TITLE: End Tidal CO₂ Monitoring Devices: Clinical and Cost-Effectiveness and Guidelines

DATE: 23 April 2015

RESEARCH QUESTIONS

1. What is the clinical effectiveness of mainstream and sidestream capnography in patients requiring cardiopulmonary resuscitation (CPR)?

2. What is the clinical effectiveness of mainstream and sidestream capnography in patients who require continuous CO₂ monitoring?

3. What is the cost-effectiveness of mainstream and sidestream capnography in patients requiring CPR?

4. What is the cost-effectiveness of mainstream and sidestream capnography in patients who require continuous CO₂ monitoring?

5. What are the evidence based guidelines associated with the use of mainstream and sidestream capnography in patients requiring CPR?

6. What are the evidence based guidelines associated with the use of mainstream and sidestream capnography in patients who require continuous CO₂ monitoring?

KEY FINDINGS

One systematic review, seven randomized controlled trials, five non-randomized studies, and one economic evaluation were identified regarding the clinical and cost-effectiveness of mainstream and sidestream capnography. In addition, nine evidence-based guidelines associated with the use of mainstream and sidestream capnography were identified.
METHODS

A limited literature search was conducted on key resources including PubMed, The Cochrane Library (2015, Issue 4), University of York Centre for Reviews and Dissemination (CRD) databases, ECRI, Canadian and major international health technology agencies, as well as a focused Internet search. No 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, 2010 and April 17, 2015. 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>
<thead>
<tr>
<th>Table 1: Selection Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Population</strong></td>
</tr>
<tr>
<td>Q1, 3, and 5: Patients requiring cardiopulmonary resuscitation (CPR)</td>
</tr>
<tr>
<td>Q2, 4, and 6: Patients requiring continuous monitoring of CO\textsubscript{2} who are at risk of adverse respiratory events</td>
</tr>
<tr>
<td><strong>Intervention</strong></td>
</tr>
<tr>
<td>Mainstream and sidestream capnography</td>
</tr>
<tr>
<td><strong>Comparator</strong></td>
</tr>
<tr>
<td>Q1, 2, 3, and 4: Mainstream or sidestream capnography</td>
</tr>
<tr>
<td>Capnometry</td>
</tr>
<tr>
<td>No comparator</td>
</tr>
<tr>
<td>Q5 and 6: No comparator</td>
</tr>
<tr>
<td><strong>Outcomes</strong></td>
</tr>
<tr>
<td>Q1 and 2: Clinical effectiveness, safety, and harms</td>
</tr>
<tr>
<td>Q3 and 4: Cost-effectiveness</td>
</tr>
<tr>
<td>Q5 and 6: Guidelines</td>
</tr>
<tr>
<td><strong>Study Designs</strong></td>
</tr>
<tr>
<td>Health technology assessments, systematic reviews, meta-analyses, randomized controlled studies, non-randomized studies, economic evaluations, and 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 systematic review, seven randomized controlled trials, five non-randomized studies, and one economic evaluation were identified regarding the clinical and cost-effectiveness of mainstream and sidestream capnography. In addition, nine evidence-based guidelines associated with the use of mainstream and sidestream capnography were identified. No relevant health technology assessment reports were identified.

Additional references of potential interest are provided in the appendix.

Health Technology Assessments
No literature identified.
Systematic Reviews and Meta-analyses


Randomized Controlled Trials


Non-Randomized Studies


Economic Evaluations


Guidelines and Recommendations


PubMed: PM24485393
See: Table 1. Summary of the key strategies to maintain safety in the GI endoscopy unit, page 365.
Recommendations for patient management, page 370.

See: Recommendations, page 2.
Other findings, page 3.

See: Summary of recommendations, page i1.
Assisted ventilation, page i2.

Appendix 2 Maternal collapse algorithm, page 22.

NGC Summary: http://www.guideline.gov/content.aspx?id=32671

PubMed: PM21255512

See: 4.7.1.3 Airway and Ventilation, page 134.
4.7.1.4.2. Tissue Perfusion, page 134.

PREPARED BY:
Canadian Agency for Drugs and Technologies in Health
Tel: 1-866-898-8439
www.cadth.ca
APPENDIX – FURTHER INFORMATION:

Non-Randomized Studies – Alternate or Unclear Population

PubMed: PM25302095

PubMed: PM23882105

PubMed: PM22260400

PubMed: PM22092123

Economic Evaluations – Alternate Population

PubMed: PM20869196

Guidelines and Recommendations – Unclear Methodology

PubMed: PM24438649

PubMed: PM23796081

See: 1.3 Advanced Life Support (Adult), section 1, page 3.
See: 3. Indications for use.

See 10.2.1 Pulse oximeter and capnography, page 11.


See: 3. Patients shall be attended for the duration of anesthetic care as follows, page 28.

See: Monitoring, page 18.

See: Adult, page 2.
Paediatric, page 3.

See: Patient Monitoring


See: Airway, page 59.
   - ALS Algorithm, page 60.
   - Airway management and ventilation, page 69.


See: 4B. If there is no pulse or other sign of life, pages 51 to 52.

See: Important guideline changes, page 120.

See: Guideline changes, page 107.
   - Paediatric Advanced Life Support, page 108.
   - Capnography, page 113.
Review Articles

PubMed: PM25400399

PubMed: PM25020234

PubMed: PM23871325

PubMed: PM23519082

Additional References


