CADTH RAPID RESPONSE REPORT: SUMMARY OF ABSTRACTS

Parenteral Nutrition Combination Products: Clinical Effectiveness, Cost-Effectiveness and Guidelines
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Acknowledgments:

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About CADTH: CADTH is an independent, not-for-profit organization responsible for providing Canada’s health care decision-makers with objective evidence to help make informed decisions about the optimal use of drugs, medical devices, diagnostics, and procedures in our health care system.
Research Questions

1. What is the comparative clinical effectiveness of commercially-available 3-in-1 versus 2-in-1 parenteral nutrition combination products?

2. What is the comparative cost-effectiveness of commercially-available 3-in-1 versus 2-in-1 parenteral nutrition combination products?

3. What are the evidence-based guidelines informing the use of commercially-available 3-in-1 versus 2-in-1 parenteral combination nutrition products?

Key Findings

One non-randomized study, one economic evaluation, and one evidence-based guideline were identified regarding the clinical effectiveness and cost-effectiveness of parenteral nutrition combination products.

Methods

A limited literature search was conducted on key resources including PubMed, CINAHL, the Cochrane Library, University of York Centre for Reviews and Dissemination (CRD) databases, Canadian and major international health technology agencies, as well as a focused Internet search. No methodological filters were applied to limit the retrieval by study type. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2013 and September 13, 2018. Internet links were provided, where available.

Selection Criteria

One reviewer screened citations and selected studies based on the inclusion criteria presented in Table 1.

Table 1: Selection Criteria

<table>
<thead>
<tr>
<th>Population</th>
<th>Patients requiring parenteral nutrition</th>
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<tbody>
<tr>
<td>Intervention</td>
<td>Commercially-available 3-in-1 parenteral nutrition combination products (e.g. Olimel, SmofKabiven)</td>
</tr>
<tr>
<td>Comparator</td>
<td>2-in-1 parenteral nutrition products</td>
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<tr>
<td>Outcomes</td>
<td>Q1: Benefits (e.g., compatibility, stability, improved fat clearance), harms (e.g., infections, emulsion instability (“cracking”), precipitant formation, catheter contamination/occlusion), safety</td>
</tr>
<tr>
<td>study Designs</td>
<td>Q2: Cost (e.g., potential institutional cost savings)</td>
</tr>
<tr>
<td>Table 1: Selection Criteria</td>
<td>Q3: Guidelines</td>
</tr>
<tr>
<td>Study Designs</td>
<td>Health technology assessments, systematic reviews, meta-analyses, randomized controlled trials, non-randomized studies, economic evaluations, evidence-based guidelines</td>
</tr>
</tbody>
</table>
Results

Rapid Response reports are organized so that the higher quality evidence is presented first. Therefore, health technology assessment reports, systematic reviews, and meta-analyses are presented first. These are followed by randomized controlled trials, non-randomized studies, economic evaluations, and evidence-based guidelines.

One non-randomized study, one economic evaluation, and one evidence-based guideline were identified regarding the clinical effectiveness and cost-effectiveness of parenteral nutrition combination products. No relevant health technology assessments, systematic reviews, meta-analyses, or randomized controlled trials were identified.

Additional references of potential interest are provided in the appendix.

Overall Summary of Findings

One non-randomized study, 1 one economic evaluation, 2 and one evidence-based guideline 3 were identified regarding the clinical effectiveness and cost-effectiveness of parenteral nutrition (PN) combination products.

One non-randomized retrospective study examined the clinical aspects of a three-in-one total nutrient mixture compared with conventional peripheral PN in inpatients ranging in age from two to eighteen years old. 1 For children inpatients, there were significant differences observed between the three-in-one total nutrient mixture compared with the conventional PN in regards to the time between the admission and the first day of peripheral PN, the duration of fasting before the parental nutrition administration, the glucose infusion rate, and the daily administered total calories per weight. 1 There was no significant difference observed in peripheral PN-related complications and amount of administered lipids and amino acids. 1

One economic evaluation examined the cost of the individualized all-in-one PN system made from nutrient solutions compared with the commercialized all-in-one three-compartment bag PN system for adult patients. 2 The mean costs of the customized bags were reported to be higher than the three-compartment bags while the time to complete an adult bag for the hospital compounded system was reported to be longer than the three-compartment system. 2 The authors concluded that the commercialized three-compartment bags for standard adult PN could lead to cost savings. 2

An evidence-based guideline by the American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.) provided guidance on PN prescribing, order review, and preparation. 3 The guideline recommends that commercially available premade multichambered PN formulations be considered as an available option as well as compounded (customized or standardized) PN formulations to best meet the patient’s needs. 3 The guideline states that there was no clinical difference in infectious complications between the two PN delivery systems; however, the three-in-one formulations administered in the homecare setting may shorten catheter lifespan and increase the risk for catheter occlusion. 3
References Summarized

Health Technology Assessments
No literature identified.

Systematic Reviews and Meta-analyses
No literature identified.

Randomized Controlled Trials
No literature identified.

Non-Randomized Studies

Economic Evaluations

Guidelines and Recommendations
Appendix — Further Information

Randomized Controlled Trials – Intervention Not Specified


Non-Randomized Studies

Alternative Outcome


Alternative Intervention


Economic Evaluations – Three-in-One Formulation Not Specified


Review Articles


Additional References

See: Parenteral nutrition process, pages 20-21 and Figure 2
See: Parenteral nutrition usage, page 23
See: PN order compounded, labelled, and dispensed, page 31