

EM CASE OF THE WEEK.

BROWARD HEALTH MEDICAL CENTER
DEPARTMENT OF EMERGENCY MEDICINE



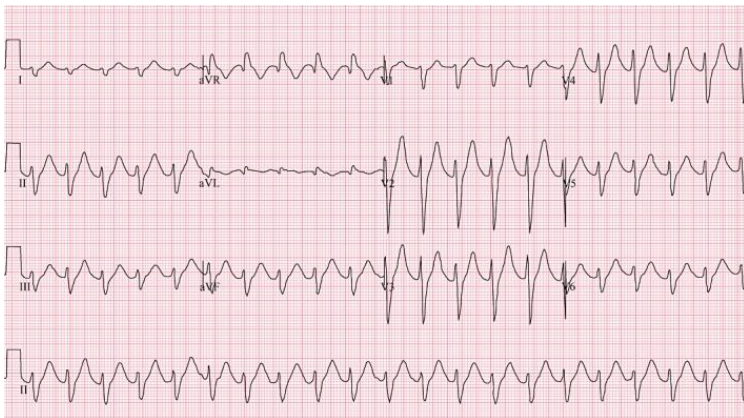
Care Warriors

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Acute Cocaine Toxicity

A 25-year-old male with unknown past medical history was brought into the ED by ambulance presenting with severe agitation, continuously exclaiming that he feels like there are bugs crawling under his skin for the past 20 minutes. His vital signs include BP of 170/93mmHg, HR of 147bpm, RR of 24 breaths per minute and temperature of 101.6°F. Upon physical exam, large, dilated pupils were noted along with diaphoresis and muscle twitches of the hands and face. The rest of the physical exam was unremarkable. The results from a STAT EKG are shown below.



Which of the following is the most appropriate initial treatment for this patient's condition?

- A. Atropine and 2-PAM
- B. Sodium Bicarbonate and Benzodiazepines
- C. Naloxone
- D. Physostigmine
- E. β -Adrenergic Receptor Blocker



Crack Cocaine
Source: DEA.gov

The most common signs and symptoms of Acute Cocaine Toxicity include:

- Mydriasis
- Hypertension
- Tachycardia
- Euphoria
- Hyperarousal

EM Case of the Week is a weekly "pop quiz" for ED staff.

The goal is to educate all ED personnel by sharing common pearls and pitfalls involving the care of ED patients. We intend on providing better patient care through better education for our nurses and staff.

BROWARD HEALTH MEDICAL CENTER

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The correct answer is B, Sodium Bicarbonate and Benzodiazepines.

Cocaine is identified as a schedule II drug in the United States. This stimulant is commonly seen as an illicit street drug that is available in different forms including cocaine base (smoked), cocaine salt (intranasal, oral, injection) or paste. Abuse potential is greatest with IV or smoked cocaine.

Discussion

Cocaine is found in the leaves of the coca plant indigenous to South America. It acts as an indirect sympathomimetic agent in the body by blocking the presynaptic reuptake pumps of monoamine neurotransmitters in both the central and peripheral nervous systems, thus enhancing their activity. The positive psychological effects and high abuse potential of cocaine is related to the enhancement of brain dopamine activity in the corticomesolimbic dopamine reward circuit.² Also, compared to other stimulants, cocaine has a unique second action of blocking voltage-gated sodium channels which accounts for the local anesthetic effect and cardiac arrhythmias that can occur after cocaine ingestion.

Cocaine is the most common illicit drug associated with emergency room visits in the United States, with the most use in males aged 15 to 35. Depending on the route of administration, tell-tale signs of acute cocaine toxicity can begin within seconds up to 90 minutes. In an acute overdose, the patient will present with dilated pupils, wet skin, elevated vital signs and elevated mental status including signs of psychosis ("cocaine bugs"). As shown above, the patient will also typically present with a prolonged QRS complex.

Cocaine can be devastating as it produces end-organ toxicity in almost every organ system. It has been shown to cause seizures, intracranial hemorrhage, coronary vasoconstriction, pneumothorax, perforated ulcers, rhabdomyolysis, and death among others.



Dilated pupils (Mydriasis)

<http://cocaine.org/crack-cocaine/signs-of-a-crack-cocaine-overdose/>

Diagnosis

Since numerous drugs and disease states can mimic the psychomotor agitation and/or cardiovascular effects of acute cocaine toxicity, a thorough history including preferred drug of choice and other medications is often essential to diagnosis.

