USE AND ABUSE OF OPIOIDS IN ATHLETICS

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March 14th, 2017

DISCLAIMERS

• None

OBJECTIVES

• Provide a general overview of opioids, their mechanism of action, and their physiologic effects
• Review the relevant terminology, signs, and symptoms related to opioid misuse
• Discuss the implications of opioid misuse and the current recommendations for prevention
• Discuss the role of opioids, NCAA regulations/testing, and the potential for misuse in the athlete
OPIOIDS

- Substances that bind to opioid receptors
  - Natural (Opiates)
  - Semi-synthetic
  - Synthetic
  - Endogenous
  - Antagonists

- 3 receptor types
  - Mu
  - Kappa
  - Delta

- Pre-synaptic and post-synaptic analgesia

- Spinal and supraspinal locations

FORMULATIONS

- Oral (PO)
  - Immediate-Release
    - Hydrocodone
    - Oxycodone
    - Codeine
    - Morphine
    - Hydromorphone
    - Often combined with other meds (Acetaminophen, etc)
  - Sustained/Extended Release
    - Oxycotin
    - MS Contin

- Intravenous (IV)
  - Morphine
  - Hydromorphone
  - Fentanyl

- Transdermal
  - Fentanyl

- Sublingual

- Rectal

- Epidural

- Intrathecal
FORMULATIONS

Equianalgesic Opioid Dosing

<table>
<thead>
<tr>
<th>Drug</th>
<th>Equianalgesic Doses (mg)</th>
<th>Parenteral</th>
<th>Oral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morphine</td>
<td>10</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Buprenorphine</td>
<td>0.3</td>
<td>0.4 (ib)</td>
<td></td>
</tr>
<tr>
<td>Codeine</td>
<td>100</td>
<td>200</td>
<td></td>
</tr>
<tr>
<td>Fentanyl</td>
<td>0.1</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Hydrocodone</td>
<td>NA</td>
<td>39</td>
<td></td>
</tr>
<tr>
<td>Hydromorphone</td>
<td>1.5</td>
<td>7.5</td>
<td></td>
</tr>
<tr>
<td>Meperidine</td>
<td>100</td>
<td>300</td>
<td></td>
</tr>
<tr>
<td>Oxycodone</td>
<td>10’</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Oxycontin</td>
<td>1</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Tramadol</td>
<td>100’</td>
<td>120</td>
<td></td>
</tr>
</tbody>
</table>

DEFINITIONS

- **Tolerance**
  - The need for increasing doses to maintain an effect

- **Dependence**
  - The occurrence of withdrawal symptoms after abrupt discontinuation

- **Addiction**
  - Behavioral pattern of compulsive use resulting in physical, psychological, and social harm

- **Central**
  - Analgesia
  - Euphoria
  - Sedation
  - Respiratory Depression
  - Cough Suppression
  - Miosis
  - Truncal Rigidity
  - Nausea, Vomiting

- **Peripheral**
  - Bradycardia
  - Constipation
  - Biliary Colic
  - Urinary Retention
  - Flushing
  - Pruritis

- **Tolerance, Dependence, Abuse**
DEPENDENCE: DSM-IV

- Tolerance
- Withdrawal
- Unintentional overuse with regard to duration or amount
- Inability to reduce usage
- Inordinate amount of time dedicated to use, acquire, or recuperate from substance
- Other life activities sacrificed
- Continued use despite health or mental issues

ABUSE: DSM-IV

- Failure to fulfill major role obligations
- Frequent use in physically hazardous situations
- Frequent legal problems
- Continued use despite having persistent or recurrent social/interpersonal problems

DSM V: SUBSTANCE USE DISORDER

- Taking the opioid in larger amounts and for longer than intended
- Wanting to cut down or quit but not being able to do it
- Spending a lot of time obtaining the opioid
- Craving or a strong desire to use opioids
- Repeatedly unable to carry out major obligations at work, school, or home due to opioid use
- Continued use despite persistent or recurring social or interpersonal problems caused or made worse by opioid use
- Stopping or reducing important social, occupational, or recreational activities due to opioid use
- Recurrent use of opioids in physically hazardous situations
- Consistent use of opioids despite acknowledgment of persistent or recurrent physical or psychological difficulties from using opioids
THE OPIOID EPIDEMIC

- 2012: 259 million opioid prescriptions written
- Opioid prescriptions increased per capita 7.3% from 2007 to 2012
- 165,000 opioid-related deaths from 1999-2014
- 2011: 420,000 opioid-related ER visits
- 2013: 1.9 million met DSM-IV criteria for abuse or dependence
- Prescribing rates and adverse outcomes vary from state to state

OPIOID USE IN ATHLETES

- Very limited data
- 2011: 8.7% of 12th graders used opioids without a doctor’s order
- 2015: 122,000 adolescents addicted to painkillers, 21,000 had used heroin
- Organized Sports associated with decreased cigarette and illicit drug use
- NFSHA Report: 7,713,577 adolescents participated in interscholastic sports in 2012-13
- 20% sustained injury requiring medical attention
- “Prosocial behavior” vs Greater propensity for injury

Injury, Pain, and Prescription Opioid Use Among Former National Football League (NFL) Players

- Telephone survey of 644 retired NFL players
- Assessed demographics, types of injuries, current opioid use/misuse and “NFL” opioid use/misuse
- 52% used opioids during NFL career, 71% of them misused (37% overall)
- 7% current misuse (3x higher than general population)
- Strongest predictors of NFL use: undiagnosed concussions, 3 or more injuries, offensive lineman
- Strongest predictors of current misuse: undiagnosed concussions, significant pain, heavy EtOH use

Original article:

Painfully Obvious: A Longitudinal Examination of Medical Use and Misuse of Opioid Medication Among Adolescent Sports Participants

- 1,540 adolescents in three waves of surveys
- Assessed medical use, medical misuse, and non-medical use
- Male participants had higher rates of medical use and misuse compared to non-participants
- No differences in non-medical use
- Females had higher rates of use overall, but no difference between participants and non-participants
Opioid Use Among Interscholastic Sports Participants: An Exploratory Study From A Sample Of College Students

Philip Verza, PhD
Institute for Research on Women & Gender, University of Michigan

- Student Life Survey: 3,442 respondents included
- Assessed lifetime medical use, diversion, and non-medical use
- Participants had higher rates of repeated lifetime use, and were more likely to be approached to divert their medication.
- No differences in non-medical use
- Participants in 3 or more sports had greater odds

OPIOID USE IN ATHLETES

- High-quality studies lacking
- Athletes more likely to be prescribed opioids
- Use can lead to misuse and long-term use
- Use/misuse possibly more prominent in males
- Recent evidence suggests lower prevalence of non-medical use

Nonmedical Prescription Opioid and Heroin Use Among Adolescents Who Engage in Sports and Exercise

NCAA TESTING

- Banned Substances
  - Stimulants
  - Anabolic Agents
  - Alcohol and Beta-Blockers (Rifle competition)
  - Diuretics and other masking agents
  - Street/Illlicit Drugs (THC, Cocaine, Heroin, etc)
  - Peptide Hormones and analogues
  - Anti-estrogens
  - Beta-2 agonists
- Prescription Opioids are NOT banned
URINE DRUG TESTING

- **Point of Care Testing (Immunoassay)**
  - Determine whether patient is taking prescribed med
  - Determine whether patient is using other drugs
  - Limited: High false-positive and false-negative rates
  - Primarily detect morphine and codeine
  - May not detect hydrocodone, oxycodone, fentanyl, etc
  - May not discern parent drug from its metabolite
  - All concerning results must be confirmed with advanced testing

- **Gas Chromatography/Mass Spectrometry (GC/MS)**
  - Used by the NCAA
  - More detailed, used as confirmatory testing
  - More expensive and time-consuming
  - Expanded opiate panel can detect most opioids
  - Positive results reflect use within 1-3 days
  - High sensitivity and specificity
  - Can identify specific drugs, even in low concentrations

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### Drugs that May Cause False-Positive Results in Immunoassay Testing

<table>
<thead>
<tr>
<th>TEST/DRUG CATEGORY</th>
<th>DRUGS THAT MAY CAUSE FALSE-POSITIVE RESULTS</th>
<th>DURATION OF DETECTABILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amphetamines</td>
<td>Adrenaline (Adderall), lioxypropan (Mexiprop), clonidine, desmopramine (Norpramin), fluoxetine (Prozac), l-methamphetamine (in nasal decongestants), labetalol (Normodyne), phentermine, phenylephrine, phenylpropanolamine, pseudoephedrine, ranitidine (Zantac), theophylline, trazodone (Desyrel)</td>
<td>Two to three days</td>
</tr>
<tr>
<td>Benzo diazepines</td>
<td>Clonazepam (Claprim), temazepam (Calmact)</td>
<td>Three days for short-acting agents (e.g., temazepam (Almact)) Up to 30 days for long-acting agents (e.g., clonazepam (Klonopin))</td>
</tr>
<tr>
<td>Cocaine</td>
<td>Narcan (Natalcan), containing cocaine</td>
<td>Two to three days with occasional use Up to eight days with heavy use</td>
</tr>
<tr>
<td>Opioids</td>
<td>Roxicodone, hydrocodone (Vicodin), fentanyl (OxyContin, Flexeril, morphine, oxycodone, hydrocodone, oxycodone, fentanyl, etc)</td>
<td>One to three days</td>
</tr>
</tbody>
</table>
URINE DRUG TESTING

