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# Ketamine Infusion Therapy for Mental Health and Chronic Pain

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# Objectives and Disclosures

- Review mechanism of action of ketamine
- Describe how this mechanism contributes to neurogenesis
- Discuss the applications of sub-anesthetic ketamine infusion
- Who needs ketamine infusion?
- Why isn't this widely used?
- Ketamine infusion as a business
- I formerly ran a ketamine infusion clinic in Bala Cynwyd, Pennsylvania
- I'm currently employed per diem by another ketamine infusion clinic, also in Bala Cynwyd
- I have no financial interests to disclose

# What is “treatment-resistant”?

## Treatment-resistant mental health:

- Has not responded to two or more traditional medications OR has not responded to two or more treatment modalities
- Example: patient has tried Prozac AND Lexapro and had unremarkable response or could not tolerate side effects
- Example: patient has tried CBT with or without medication AND yoga and had unremarkable response

## Treatment-resistant chronic pain:

- Has not responded to two traditional pain treatment modalities (including medication, therapy, procedures)
- Example: patient has CRPS of the wrist and has not responded to gabapentin AND physical therapy
- Example: patient has low-back pain with radiculopathy and has not responded to opioid medications AND lumbar spinal epidural injections

# What is “chronic pain”?

## Multiple etiologies:

- Injuries (e.g., sprains, strains, fractures)
- Medical conditions (e.g., arthritis, fibromyalgia, nerve damage)
- Infections
- Psychological factors (e.g., stress, anxiety)

## Various symptoms:

- Persistent pain lasting for at least 3 months
- Can be constant or intermittent
- Pain that ranges from mild to severe
- Can also include fatigue, sleep disturbances, and mood changes

# Ketamine: a refresher

- In the anesthetic setting, ketamine antagonizes the NMDA receptor, resulting in analgesia by preventing central sensitization in dorsal horn neurons, interfering with pain transmission in the spinal cord
  - It's also dissociative, resulting in a feeling of detachment from pain and environment
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- For the purposes of the ketamine clinical/mental health space, antagonism of the NMDA receptor activates AMPA receptors (this is the part we care about)
  - Activation of AMPA results in upregulation of BDNF
  - BDNF encourages growth of new neurons and synapses

# Ketamine: routes of administration

- Intravenous: 100% bioavailable
- Intramuscular: 95% bioavailable
- Nasal: 50% bioavailable\*
- Rectal: 25-50% bioavailable\*\*
- Oral: 20% bioavailable

\* can be administered in a clinic if there is a psychiatrist on-site, but more often is administered in a psychiatrist's office, and must be used with a traditional antidepressant

\*\* not a route used for mental health or in a clinic setting. You may, however, encounter a chronic pain patient who has been prescribed rectal ketamine by a GYN for chronic pelvic pain, so knowing absorption is important for converting dosages

# Who benefits from ketamine at sub-anesthetic doses?

- Suicidal ideation
- Treatment-resistant depression
- Treatment-resistant anxiety
- Post-traumatic stress disorder (inc complex)
- Obsessive-compulsive disorder
- Eating disorders
- Alcohol abuse
- Drug abuse?
- Complex regional pain syndrome
- Allodynia
- Ehlers-Danlos syndrome
- Chronic radiculopathy
- Migraines?

# Why ketamine?

Ketamine uses a completely different pathway than traditional antidepressants, therefore:

- It can be used in tandem with traditional antidepressants
- It can effect mood improvement in patients who have tried and failed on two or more traditional antidepressants

Additionally, ketamine can serve as a “lubricant” for therapy, as it decreases ego defenses

# The ketamine train (my analogy)

Mental health disorders rely on rutted-in autopilot responses to thoughts and experiences. It's like a train that only takes one route: negativity.

Ketamine "lays down new track" and allows for new thought patterns.

It's like taking the same train all the time, knowing that the train only goes to the casino and every time you go there you lose all your money. Ketamine shows you a different train that takes you to the beach instead.



# Example ketamine dosing protocol

- Two infusions per week for first week, then one per week for next four weeks (six doses total)
- Start at 0.7mg/kg. Can increase dose 25mg each infusion as tolerated until:
  - Antidepressant effect lasts from one infusion to the next, or
  - 2mg/kg limit is reached
- Infusion over 45 minutes as tolerated. A faster infusion will increase the psychedelic effect. Some pain patients report that a slower infusion (60 minutes) elicits a more substantial decrease in pain
- For mental health treatment, Versed is not recommended (one study showed that the psychedelic impact has therapeutic value)

# Why can't everyone have ketamine?

- Cardiac history
- Uncontrolled HTN
- Liver dysfunction
- Pregnancy
- Glaucoma/recent eye surgery
- Intracranial pathology
- Bladder dysfunction?
- Active mania
- Current psychosis
- Clinically significant substance abuse

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# Why aren't we using ketamine more?

- Cost of running a clinic
- Investment of patient time and money
- Maintenance phase
- Negligible insurance coverage
- The Matthew Perry Effect

# What is a ketamine clinic?



Courtesy Genesis Ketamine Centers



Courtesy Ketamine Wellness Infusions

# Ketamine infusion as a business model

State laws vary; in PA only a MD or DO can own a medical facility. Check your state's laws – some states allow a CRNA and MD to co-own a facility

In PA a CRNA who manages a ketamine clinic must have medical supervision; this is generally a Medical Director (this can be, and usually is, an offsite position)

Startup costs

Malpractice insurance

Psychiatrist/psychologist/PMHNP on staff

# Ketamine clinic competition: concierge ketamine

- Mindbloom
- Joyous
- Esketamine

## Mindbloom: oral

Established in 2018, Mindbloom was the first major venture-backed start-up to offer at-home ketamine troches and guidance. They source their troches from compounding pharmacies, and the troches are delivered to the patient's home along with a black-out mask and access to live physician support and coaching. There are now multiple copycat programs out there with comparable costs and services.

Pros: lower in cost than infusions, no need for transportation

Cons: inability to stop the experience once it's started, dosage limits

# Mindbloom: injectable?!?!?

In 2026, Mindbloom added a new product to their line-up: injectable ketamine. Intended for SQ use, a vial of ketamine and insulin needles are delivered to the patient's house.

Pros: same convenience of the oral, higher bioavailability than oral

Cons: can't stop an experience once it's started, risk of infection, vials are multi-dose so risk of overdose

# Joyous

Founded in 2021, Joyous provides oral ketamine in a slightly different format: microdosing. An average daily dose is 20-80mg taken daily.

Pros: can drive and work normally after taking, less risk of “ketamine bladder”

Cons: not effective against moderate to severe symptoms, mainly effective against anxiety but not depression/ODC/etc

# Esketamine (Spravato)

- Nasally administered, same applications as other methods
- Can be used with or without traditional antidepressant
- COVERED BY INSURANCE (more or less depending on whether the policy includes behavioral health coverage)
- Must be delivered to and administered in a healthcare office
- Similar but attenuated risks as for ketamine (cardiac, CNS, hepatic, etc)
- Time dedication similar to or longer than IV administration (patient stays in the clinic setting 1-4 hours), cannot drive afterward, same NPO guidelines
- More often than not given by a psychiatrist who provides therapy during the mild psychedelic experience

# The bottom line

Do these online, concierge services adversely affect the ketamine clinic business model? Probably!

- Economic downturn of recent years makes it difficult to start, maintain, and justify the clinic model (to both investors and patients)
- The safety and efficacy profile of the clinic remains superior
- Time will tell whether there is blowback to the at-home injection model

# Sources

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# Questions?



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