**Succinylcholine or rocuronium: a meta-analysis of the effects on intubation conditions**

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**CRD summary**

The review concluded that succinylcholine was associated with an increased frequency of excellent endotracheal intubation conditions and a decreased frequency of unacceptable endotracheal intubation conditions in comparison with rocuronium in adults. In view of some methodological limitations of the review and potential issues with generalisability and confounding in the included studies, the authors' conclusions should be interpreted with caution.

**Authors' objectives**

To compare the effects of succinylcholine (SCH) and rocuronium (RCR) on endotracheal intubation (ETI) conditions in adults.

**Searching**

MEDLINE (1966 to March 2002) and the Cochrane CENTRAL Register were searched without any language restrictions; the keywords were reported. The reference lists of identified articles were screened for further studies.

**Study selection**

Randomised controlled trials (RCTs) comparing SCH with RCR prior to ETI in adults were eligible for inclusion. Studies had to assess doses ranging from 1.0 to 1.5 mg/kg for SCH and 0.6 to 1.2 mg/kg for RCR. Studies assessing intubation conditions using scores reflecting excellent or unacceptable conditions were eligible for inclusion. Excellent conditions were defined as complete jaw relaxation, vocal cord position abducted or open, no vocal cord movement, no diaphragmatic movement, easy laryngoscopy and no cough reflex. Unacceptable conditions were defined as jaw not relaxed, vocal cord position adducted or closed, vocal cord movement, diaphragmatic movement, laryngoscopy difficult or impossible and severe cough reflex (not all criteria were employed in each study). The included studies used varying doses of SCH and SCR. Premedications used in the included studies were temazepam, midazolam, fentanyl, lormetazepam, clorazepate, droperidol and oxazepam. Induction medications and doses varied between the included studies. All of the included studies were conducted in the operating room.

One reviewer selected studies for inclusion.

**Assessment of study quality**

Validity was assessed and scored (between 0 and 5) using the Jadad scale, which assesses randomisation, blinding and handling of withdrawals.

Two blinded reviewers assessed validity and resolved any disagreements through consensus, with the aid of a third reviewer where required.

**Data extraction**

The data extracted included names and dosages of all medications used proximal to or during ETI, and the number and frequency of patients in each treatment arm with excellent or unacceptable intubation scores. Data were also extracted to determine whether true rapid sequence induction (RSI) was utilised. This was defined as the rapid sequential administration of an intravenous induction agent, followed by administration of an intravenous neuromuscular blocker (NMB). The differences in each study for excellent and unacceptable intubation conditions were determined by subtracting the proportion of events in the RCR group from that of the SCH group. Odds ratios (ORs) and 95% confidence intervals (CIs) were also calculated for excellent and unacceptable intubation conditions for individual studies, where data were available.

Two blinded reviewers extracted the data and resolved any disagreements through consensus, with the aid of a third reviewer where required.
Methods of synthesis

The overall difference in proportion of events for excellent and unacceptable intubation conditions was calculated by summing individual study frequency differences, together with 95% CIs. Subgroup analyses were performed using high-quality studies, patients undergoing true RSI and patients receiving high-dose NMBs.

Results of the review

Sixteen RCTs (n=1,382) were included.

Two studies scored 5 points on the validity scale, seven scored 4 points, two scored 3 points, four scored 2 points and one scored 1 point.

The analysis found there was an overall increase of 17.7% (95% CI: 13, 22) in the frequency of excellent ETI conditions and a decrease of 5.1% (95% CI: -7.3, -2.9) in the frequency of unacceptable ETI conditions associated with SCH. Similar results were found for a subgroup analysis of high-quality studies (rated 4 to 5 points).

Subgroup analysis of patients receiving true RSI reported that a 19.1% increase (95% CI: 13.7, 24.5) in the frequency of excellent ETI conditions, and a 6.8% decrease (95% CI: -9.5, -4.1) in unacceptable ETI conditions were associated with SCH.

A subgroup analysis of patients receiving high-dose NMB reported an increase of 18.4% (95% CI: 8.4, 28.4) in the frequency of excellent ETI conditions and a non-statistically significant decrease of 2% (95% CI: -6.9, 2.9) in unacceptable ETI conditions associated with SCH.

ORs were also reported for some individual studies.

Authors’ conclusions

The results show that SCH was associated with an increased frequency of excellent intubation conditions and a decreased frequency of unacceptable intubation conditions in comparison with RCR. Similar results were found in patients undergoing true RSI or receiving high-dose NMB.

CRD commentary

Inclusion criteria were clearly defined in terms of the intervention, outcomes and study design, but only broadly defined in terms of the participants. Only two databases were searched for published studies and this might have resulted in other relevant studies being missed. No attempt was made to locate unpublished studies, thus raising the possibility of missing relevant data and publication bias. However, steps were taken to minimise language bias. Only one author selected the studies and this lack of duplication may have led to errors and bias. However, appropriate methods were used to minimise reviewer errors and bias in the assessment of validity and extraction of data. Validity was assessed using specified criteria and the results of this assessment reported. Heterogeneity was not formally assessed, so it is not clear whether it was appropriate to pool the studies, although authors did conduct some subgroup analyses. There were no details of the demographics of participants in the included studies and the studies were all conducted in an operating room setting, thus it may be difficult to generalise the review findings. In addition, the results may be confounded by the effects of concomitant medications. In view of these methodological limitations, the authors’ conclusions should be interpreted with caution.

Implications of the review for practice and research

Practice: The authors stated that current guidelines should emphasise that SCH is associated with an increase in the frequency of excellent intubation conditions and a decrease in the frequency of unacceptable intubation conditions in comparison with RCR.

Research: The authors stated that further RCTs, measuring more clinically relevant outcomes such as time to intubation, number of confirmed ETIs, number of mainstem or oesophageal intubations, number of days in intensive care units, number of days hospitalised and in-hospital mortality, are required.
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