


Kratom-induced Liver Failure and Death

Barrington Hwang, MD, Lesley Omary, MD
Academy of Consultation-Liaison Psychiatry Annual Meeting I November 10-12, 2021
Vanderbilt University Medical Center, Department of Psychiatry and Behavioral Sciences

ACADEMY OF CONSULTATION-LIAISON PSYCHIATRY

VANDERBILT UNIVERSITY MEDICAL CENTER

Background

Kratom (mitragynine speciosa) is a tree native to Southeast Asia that has both opioid, stimulant, and other properties. It is currently legal in parts of the United States and used for therapeutic and recreational purposes. At least half of reported kratom exposures resulted in a serious medical outcome, including death[1]

Learning Objectives

(1) Analyze kratom's MOA and effects liver/organs
(2) Assess current regulations surrounding kratom
(3) Describe kratom usage and potential for addiction

Case

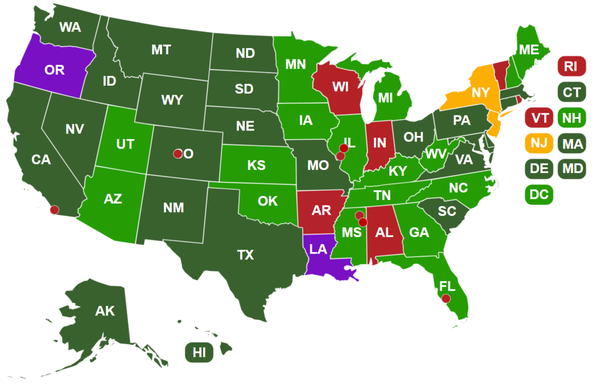
A 32-year-old mother of two children with a history of unspecified depression, anxiety, tobacco use disorder, and unclear opioid and stimulant use history presented intubated to the MICU from an outside hospital with acute fulminant hepatic failure in the setting of significant kratom use. She was emergently evaluated for liver transplant candidacy, though no appropriate donor was found, and she died in the next three days from multiorgan failure stemming from "kratom ingestion causing acute liver failure with hepatic coma".

Diagrams

Receptors affected[2,3]		
Mu (opioid)	α2a adrenergic	COX2, PGE2 inhibition
Delta (opioid)	Ca2+ blockage	5HT2C, 5HT7
Kappa (opioid)	No β-arrestin	D2

Dose	Primary Effect
Low-dose (<5mg)	Stimulant
High-dose (>5mg)	Opioid

Pharmacology	
Half-life	3.5h, 2.5h metabolite
Metabolism	Hepatic, Phase I
Interactions	CYP3A4 > 2D6, 2C9 inhibition



- Green: Kratom is legal with no restrictions
- Light Green: Legislation in these states have failed or been amended
- Orange: There is pending legislation on Kratom in these states
- Red: Banned states Schedule 1 for Kratom
- Purple: Study involving Kratom
- Red Dot: Banned city for Kratom

Discussion

Epidemiology

- Prevalence of Kratom use in past-year is 0.8%, more commonly among young adult males with increasing usage in the US[4]

Legality

- DEA considered kratom as Schedule I drug in 2016, then has labeled it a "Drug and Chemical of Concern"
- No current FDA-approved use, FDA currently evaluating information
- Banned in many countries around the world

Clinical Utility

- Both a drug of abuse and potential therapeutic option
- Future studies are needed to characterize addiction and usefulness

References

References
(1) Post S, Spiller HA, Counthirath T, Smith GA. Kratom exposures reported to United States poison control centers: 2011-2017. Clinical Toxicology. 2019 57:10, 847-854. DOI: 10.1080/15563650.2019.1569236. PMID: 30786220
(2) Kruegel AC, Grundmann O. The medicinal chemistry and neuropharmacology of kratom: A preliminary discussion of a promising medicinal plant and analysis of its potential for abuse. Neuropharmacology. 2018 134A:108-120. DOI10/1016/j.neuropharm.2017.08.026
(3) Eastlack SC, Cornett EM, Kaye AE. Kratom–Pharmacology, Clinical Implications, and Outlook: A Comprehensive Review. Pain Therapy: 2020 9:55-69. DOI: 10.1007/s40122-020-00151-x
(4) Schimmel J, Amioka E, Rockhill K, Haynes C, Black J, Dart R, Iwanicki J. Prevalence and description of kratom (Mitragyna speciosa) use in the United States: a cross-sectional study. Addiction. 2021 116:1, 176-181. DOI: 10.1111/add.15082. PMID: 32285981
Pictures and diagrams from American Kratom Association (leaves, fields), Triumph Botanicals (map), and US News (bottles)