Patient Safety: Psychosis as the Diagnosis, Drugs as the Cause

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Disclosure

- Dr. Waters has no actual or potential conflict of interest associated with this presentation, nor does Dr. Waters have any relevant financial interests.
- This activity may contain discussion of unlabeled/unapproved use of drugs. The content and views presented in this educational program are those of the faculty and do not necessarily represent those of YNHH or University of Connecticut School of Pharmacy. Please refer to the official prescribing information for each product for discussion of approved indications, contraindications, and warnings.

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Learning Objectives

- Differentiate between drug-induced psychosis vs. psychosis associated with a medical or mental illness
- Identify features of drug-induced psychosis
- Articulate which substances are most likely to contribute to psychotic symptoms, including prescription medications, over-the-counter (OTC) medications, and illicit substances
- Apply knowledge of drug-induced psychosis to patient case examples

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What is Psychosis?

- **Psychosis is a symptom** (NOT an illness)
- Disruptions to thoughts and perceptions that make it difficult for person to recognize what is real and what is not
- **3 in 100 people** will have a psychotic episode in their lifetime

Hallucinations	Delusions	Paranoia
Hearing (auditory), **seeing** (visual), **feeling** (tactile), or **smelling** (olfactory) things that are not there	Strong **beliefs not consistent with reality** or the person's culture or religion	Intense anxious or fearful feelings and thoughts often related to **persecution**, **threat**, or conspiracy

Psychosis. National Alliance on Mental Illness. Available from: https://www.nami.org/About-Mental-Illness/Mental-Health-Conditions/Psychosis

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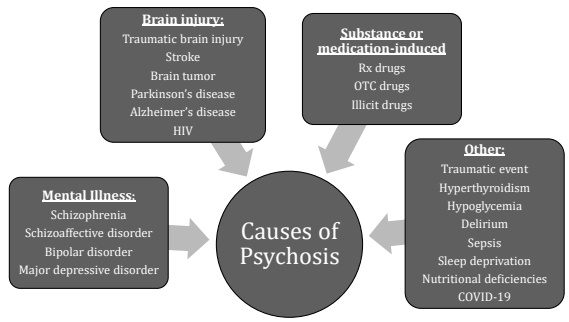

Psychosis. National Alliance on Mental Illness. Available from: https://www.nami.org/About-Mental-Illness/Mental-Health-Conditions/Psychosis Joyce EM. *CNS Neurosci Ther.* 2018

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Differential Diagnosis

- **Considerations:**
  - Age
  - Previous psychiatric and medical diagnoses
  - Temporal relation to potential causes:
    - Illicit drug use, new medication prescriptions, traumatic event, head injury, etc.
- **Objective information (not all-inclusive):**
  - Electrolyte, vitamin levels
  - Metabolic panel
  - Thyroid function tests
  - Urine toxicology
  - STD testing

Griswold KM, et al. *Am Fam Physician.* 2015

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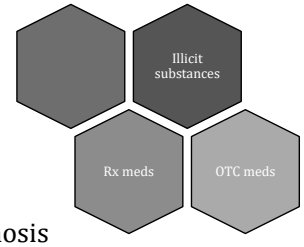

Substance-Induced Psychosis

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Illicit Substance-Induced Psychosis

- May be associated with acute intoxication, chronic use, and/or withdrawal
- **Most commonly implicated:**
  - Synthetic cannabinoids
  - Stimulants:
    - Methamphetamine >> cocaine
  - Hallucinogens:
    - Ketamine
    - PCP
    - LSD
  - **Synthetic cathinones (Bath Salts)**

Skyrabin VY, et al. *J Psychiatr Pract.* 2019; Arumugiri S, et al. *Aust N Z J Psychiatry.* 2018

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Alcohol-Related Psychosis (Alcoholic Hallucinosis)

- Psychotic symptoms present during or shortly after heavy alcohol intake
- Relatively rare:
  - May affect up to 4% of patients with alcohol use disorder
- Risk factors:
  - Becoming dependent on alcohol at younger age
  - Low socioeconomic status
  - Unemployed
  - Living alone

Stankowicz HA, et al. *Stat Pearls [Internet].* 2020; Masood B, et al. *Alcohol Alcohol.* 2018

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Prescription Medications

- Stimulants
- Corticosteroids (CS)
- Anticholinergics
- Parkinson's disease (PD) medications
- Cardiovascular medications
- Opioids (withdrawal)
- Varenicline

Stimulants | CS | Anti-cholinergics | PD meds | CV meds | Opioids | Varenicline

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Stimulants

Methylphenidate-Based	Amphetamine-Based	Other
Methylin® Ritalin® Metadate ER® Concerta® Daytrana® (patch)	Adderall®, Adderall XR® Lisdexamfetamine (Vyvanse®)	Modafinil (Provigil®) Armodafinil (Nuvigil®)

Stimulants

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Prescription Medications: Stimulants for ADHD

- **Pathophysiology:** Significant increase in synaptic dopamine (DA) levels
  1. **Increased release** of DA from neurons
  2. Inhibition of DA transporter (**less reuptake**)
- **More common with amphetamine-based** medications than methylphenidate-based
  - Amphetamine causes 4x the DA release of methylphenidate
  - Methylphenidate more potent inhibitor of DA transporter
- Amphetamine more closely mimics primary psychotic disorders
  - Ex: Patients with schizophrenia tend to have high presynaptic DA capacity (index of DA release) but no difference in DA transporter availability

Lappin JM, et al. *Addiction.* 2019; Moran LV, et al. *N Engl J Med.* 2019

Stimulants

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Retrospective Review: Stimulants for ADHD

- Large retrospective study of insurance claims databases included patients 13 to 25 years old with ADHD
  - Started taking prescription methylphenidate or amphetamine
- **Primary outcome:** New diagnosis of psychosis for which an antipsychotic medication was prescribed
- **Results:** N=221,846
  - 343 episodes of psychosis
    - Amphetamine: 237 (0.21%)
    - Methylphenidate: 106 (0.10%)
  - Overall: New-onset psychosis occurred in 1 in 660 patients

Moran LV, et al. *N Engl J Med.* 2019

Stimulants

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Stimulants for Sleep Disorders

- Modafinil, armodafinil indicated for treatment of excessive somnolence due to:
  - Narcolepsy
  - Obstructive sleep apnea
  - Sleep work sleep disorder
- Mechanism not completely understood → no effect on DA
- Multiple case reports of new-onset psychosis requiring antipsychotics with modafinil
  - Within ~4-5 days following initiation

Flavell J. *Australas Psychiatry.* 2020; Aytaç O, et al. *Noro Psikiyatr Ars.* 2015

Stimulants

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Treatment of Stimulant-induced Psychosis

- Relapse may occur with continued stimulant use
  - Other stressors such as insomnia or heavy use of alcohol may contribute
- If psychotic symptoms persist may consider antipsychotics
- Can consider a re-challenge of stimulants for ADHD treatment
  - Methylphenidate preferred

Moran LV, et al. *N Engl J Med.* 2019; Grant KM, et al. *J Neuroimmune Pharmacol.* 2012

Stimulants

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Patient Case: Audience Question 1

KR is a 53 year old female with no previous psychiatric history. Her past medical history includes hypothyroidism and hypertension. She presents to the emergency department with her husband and states that the FBI has been watching her through her computer for the past week and that she can hear them giving her secret instructions that her husband cannot hear.

All labs are WNL and her urine toxicology screen is negative.

Which of the following patient factors may indicate that KR's psychotic symptoms are NOT associated with a mental illness?