In the history, complaints of chest pain, shortness of breath, focal neurologic symptoms and extremity symptoms are very worrisome.¹ Hypertension and wide-complex tachycardia are very common along with agitation and mydriasis. Urine toxicology testing will confirm cocaine use in the last several days, but it will not confirm acute toxicity.¹

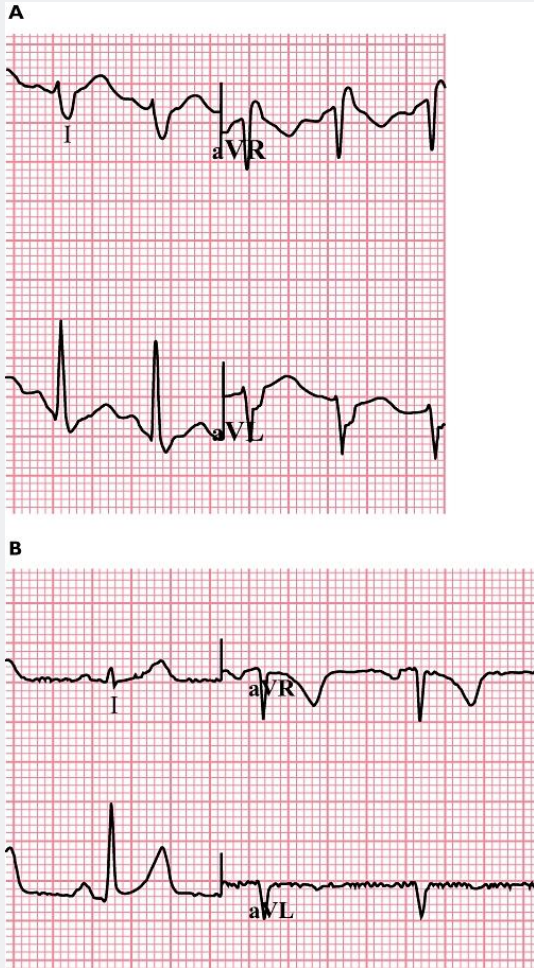
Treatment

Treatment for acute cocaine toxicity begins with airway management. If rapid sequence intubation is necessary, rocuronium (1 mg/kg IV) should be used. To control the psychomotor agitation, administer a benzodiazepine (diazepam 5 to 10 mg IV every 3-5 minutes until controlled). For severe hypertension, diazepam (5 mg IV) can be used but beta blockers are contraindicated in acute cocaine toxicity.¹ The administration of 1 to 2 mEq/kg IV push of hypertonic sodium bicarbonate will normalize the wide-complex tachycardia seen on the EKG. Patients without significant sequelae are usually safe for discharge once mental status and vital signs have returned to baseline.³

For a list of educational lectures, grand rounds, workshops, and didactics please visit BrowardER.com and **click** on the **"Conference"** link.

All are welcome to attend!

Warriors



A. Shows early sodium channel blocking effects of cocaine. Presence of an S wave in lead I and aVL and an R wave in aVR. There is also a wide QRS complex.

B. ECG of the same patient from figure A after the infusion of hypertonic sodium bicarbonate. The QRS duration has narrowed, and leads I, aVL, and aVR essentially have normalized.

Hoffman, R. S. (2010, May). Treatment of patients with cocaine-induced arrhythmias: Bringing the bench to the bedside. Retrieved September 12, 2018, from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2856045/>



ABOUT THE AUTHOR

This month's case was written by Erin Sperling. Erin is a PA student from NSU-CHCS. She did her emergency medicine rotation at BHMC in September 2018. Erin plans on pursuing a career in Orthopedic Surgery after graduation.

Take Home Points

- Cocaine is the most common illegal drug associated with emergency room visits in the United States.
- Main signs and symptoms of acute cocaine toxicity include elevated vital signs (tachycardia, HTN), diaphoresis, mydriasis, and elevated mental status (psychomotor agitation).
- A thorough history is the key to diagnosing acute cocaine toxicity.¹
- Benzodiazepines are used for the treatment of psychomotor agitation and hypertension, while sodium bicarbonate is used to treat the wide-complex tachycardia.
- Beta blockers should NOT be used, because unopposed α -adrenergic stimulation increases the risk of cardiovascular complications.¹

REFERENCES

1. Nelson, L., & Odujeb, O. (2018, February 26). Cocaine: Acute intoxication. Retrieved September 12, 2018, from https://www.uptodate.com/contents/cocaine-acute-intoxication?topicRef=7802&source=related_link#H26
2. Gorelick, D. A. (2017, August 1). Cocaine use disorder in adults: Epidemiology, pharmacology, clinical manifestations, medical consequences, and diagnosis. Retrieved September 12, 2018, from [https://www.uptodate.com/contents/cocaine-use-disorder-in-adults-epidemiology-pharmacology-clinical-manifestations-medical-consequences-and-diagnosis?search=Cocaine use disorder in adults: Epidemiology, pharmacology, clinical manifestations, medical consequences, and diagnosis&source=search_result&selectedTitle=1~150&usage_type=default&display_rank=1#H6](https://www.uptodate.com/contents/cocaine-use-disorder-in-adults-epidemiology-pharmacology-clinical-manifestations-medical-consequences-and-diagnosis?search=Cocaine%20use%20disorder%20in%20adults:Epidemiology,%20pharmacology,%20clinical%20manifestations,%20medical%20consequences,%20and%20diagnosis&source=search_result&selectedTitle=1~150&usage_type=default&display_rank=1#H6)
3. Stolbach, A. (2018, January 31). Cocaine overdose. Retrieved September 12, 2018, from <https://online.epocrates.com/u/2942340/Cocaine-overdose/Treatment/Tx-Details>