

Syringe-dispensed omega-3 lipid injectable emulsions should be stored under airtight refrigeration: a proposal for the efficient supply of unapproved precious lipid resources

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論 文 要 旨

Syringe-dispensed omega-3 lipid injectable emulsions should be stored under airtight refrigeration: a proposal for the efficient supply of unapproved precious lipid resources

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Abstract**Background:**

Both fish oil lipid injectable emulsion (FO-ILE) and mixed oil lipid injectable emulsion (MO-ILE) are key components of parenteral nutrition and require importation into Japan, and they are easily oxidized after opening. Given the small daily volumes of these lipids dispensed in infants and children with intestinal failure (IF), the purpose of the study was to identify the optimal storage method.

Methods:

Lipids were prepared in polypropylene syringes in the following manner: air-sealing and photoprotection, air-sealing only, photoprotection only, and uncovered. Samples were stored for 14 days at 4°C or 26°C. The degree of oxidative degradation was evaluated by measuring malondialdehyde (MDA) concentration and pH compared to the values measured immediately after opening.

Results:

For FO-ILE, the increase in MDA concentration for 14 days was insignificant in air-sealed samples, regardless of photoprotection (+0.45 μM , $p=1.0$) or no-photoprotection (+0.52 μM , $p=1.0$). This trend was more pronounced at 4°C than at 26°C ($p<0.01$). The maximum pH decrease was 0.08 at 4°C. MO-ILE exhibited an insignificant increase in MDA concentration for 14 days with air-sealed samples, regardless of photoprotection (+0.36 μM , $p=0.11$) or no-photoprotection (+0.33 μM , $p=0.76$). This trend was more pronounced at 4°C than at 26°C ($p<0.01$). The maximum pH decrease was 0.12 at 4°C. For soybean oil lipid injectable emulsion (SO-ILE), the trend was similar with no considerable deterioration.

Conclusion:

Syringe-dispensed FO-ILE and MO-ILE stored under airtight refrigeration remained undeteriorated for 14 days. Our results are considered clinically valuable when supplying these expensive resources for infants with IF.