

Delirium in the Alcohol Withdrawal Patient

DR. BREANNA BAGWELL DNP, CRNP, PMHNP-BC

Objectives

- ▶ Alcohol abuse
- ▶ Alcohol use disorder
- ▶ Alcohol withdrawal
- ▶ Alcohol withdrawal delirium – Delirium Tremens
- ▶ Alcohol-Related Psychosis – Alcohol Hallucinosiis
- ▶ Wernicke-Korsakoff Syndrome

Alcohol Abuse

- ▶ 2021 National Survey on Drug Use and Health (NSDUH)
 - ▶ 219.2 million people ages 12 and older (78.3% in this age group) reported that they drank alcohol at some point in their lifetime
 - ▶ 6.0 million youth ages 12 to 17 (22.9% in this age group) reported that they drank alcohol at some point in their lifetime
 - ▶ 213.2 million adults ages 18 and older (84.0% in this age group) reported that they drank alcohol at some point in their lifetime

Alcohol Use in the United States



In 2021,
84.0%
of people ages 18 and
older reported that they
drank alcohol at some
point in their lifetime.

Source: 2021 NSDUH

Alcohol Use Disorder (AUD) in the United States

29.5 million

people ages 12 and older had AUD in 2021.



Source: 2021 NSDUH

Alcohol Use Disorder (AUD) Among U.S. Adolescents

894,000

 adolescents ages 12 to 17
had AUD in 2021.

Source: 2021 NSDUH

Alcohol and the Human Body

In 2021, of the 100,530 liver disease deaths among people ages 12 and older,

47.4%
involved alcohol.



Source: CDC WONDER, 2022

U.S. Children Living With Parent / Caregiver With Alcohol Use Disorder (AUD)

More than 10 percent of U.S. children ages 17 and younger live with a parent with AUD.



Source: SAMHSA

Alcohol-Related Deaths in the United States

More than
140,000

people died from alcohol-related causes annually from 2015 to 2019.

Source: CDC/ARDC

88,000

alcohol-related DEATHS
per year (2006-2010)

WHAT IS A STANDARD DRINK?

12 fl oz of beer	= 8-9 fl oz of malt liquor 12 oz glass	= 5 fl oz of wine	= 1.5 fl oz shot gin, rum, whiskey, vodka, etc.
			
about 5% alcohol	about 7% alcohol	about 12% alcohol	about 40% alcohol

\$249 BILLION

Cost of excessive
alcohol use in
the U.S. in 2010



Workplace productivity: **\$179 billion**

Medical expenses: **\$28 billion**

Criminal justice: **\$25 billion**

Motor vehicle collisions: **\$13 billion**

EXCESSIVE DRINKING



WOMEN



- ▶ **Binge drinking** is having **4** or more drinks in one occasion
- ▶ **Heavy drinking** is having **8** or more drinks per week

MEN



- ▶ **Binge drinking** is having **5** or more drinks in one occasion
- ▶ **Heavy drinking** is having **15** or more drinks per week

An occasion is one sitting or within two to three hours.



UNDERAGE DRINKING IS RISKY DRINKING

in 2016 ages 12 to 20

19.3% (7.3 Mil) reported alcohol use
12.1% (4.5 Mil) were binge drinkers
2.8% (1 Mil) were heavy drinkers



ALCOHOL USE AGE 21 OR OLDER

in 2016

55.8% (129 Mil) reported alcohol use
6.2% (60 Mil) were binge drinkers
6.6% (15 Mil) were heavy drinkers

Alcohol Abuse

- ▶ Of the 100,530 liver disease deaths among people ages 12 and older in 2021, 47.4% involved alcohol
- ▶ Among all cirrhosis deaths in 2019, 50.3% were alcohol related. The percentage of alcohol-associated cirrhosis deaths was highest (at 80.9%) among adults ages 25 to 34, followed by adults ages 35 to 44 (at 75.4%)
- ▶ From 2010 to 2016, alcohol-associated liver disease was the primary cause of almost 1 in 3 liver transplants in the United States, replacing hepatitis C virus infection as the leading cause of liver transplantation due to chronic liver disease