• Oxycodone: Oxymorphone
• Hydrocodone: Hydromorphone (Dilaudid)
• Morphine
  • Morphine
  • Codeine
  • Heroin

URINE DRUG TESTING

• Heroin
  • Illegal, semisynthetic opioid
  • Similar in structure to morphine
  • Extremely short half-life
  • UDT will test positive for morphine

  How to distinguish heroin use from morphine/prescription opioid use?
  • 6-monoacetylmorphine (6-MAM)
  • Presence of metabolite confirms heroin use
  • Extremely short window (6-8 hours)

URINE DRUG TESTING

• All prescription and non-prescription medications should be disclosed to team physician/trainer
• Caution with dietary supplements, vitamins, etc.
• Stimulants
  • Caffeine >150μg/mL illegal
  • Pseudoephedrine and phenylephrine allowed
  • Exemption possible for ADHD
• Opioids are not banned by the NCAA
• Heroin??
NCAA PENALTIES

- Performance-enhancing drugs
  - First offense = loss of one year of eligibility and being withheld from competition for 365 days
  - Second offense = loss of all remaining eligibility
- Street Drugs
  - First offense = being withheld from 50% of the season in any sport that the athlete takes part in
  - Second offense = loss of one year of eligibility and being withheld from competition for 365 days
- Tampering
  - Ineligible for participation for two full calendar years
  - No-show = Positive test

Reinstatement

- “Exit Test”
- Conducted no sooner than the 11th month of a one-year suspension, or as determined by the NCAA for shorter suspensions
- Institution must request the exit test and allow 2-4 weeks for scheduling
- Institution pays for the test

THE OPIOID EPIDEMIC

- The Department of Health and Human Services Opioid Initiative
  - Opioid Prescribing Practices
    - Controversial
    - Various state and agency guidelines
    - 2016 CDC guidelines
- Medication-Assisted Treatment
  - Methadone
  - Buprenorphine
- Naloxone and Good Samaritan Laws
CDC GUIDELINES

- Utilize non-pharmacologic therapy and non-opioid medications
  - Physical Therapy
  - Injections
  - Tylenol, NSAIDs, Neuropathic pain agents, etc

- Establish treatment goals and expectations

- Discuss and document the risks and benefits of opioid use
  - Focus on improvement in function

CDC GUIDELINES

- Use Immediate-Release formulations, and lowest effective dose
  - No more than 20-50 morphine milligram equivalents (MME) per day

- Limited initial prescriptions and acute pain to 3-7 day supply

- When benefits do not outweigh risks, consider tapering/discontinuing opioids
CDC GUIDELINES

- Proper screening and review of opioid use
  - Prescription Drug Monitoring Program
- Risk Assessment Tools
  - Opioid Risk Tool
  - D.I.R.E. Score
  - SOAPP-R
- Consider Urine Drug Testing and periodic re-testing
- Avoid prescribing opioids in conjunction with benzodiazepines (Valium, Klonopin, Xanax, etc)
**CONNECTICUT LAW**

  - No more than a 7-day supply of opioids when prescribing to a minor
  - Discussion of risks must be documented
  - Medical justification must be documented if providing more than a 7-day supply to adults
  - The Prescription Monitoring Program must be reviewed if providing more than a 72-hour supply of opioids
  - Provisions for the appropriate prescribing of opioid antagonists

**MANAGING PAIN IN ATHLETES**

- Non-pharmacologic/non-opioid options first
  - Bracing, Physical Therapy, Modalities, Injections
  - NSAIDs, oral steroids, etc.
- If opioids are needed, discuss risks/benefits and establish expectations up front
- Prescribe the lowest dose and shortest duration possible
- Review the PMP and consider screening tools
- Regularly reassess the patient and consider risks/benefits before refilling

**NON-OPIOID ALTERNATIVES**

- Non-steroidal anti-inflammatory (NSAIDs)
  - Ibuprofen, Diclofenac
- Oral Steroids
  - Medrol, Decadron
- Neuropathic pain agents (Anticonvulsants)
  - Topamax
  - Gabapentin
  - Lyrica
- Antidepressants
  - Amitriptyline
  - Cymbalta
  - Savella
- Topical agents
  - Lidoderm
  - Voltaren gel
- Tramadol*
  - Opioid and non-opioid properties
  - Schedule IV
SUMMARY

- Opioids are commonly prescribed, highly-effective analgesics with significant risks and side effects, to include the risk of abuse/misuse
- Very limited data suggest that athletes are prescribed opioids at a higher rate than non-athletes, and this may contribute to long-term use
- The NCAA does not ban the use of opioids, but providers should be familiar with the urine testing process
- Opioid abuse is a national epidemic, requiring patients to be closely monitored and prescribers to be cautious with prescribing
- Non-pharmacologic and non-opioid treatment options should be exhausted before opioids become the mainstay of treatment

THANK YOU

REFERENCES

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