TITLE:  Cricothyroidotomies for Difficult Intubations in the Pre-Hospital Setting: Clinical Effectiveness and Guidelines

DATE:  24 March 2016

RESEARCH QUESTIONS

1. What is the clinical effectiveness of cricothyroidotomies for patients with difficult intubations in the pre-hospital setting?

2. What are the evidence-based guidelines regarding the performance of cricothyroidotomies for patients with difficult intubations in the pre-hospital setting?

3. What are the evidence-based guidelines regarding non-surgical airway options for the pre-hospital management of patients with difficult intubations?

KEY FINDINGS

One meta-analysis, three non-randomized studies, and one evidence-based guideline were identified regarding cricothyroidotomies for patients with difficult intubations in the pre-hospital setting.

METHODS

A limited literature search was conducted on key resources including PubMed, 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. Filters were added to limit the retrieval to health technology assessments, systematic reviews, and meta-analyses, randomized controlled studies, non-randomized trials and guidelines. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2011 and March 10, 2016. Internet links were provided, where available.

The summary of findings was prepared from the abstracts of the relevant information. Please note that data contained in abstracts may not always be an accurate reflection of the data contained within the full article.

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Cricothyroidotomies for Difficult Intubations in the Pre-Hospital Setting

SELECTION CRITERIA

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

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<th>Table 1: Selection Criteria</th>
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<td>Population</td>
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| Intervention | Q1, Q2: Cricothyroidotomy (also known as cricothyrotomy; needle or surgical)  
Q3: Any non-surgical airway option |
| Comparator | Q1: Orotracheal intubation; Nasotracheal intubation; No comparator  
Q2, Q3: No comparator |
| Outcomes | Q1: Clinical benefits and harms (e.g., success rates, provision of adequate airway, complications, mortality)  
Q2, Q3: Evidence-based guidelines (e.g., skill level of the practitioner and recommendations for maintenance of proficiency) |
| Study Designs | Health technology assessments, systematic reviews, meta-analyses, randomized controlled trials, non-randomized studies, evidence-based guidelines |

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, and evidence-based guidelines.

One meta-analysis, three non-randomized studies, and one evidence-based guideline were identified regarding cricothyroidotomies for patients with difficult intubations in the pre-hospital setting. No relevant health technology assessments or randomized controlled trials were identified.

Additional references of potential interest are provided in the appendix.

OVERALL SUMMARY OF FINDINGS

One meta-analysis examined the success rates of different airway management procedures in the pre-hospital (air medical) setting. Surgical cricothyrotomy was successful in 90.8% of cases amongst all healthcare providers.

One non-randomized study was conducted to examine success rates of emergency surgical cricothyrotomy undertaken by physician/paramedic teams in the pre-hospital setting. Surgical airways were established immediately in 0.6% of participants in the study (46/7256). The authors found the surgical airway success rates identified in this study were lower than those observed in other physician-led studies.
Two non-randomized studies\(^2,^4\) studies were undertaken to describe success rates and complications of surgical cricothyrotomy in battlefield and combat pre-hospital settings. In one study,\(^2\) cricothyrotomy was successful in 82% of cases; however, the procedure was undertaken in only 34 (1.8%) of patients enrolled in the study. Endotracheal intubation was unsuccessfully attempted prior to 15% of the cricothyrotomies.\(^2\) In the second study,\(^4\) pre-hospital cricothyrotomy was successful in 68% of cases. The trachea was not cannulated in 26% of procedures. The authors determined that physicians and physician assistants were more successful at the cricothyrotomy procedure than medics.

One evidence-based guideline,\(^5\) prepared by the National Institute for Health and Care Excellence, was identified regarding the assessment and management of trauma patients. The guideline recommends:
- “Use drug-assisted rapid sequence induction (RSI) of anaesthesia and intubation as the definitive method of securing the airway in patients with major trauma who cannot maintain their airway and/or ventilation.” (page 3)
- “If RSI cannot be performed at the scene:
  - consider using a supraglottic device if the patient's airway reflexes are absent
  - use basic airway manoeuvres and adjuncts if the patient's airway reflexes are present or supraglottic device placement is not possible
  - transport the patient to a major trauma centre for RSI provided the journey time is 60 minutes or less
  - only divert to a trauma unit for RSI before onward transfer if a patent airway cannot be maintained or the journey time to a major trauma centre is more than 60 minutes.” (pages 3 and 4)
REFERENCES SUMMARIZED

Health Technology Assessments
No literature identified.

Systematic Reviews and Meta-analyses

   PubMed: PM21549286

Randomized Controlled Trials
No literature identified.

Non-Randomized Studies

   PubMed: PM25399366

   PubMed: PM25038154

   PubMed: PM22427045

Guidelines and Recommendations

   See: 1.2.3 Airway management in pre-hospital settings, page 3

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APPENDIX – FURTHER INFORMATION:

Previous CADTH Reports


Non-Randomized Studies – Simulation


Clinical Practice Guidelines – Methodology Not Specified


Additional References