A. The severity of her psychosis
B. Her age at onset of psychosis
C. Her comorbid hypothyroidism
D. The duration of her psychosis

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Corticosteroids (CS)

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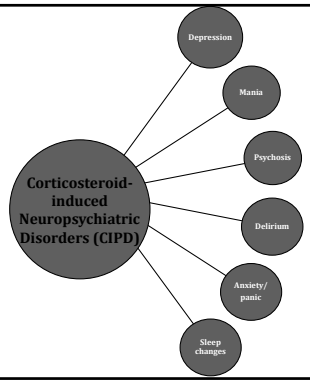

- Effects are well-known but not well-documented
  - May occur in **up to 20%** of patients treated with high-dose CS (≥ 40 mg prednisone/day)
- Most commonly reported with prednisone
- Psychiatric effects may begin within 3-5 days of initiation
  - Most develop within first 6 weeks

Bhangle SD, et al. *Rheumatol Int.* 2013; Gable M, et al. *Int J Psychiatry Med.* 2015

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Pathophysiology of CIPD

- Not completely understood
- Down-regulation of glucocorticoid receptors
- Altered levels of neurotransmitters
  - Decreased serotonin
  - Increased DA activity in some brain regions

Bhangle SD, et al. *Rheumatol Int.* 2013; Gable M, et al. *Int J Psychiatry Med.* 2015

CS

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CS Formulations and Dosing

- CPID may occur at low doses, however risk increases dose:

Prednisone Dose*	% of patients CIPD
≤ 40 mg/day	1.3%
41-80 mg/day	4.6%
≥ 80 mg/day	18.4%

*Prospective analysis of 717 hospitalized patients treated with prednisone

- Case reports of **psychosis** associated with:
  - Pulse-dosing (high-dose, short-term)
  - Alternate day dosing
  - Inhaled CS
  - One-time epidural injections, perioperative steroid administration
- Sustained psychosis (> 5 months) following cessation has been reported

Bhangle SD, et al. *Rheumatol Int.* 2013; *Clin Pharmacol Ther.* 1972; Türkim I, et al. *J Am Acad Child Adolesc Psychiatry.* 1997; Fischer M, et al. *WMJ.* 2019; Gable M, et al. *Int J Psychiatry Med.* 2015; Nirantani K, et al. *Keio J Med.* 2015

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Risk Factors for CIPD?

- 6x more common in **women** than men
- 2x more common with history of **systemic lupus erythematosus**
- Prednisone equivalent of > 40 mg/day
- Mixed results:
  - Age
  - Previous psychiatric or medical illness
- **Previous tolerance of CS does <u>not</u> correlate with reduced frequency upon reintroduction of the medication**

Gable M, et al. *Int J Psychiatry Med.* 2015

CS

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CS-Induced Psychosis: 2 Case Reports

Case 1: Sustained Psychosis after CS Discontinuation	Case 2: Worsening Psychosis Despite CS Taper

▪ 58 y/o male with **no previous psych history** except 1 episode of general anxiety disorder
▪ PMH of idiopathic thrombocytopenic purpura treated with 3 courses of high-dose prednisone over 9 years
▪ Brought to ED during **4th lifetime steroid treatment** for unusual behavior (delusions, pressured speech, disorganization)
  • 40 mg dexamethasone x 4 day bursts (267 mg prednisone equivalent) every 3 weeks
▪ Required **inpatient psych admission following steroid cessation**
  • Treated with high-dose quetiapine and electroconvulsive therapy
  • Gradual improvement over 5 months
	▪ 85 y/o female with **no previous psych history**
	▪ Oral prednisone 60 mg/day started for temporal arteritis in right eye
	▪ Hospitalized after developing depressive and psychotic symptoms while tapering to 40 mg/day
	  • Psychosis resolved after several weeks of inpatient treatment but became more depressed after discharge
	▪ **Prednisone lowered to 10 mg/day** → after 4 months was making suicidal statements, assaultive, **delusional guilt, visual hallucinations**, poor insight, self-neglect
	▪ Readmitted and treated with olanzapine → 2 weeks later she had improved and olanzapine was gradually decreased

Gable M, et al. *Int J Psychiatry Med.* 2015; Kenna HA, et al. *Psychiatry Clin Neurosci.* 2011

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Anticholinergics (Rx or OTC)

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Anticholinergics: "Mad as a Hatter"

Pathophysiology:

