

# Driving Impairment from Dextromethorphan Abuse

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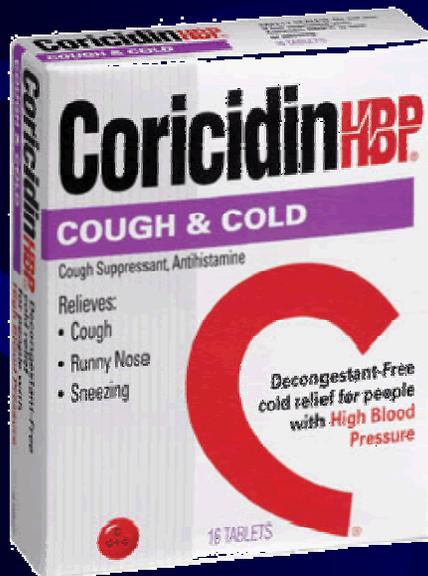
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# Dextromethorphan

- An over-the-counter antitussive
  - Present in hundreds of cold, cough and flu preparations.
  - Dosing 20-30mg q.i.d. (60-120mg/day)



# Dextromethorphan

- Abuse

- Slang terms:
- DXM, DM, Dex, Robo, Rojo, Velvet, Skittles, Triple C.
- Robo-tripping, Skittling, Dexing, Pharming.



# Dextromethorphan



Dextromethorphan



Morphine

- $T_{1/2}$  3-4 hours
- CYP2D6, CYP3A4

# Dextromethorphan

- Pharmacology

- Binds at

- Opioid sigma 1 and 2 receptor agonist
    - Catecholamine reuptake inhibitor
    - NMDA Glutamatergic receptor antagonist

- Other NMDA antagonists:

- Dextrophan

- Phencyclidine

- Ketamine

# Dextromethorphan

- Abuse
  - Continuum of dose dependent effects
    - Intoxication: “stoned and drunk”
    - Restlessness, mild stimulant effect
    - Dissociative/hallucinogenic effects
    - Complex sensory dissociation
      - Jumbling of visual images
      - Loss of depth perception/diplopia
      - Mind body dissociation

# Dextromethorphan

- Plateaus of DXM abuse
  - 1st Plateau: 1.5-2.5 mg/kg (150mg\*):
    - Mild intoxication, light headedness, euphoria
  - • 2nd Plateau: 2.5-7.5 mg/kg (400mg\*):
    - Intoxication. Mild hallucinations, loss of concentration, slurred speech, short-term memory impairment.

*\*Approximate dose in 150lb person*

# Dextromethorphan

- Plateaus of DXM abuse
  - • 3rd Plateau: 7.5-15 mg/kg (800mg\*):
    - Strong intoxication. Delusions and hallucinations. Confusion, disturbed thought processes. Self absorbed. Can be unpleasant.
  - • 4th Plateau: +15 mg/kg (>1000mg\*)
    - Hallucinations, delusions, sub-anesthetic dose, Mind/body dissociation.
    - Equivalent to a high dose of Ketamine.

*\*Approximate dose in 150lb person*

# Chlorpheniramine



## Chlorpheniramine

- $T_{1/2}$  12-43 hours
- CYP3A4, (CYP2D6)

- Chlorpheniramine overdose: extreme sleepiness, confusion, weakness, ringing in the ears, blurred vision, large pupils, dry mouth, flushing, fever, shaking, insomnia, hallucinations, and possibly seizures.

# DXM + Chlorpheniramine

- Typical case – 20 y.o. male driver
  - 0016 hrs: Observed to strike the curb.
  - Drove down the center of the street.
  - Sudden right turn with no signaling.
- Droopy-eyed, sleepy look
- Moved in slow motion
- Handed over entire wallet
- Fumbled for ID
- Slurred speech, flushed face, confused about age

# DXM + Chlorpheniramine

- Typical case – 20 y.o. male driver
- No odor of intoxicants
- Stumbled, walked slowly and deliberately
- HGN and VGN with immediate onset
- Could not balance sufficiently well for SFST

# DXM + Chlorpheniramine

- Typical case – 20 y.o. male driver
- Arrested for DUI
- Admits to taking 24 Coricidin ® pills several hours earlier for the purposes of hallucinating. Also had smoked marijuana earlier that day, and took Prozac.

# DXM + Chlorpheniramine

- Typical case – 20 y.o. male driver
- DRE Exam:
- Alcohol negative by breath
- Appearance: cooperative, slow speech, flushed
- SFSTs: balance problems, not following instructions, stepped off the line
- HGN and VGN present, eyes watery, dilated
- Pulse 102 – 118 bpm, BP 152/110
- Muscle tone normal

# DXM + Chlorpheniramine

- Typical case – 20 y.o. male driver
- Time of stop 00:16hrs
- Time of blood draw 01:30hrs
- Toxicology:
  - Dextromethorphan 0.67mg/L
  - Chlorpheniramine 0.18mg/L
  - THC/THC-COOH neg

# DXM + Chlorpheniramine

- Admitted abusers (n=5):

History	DXM	Chlorph.
Took 48 Coricidin ® pills	0.47mg/L	0.18mg/L
Took 24 Coricidin ® pills 6 hours earlier to hallucinate.	0.67mg/L	0.18mg/L
Takes 24-32 pills at a time.	0.74mg/L	0.13mg/L
Drank 2 eight ounce bottles of Equate ® and took 20 pills nine hours earlier	1.00 mg/L	Neg
Drank 2 bottles Robitussin and took 5 trays of Coricidin ®	1.22mg/L	0.27mg/L

# DXM + Chlorpheniramine

- Blood concentrations (n=5):
  - Range 0.47mg/L – 1.22mg/L
  - (mean 0.79mg/L, median 0.70mg/L)
- Therapeutic concentrations
  - DXM 0.002 – 0.207mg/L after 30mg QID over 7 days
  - CPA 0.01mg/L 3 \* 2mg, 4 hrs apart

# DXM + Chlorpheniramine

- **Driving:**

- Erratic driving, extreme weaving, failing to stop, entering roadway without stopping, collisions, hit and run, speeding.

- **Appearance:**

- Generally cooperative, slow to comprehend and respond, speech slurred, poor coordination and movements, flushed face, poor balance

# DXM + Chlorpheniramine

- Vital Signs:

- Pulse (92-162bpm) and blood pressure tended to be high, muscle tone flaccid.

- Eyes:

- HGN and VGN typically present, often resting nystagmus, droopy eyelids, red eyes.

- Field Tests:

- Poor balance, slow comprehension, sway

# Dextromethorphan and Driving

- Conclusions

- The popular practice of dextromethorphan abuse results in driving impairment.
- Signs of impairment are often a result of combined DXM dissociative and Chlorpheniramine CNS depressant effects.

# Dextromethorphan and Driving

- Conclusions

- Principle indicators:

- HGN, VGN

- CNS depression

- poor balance and coordination

- slurred or slow speech

- Elevated pulse and blood pressure

- Facial flushing and behavioral cues are also diagnostic.

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