ASPEN Lipid Injectable Emulsion Safety Recommendations for Adult Patients

- Lipid injectable emulsions (ILEs) are intended as a daily source of energy and fatty acids (FAs) for parenteral nutrition (PN) therapy.
- There are currently four FDA approved ILE products with an adult indication available in the US. Alternative ILE products for adults are those with decreased amounts of soybean oil.

**Dosing and Prescribing**

- The dose of ILE should be prescribed as amount per day (ie, g/d or kcal/d for adults). Table 1 provides adult daily dosing recommendations.

**TABLE 1. ADULT ILE DAILY DOSING RECOMMENDATIONS**

<table>
<thead>
<tr>
<th>Oil Source</th>
<th>SO-ILE</th>
<th>SO,MCT,OO,FO-ILE</th>
<th>OO,SO-ILE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>100% soybean oil</td>
<td>30% soybean oil, 30% MCT oil, 25% olive oil, 15% fish oil</td>
<td>80% olive oil, 20% soybean oil</td>
</tr>
<tr>
<td>Recommended Dose</td>
<td>Critically ill: &lt;1g/kg/d</td>
<td>Stable: 1 g/kg/d</td>
<td>1–2 g/kg/d</td>
</tr>
<tr>
<td></td>
<td>2.5 g/kg/d</td>
<td>2.5 g/kg/d</td>
<td>2.5 g/kg/d</td>
</tr>
<tr>
<td>Maximum Infusion Rate</td>
<td>0.11 g/kg/h</td>
<td>0.11 g/kg/h</td>
<td>0.11 g/kg/h</td>
</tr>
</tbody>
</table>

**TABLE 2. CALCULATED MINIMUM ILE DAILY DOSE TO MEET 2% OF TOTAL KCAL FROM LA**

<table>
<thead>
<tr>
<th>Daily total caloric dose</th>
<th>Daily dose SO ILE (20%)</th>
<th>Daily dose SO,MCT,OO,FO ILE (20%)</th>
<th>Daily dose OO,SO ILE (20%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>kcal</td>
<td>mL*</td>
<td>g</td>
<td>mL*</td>
</tr>
<tr>
<td>1000</td>
<td>20.4</td>
<td>4.1</td>
<td>62.9</td>
</tr>
<tr>
<td>1500</td>
<td>30.6</td>
<td>6.1</td>
<td>94.3</td>
</tr>
<tr>
<td>2000</td>
<td>40.8</td>
<td>8.2</td>
<td>125.7</td>
</tr>
</tbody>
</table>

Daily dose, % total kcal to meet ≥ 2% of total kcal from LA

- ≥ 7%
- ≥ 12.5%
- ≥ 12.5%

**Abbreviations:** ILE, lipid injectable emulsion; SO-ILE, olive oil ILE—Clinolipid® (Baxter Healthcare Corporation); SO,MCT,OO,FO-ILE, soybean oil, medium-chain triglycerides, olive oil, fish oil ILE—SMOFLipid® (Fresenius Kabi); SO-ILE, soybean oil ILE—Intralipid® (Baxter Healthcare Corporation), Nutrilipid® (B. Braun Medical, Inc).

- ILEs that are less than 100% soybean oil require a higher minimum dose vs SO-ILE due to lower LA and ALA content.

- The minimum dose to prevent EFAD is NOT the daily recommended dose.
- EFA content may vary within a preestablished range which may account for variations of reported amounts in the literature.
- These are minimum estimated dosing recommendations; individuals may require higher ILE dosing to prevent or treat EFAD depending on clinical circumstances.
- Greater than ILE minimum dosing allows for a reduction in the amount of dextrose needed to provide appropriate energy intake.

Continued
Monitoring
- Check serum triglycerides at baseline and weekly for hospitalized patients and monthly for long-term PN patients.
- Hold or limit ILE if triglyceride level is > 400 mg/dL. Note, withholding ILE greater than 2 weeks is not advised due to risk for EFAD.

Stability/Compatibility
Total Nutrient Admixture (TNA) Stability
- The stability and compatibility of TNA is dependent on many factors including, electrolyte content and specific salts used, final concentration of macronutrients, and pH (These are not the same across all manufacturer’s products).
- A pharmaceutical review should be conducted by a knowledgeable pharmacist to assess the stability and compatibility of ILE with the other components of the PN admixture.
- ILE manufacturers should be contacted to determine the acceptable range of macro- and micronutrient concentrations for TNA stability.
- Figure 1 illustrates phases of TNA physical destabilization:

Preparation & Administration
- When ILE is ordered as part of a TNA, it may be infused over 24 hours. If ordered as a separate infusion, it should be infused over a maximum of 12 hours. Can split into two 12 hour doses if needed for volume limitations.
- ILE should be administered using DEHP-free tubing due to concern of DEHP plasticizer leaching into ILE.
- A 1.2 micron filter should be used for a TNA formulation or as a separate ILE infusion. See Figure 2 for appropriate set-up.
- Administration of medications through the PN venous catheter should be avoided due to increased risk for catheter related blood stream infection (CRBSI) and compatibility concerns.
- ILE manufacturers should be contacted for medication compatibility information.

FIGURE 2. APPROPRIATE SET-UP OF PN WITH FILTER

References
2 Intralipid 20% (IV fat emulsion) Prescribing Information. In: Fresenius Kabi; 2015.
3 Nutrilipid 20% (lipid injectable emulsion) Prescribing Information. In: B. Braun Medical Inc.; 2014.
4 Clinolipid 20% (lipid injectable emulsion) Prescribing Information. In: Fresenius Kabi LLC USA; 2020.