

Mitragyna Speciosa: The 411 for the Practicing CRNA

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Disclosures

I have no financial relationships with any commercial interest related to the content of this activity.

I will not discuss any off-label use of medications during this presentation.

Objectives

Define	Define the herbal extract <i>Mitragyna Speciosa</i> , also known as Kratom
Describe	Describe the pharmacology of Kratom
List	List three adverse physiologic effects of Kratom
Summarize	Summarize anesthetic implications for patients who use Kratom

***What in the world
is Mitragyna
Speciosa?***



Let's go back to
the
Tobacco/Vape
Shops



Mitragyna Speciosa: Kratom

- Evergreen tree
- Member of the Plantae kingdom, Rubiaceae family
 - Cousin of the coffee plant
- Southeast Asia:
 - Cambodia, Thailand, Phillipines, Malaysia, Papua New Guinea, Vietnam
- Grows at low elevations near savannahs and swamps




More about Kratom...



Trees grow 50 feet in height

Wood is harvested, used in construction

When in bloom, has cream colored flowers

A close-up photograph of a person's face, focusing on their nose and mouth as they drink from a small white cup. The cup contains a yellowish-green liquid with visible green plant matter, likely kratom leaves. The person's hand is holding the cup, and their fingers are visible. The background is blurred.

Do people ingest Kratom and why?!?!

- Used for centuries by natives to the area of Southeast Asia
- Other names: Ketum, Biak-biak, Thom, Ithang
- Traditionally consumed by chewing the whole leaf or brewed into tea
- Achieves stimulant OR analgesic effects

What physiologic effects does it have?

Stimulant:

Low doses of Kratom

- *Oral ingestion of 1-5 gm*

Increased alertness, productivity

Anxiolytic

Anti-diarrheal

Analgesic

- **Higher doses of Kratom**

- *Oral ingestion of 5-15 gm*

- Euphoria

- Sedation

- Pain relief

How many people are using Kratom?

2022: 2 million
users

2025: Estimates
between 11-6
million
(Medscape.com)

2024: 2.2 **billion**
dollars in retail
sales

Is it detected in a drug test?

Routine drug
screens do NOT
detect Kratom

Can be detected by
gas
chromatography-
mass spectrometry

Urine or hair
samples used

3 Strains → Based on Leaf Veins!

RED



WHITE



GREEN



Oh wait, there's more...a yellow strain!

- Does not occur in nature
- White leaves are dyed yellow
 - Alters the effects of the plant
- Potent, euphoric
- Mood booster



The pharmacology behind the effects....

- Over 40 identified alkaloids isolated
 - 4 active alkaloids: Mitragynine, 7-Hydroxymitragynine, Speciociliatine, Corynantheidine
- Most abundant: **Mitragynine**
 - 60-65% of the dried leaves
- Most active: **7-Hydroxymitragynine**
- Mostly responsible for the psychoactive and analgesic effects
- **7-Hydroxymitragynine** is antinociceptive
 - “7-OH”
 - “7-Hydro” or “legal Morphine”
 - 5 times more potent than Morphine!
- G-protein based agonist at the **Mu** receptor
- Antagonist at the **Kappa, Delta** receptors

So...is Kratom considered an opioid?

- Opioid-like! Similar to Buprenorphine
- But unlike Fentanyl, Heroin, Morphine because is not a full agonist
- When Kratom binds to the G-protein receptor, the effects with full agonists are not seen

Kratom also has these effects:

Inhibition of Cyclooxygenase-2 (COX-2) pathway

Inhibition of presynaptic Acetylcholine release, Adenosine release

Alpha-2 agonism

Calcium channel blockade

Serotonin (5-HT_{2A}) antagonism

Dopamine (D₁) antagonism

Which results in...and is used for:

Anti-inflammatory effect=  pain (COX2)

Anxiolysis, vasodilation (α_2 agonism)=relaxation, HTN, opioid withdrawal

Analgesia, vasodilation (Calcium)= pain,  sexual stamina

Decreased anxiety/depression (5HT_{2A})

