Opioid Toxicity and Naloxone: Implications for the K-12 Population

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Outline

- Definitions
- Patterns of opioid exposure grades K-12
- Opioid Toxicology
 - I. Opioid toxidrome
 - II. Pharmacologic differences: effect on toxicity
 - III. Designer opioids: what this means for WV
- Naloxone
 - I. Mechanism details
 - II. Potential adverse effects
 - III. Meaning of "response" to naloxone



Definitions

- Opioid
 - A drug that works by binding to the opioid receptors
 - Opioid receptors are where the body's "natural" painkillers (endorphins for example) attach to decrease the perception of pain
 - Examples: morphine, hydrocodone, heroin, oxycodone
- Naloxone
 - Opioid antidote
 - Competitively takes the place of the opioid on the opioid receptor



Young Opioid Abusers

- Survey of 50 injection drug users 16-25 years
 - Hydrocodone/acetaminophen, oxycodone, oxycodone/acetaminophen most common initial opioid drugs
 - Average age first use = 14.5 years
 - Obtained from family member, their own Rx, friend/contact
 - Oral = 41, Sniffing/snorting = 8, Injecting = 1
 - Followed initial use of alcohol (avg 12.8 years of age), marijuana (avg 12.5 years of age), Rx stimulants (avg 14.1 years of age)
- Opioid misuse prior to heroin (n = 43)
 - Average age of first use = 16.1 years



WV Poison Center Data 30 41 83 120 161 52 49 59 29 69 61 82 28 55 Heep.

Classic Opioid Toxidrome

- Textbook description:
 - Central Nervous System (CNS) depression
 - Respiratory depression (decreased breathing)
 - Miosis (constricted pupils)
- Caveats

 - Miosis may not be recognized or present
 Hypoxia can result in mydriasis (dilated pupils)
 - CNS and respiratory depression combination not unique to
 - Hypotension (low blood pressure) is of importance but not listed



Not All Opioids are Equal

- Share the risk for CNS and respiratory depression, however:
 - Some are more potent than others (takes less to cause harm)
 - Some have drug interactions, some do not
 - Some work faster than others
 - Some work longer than others
 - Some are combined with other drugs, some are not



Some Opioids Do Other Things

- Those combined with acetaminophen can cause fatal liver injury
- Tramadol can cause seizures
- Methadone can cause fatal arrhythmias (heart rhythm abnormality)
- Injecting ground pills can cause strokes, blindness, lung injury, necrosis
- Injections of impure drugs can cause infections



Naloxone does not reverse these

Heroin Overdose

- White, bitter, powder: injected, snorted, inhaled
 - Impurities may inhibit absorption
 - Injecting the drug gets around this
- May be mixed with diluents and/or adulterants
 - Diluents used to add bulk (buyer believes he/she getting more for their money)
 - Adulteration can be inadvertent or, most commonly, purposeful in order to shortchange the buyer or enhance mood altering effects by:
 - Increasing vaporized dose of heroin
 - Additive drug action



OR: It may not be heroin

Increasing Fentanyl Overdoses

- Recent increase involves non-pharmaceutical fentanyl (NPF) and fentanyl analogs (e.g., acetyl fentanyl)
- · Similar to heroin:
 - Same toxidrome
 - Both extremely potent
 - Same routes of administration
- Used alone or in combination with heroin
- Fentanyl not detected by many drug screens



Additional Novel Opioids of Concern

- Additional fentanyl analogues
 - Not just designer fentanyl and acetylfentanyl
- U47700
- W series (W-1 through W-32)
- Extremely potent
- Not detected with drug screening



Naloxone Closest to Ideal Antidote

- Specific for the opioid receptor
- Readily available
- Inexpensive (generic injectable formulation)
- Effective via multiple routes
- When opioid action blocked, breathing resumes
- Not perfect because:
 - Some opioids cause effects not opioid-related
 - Cannot reverse hypoxic organ damage that has already occurred.
 - Potential for adverse effects exists if dependence present



It may not be a pure opioid overdose!

When To Give Naloxone

- Opioid overdose/toxicity is possible and:
 - Person does not respond to verbal and physical stimulus
 - Person does not appear to be breathing well or at all
 - May or may not be blue



Risk vs. Benefit

- If the victim is not breathing there is more to gain by trying naloxone than there is to loose
- If the dose is kept at 0.4 mg injection, or 2 mg nasally, the risk of withdrawal is minimized



Naloxone Safety

- No documented case of anaphylaxis or allergic reaction
- No documented teratogenicity (birth defects)
- IF not opioid dependent, withdrawal not a concern
 - Unfortunately, often uncertain if person is dependent or not
- If no opioid on board, cannot overdose someone with naloxone



Naloxone Treatment Goal

- Reversal of respiratory depression: NOT return to wakefulness
- If victim has taken an opioid overdose, but is arousable and talking, naloxone (or a repeat dose of naloxone) is not indicated at that time
 - The victim still needs close observation and follow-up



Without need, no risk is acceptable

Naloxone Risk #1

- · Induction of withdrawal
 - Not usually life-threatening but person may feel like they are going to die
 - "First do no harm": Can be considered assault if not indicated
 - Response may result in violent behavior placing themselves and the rescuer at risk for physical harm
 - Vomiting may result in aspiration pneumonia if other CNS depressants are present and depressing gag reflex
 - Massive catecholamine surge has resulted in death in medically unstable individuals
 - May cause acute pain syndrome if chronic pain patient



Prevent by giving the right dose

Naloxone Risk #2

- Reversal of sedative effects of naloxone can unmask stimulant toxicity from co-ingestant(s)
 - Victim becomes unmanageable in the outpatient setting



Naloxone Risk #3

- Pulmonary edema not common but a well documented effect
 - Can be life-threatening
- → Risk is low, so not a reason not to use naloxone. However, as risk exists, naloxone should not be given when not indicated and dose should not be excessive.



Naloxone Response

- As goal is reversal of respiratory depression
 - Response = effective respirations
- Return to wakefulness is NOT required
 - Aiming for this goal can increase risk of harm (naloxone dose too high leading to withdrawal symptoms)
 - The victim may not wake up but they may have adequate respirations now and their blood pressure may have increased



Naloxone Response

- If (+) response, opioid likely involved
 - Does not mean other substances not involved!
- If no response, the following are possible:
 - Opiate exposure does not exist
 - Other CNS depressants are on board and their effects are masking any response
 - E.g.: ethanol, antidepressants, benzodiazepines, others
 - Co-existing traumatic brain injury exists (e.g., from fall or fight)
 - Hypoxic brain injury has already occurred
 - Partial agonist involved and dose is inadequate



Why Call 911

- Response does not mean a pure opioid overdose
 - Acetaminophen toxicity can be fatal
 - Acetaminophen is a common co-ingestant
 - Adulterants, other drugs may be of concern
 - May be other injuries
- Respiratory depression may recur
- Oxygen saturation evaluation not available
- Reason for overdose needs to be evaluated
 - "Near death" experience can be trigger for starting therapy
 - If from drug interaction or disease/drug interaction, a change in therapy is needed



Questions?
Call WV Poison Center
1-800-222-1222



