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Title **Capnography for Monitoring End-Tidal CO_2 in Hospital and Pre-hospital Settings: A Health Technology Assessment**

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Aim

The aim of this report was to review the evidence regarding the clinical effectiveness, cost-effectiveness, and implementation issues associated with capnography devices to help inform decisions about their adoption and use.

Conclusions and results

The literature search identified 2,753 citations, with 6 additional articles identified from other sources. Of these, 29 met the criteria for inclusion in the clinical review of this health technology assessment. Findings showed that capnography is clinically effective in adults undergoing procedural sedation or cardiopulmonary resuscitation (CPR) in certain settings. Limited clinical evidence suggests that capnography may increase the detection of misplaced endotracheal tubes in adult trauma patients and may allow for a greater detection of respiratory events in adult patients recovering from surgery. There was insufficient evidence to assess the effectiveness of capnography for other uses, specific subgroups of patients, and for pediatric patients. The results of the economic evaluation in adults undergoing procedural sedation suggest that capnography offered a reduction in the number of episodes of respiratory failure, but at an additional cost (incremental cost-effectiveness ratio: $413 per averted respiratory failure). The cost-effectiveness on the use of capnography in other patient populations is less clear and will depend on local factors. To aid implementation, barriers and supports should be considered.

Recommendations

Not applicable.

Methods

A literature search was conducted for English language documents published since January 1, 2005. Two reviewers independently screened titles and abstracts, and full-text articles remaining after the initial screen were evaluated for final inclusion according to predetermined selection criteria. Clinical data were meta-analyzed where possible, and sensitivity analyses were conducted to explore the robustness of the findings. If a meta-analysis was not possible, a narrative synthesis of the results was presented.

De novo economic evaluations from a Canadian ministry of health perspective were performed to address the cost-effectiveness of capnography monitoring in adults undergoing procedural sedation, CPR, in post-operative care, and in serious or critical condition. The time horizon for each economic analysis spanned from the start of monitoring until hospital discharge. Sensitivity analyses were conducted to explore the robustness of the model findings.

A narrative summary of the literature was performed to identify the supports and barriers to implementing capnography in hospital or pre-hospital settings.

Further research/reviews required

Future research would be useful on the impact of capnography on the entire continuum of care for each of the four clinical populations included in our review. Comparative interventional research studies are needed for pediatric patients undergoing CPR and in post-operative recovery, and for adult patients undergoing CPR, in serious or critical condition, and in post-operative recovery. The establishment of levels of severity for hypoxemia (for example, mild, moderate, severe, and profound) may help to encourage consistent reporting across studies and allow for a more objective assessment of study results. The systematic collection of harms data may help identify patient populations that are particularly susceptible to false alarms or technical problems with the monitoring device.

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