Antipsychosis (D₁)=Substance misuse, relief of PTSD

Pharmacokinetics: the alkaloids in Kratom

Mitragynine: lipophilic opioid

- Peak plasma concentration: 90 minutes
- Half-life: 23 +/- 16 hours

Hepatic metabolism

- Inhibit the Cytochrome P450 System
 - CYP2D6 (strongest), CYP3A4 (weak)

Kratom users have a highly variable reported drug effect

August 31, 2016



Drug Enforcement Administration

@DEAHQ

DEA Announces Intent To Schedule Kratom

DEA will ban kratom, a popular herbal supplement

[MARK FRAUENFELDER](#) / 9:18 AM WED AUG 31, 2016



DEA Withdraws Kratom Ban, Opens Formal Comment Period

www.forbes.com/sites/davidkroll/2016/10/13/dea-withdraws-kratom-ban-opens-formal-comment-period/

HEALTH REPORTING IN THE STATES

Kratom Gets Reprieve From Drug Enforcement Administration

www.npr.org/sections/health-shots/2016/10/12/497697627/kratom-gets-reprieve-from-drug-enforcement-administration

 News

DEA Withdraws Kratom Ban Notice After Public Outcry

The DEA's Notice of Intent to ban the herbal analgesic kratom led to an online campaign and subsequent withdrawal of the decision pending further action.

www.snopes.com/news/2016/10/12/dea-withdraws-kratom-ban-notice-after-public-outcry/

However--Kratom sales are illegal in these states:

- Alabama
- Arkansas
- Indiana
- Rhode Island
- Vermont
- Wisconsin



OHIO POLITICS

DeWine seeks to ban sale of Asian plant, derivatives, citing 200 overdose deaths

Published: Aug. 25, 2025, 4:08 p.m.

Ohio kratom ban: Gov. Mike DeWine wants to declare it an illegal drug



ABOUT US

OUR MISSION

The American Kratom Association (AKA) is dedicated to protecting the rights of all Americans to legally consume safe kratom to better manage their overall health and well-being.

www.amerikankratom.org/about

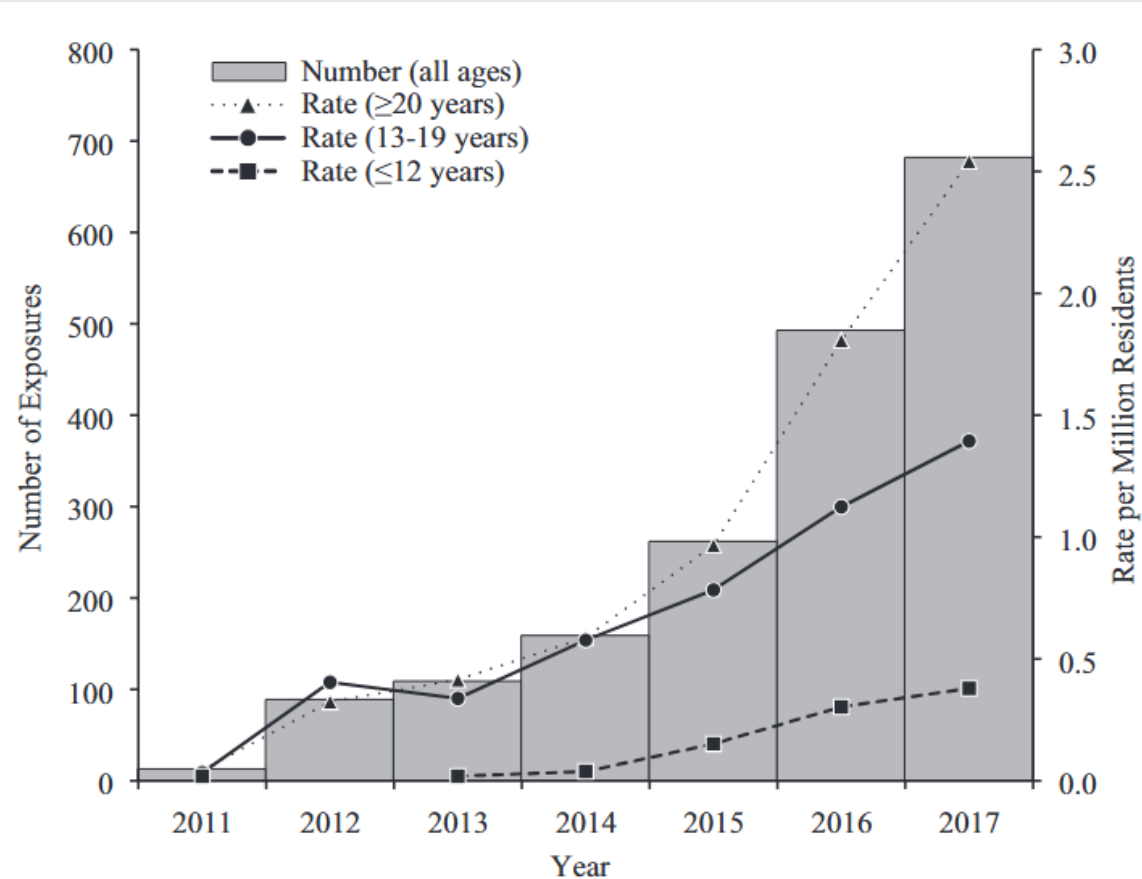
What are signs/symptoms of a Kratom overdose?

-
- GI: Nausea, vomiting, hepatotoxicity
 - CV: HTN, tachycardia, prolonged QT, cardiac arrest
 - Neuro: Drowsiness, confusion, agitation, hallucinations, seizures, coma
 - Renal: Nephrotoxicity
 - Deaths reported→
 - almost exclusively Americans
 - Adulterated or concentrated leaf extracts
 - Contaminated products from importers
 - Strong correlation with ingestion of illicit substances
 - Prescription opioids, cannabis, and others

Kratom exposures reported to United States poison control centers: 2011–2017

Sara Post^{a,b}, Henry A. Spiller^{c,d}, Thitphalak Chounthirath^a and Gary A. Smith^{a,d,e}

^aCenter for Injury Research and Policy, The Research Institute at Nationwide Children's Hospital, Columbus, OH, USA; ^bNortheast Ohio Medical University, Rootstown, OH, USA; ^cCentral Ohio Poison Center, Columbus, OH, USA; ^dDepartment of Pediatrics, College of Medicine, The Ohio State University, Columbus, OH, USA; ^eChild Injury Prevention Alliance, Columbus, OH, USA



Treatment for Kratom overdose:

Supportive

- Naloxone if indicated
- IV fluids
- Anticonvulsants
- Benzodiazepines
- N-acetylcysteine
- Ursodiol

Life-threatening organ failure management

- ACLS
- Liver transplant

What are withdrawal symptoms of Kratom?

Both physical and psychological!

GI: abdominal pain, anorexia,
nausea/vomiting, diarrhea

CV: HTN, Tachycardia,
hyperhidrosis and hot flashes

Neuro: Myalgia, myoclonus,
insomnia, irritability, blurred vision

***Symptoms present hours to days
after last Kratom use!***

- Abstinence: Naltrexone
- MAT (SUD): Buprenorphine-Naloxone
- Supportive:
 - IV Fluids
 - Benzodiazepines
 - Clomipramine
 - Clonidine
 - Gabapentinoids
 - Haloperidol
 - Hydroxyzine

Treatment for Kratom Withdrawal

What does the literature say about anesthesia concerns in patients who use Kratom?



Let's look at a couple of case reports....

Kratom and General Anesthesia: A Case Report and Review of the Literature

Deborah J. Vermaire, MD, Deborah Skaer, BS Pharm, and William Tippets, DO

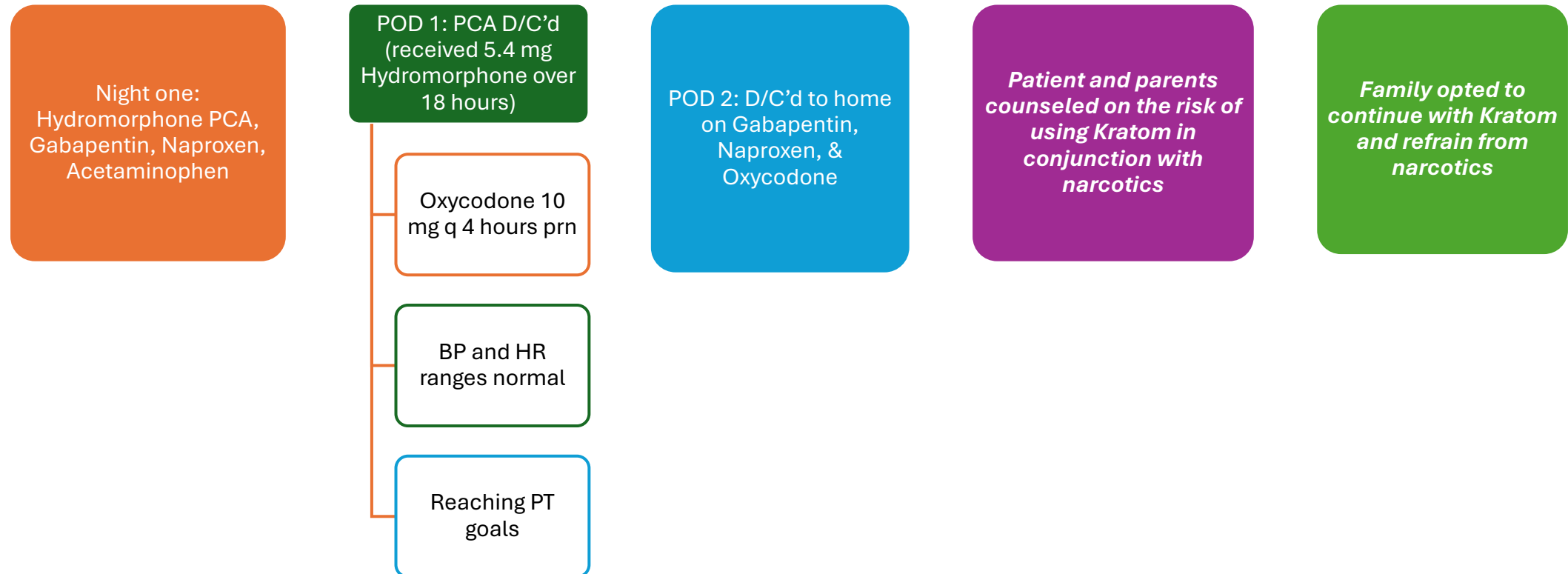
- 15-year-old male, lower back injury while playing basketball
- Unable to attend school, ambulated with a cane
- MRI: Central stenosis, bilateral recess compromise at L2-L3
- Scheduled for Lumbar Laminectomy L2-L3
- PMH: + snoring, weight 100 kg, otherwise healthy
- Meds: Gabapentin 400 mg TID, Naproxen 500 mg BID
- ***Mom revealed in preop interview patient was taking Kratom, ½ tsp 3-4 times per day x 3 months***

Induction, Maintenance, & Emergence

- Induction: Fentanyl, Lidocaine, and Propofol
 - No muscle relaxation, intubated
- Maintenance: Sevo and Fentanyl (250 mcg)
 - 100 mg Ketamine
 - 1000 mg IV Acetaminophen
 - 30 mg Ketorolac
 - 12 mg Decadron
 - 4 mg Zofran
- Emergence: Extubated and taken to PACU in stable condition



Postoperative Course



Anesthetic Challenges Posed by Heavy Kratom Users

Elisa Lund ¹, Aaron B. Low ², Jennifer D. Allan ¹, Jose A. Puentes ¹, David N. Flynn ¹

1. Anesthesiology, University of North Carolina, Chapel Hill, USA 2. Pediatric Anesthesiology, University of North Carolina, Chapel Hill, USA

Corresponding author: Elisa Lund, elisa_lund@med.unc.edu

- 18-year-old male, bilateral idiopathic condylar resorption → retrognathia and OSA
- Scheduled for LeFort I Osteotomy with bilateral 5th rib resection, bilateral mandibular bone grafts, & genioplasty with genioglossus advancement
- PMH: Substance use → occasional Cannabis, rare LSD
- OSA; no other PMH, weight 52 kg
- No medications, ***daily Kratom use up to 35 g/day***

