


GETTING THE FAT IN: ACUTE LIPID INFUSIONS FOR CARDIOPULMONARY ARREST

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DISCLOSURE STATEMENT

- CME Speaker for ZOLL Circulation/Alsius Corp
 - Specializing in Resuscitative Hypothermia and Emergency Medicine related issues
 - Co-investigator ICTuS 2/3 trial
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ST PAUL WINTER CARNIVAL



KING BOREALIS AND HIS QUEEN



VULCANUS REX AND HIS VULCANS



VULCANUS REX AND HIS VULCANS



CASE PRESENTATION

- 20 yo WM sitting in class at community college, h/o depression and sinusitis
- Patient noted to be snoring at this desk, then collapsed to the floor with seizure activity noted
- Nurse in class found patient without pulse and CPR started
- EMS dispatched at 1206 and arrives at 1211

CASE PRESENTATION

- CPR in progress and defibrillated x 2 by EMS; remains in v-fib with continued CPR
- IV started and patient given epinephrine x 2, atropine, bicarbonate, naloxone 2 mg and magnesium sulfate 1 gram
- Patient remains in v-fib, ETT placed with EtCO₂ of 17, and transported Code 3 to NMMC at 1227

CASE PRESENTATION

- Arrives at NMMC at 1245 with CPR in progress and bright red blood coming from ETT
- CPR continued in STAB room, given additional epinephrine, atropine, naloxone and amiodarone without result.
- Patient then given glucagon without results, and finally 100 ml of 20% intra-lipid emulsion for possible anti-depressant OD

CASE PRESENTATION

- PEA was initially seen, but patient then rapidly developed a strong, steady pulse with a junctional rhythm at 1309, and systolic BP of @130 mm Hg
- Diminished breath sounds were heard on the left side, and a needle thoracostomy was performed followed by chest tube placement

CASE PRESENTATION

- Recurrent v-fib occurred, treated with an amiodarone drip and ensuing hypotension treated with a Levophed drip
- CT scan of head and chest were performed, and were unremarkable except for resolving left sided pneumothorax and developing ARDS
- Bedside ultrasound was negative for pericardial effusion

CASE PRESENTATION

- Lab data showed early renal failure, hypoxemia and rhabdomyolysis
- Family interview reveals patient not on any anti-depressants, occasional marijuana use, and possible use of K2 in the last 48 hours
- Patient started on Induced Hypothermia and transferred to the ICU

CASE PRESENTATION

- Patient cleared all medical conditions and extubated within 8 days
- TEE, TTE, EPS and cardiac MRI all negative; AICD placed and patient discharged to home 3 weeks s/p event
- All toxicology screens were negative, and patient still with mild short term memory deficits
- Total CPR time estimated at @ 65 minutes

INTRA-LIPID EMULSION

- Soybean based emulsion of 20% lipids and proteins
- Most commonly used for calorie augmentation in TPN
- Available in 200cc and 500cc bottles
- Cost is @ \$20 per 200cc



INTRA-LIPID EMULSION

- Original case reports in 2002-4 from the anesthesia literature for use in refractory cardiac arrest
- Used in cardiac arrests that occurred during regional anesthesia/epidural block procedures



INTRA-LIPID EMULSION

- Leakage of long-acting local anesthetics into the central circulation caused refractory V-fib/V-tach cardiac arrests
- Unresponsive to all standard ACLS drugs, naloxone, glucagon and cardiac pacing
- “Rescue” infusions of 1-1.5 ml/kg given and seen to cause ROSC within 1 minute in multiple cases

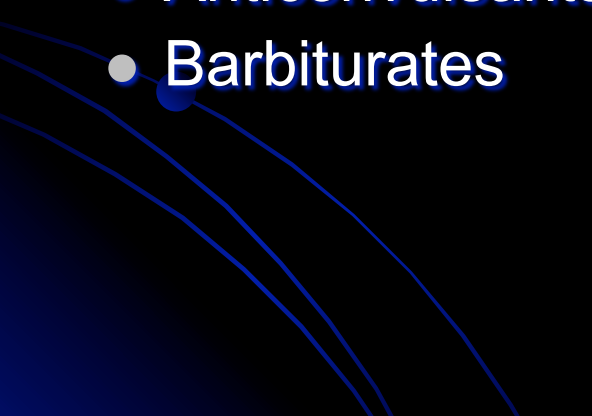
INTRA-LIPID EMULSION

- Chemical mechanism postulated was the creation of a “lipid sink” by the emulsion infusion
- Created a large reserve of proteins that would bind these drugs over a long period, eliminating the toxic levels in central circulation
- Usually followed by a 12 hour lipid infusion

INTRA-LIPID EMULSION

- New case reports were seen in the literature about its use in OD situations with other cardio-toxic drugs
- Same mechanism of a “lipid sink” postulated, causing the reduction of unbound drug affecting myocardial conduction cells
- Greatest potential benefit was in lipophilic drugs, calcium channel blockers, SSRIs and tri-cyclic anti-depressants

TARGET MEDICATIONS FOR INTRA-LIPID RESCUE

- Lipophilic drugs
 - Benzodiazepines
 - Narcotics
 - Anti-dysrhythmic drugs
 - General anesthetics
 - Anticonvulsants
 - Barbiturates
 - Ca channel blockers
 - Verapamil, Diltiazem, Norvasc, Amlodipine
 - SSRIs
 - Celexa, Lexapro, Paxil, Zoloft, Luvox
 - Tri-cyclic anti-depressants
 - Amitriptyline, Nortriptyline
 - Neuroleptic agents
 - Haldol, Droperidol, Thorazine
 - Beta blockers(?)
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NEW INDICATIONS FOR INTRA-LIPID EMULSION THERAPY

- Recent research has postulated a new possible use for this medication
- Experimental research has shown that intra-lipids open a different calcium channel into myocardial conduction cells, allowing the generation of ATP (energy) that can stimulate cardiac conduction
- Similar to the mechanism of glucagon in calcium channel/beta blocker overdose

NEW INDICATIONS FOR INTRA-LIPID EMULSION THERAPY

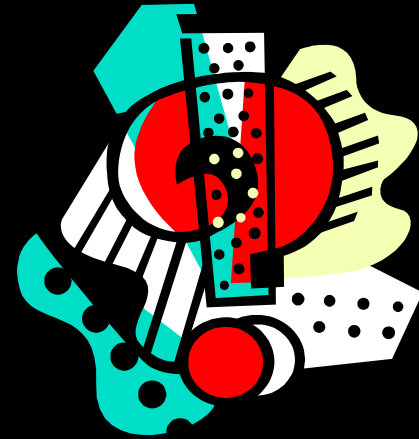
- Also increases circulating levels of epinephrine by endogenous release
- May play a role in the treatment of refractory v-fib and v-tach
- Also being looked at as a myocardial energy generation agent for the treatment of PEA (T is for toxins and ATP)

ACKNOWLEDGMENTS

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QUESTIONS?



THANK YOU