Alcohol Abuse

- ▶ Recent estimates for the United States indicate that 5.6% of cancer cases and 4.0% of cancer deaths are attributable to alcohol consumption
- ▶ Research has shown that people who misuse alcohol have a greater risk of liver disease, heart disease, depression, stroke, and stomach bleeding, as well as cancers of the oral cavity, esophagus, larynx, pharynx, liver, colon, and rectum
- ▶ These individuals may also have problems managing conditions such as diabetes, high blood pressure, pain, and sleep disorders
- ▶ Misusing alcohol may also increase the likelihood of unsafe sexual behavior

Alcohol Abuse

- ▶ Alcohol consumption is associated with increased risk of drowning and injuries from violence, falls, and motor vehicle crashes
- ▶ Alcohol consumption is also associated with an increased risk of female breast cancer, oropharyngeal cancer, esophageal cancer (especially in individuals who inherit a deficiency in an enzyme involved in alcohol metabolism), and harmful medication interactions
- ▶ Alcohol consumption has been linked to risk for fetal alcohol spectrum disorders in the offspring of women who consume alcohol during pregnancy
- ▶ Excessive alcohol use can lead to risk-taking behaviors, including driving while impaired
 - ▶ CDC – 29 people die in the US in MVCs that involve alcohol-impaired driver daily

Alcohol Use Disorder

Alcohol Use Disorder

- ▶ The lifetime prevalence of alcohol use disorder is estimated to be approx. 29.1% in community-based samples in the USA
- ▶ Alcohol is the 3rd most common modifiable cause of death in the USA after tobacco and poor diet/physical inactivity
- ▶ It causes approximately 3.8% of all deaths worldwide and accounts for 4.6% of the global burden of disease
- ▶ Alcohol use results in significant financial burden on the healthcare system
 - ▶ In 2014, the aggregate costs for all hospitalizations with alcohol-related diagnosis were \$30 billion dollars

Alcohol Use Disorder DSM-5 Criteria

- A. A problematic pattern of alcohol use leading to clinically significant impairment or distress, as manifested **by at least two** of the following, occurring in a **12 month period**:
 1. Alcohol is often taken in larger amounts or over a longer period than was intended.
 2. There is a persistent desire or unsuccessful efforts to cut down or control alcohol use.
 3. A great deal of time is spent in activities necessary to obtain alcohol, use alcohol, or recover from its effects.
 4. Craving, or a strong desire or urge to use alcohol
 5. Recurrent alcohol use resulting in a failure to fulfill major role obligations at work, school, home.

Alcohol Use Disorder DSM-5 Criteria

6. Continued alcohol use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of alcohol.
7. Important social, occupational, or recreational activities are given up or reduced because of alcohol use
8. Recurrent alcohol use in situations in which it is physically hazardous
9. Alcohol use is continued despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by alcohol

Alcohol Use Disorder DSM-5 Criteria

10. Tolerance, as defined by either of the following:
 - a. A need for markedly increased amounts of alcohol to achieve intoxication or desired effect
 - b. A markedly diminished effect with continued use of the same amount of alcohol

11. Withdrawal, as manifested by either of the following:
 - a. The characteristic withdrawal syndrome for alcohol
 - b. Alcohol (or closely related substance, such as a benzodiazepine) is taken to relieve or avoid withdrawal symptoms.

Alcohol Use Disorder DSM-5 Criteria

Specify current severity:

Mild: Presence of 2-3 symptoms

Moderate: Presence of 4-5 symptoms

Severe: Presence of 6 or more symptoms

Specify if:

In early remission: no criteria met for over 3 months but less than 12 months

In sustained remission: no criteria for period of 12 months or longer

Alcohol Withdrawal DSM-5 Criteria

- A. Cessation of (or reduction in) alcohol use that has been heavy and prolonged.
- B. Two (or more) of the following, developing within several hours to a few days after the cessation of (or reduction in) alcohol use described in Criterion A:
 1. Autonomic hyperactivity (diaphoresis or pulse rate higher than 100bpm)
 2. Increased hand tremor
 3. Insomnia
 4. Nausea or vomiting
 5. Transient visual, tactile, or auditory hallucinations or illusions
 6. Psychomotor agitation
 7. Anxiety
 8. Generalized tonic-clonic seizures

Alcohol Withdrawal – DSM-5 Criteria

- C. The signs or symptoms of Criterion B cause clinically significant distress or impairment in social, occupational, or other important areas of functioning.
- D. Signs and symptoms are not attributed to another medical condition and are not better explained by another mental disorder, including intoxication or withdrawal from another substance

Specify if:

With perceptual disturbances: This specifier applies in the rare instance when hallucinations (usually visual or tactile) occur with intact reality testing, or auditory, visual or tactile illusions occur in the absence of delirium

**When hallucinations occur in the absence of delirium (i.e. in a clear sensorium), a diagnosis of substance/medication-induced psychotic disorder should be considered.