Induction and Maintenance



- **Induction:** 150 mcg Fentanyl, 60 mg Lidocaine, 300 mg Propofol
 - No loss of consciousness
 - Mask ventilated w 4-6% Sevoflurane
 - After LOC, 60 mg Succinylcholine → intubation
- **Maintenance:** Propofol infusion @ 150-200 mcg/kg/min + Remifentanyl infusion @ 0.15-0.2 mcg/kg/min → BIS 50
 - After incision, MAP ↑ 60-110 mmHg
 - Boluses of Fentanyl and Dexmedetomidine
 - Infusions of Nicardipine and Esmolol required to achieve MAP < 80 mmHg
 - Continued until completion of surgery

Maintenance, continued

- Case was 9 hours in length
 - 5400 mg Propofol
 - 5.5 mg Remifentanyl
 - 3200 mg Esmolol
 - 19 mg Nicardipine
 - 52 mcg Dexmedetomidine
 - 400 mcg Fentanyl
 - 2 mg Morphine
 - 800 mg Acetaminophen
 - Bupivacaine infiltration at sites by surgeon
- Prior to emergence:
 - Thoracic epidural placed in OR
 - Loading dose: 5 mL 1.5% Lidocaine with 1:200,000 Epinephrine
 - Infusion 0.125% Bupivacaine started at 7 mL/hour

Emergence



Agitation and emergence delirium, requiring:

20 mg bolus of Propofol

4 mcg boluses of Dexmedetomidine (20 mcg total)

