flu-like symptoms, experienced for two days. The symptoms started after he stopped taking oxycodone, which he had been taking for 6 months. His symptoms included:

- *Fever
- *Muscle aches
- *Vomiting
- *Insomnia
- Difficulty concentrating
- Low energy
- *Depressed mood

The symptoms marked with an "*" are on the list of symptoms required for a diagnosis of withdrawal, so he meets more than the required three criteria needed.

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QUIZ: NALOXONE

With Respect To Treating Overdose, How Does Naloxone Treatment Of Buprenorphine (a Partial Opioid Agonist) Overdose Compare To Naloxone Treatment Of Full Agonist Opioid Overdose (Choose One)

1. Faster
2. About the same
3. Slower

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NALOXONE QUIZ FEEDBACK

(1) Faster, (2) About The Same

As compared to other opioid antagonists, the effects of utilizing naloxone for buprenorphine overdose is slower.

(3) Slower

Correct. As compared to other opioid antagonists, the effects of utilizing naloxone for buprenorphine overdose is slower.

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QUIZ: BUPRENORPHINE PHARMA

Which Of The Following Best Describes The Action Of Buprenorphine On Opioid Receptors? (Choose The Best Answer)

1. Partial mu antagonist, kappa agonist
2. Mu antagonist, kappa agonist
3. Partial mu agonist, kappa antagonist
4. None of the above

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BUPRENORPHINE PHARMA QUIZ FEEDBACK

(1) Partial Mu Antagonist, Kappa Agonist,

(2) Mu Antagonist, Kappa Agonist,

(4) None Of The Above

Buprenorphine is classified as a partial mu agonist, kappa antagonist, and nociceptin (kappa-type 3 opioid) receptor agonist.

(3) Partial Mu Agonist, Kappa Antagonist

Correct. Buprenorphine is classified as a partial mu agonist, kappa antagonist, and nociceptin (kappa-type 3 opioid) receptor agonist.

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QUIZ: DIAGNOSING SYMPTOMS

Mrs. Murphy has come to your office complaining of nausea and sweating. She recently started buprenorphine treatment after ceasing use of opioids. Mrs. Murphy reports that the symptoms have come on within the past two days and she is having a hard time sleeping at night as well.

Based On Her Symptoms, What Is Mrs. Murphy Experiencing? (Choose One)

1. Opioid withdrawal
2. Side effects from buprenorphine
3. Unable to determine based on symptoms

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CASE: DIAGNOSING SYMPTOMS QUIZ FEEDBACK

(1) Opioid Withdrawal,

(2) Side Effects From Buprenorphine

These are side effects of buprenorphine, but they are also present as a result of opioid withdrawal.

(3) Unable To Determine Based On Symptoms

Correct. These symptoms are present both during opioid withdrawal and as a result of buprenorphine side effects.

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QUIZ: DRUG INTERACTIONS

Which Of The Following Drugs That Interact With Buprenorphine Is Most Likely To Have A Relatively Severe Interaction With Buprenorphine? (Choose One)

1. Antiretroviral agents
2. Cocaine
3. Benzodiazepines
4. SSRI antidepressants

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DRUG INTERACTIONS QUIZ FEEDBACK

(1) Antiretroviral Agents

Many antiretroviral agents have interactions with opioid treatment, but they are not as likely to be life-threatening as interactions with benzodiazepines or alcohol.

(2) Cocaine

Drug interactions between buprenorphine and cocaine are not clear; severe interactions have not been reported commonly. The interaction between buprenorphine and benzodiazepines can be particularly serious. Overdosing on both of these drugs at the same time may cause fatal respiratory depression. Alcohol and other CNS depressants also can cause overdose, respiratory depression, and death when taken with buprenorphine.

(3) Benzodiazepines

Correct. The interaction between buprenorphine and benzodiazepines can be particularly serious. Overdosing on both of these drugs at the same time may cause fatal respiratory depression. Alcohol and other CNS depressants also can cause overdose, respiratory depression, and death when taken with buprenorphine.

(4) SSRI Antidepressants

May increase drowsiness a little in combination with buprenorphine especially initially. Depressants, such as benzodiazepines, alcohol, sedatives, hypnotics, general anesthetics, tranquilizers, and other opioids, are more dangerous in combination with buprenorphine.

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