- Block presynaptic uptake of DA and increase release from presynaptic terminals
- Impaired cholinergic transmission may induce psychotic symptoms by weakening of the "sensory gating"
  - Brain has decreased ability to inhibit repetitive and irrelevant incoming sensory stimuli
- Most likely to affect elderly patients, especially with dementia
- Psychosis most common in setting of an overdose
  - Cases at therapeutic doses have also been reported

Sexton JD, et al. *Am J Emerg Med.* 1997; Cancelli I, et al. *Neurol Sci.* 2009; Adler LE, et al. *Schizophr Bull.* 1998; Ogino S, et al. *Psychiatry Clin Neurosci.* 2014

Anti-cholinergics

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Anticholinergic-Induced Psychosis: 2 Case Reports

Case 1: Oxybutynin	Case 2: Diphenhydramine
• 21 y/o male developed auditory and visual hallucinations after 3 days of **oxybutynin 15 mg** po for nocturnal enuresis • Resolved 4 days after discontinuation • **Re-trialed and hallucinations returned within one day along with delusions of persecution**	• 26 y/o male with no medical or psych history • Brought in by police for agitation and confusion • 2 episodes of acute paranoid delusions that both occurred 1-2 hours after ingestion of **Tylenol PM** (500 mg acetaminophen/25 mg diphenhydramine) • 1 tab the previous night + 2 tabs the night of presentation • No previous history of taking Tylenol PM but had taken acetaminophen before

Gulzan M, et al. *Clin Drug Investig.* 2006; Sexton JD, et al. *Am J Emerg Med.* 1997

Anti-cholinergics

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Other Implicated Anticholinergics

- Benztropine
- Scopolamine
- Trihexyphenidyl
- Atropine
  - Including eye drops

Clarke LA, et al. *Ann Clin Psychiatry.* 2004; Varghese S, et al. *J Assoc Physicians India.* 1990; Ananth JV, et al. *Can Psychiatr Assoc J.* 1973

Anti-cholinergics

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Parkinson's Disease (PD) Medications

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Parkinson's Disease Psychosis

- Parkinson's disease is associated with neuropsychiatric symptoms including psychosis (up to **30% of patients**)
  - **Well-formed visual hallucinations** and **delusions** most common
  - Caused by neurodegenerative processes within the CNS
    - Most common in patients with more severe disease, cognitive impairment, mood disorders
  - **Parkinson's disease (PD) medications may worsen psychotic symptoms however likely are not the sole cause**

Simonet C, et al. *Pract Neurol.* 2020; Chang A, et al. *Drugs.* 2016

PD meds

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Treatment of Parkinson's Disease Psychosis

- Discontinue any **non-essential non-PD** meds that may be contributing
  - Anticholinergics, benzodiazepines, muscle relaxants, opioids
- **Discontinue/modify PD drugs in the following order:**
  1. Anticholinergics
  2. Monoamine oxidase B inhibitors (MAOB-Is)
  3. Amantadine
  4. Dopamine agonists
  5. COMT inhibitors
  6. Levodopa

Simonet C, et al. *Pract Neurol.* 2020; Chang A, et al. *Drugs.* 2016; Wilby KJ, et al. *Ann Pharmacother.* 2017; Friedman JH. *Expert Opin Pharmacother.* 2018

PD meds

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Parkinson's Disease Medications

MAOB-Is	Dopamine Agonists	COMT* Inhibitors
• Selegiline • Rasagiline • Safinamide	• Ropinirole • Pramipexole • Rotigotine patch • Apomorphine	• Entacapone • Tolcapone • Opicapone

*Catechol-O-methyl transferase

PD meds

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Treatment of Parkinson's Disease Psychosis

- **Antipsychotics:**
  - Quetiapine
  - Clozapine
  - Pimavanserin:
    - Selective **serotonin** 5-HT2A inverse agonist with no dopaminergic activity
    - Only FDA-approved medication
- **Anticholinesterase inhibitors:**
  - **MOA:** Atrophy of cholinergic brain structures in PD may contribute to hallucinations
    - Rivastigmine
    - Donepezil

Wilby KJ, et al. *Ann Pharmacother.* 2017; Powell A, et al. *Expert Rev Neurother.* 2020.

