

Review: Early tracheostomy is not better than late tracheostomy for reducing all-cause mortality in critically ill patients

Griffiths J, Barber VS, Morgan L, Young JD. Systematic review and meta-analysis of studies of the timing of tracheostomy in adult patients undergoing artificial ventilation. *BMJ*. 2005;330:1243.

Clinical impact ratings: Hospitalists ★★★★★☆ Critical Care ★★★★★☆

QUESTION

In critically ill patients who require prolonged mechanical ventilation, is early tracheostomy better than late tracheostomy or prolonged endotracheal intubation for reducing all-cause mortality?

METHODS

Data sources: MEDLINE, CINAHL, EMBASE/Excerpta Medica, Cochrane Central Register of Clinical Trials, National Research Register, the National Health Service Trusts Clinical Trials Register, Medical Research Council U.K. database, National Health Service Research and Development Health Technology Assessment Programme, and British Heart Foundation database (last search in November 2004).

Study selection and assessment: Randomized controlled trials (RCTs) or quasi-RCTs that compared early tracheostomy with continued translaryngeal intubation or continued translaryngeal intubation followed by late tracheostomy in critically ill adults requiring artificial ventilation. Early tracheostomy was defined as tracheostomy done ≤ 7 days after admission to the intensive care unit (ICU), initiation of translaryngeal intubation, and mechanical ventilation. Late tracheostomy was any time after early tracheostomy.

Outcomes: All-cause mortality. Secondary outcomes included incidence of ventilator-associated pneumonia (VAP), duration of artificial ventilation, and length of stay in the ICU.

MAIN RESULTS

3 RCTs (*n* = 226) and 2 quasi-RCTs (*n* = 180) met the selection criteria. Meta-analysis was done using a random-effects model. The groups did not differ for all-cause mortality or incidence of VAP (Table). However, duration of artificial ventilation and ICU length of stay were shorter in the early tracheostomy group than in the late tracheostomy group (Table).

CONCLUSIONS

In critically ill patients who require prolonged mechanical ventilation, early tracheostomy is not better than late tracheostomy or prolonged endotracheal intubation for reducing all-cause mortality. Early tracheostomy may be associated with a shorter duration of artificial ventilation and length of stay in the intensive care unit.

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Early tracheostomy (ET) vs late tracheostomy (LT) (or prolonged endotracheal intubation) in critically ill patients who require prolonged mechanical ventilation*

Outcomes	Number of trials (<i>n</i>)	Weighted event rates		RRR (95% CI)	NNT
		ET	LT		
All-cause mortality	4 (332)	29%	37%	21% (-39 to 55)	Not significant
Ventilator-associated pneumonia	5 (406)	55%	62%	10% (-21 to 34)	Not significant
		Weighted means		Weighted mean difference (CI)	
Duration of ventilation (d)	4 (332)	15.59	24.08	-8.49 (-15.32 to -1.66)	
Length of stay in the intensive care unit (d)	2 (226)	10.82	26.15	-15.33 (-24.58 to -6.08)	

*Abbreviations defined in Glossary; weighted event rates and means, RRR, NNT, and CI calculated from data in article.

COMMENTARY

Debate regarding the mortality benefit from early tracheostomy will continue, because the systematic review by Griffiths and colleagues generates further uncertainty. Several methodologic limitations of the primary studies in this systematic review may explain the lack of a clear mortality benefit. First, the data came from small, low-quality, primarily single-center RCTs and quasi-RCTs of heterogeneous patient populations. Second, the small total number of patients results in trends for treatment benefit and wide confidence intervals that include harm. Third, the review had significant between-study heterogeneity (most likely a result of differences between patients), differences in individual study design, and differences in definitions of both timing of early tracheostomy and VAP.

In view of the additional heterogeneity of the treatment effect for mortality, VAP, and duration of mechanical ventilation, one may question the rationale for pooling the results of these studies. Hence, interpretation of the results is problematic and conclusive recommendations not possible.

We should learn from the albumin/crystalloid debate (1), in which systematic reviews of methodologically limited, heterogeneous studies

provided only trends about treatment effects, gave no definitive guidance, and generated uncertainty. Recently, a large, multicenter RCT provided more answers (2).

While uncertainty cannot handcuff patient care, we must consider the need for a large, multicenter RCT to answer the question investigated by this review. To avoid undue risk without benefit, careful patient selection is essential. Unless patients are expected to require prolonged mechanical ventilation, the available evidence suggests that early tracheostomy does not provide a clear benefit.

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References

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2. Finfer S, Bellomo R, Boyce N, et al. A comparison of albumin and saline for fluid resuscitation in the intensive care unit. *N Engl J Med*. 2004;350:2247-56.