Alcohol Withdrawal Delirium

Delirium Tremens



Delirium

- ▶ Understood as a complex neuropsychiatric syndrome that is characterized by disturbances in consciousness, orientation, memory, thought, perception and behavior resulting from one or more structural and/or physiological abnormalities directly or indirectly affecting the brain
- ▶ Defined as a unitary syndrome, whereby a range of different etiological causes produces a relatively consistent pattern of acute generalized cognitive disturbances
- ▶ Characterized by a rapid onset and fluctuating course with disturbances in the level of consciousness, cognition, psychomotor activity and sleep-wake cycle

Delirium

- ▶ Acute change in mental status, cognition and orientation associated with agitation and adrenergic dysfunction
- ▶ Increased pain tolerance
- ▶ Police or EMS noncompliance
- ▶ Excessive energy
- ▶ Lack of fatigue
- ▶ Unusual strength
- ▶ Often wearing inappropriate clothing
- ▶ Hyperadrenergic autonomic dysfunction
 - ▶ Tachycardia, tachypnea, hyperthermia, diaphoresis

Delirium Tremens (DTs)

- ▶ Profound confusion, autonomic hyperactivity and cardiovascular collapse
- ▶ First recognized as a disorder attributed to excessive alcohol abuse in 1813
- ▶ Usually develop 48-72hrs after the cessation of heavy drinking
- ▶ Hallucinations are usually vivid, followed by auditory and tactile
 - ▶ Frequently pertaining to animals
 - ▶ Lilliputian hallucinations
- ▶ Duration of 3-5 days but may last longer
- ▶ Classically ends with prolonged sleep

Delirium Tremens (DTs) - Pathophysiology

- ▶ Acute alcohol use produces CNS depression by increasing GABAergic neurotransmission and reduction of glutamatergic activity
 - ▶ GABA – inhibitory neurotransmitter
 - ▶ Glutamate – excitatory neurotransmitter
- ▶ In withdrawal – increase of glutamate activity leading to excitotoxicity
- ▶ Kindling: a process of sensitization and enhanced neuronal excitability of the nervous system
 - ▶ Occurs after repeated episodes of alcohol withdrawal leading to greater excitotoxicity and risks of developing DTs

Delirium Tremens

Risk Factors

- ▶ Past history of DTs
- ▶ Low platelet count
- ▶ Low potassium
- ▶ High blood homocysteine levels
- ▶ Low blood pyridoxine levels
- ▶ Presence of structural brain lesion (head injury)
- ▶ Presence of withdrawal seizures
- ▶ Somatic comorbidities (infection, respiratory, cardiac disease)
- ▶ Early withdrawal symptoms
- ▶ Severity of early withdrawal symptoms (SBP >150mmHg, HR >100)
- ▶ Older age
- ▶ Low blood magnesium level

Delirium Tremens

Risk Factors

- ▶ Past history of DTs and withdrawal seizures – increase risk for DTs in present episode
- ▶ Screen for history of comorbid conditions
 - ▶ Arrhythmias
 - ▶ Congestive heart failure
 - ▶ Coronary heart disease
 - ▶ GI bleed
 - ▶ Infections
 - ▶ Liver disease
 - ▶ Nervous system impairment
 - ▶ Pancreatitis
 - ▶ Baseline cognitive functioning and comorbid psychiatric disorders

Delirium Tremens

Cardiac Risks

- ▶ Cardiac disease and arrhythmias are known cause of mortality in DT
- ▶ AUD is associated with higher risk of Ischemic Heart Disease (IHD)
 - ▶ cardio protective effect of alcohol dissipates with heavy use
 - ▶ Increase risk of atrial fibrillation and other dysrhythmias
- ▶ Chronic alcohol use associated with HTN and cardiomyopathy
 - ▶ Increase mortality with DTs