25 mg Ketorolac

1 mg Lorazepam



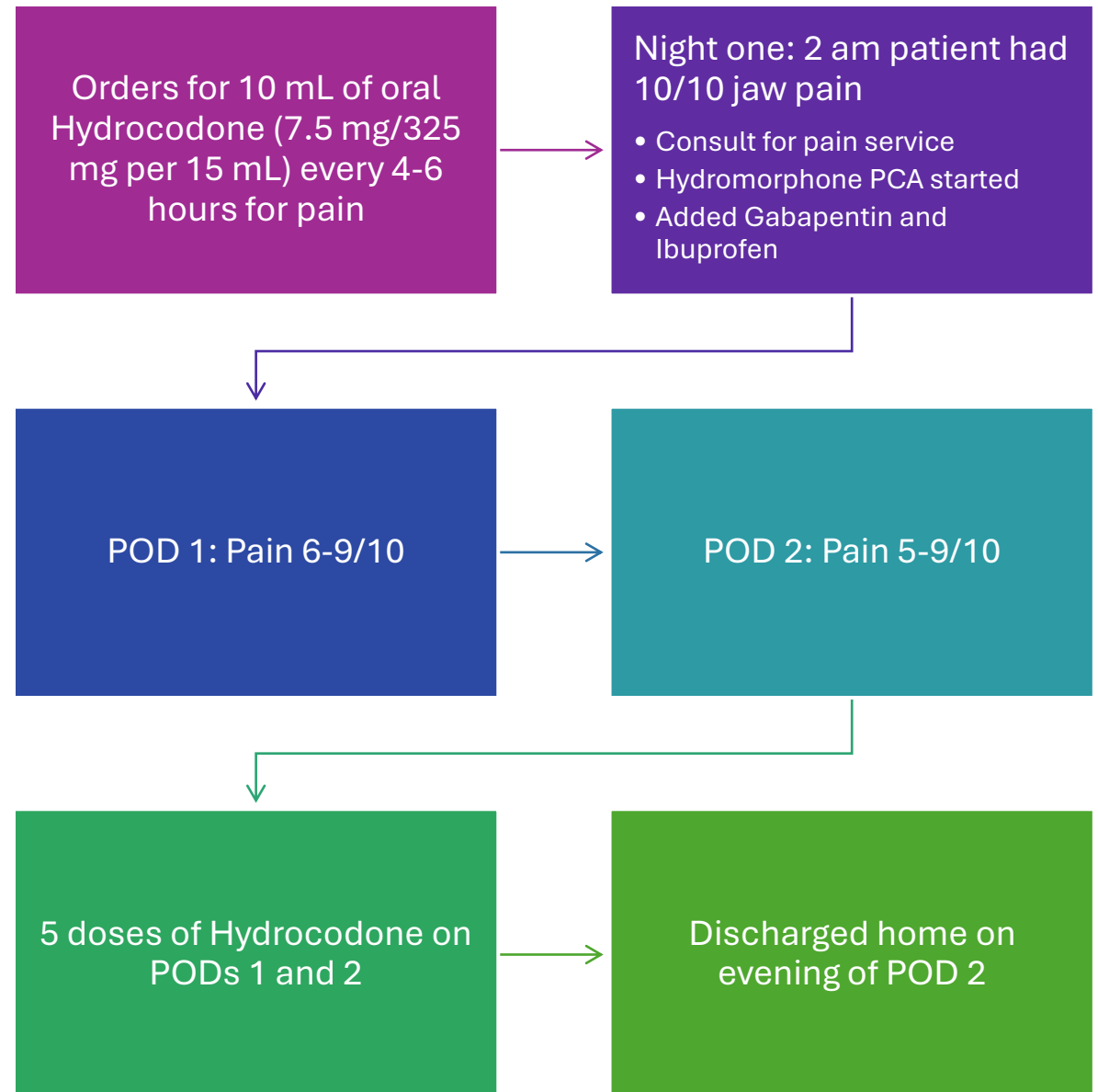
Pain 10/10 at mandibular incision

5 mg oral Oxycodone solution

Pain → 8/10

Transferred to inpatient pediatric floor

Postoperatively:



In this case:

“Habitual, high-dose Kratom abuse likely contributed to the observed anesthetic resistance, due to up-regulation of receptors in the central nervous system”

and

“Refractory pain was attributed to opioid resistance secondary to habitual Kratom use”

Lund et al (2022)

Other takeaways:

- 1) Patient complained of significant jaw pain, but not thoracic pain
 - Regional anesthesia?
- 2) In the PACU, his agitation resolved after he received Fentanyl, Dexmedetomidine, Lorazepam, & Oxycodone
 - This may have been appropriate treatment for withdrawal symptoms (although inadvertent)

Kratom and Anesthesia Considerations

-
- + • **NO guidelines currently exist**
 - **for the anesthetic management of patients who use Kratom**

But until they do.... **Preoperatively:**

Ask, ask, ask

- “Do you take anything additionally to your medications I see here, such as supplements that are not prescribed?”
- Vitamins or herbals?

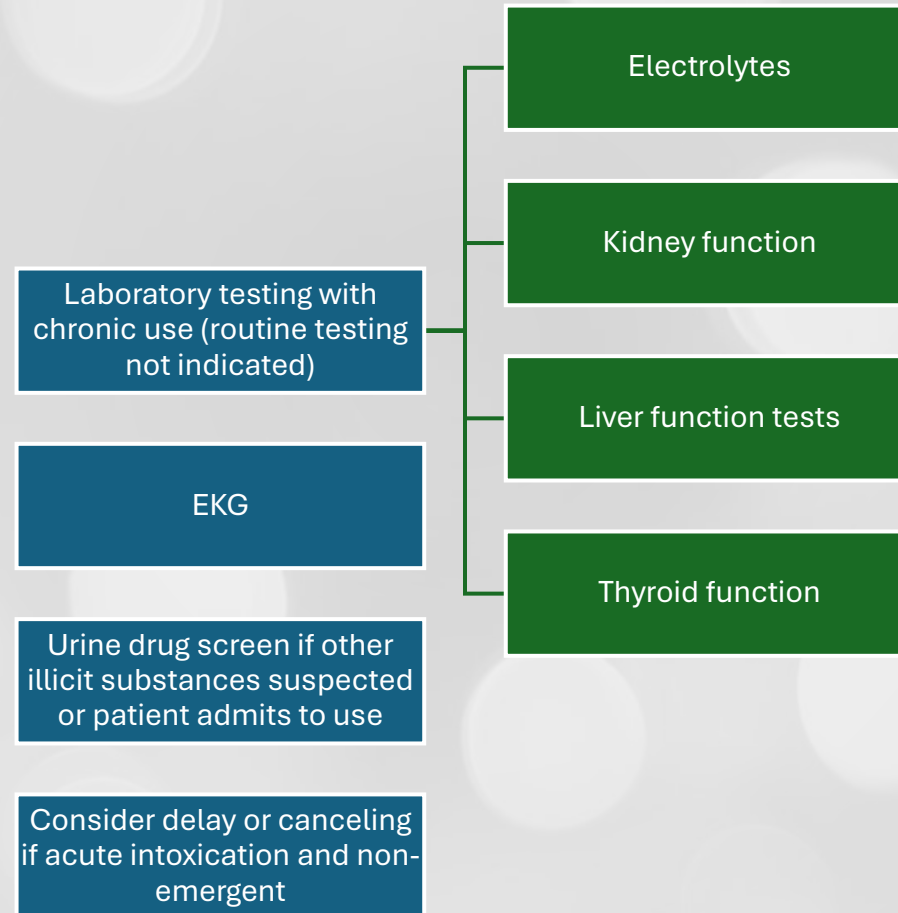
If you discover Kratom use:

