Intravenous Lipid Emulsion Therapy
Updated March 2018

Intravenous lipid emulsions have been used as a component of total or partial parenteral nutrition, as well as a carrier vehicle for drug delivery for other emulsions.

Intralipid emulsion therapy (ILE) can provide an important antidote for a wide variety of toxicities specifically those that are more lipophilic. ILE therapy can be a beneficial component of treatment when the toxicity has a very narrow margin of safety, the toxin exposure approaches the LD50, or the patient cannot be decontaminated safely (e.g., comatose patients). ILE therapy increases the rate of recovery and may limit the severity of clinical signs by increasing clearance.

There are four main hypotheses about the mechanism of action include:
1. Provides myocytes with energy substrates, thereby augmenting cardiac performance
2. Restore myocardial function by increasing intracellular calcium concentration, which increases contractility
3. Increases overall fatty acid pool, which overcomes inhibition of mitochondrial fatty acid metabolism (e.g., bupivacaine toxicosis)
4. Acts as a lipid sink by sequestration of lipophilic compounds into the newly created intravascular lipid compartment resulting in decreased free drug concentration available to the tissues.

Complications:
1. Fat overload syndrome (has not been documented in animals)
2. Cholesterol deposits in the cornea
3. Coagulopathy
4. Pancreatitis
5. Anaphylaxis
6. Embolism

Procedure:
1. A peripheral catheter is required as a clean venipuncture. Does not require a central line.
2. ILE therapy is hooked up to the IV catheter with aseptic technique to prevent risks of contamination
3. An in-line 1.2-micron filter is required between the bag and the patient to decrease the concerns for possible emboli.
4. To limit contamination, the solution should not be disconnected while infusion is taking place.
5. The bag is for single-patient use only. The bag may be used for up to 24 hours but must be kept in the refrigerator between doses. Aseptic technique is imperative.

Dosing:
1. When using the 20% solution, an initial bolus of 1.5 mL/kg IV over 1 minute has been recommended. This is then followed by a CRI of 0.25 mL/kg/min over 45-60 minutes.
2. If clinical signs persist and the patient’s serum is no longer lipemic consider one of the following methods:
   a. Intermittent bolus dosing of 1.5mL/kg q 4-6 hours for 24 hours
   b. CRI of 0.5mL/kg/hr until resolved
   c. Follow same initial protocol as listed above
3. If there has been no change in patient’s progress in 24 hours then there is no need to repeat further.
Possible toxicities treated with ILE therapy (but not limited to this list)

<table>
<thead>
<tr>
<th>Analgesics/Anesthetics</th>
<th>Antiparasitics</th>
<th>Recreational drugs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baclofen</td>
<td>Macrocyclic lactones (ivermectin, moxidectin)</td>
<td>Marijuana</td>
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<tr>
<td>Bupivacaine, lidocaine, mepivacaine</td>
<td>Permethrins</td>
<td>Methamphetamine</td>
</tr>
<tr>
<td>NSAIDs (carprofen, ibuprofen, ketoprofen, naproxen)</td>
<td>Pyrethrins</td>
<td></td>
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</tbody>
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<table>
<thead>
<tr>
<th>Antibiotics &amp; Antifungals</th>
<th>Cardiovascular medications</th>
<th>Rodenticides</th>
</tr>
</thead>
<tbody>
<tr>
<td>Itraconazole</td>
<td>Beta blockers (atenolol, metoprolol, propranolol)</td>
<td>Bromethalin</td>
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<tr>
<td>Metronidazole</td>
<td>Calcium channel blockers (amlodipine, diltiazem, nifedipine, verapamil)</td>
<td>Cholecalciferol</td>
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<thead>
<tr>
<th>Antidepressants</th>
<th>Chemotherapeutics/Immunomodulators</th>
<th>Others</th>
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<tbody>
<tr>
<td>Amitriptyline</td>
<td>Cyclosporine</td>
<td>Caffeine</td>
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<tr>
<td>Clomipramine</td>
<td>Dexamethasone</td>
<td>Chlorpromazine</td>
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<td></td>
<td>Vinblastine</td>
<td>Loperamide</td>
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References: