Comparison of tracheal intubation and alternative airway techniques performed in the prehospital setting by paramedics: a systematic review

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CRD summary
This well-conducted review compared tracheal intubation with alternative airway techniques performed by paramedics in the pre-hospital setting. It concluded that existing data were limited, but that the evidence did not support a difference in outcome between tracheal intubation and alternative airway techniques. The authors' conclusions are likely to be reliable.

Authors' objectives
To compare tracheal intubation with alternative airway techniques performed by paramedics in the pre-hospital setting.

Searching
MEDLINE, EMBASE, Web of Science and CINAHL (dates spanned 1966 to January 2009) and the Cochrane Library (Issue 4, 2008) were searched with no restrictions on language or publication status. Search terms were reported. Reference lists of literature reviews, position statements and included studies were also searched. Authors were contacted for additional studies.

Study selection
Randomised controlled trials (RCTs) and quasi-RCTs that compared tracheal intubation with alternative airway techniques involving paramedics in advanced airway management in the pre-hospital setting were eligible for inclusion. Alternative airway techniques were limited to bag-mask ventilation or extra-glottic devices. Paramedics were defined as any clinician who provided pre-hospital care (excluding physicians, nurses and respiratory therapists). One of the following outcomes had to be reported for inclusion: survival, neurologic outcomes, airway management success rates or complications. The following complications were assessed: rates of hypoxaemia (saturated oxygen and oxygen partial pressure), hypercarbia (carbon dioxide partial pressure), hypotension and aspiration.

Most of the included patients were in cardiac and/or respiratory arrest. Most included trials were of adults only; one was children only. Most trials compared tracheal intubation with extra-glottic devices; one trial in paediatric patients compared tracheal intubation with bag-mask ventilation. All trials provided additional airway training to the paramedics involved in the trial. One trial was conducted in a rural setting.

Studies were selected independently by two reviewers and disagreements were resolved with a third reviewer.

Assessment of study quality
Methodological quality was assessed independently by two reviewers using the Jadad scale. The trials were assessed for randomisation, presence of double blinding, description of withdrawals and allocation concealment to derive a quality score out of 5 points.

Data extraction
The authors reported that odds ratios (ORs) or standardised mean differences (SMDs), and 95% confidence intervals (CIs), were calculated (not reported in the review). Two reviewers independently extracted event rates by group.

Methods of synthesis
The trials were described in a narrative synthesis and a table.

Results of the review
Five trials were included (1,559 patients, range 86 to 830). It appeared that one trial was an RCT (175 patients). Four trials had a Jadad methodological score of 1 out of 5 points, and one trial scored 3.

None of the trials reported any statistically significant difference in success rate between the tracheal intubation and
alternative airway techniques groups. Hypoxaemia (three trials), good neurologic outcome at discharge (three trials), survival to hospital admission (two trials) and survival to discharge (two trials) were not significantly different between groups.

**Authors' conclusions**
Existing data were limited, but the evidence did not support a difference in outcome between tracheal intubation and alternative airway techniques.

**CRD commentary**
The research question was supported by clear inclusion criteria. Studies of any language and publication status were sought, reducing the possibility of language and publication bias. The review processes were performed in duplicate, reducing the risk of error and bias.

Trial quality was assessed using a validated scale. The authors did not pool data due to clinical heterogeneity, which appeared appropriate.

The review appeared to be well conducted and the authors’ conclusions are likely to be reliable.

**Implications of the review for practice and research**
*Practice:* The authors stated that, owing to the heterogeneity of pre-hospital systems, administrators of each system must individually consider their airway management protocol.

*Research:* The authors did not state any implications for research.

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