Lipid Emulsion Therapy for Oral Cardiovascular Toxicant Overdose: Quick Treatment Tips

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Lipid emulsion therapy is a relatively new “rescue” treatment for cardiovascular collapse from lipophilic drug poisoning. It is not FDA-approved for this indication and optimal dosing and practice has not been defined by clinical trials.

Lipid Emulsion Administration

- Contraindicated with egg, soy or safflower allergy.
- Relative contraindications: neonates, fat metabolism disorder, pancreatitis, immediate availability of ECMO support.
- Best to have dedicated IV line. Don’t give calcium salts or glucagon simultaneously in the same line.
- 20% Lipid Emulsion: 100 mL (children: 1.5 mL/kg) IV push, then 50 mL (0.75 mL/kg) slow push over 3-5 minutes; if prolonged therapy desired then 100 mL/hr infusion (0.025 mL/kg/min) for up to 6 hours. (FDA limits total dose, for other indications, to < 12.5 mL/kg/day)
- Infusion may be titrated to clinical effect.
- If infusion > 6 hours required, try to target serum triglyceride concentration of ~1000 mg/dL (1%).

Known Adverse Effects of Lipid Emulsion

- Phlebitis
- Pancreatitis
- Pulmonary infiltrates / ARDS
- Sequestration of other pharmaceuticals
- Laboratory difficulty with lipemic samples
- Clogging of renal replacement therapy filters / ECMO circuitry
- Fat overload syndrome

Proposed Mechanisms of Action

- Acts as a “lipid sponge” and keeps lipophilic drugs from binding to sodium or calcium channels of heart.
- Increases fatty acid fuel delivery to cardiac mitochondria.
- Increases efficiency of calcium use by cardiac muscle.
- Inhibits the mitochondrial permeability transition pore.
- Stimulates insulin release.

Support for Use of Lipid Emulsion Therapy

- Recommended by the Australian and New Zealand College of Anesthetists and the Resuscitation Council of the United Kingdom for cardiac arrest due to local anesthetic toxicity.
- Recommended by the American Heart Association’s ACLS guidelines for cardiac arrest due to lipophilic beta- and calcium channel-blockers.

The specialists, and consulting toxicologists, at The Poison Control Center may be able to provide more nuanced information to assist clinicians trying to make patient care decisions.

This information has been downloaded from The Poison Control Center at The Children’s Hospital of Philadelphia’s website and anyone using this information is subject to the Terms of Use on that website including Additional Terms of Use for Medical Information.
Selected References for More In-Depth Information:


A Simple System for Emergency Department or Intensive Care Unit Stocking:

- Stock a 250 mL bag of 20% lipid emulsion in ED or ICU.
- An unopened bag may be stored at room temperature for up to 24 months.
- For a patient > 60 kg: Give 100 mL push, then 50 mL over 3-5 minutes, then remaining 100 mL over one hour.
- Get 500 mL bag from pharmacy – may give at rate 100 mL/hr as needed for next 5 hours.