PD meds

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Cardiovascular Medications

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Cardiovascular Medications

	Beta-Blockers	ACEIs	Diuretics
Mechanism	• Action at beta-adenoreceptors can have cognitive behavioral effects • Increase in catecholamines • Decrease in melatonin **Most common symptom:** Visual hallucinations, often hypnogogic Higher risk in elderly patients and those with cognitive deficits, hepatic dysfunction	• Not well-understood • Action on brain carboxypeptidase enzymes → glutamate regulation Very few case reports	Secondary to hyponatremia
Medications	Propranolol, metoprolol, timolol, pindolol > atenolol, carvedilol	Quinapril, enalapril, captopril	Thiazides

Hoffman JC, et al. *Dialogues Clin Neurosci.* 2007; Goldner JA. *J Med Case Rep.* 2012; Tarlow MM, et al. *J Am Geriatr Soc.* 2000; Bergeron R, et al. *Curr Med Chem.* 2012.

CV meds

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Beta-Blocker Induced Psychosis: 2 Case Reports

Case 1: Carvedilol	Case 2: Metoprolol
• 67 y/o male with PMH of diabetes, hypertension, hyperlipidemia, mild cognitive impairment • Treated with amlodipine/benazepril → **carvedilol** added for better BP control • Within a few days started complaining of **seeing people by his bedside especially at night** • Also reported **seeing "odd looking animals"** and the fire hydrant wave to him and move around • Went on for **10 months** before he reported symptoms • Quetiapine 25 mg nightly was started but visual hallucinations persisted • Carvedilol tapered off, **visual hallucinations disappeared 2-3 weeks** after discontinuation	• 21 y/o male with htn and mild fatty liver • Treated with amlodipine 2.5 mg daily, isosorbide mononitrate 10 mg po TID, and metoprolol 12.5 mg po BID • **Metoprolol increased to 25 mg po BID** → after 2 days pt because disoriented, **paranoid, auditory hallucinations** • Metoprolol discontinued and **3 days later symptoms had disappeared**

Akinye SA, et al. Tokai J Exp Clin Med. 2019; Zhao Y, et al. *Gen Hosp Psychiatry.* 2013

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Opioids and Partial Opioids (Withdrawal)

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Opioid Withdrawal Psychosis

- Some opioids may have antipsychotic properties
  - Opiate receptor agonism may modify DA flow and release → interferes with postsynaptic action of DA
- Psychotic symptoms rarely reported following **abrupt cessation** of full and partial opioid receptor agonists following chronic use:
  - Oxycodone
  - Morphine
  - Tramadol
  - Methadone
  - Buprenorphine
  - Heroin

Casado-Espada NM, et al. *Eur Rev Med Pharmacol Sci.* 2019; Sharma S, et al. *Current.* 2021; Narkhare P, et al *J Clin Psychopharmacol.* 2017

Opioids

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Varenicline (Chantix®)

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Varenicline (Chantix®): Boxed Warning Controversy

- Black box warning was added in 2009 but removed in 2016
- Removal of warning based on EAGLES study:
  - Study mandated by FDA to assess neuropsychiatric safety of bupropion, varenicline, and nicotine patches in patients with and without psychiatric disorders
  - Conducted by pharmaceutical company
  - **ISMP recommended against removal of boxed warning** due to high number of reported psychiatric adverse effects
  - Concerns about study design

WARNING: SERIOUS NEUROPSYCHIATRIC EVENTS
See full prescribing information for complete boxed warning.