Clinical Parameter	Delirium	Primary Psychiatric Illness
Patient age	<12 y or >40 y	13-40 y
Symptom onset timeline	Acute onset	Acute onset
Clinical course	Fluctuation	Stable
Previous medical history	Substance use, medical illness without psychiatric history	Previous psychiatric history
Affect	Emotionally labile	Flat, labile
Vital signs	Usually abnormal	Usually normal
Orientation	Usually impaired	Rarely impaired
Attention	Impaired-fluctuates	Disordered-persistent
Hallucinations	Primarily visual	Primarily auditory
Speech	Slow, incoherent	Tangential, pressured, disorganized
Level of consciousness	Decreased	Alert

^aAdapted from the American Psychiatric Association,⁴ Sood and Mcstay,⁶ and Williams and DeBattista.¹⁰

Trends of Alcohol Withdrawal Delirium in the Last Decade: Analysis of the Nationwide Inpatient Sample

Published: August 23rd, 2023

- ▶ Retrospective longitudinal trends study involving hospitalizations with Alcohol withdrawal delirium (AWD) in the USA from 2010 – 2019
- ▶ Sample: Nationwide Inpatient Sample (NIS) – NIS is a database of inpatient stays derived from billing data submitted by hospitals to statewide data organizations across the USA, covering more than 97% of the US population
- ▶ 2 cohorts of hospitalizations
 - ▶ All hospitalizations complicated by AWD
 - ▶ All hospitalizations with AWD as a primary diagnosis for admission
 - ▶ **Excluded anyone under age of 18

Trends of Alcohol Withdrawal Delirium in the Last Decade: Analysis of the Nationwide Inpatient Sample

- ▶ Highlighted the biodemographic trends over time for AWD hospitalizations
- ▶ Total: 944,162 hospitalizations complicated by AWD were included
- ▶ The incidence of AWD per million hospitalizations increased from 2,671.8 in 2010 to 3,405.9 in 2019, with an annual percentage change (APC) of 3.1%
- ▶ AWD admission rate per million hospitalizations increased from 1,030.3 in 2010 to 1,556.0 in 2019

Results:

- ▶ Middle aged and elderly patients were associated with higher mortality rates than compared to young adults
- ▶ Females had lower odds of mortality when compared to males
- ▶ Statistically significant trend of increasing THC over the studied years
- ▶ Statistically significant trend of LOS increased
- ▶ Overall admission rates for AWD has increased with a trend of worsening clinical outcomes (inpatient mortality, LOS and THC)
- ▶ Alcohol consumption has increased in the elderly, particularly in women

Alcohol-Related Psychosis – Alcohol Hallucinosi

Alcohol-Related Psychosis – Alcohol Hallucinosi

- ▶ Psychosis associated with alcohol can occur with acute intoxication, alcohol withdrawal, as well as in patients with chronic alcohol abuse disorder
- ▶ Usually symptoms of psychosis present during or shortly after heavy alcohol intake
- ▶ Clinically, alcohol-related psychosis is similar to schizophrenia but has been found to be a unique and independent condition
 - ▶ Characterized by hallucinations, paranoia and fear

Alcohol-Related Psychosis – Alcohol Hallucinosi

- ▶ Etiology: unknown
 - ▶ Theories: Likely related to dopamine, serotonin and other neurotransmitters
- ▶ Pathophysiology: Unclear
 - ▶ Increase in central dopaminergic activity and dopamine receptor alterations may be associated with hallucinations
 - ▶ Amino acid abnormalities lead to decreased brain serotonin and increased dopamine activity leading to hallucinations
 - ▶ Elevated levels of beta-carbolines and impaired auditory system
 - ▶ Neuro-imaging studies suggested that perfusion abnormalities to various regions of the brain may be associated with hallucinations

Alcohol-Related Psychosis – Alcohol Hallucinosis

- ▶ Presence of significant hallucinations or delusions must be evident
- ▶ The psychosis is more extreme than what could potentially be attributed to alcohol intoxication or withdrawal
- ▶ Flat affect
- ▶ Responding to internal stimuli
- ▶ Paranoid
- ▶ Fearful