- Dose
- Frequency
- History of adverse effects or withdrawal symptoms (looking for opioid cross-tolerance)
- Inquire about other illicit substances

Consider counseling about pain management strategies

- Kratom + opioids → oversedation, respiratory depression, and possible death

Preoperatively, also consider:



Additionally:



1

Consider weaning
from Kratom prior
to surgery



2

Avoid abrupt
withdrawal



3

Consult an
addiction
specialist with
heavy Kratom
users

Intraoperatively...be prepared!

Interactions between Kratom and anesthesia

Vigilance!

Consider the activity of Kratom at opioid, COX-2, alpha-2, Calcium, Serotonin, Acetylcholine, and Adenosine receptors

As part of your anesthetic, consider:



Regional anesthesia if possible

SAB or epidural
Peripheral Nerve Blocks



Ketamine, Dexmedetomidine, Magnesium



Nonopioid analgesia

Gabapentin, Acetaminophen, Ketorolac

Intraoperatively, you could see:

- Prolonged QT interval
- Hypotension
- Hypertension
- Prolonged neuromuscular blockade
- Prolonged emergence
- Emergence delirium

EVEN...

Extrapyramidal
symptoms or Serotonin
Syndrome

Postoperatively


Education about drug interactions

Caution regarding continued Kratom use in the absence of safety data

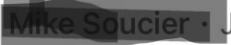

Information about additives like bacterial and heavy metals

Referrals for patients interested in treatment




Social Media Consults

 **TNAG for CRNAs and RRNAs: The Nurse Anesthesiologist Group ·**


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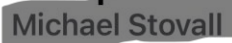

 **Mike Soucier ·** Jan 1 · 

Has anyone taken care of a patient using Kratom chronically? Ortho case. The patient was told yesterday to stop. Surgery is scheduled two weeks from today. From what I have read, pain control can be an issue, and possibly there can be refractory hypertension. This is my first time hearing of this substance. Any insight is appreciated.




   15



43 comments

 **TNAG for CRNAs and RRNAs: The Nurse Anesthesiologist Group**


 **Michael Stovall ·** Dec 12, 2024 · 

Any suggestions for heavy Kratom users? Best I can find is that they should wean off for at least 7 days before surgery. Not a well studied herbal and seems only case reports out there, no legit studies for recommendations

 Like  Comment  Send

  2

Most relevant ▾

 **Ryan Gundrum ·** 39w

I had a HEAVY user who cut his dose in half 3 days prior but still used the day of surgery. Did a lot of education up front to him about it and he did fine. I did not



Lauren Hostetler · 36w

All adjuncts. Regional block.
Ketamine. Toradol. Ice.
Magnesium. Precedex.
Everything besides opioids

Reply  1



Write a comme...



In conclusion

The use of Kratom is increasing in the United States

Kratom is a stimulant at low doses and has opioid-like effects at high doses

Patients who use Kratom will present as patients needing an anesthetic

There are no current anesthetic guidelines in place for patients who use Kratom

Conclusion, continued:

Patients need to be advised that their responses to anesthesia could be unpredictable and pain management may be challenging



Heavy Kratom use may need:

More narcotics

Multimodal
analgesia

Regional or
neuraxial
anesthesia

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Thank you!!! I
will be happy to
answer any
questions!