- **Serious neuropsychiatric events have been reported in patients taking CHANTIX. (5.1 and 6.2)**
- **Advise patients and caregivers that the patient should stop taking CHANTIX and contact a healthcare provider immediately if agitation, hostility, depressed mood, or changes in behavior or thinking that are not typical for the patient are observed, or if the patient develops suicidal ideation or suicidal behavior while taking CHANTIX or shortly after discontinuing CHANTIX. (5.1 and 6.2)**
- **Weigh the risks of CHANTIX against benefits of its use. CHANTIX has been demonstrated to increase the likelihood of abstinence from smoking for as long as one year compared to treatment with placebo. The health benefits of quitting smoking are immediate and substantial. (5.1 and 6.2)**

FDA. 2015; Correa JB, et al. *Nicotine Tob Res*. 2021

Varenicline

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Varenicline-Induced Psychosis

- Suicidal thoughts and behaviors more common than psychosis
- May induce psychosis by stimulating the mesolimbic dopamine system → increased release of dopamine
- Multiple case reports of exacerbating psychosis in patients with previous psychiatric history
- Case reports of patients with no psychiatric history requiring antipsychotic treatment also reported

Tuman TC. *Prim Care Companion CNS Disord*. 2017;Gupta A, et al. *Aust N Z J Psychiatry*. 2012; Liu ME, et al. *CNS Spectr*. 2009

Varenicline

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Patient Case: Audience Question 2

Current medications:

Medication	Indication	Duration of Treatment
Acetaminophen 650 mg po q6h prn	Headache, body aches	3 months
Amlodipine 10 mg po daily	Hypertension	1 month
Levothyroxine 37.5 mcg po daily	Hypothyroidism	2 years
Lisinopril 10 mg po daily	Hypertension	1 year
Metoprolol XL 50 mg po daily	Hypertension	1 month

Which of KR's medications is most likely to be contributing to her current presentation?

A. Acetaminophen
B. Amlodipine
C. Lisinopril
D. Metoprolol XL

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Over-the-Counter Medication Induced Psychosis

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Dextromethorphan-Induced Psychosis

- Non-narcotic antitussive in many combination cold products
- Blocks NMDA receptors similarly to ketamine, PCP
  - "Poor Man's PCP"
- Binds to serotonin receptors , sigma opioid receptors, and blocks reuptake of adrenergic neurotransmitters
- Psychosis usually attributed to excessive use
  - **FDA-approved daily dose:** 120 mg

Bernstein LB, et al. *J Addict Med*. 2020

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Dextromethorphan Neuropsychiatric Symptoms

Dextromethorphan Dose	Psychiatric Effect
1.5-2.5 mg/kg	• MDMA-like perceptual alterations
2.5-7.5 mg/kg	• Impairment of motor, cognitive, perceptual functioning • Comparable to alcohol + cannabis
7.5-15 mg/kg	• **Intense hallucinations**, dissociative symptoms, agitation • Comparable to low-dose ketamine
>15 mg/kg	• **Complete psychophysical dissociation** with violent behaviors, elevated temperatures, possible death from cardiac or respiratory arrest • Comparable to high-dose ketamine

Martinak B, et al. *Psychopharmacol Bull.* 2017

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Weight Loss Supplement-Induced Psychosis

- FDA banned products that contained **ephedrine** in 2004 due to cardiovascular and neurologic reactions
  - Newer generally products touted as safe however many case reports of psychosis and mania
- **Implicated substances:**
  - **Synephrine** is one of most common active ingredient in current weight loss products
    - Structurally very similar to ephendrine and other amphetamines (may have (+) amphetamine on Utox)
    - Contained in Bitter orange
  - **Sibutramine**
    - Structurally similar to amphetamine
  - **Caffeine**
    - Adenosine antagonist → affects dopamine transmission

Retamero C, et al. *Psychosomatics.* 2011; Hedges DW, et al. *CNS Spectr.* 2009; Naik S, et al. *Prog Neuropsychopharmacol Biol Psychiatry.* 2010

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Weight-Loss Supplement-Induced Psychosis: Case Report

HPI: 52 year old Caucasian woman who worked in the OR as a nurse with PMH of anxiety, depression, hypothyroidism. Presented to the ED when she "saw occult messages on her identification badge from Satan that read 'You will die.'" Heard body "ticking" and saw "laser-writing from aliens on the hospital floor, door, arm."