Alcohol-Related Psychosis – Alcohol Hallucinosi

- ▶ Requires the presence of significant hallucinations or delusions
- ▶ Started during or soon after substance intoxication or withdrawal
- ▶ The symptoms are not better explained by a psychotic disorder unrelated to substance use
- ▶ The psychosis does not occur only with delirium
- ▶ Symptoms cause significant distress or difficulty with normal activity such as work or social interactions
- ▶ Rule out and evaluate for other traumas, infection metabolic and electrolyte abnormalities

Alcohol-Related Psychosis – Alcohol Hallucinosi

- ▶ Seeing things that are not there
- ▶ Smelling things that are not present
- ▶ Hearing sounds others cannot
- ▶ Tasting things that are not in the mouth
- ▶ Feeling touch when not being touched
- ▶ Holding irrational beliefs that someone is out to get them
- ▶ Believing that you have abilities or powers you do not
- ▶ Believing something that is untrue

Alcohol-Related Psychosis – Alcohol Hallucinosi

- ▶ Must be differentiated from other psychotic disorders (schizophrenia)
 - ▶ Tend to have significantly lower education levels
 - ▶ Onset of psychosis at an older age
 - ▶ More intense depressive and anxiety symptoms
 - ▶ Fewer negative and disorganized symptoms
 - ▶ Usually have better insight and judgement
- ▶ Higher rates of suicidal behaviors
 - ▶ Suicide assessment

Alcohol-Related Psychosis – Alcohol Hallucinosi

- ▶ 68% chance of re-admission
- ▶ 37% co-morbidity with other mental disorders
- ▶ 5-30% risk of developing chronic schizophrenia-like syndrome
- ▶ Higher rates of anxiety, depression and suicide
- ▶ Continued alcohol consumption
 - ▶ Less favorable prognosis
 - ▶ High risk of recurrence
- ▶ Abstinence from alcohol has shown good prognosis

Wernicke- Korsakoff Syndrome

Wernicke-Korsakoff Syndrome

- ▶ A neurological disorder caused by lack of thiamine (vitamin B1)
- ▶ Includes Wernicke encephalopathy and Korsakoff amnesic syndrome
 - ▶ Not different conditions but different stages of same disease
- ▶ Wernicke encephalopathy
 - ▶ Represents the “acute” phase of the disorder – often reversible
- ▶ Korsakoff’s amnesic syndrome
 - ▶ Represents disorder progressing to a “chronic” or long-lasting stage

Wernicke-Korsakoff Syndrome

- ▶ Main features are problems in acquiring new information or establishing new memories and in retrieving previous memories
- ▶ B1 deficiency causes damage to the brain's thalamus, hypothalamus and mammillary bodies
- ▶ Causes damage to nerve cells and supporting cells in the brain and spinal cord, specifically memory center of brain
- ▶ Damage to the medial temporal lobe
- ▶ Ocular lesions are due to damage to the abducens nuclei and eye movement centers in the midbrain/pons
- ▶ Ataxia is due to damage in the superior vermis

Wernicke-Korsakoff Syndrome

- ▶ Present with classic triad of symptoms
- ▶ **Ocular disturbances**
 - ▶ Diplopia, painless vision loss, strabismus, nystagmus
- ▶ **Altered mental status**
 - ▶ Apathy, a paucity of speech, indifference to environment, agitation, anger, depression, memory disturbances hallucinations and confabulations
 - ▶ *Confabulation* - erroneous recollection of memories arising involuntarily
- ▶ **Cerebellar dysfunction - ataxia**
 - ▶ Wide-based, short stepped gait, inability to stand or ambulate without assistance

Wernicke-Korsakoff Syndrome

- ▶ 60% with WE will progress to WKS
- ▶ Treatment: Thiamine replacement
- ▶ Thiamine needs to be administered quickly in both dose and duration
- ▶ Improvement in mental status after 2-3 weeks of therapy
- ▶ With treatment, Wernicke encephalopathy will not necessarily progress to Wernicke-Korsakoff syndrome

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Thank you!!

QUESTIONS??
CONCERNS??
CRITICISM??
COMPLIMENTS??