



# Clinical Pharmacology & Toxicology Pearl of the Week

## ~ Intravenous Lipid Emulsion (ILE) ~

### Background:

- ✓ ILE is a treatment for severe toxicity from local anesthetics. In addition, it has been used in life-threatening toxicity from
  - anticonvulsants (lamotrigine)
  - antidysrhythmics (flecainide)
  - antihistamines (diphenhydramine)
  - beta blockers
  - bupropion
  - calcium channel blockers
  - cocaine
  - cyclic antidepressants

### Indications:

- ✓ Cardiac arrest or hemodynamic instability resulting from hypotension, widened QRS interval or refractory seizures secondary to either local anesthetics or lipophilic drugs which are unresponsive to conventional resuscitation and advanced cardiac life support therapies.
- ✓ ILE is considered a heroic measure and only indicated in extremis. Other heroic measures, such as extracorporeal life support (ie: ECMO) should be considered first if available.

### Dosing:

1. 20% Intravenous Lipid Emulsion (ILE) 1.5 mL/kg IV bolus over 1-2 minutes.
2. If hemodynamic instability persists, repeat 1.5 mL/kg bolus every 3-5 minutes for two additional doses.
3. There is insufficient evidence to recommend an ILE infusion. Ongoing boluses are sufficient should hemodynamic instability re-occur.
4. A maximum dose of 10-12 ml/kg of 20% ILE is advised.

### Potential Hazards with Parenteral Administration:

- ✓ Adverse Effects
  - Local:
    - Thrombophlebitis at infusion site.
  - Systemic:
    - Cholestasis, pancreatitis, acute lung injury, hepatomegaly, splenomegaly, thrombocytopenia, leukopenia, transient elevation of liver enzymes.
    - Fat emboli: priapism, stroke, limb ischemia, other end-organ failure.
    - Symptoms are usually reversible if fat infusion is discontinued.

- Other:
  - ILE has been shown to increase GI absorption of drugs in animal models and may paradoxically increase risk of toxicity through increased absorption, as well as through adsorption of other beneficial therapies (ie: vasopressors).
  
- Relative contraindications:
  - Severe liver disease
  - Pulmonary disease
  - Severe renal disease
  - Acute myocardial infarction
  - Severe egg or soybean allergies
  - Early age (neonates/infant)

**Additional treatment notes:**

**Concurrent therapy** - other therapies and cardiopulmonary resuscitation should continue while ILE is administered.

**Lipemic serum** - lipemic serum may transiently interfere with measurement of labs (electrolytes, blood gases) for 6-12 hours following ILE use.

**References:**

1. ACMT Position Statement: Guidance for the Use of Intravenous Lipid Emulsion. *Journal Medical Toxicology*. 2017; 13:124-125
2. Fettiplace MR *et al*. Confusion About Infusion: Rational Volume Limits for Intravenous Lipid Emulsion During Treatment of Oral Overdoses. *Ann Emerg Med*. 2015; 66:185-188.
3. Grunbaum AM *et al*. Review of the effects of intravenous lipid emulsion on laboratory analyses. *Clinical Toxicology*. 2016; 54(2):92-102
4. Gosselin S *et al*. Evidence-based recommendations on the use of intravenous lipid emulsion therapy in poisoning. *Clinical Toxicology*. 2016; 54(10):899-923
5. Hayes BM *et al*. Systematic review of clinical adverse events reported after acute intravenous lipid emulsion administration. *Clinical Toxicology*. 2016;54(5):365-404
6. Hoegberg L *et al*. Systematic review of the effect of intravenous lipid emulsion therapy for local anesthetic toxicity. *Clinical Toxicology*. 2016; 54(3):167-193

7. Levine M *et al.* Systematic review of the effect of intravenous lipid emulsion therapy for non-local anesthetics toxicity. *Clinical Toxicology*. 2016;54(3):194-221

The Clinical Pharmacology (CP) physician consultation service is available Mon-Fri, 8am-5pm. The on-call physician is listed in ROCA on the AHS Insite page. CP consultations are also available through Netcare e-referral and Specialist Link. You can also find us in the [Alberta Referral Directory](#) (ARD) by searching "Pharmacology" from the ARD home page. Click [HERE](#) for more details about the service.

The Poison and Drug Information Service (PADIS) is available 24/7 for questions related to poisonings. Please call 1-800-332-1414 (AB and NWT) or 1-866-454-1212 (SK). Information about our outpatient Medical Toxicology Clinic can be found in [Alberta Referral Directory](#) (ARD) by searching "Toxicology" from the ARD home page.

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