Physical exam: Tachycardia, htn, unsteady gait

- Urine drug screen positive for amphetamines

Psychiatric exam: Disoriented, anxious, depressed, paranoid, guarded, suspicious, labile, disorganized

Medications prior to admission:

- Buspirone
- Levothyroxine
- Jillian Michaels' Fat Burner and Calorie Control pills

- Admitted to inpatient psychiatric unit where she remained psychotic with auditory and visual hallucinations for ~2 days
- Symptoms improved on hospital day 4 when urine drug screen no longer positive for amphetamines
- Admitted to increasing doses of weight loss pills for more energy 4 days prior to admission

Retamero C, et al. *Psychosomatics.* 2011

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Weight-Loss Supplement-Induced Psychosis: Case Report

Jillian Michaels' Fat Burner ingredients (at the time of case):

- *Citrus aurantium* (aka Bitter orange, Sour orange, Seville orange)
- Caffeine 400 mg

- Ingredients appear to have been modified following several lawsuits

Retamero C, et al. *Psychosomatics.* 2011

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Caffeine-Related Psychosis

Table 1 Case Reports of Caffeine-Induced Mania and Psychosis

Author	Sex	Age, y	Clinical Presentation	Caffeinated Beverage	Estimated Daily Caffeine Intake, mg	Preexisting Psychiatric Diagnosis
Quadri *et al*[8]	Female	17	Mania	Energy drinks	600 × 1 week	None
Krankl and Gitlin[10]	Female	69	Mania	Coffee/cola	840	None
Cruzado *et al*[11]	Female	31	Mania	Energy drinks	1,000–1,810	None
Ogawa and Ueki[12]	Male	43	Mania	Coffee	660–1,320	None
Kunitake *et al*[13]	Male	54	Mania	Coffee	1,300–2,000	Bipolar spectrum
Machado-Vieira *et al*[14]	Male	36	Mania	Energy drinks	300–400	Bipolar spectrum
Tondo and Rudas[15]	Female	50	Mania	Espresso	900–1,500	Bipolar spectrum
Hernandez-Huerta *et al*[16]	Male	18	Psychosis	Energy drinks	480	None
Govil[17]	Male	35	Psychosis	Source unclear	1,600	None
Görgülü *et al*[18]	Male	21	Psychosis	Energy drinks	Unknown	None
Hedges *et al*[19]	Male	47	Psychosis	Coffee	"High intake"	None
Shaul *et al*[20]	Female	18	Psychosis	Diuretic/caffeine pill	4,800	Anorexia nervosa, no history of psychosis
Peng *et al*[21]	Male	49	Psychosis	Coffee	600	Schizophrenia
Menkes[22]	Male	27	Psychosis	Coffee, energy drinks	600–1,305	Schizophrenia
Cerimele *et al*[23]	Male	43	Psychosis	Energy drinks	1,280–1,600	Schizophrenia
Tibrewal and Dhillon[24]	Male	52	Psychosis	Coffee	960–5,000	Schizophrenia
Lucas *et al*[25]	12 male, 1 female	18–36	Psychosis (exacerbation)	Intravenous; double-blind placebo, controlled	10 mg/kg	Schizophrenia

Hearn JK, et al. *J Am Acad Psychiatry Law.* 2020

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Audience Question 3

A 14 year old male patient is brought to the ED by his parents who are very concerned. He has been saying that he does not "feel real" and has been experiencing auditory, visual, and tactile hallucinations. He was recently started on clonidine and Adderall XR for ADHD. His parents insist that he does not use illicit drugs or alcohol, however his Utox is positive for PCP and his brother states that he has found boxes of "some cough medicine" in the patient's room.

Which of the following substances is the **least** likely to be contributing to the patient's current symptoms?

A. Adderall XR
B. Clonidine
C. Dextromethorphan
D. PCP

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Summary

- It can be difficult to differentiate between drug-induced psychosis vs. psychosis associated other medical or psychiatric conditions
- Commonly used prescription and over-the-counter medications have been associated with psychosis in patients without psychiatric history
- Patients with medication-induced psychosis may require inpatient psychiatric admission and pharmacologic treatment

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Questions?

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Psychosis as the Diagnosis, Drugs as the Cause

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