

Evidence-Based Emergency Medicine

Clinical Synopsis

TAKE-HOME MESSAGE

Succinylcholine is superior to rocuronium for creating excellent intubating conditions and should be the first-line paralytic agent used for rapid sequence intubations.

METHODS

DATA SOURCES

The authors searched the Central Register of Controlled Trials (CENTRAL), MEDLINE (1966 to June Week 3 2007), and EMBASE (1988 to 2007), without language restrictions. References of selected articles were also hand searched to identify any pertinent additional citations missed by the electronic search.

STUDY SELECTION

All randomized and nonrandomized controlled trials were included that compared rocuronium to succinylcholine and used a scoring system to assess the main outcome of intubation condition at 60 seconds.

DATA EXTRACTION AND SYNTHESIS

Quality of study methodology was assessed independently by 2 investigators. All included trials (37) were randomized controlled trials; 19 of these trials were deemed to be adequately concealed, whereas concealment was unclear in the remaining 18. Data were pooled with a random-effects model, and results were reported as a relative risk with 95% confidence intervals.

An installment of the Systematic Review Abstract series:

Does Succinylcholine Maximize Intubating Conditions Better Than Rocuronium for Rapid Sequence Intubation?

EBEM Commentator

Rawle A. Seupaul, MD
James H. Jones, MD

*Department of Emergency Medicine
Indiana University School of Medicine
Indianapolis, IN*

Results

The search identified 58 potential studies; 37 trials met the inclusion criteria.

Creating excellent intubating conditions: rocuronium versus succinylcholine

Induction Agent	Relative Risk	95% Confidence Interval	N
Any	0.86	0.80–0.92	2,690
Propofol	0.88	0.80–0.97	1,183

N=total patient population.

Commentary

This Cochrane systematic review concludes that in the emergency department (ED) setting, rapid sequence intubation with succinylcholine compared with rocuronium more often creates excellent intubating conditions. Two questions should be explored to assist in the interpretation of this finding.

Why look for an alternative to succinylcholine for ED rapid sequence intubation? There is no best neuromuscular blocking agent for ED rapid sequence intubation. Succinylcholine is time tested, possesses the fastest onset

(45 seconds), and produces the shortest muscle relaxation (6 to 10 minutes) compared with all other agents.¹ Although uncommon, succinylcholine does possess serious adverse effects. There is the real risk of succinylcholine-induced hyperkalemia in certain subsets of patients.² Although rare, malignant hyperthermia is associated with succinylcholine. Because of these, succinylcholine cannot be used as the sole neuromuscular blocking agent for ED rapid sequence intubation. Rocuronium does not carry the same risk profile as succinylcholine and has no known contraindications. Rocuronium does have a slightly longer onset (60 seconds) and much longer muscle relaxation (25 to 60 minutes) compared with succinylcholine.¹ Not surprisingly, some have advocated the use of rocuronium for all ED rapid sequence intubations, thereby erasing any concern for succinylcholine-induced hyperkalemia or malignant hyperthermia.

How important are better intubating conditions? Most ED intubations take place under less than ideal condi-

tions; unstable vital signs, inability to maintain oxygenation, and compromised intubating conditions (altered anatomy, cervical spine immobilization, blood, vomitus, etc) are common. Repeated intubation attempts are associated with an array of complications that increase morbidity and mortality.³ Therefore, achieving excellent intubating conditions that facilitate first-pass success is best for both patients and physicians.

Succinylcholine remains the neuromuscular blocking agent of choice for ED rapid sequence intubation, except in those situations in which the concern for succinylcholine-induced hyperkalemia and malignant hyperthermia exists. A recent critical appraisal supports this approach.⁴

1. Schneider RE, Caro DA. Neuromuscular blocking agents. In: Walls RM, ed. *Manual of Emergency Medicine Airway*. 2nd ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2004.
2. Martyn JAJ, Richtsfeld M. Succinylcholine-induced hyperkalemia in acquired pathologic states: etiologic factors and molecular mechanisms. *Anesthesiology*. 2006;104:158-169.
3. Mort TC. Emergency tracheal intubation: complications associated with repeated laryngoscopic attempts. *Anesth Analg*. 2004;99:607-613.
4. Mallon WK, Keim SM, Shoenberger JM, et al. Rocuronium vs succinylcholine in the emergency department: a critical appraisal. *J Emerg Med*. 2009;37:183-188.

This is a systematic review abstract, a regular feature of the *Annals'* Evidence-Based Emergency Medicine (EBEM) series. Each features an abstract of a systematic review

from the Cochrane Database of Systematic Reviews and a commentary by an emergency physician knowledgeable in the subject area. The source for this systematic review abstract is: Perry JJ, Lee JS, Sillberg VAH, et al. Rocuronium versus succinylcholine for rapid sequence induction intubation. *Cochrane Database Syst Rev*. 2008; (2):CD002788. DOI: 10.1002/14651858.CD002788.pub2. The *Annals* EBEM editors assisted in the preparation of the abstract of this Cochrane systematic review.

Systematic Review Author Contact

Jeffrey J. Perry, MD, MS
Clinical Epidemiology Programme
The Ottawa Hospital
F6 Clinical Epidemiology Programme
Ottawa, Ontario, Canada
E-mail: jperry@obri.ca