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SOCIÉTÉ CANADIENNE DES ANESTHÉSIOLOGISTES



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CAS
2023
ANNUAL MEETING
JUNE 9-12
QUÉBEC CITY

CAS 2023 Annual Meeting

Pharmacology Abstracts

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Systematic Review with Meta-Analysis of Relative Risk of Prolonged Times to Tracheal Extubation with Desflurane Versus Sevoflurane or Isoflurane

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INTRODUCTION

The objective of this systematic review was to estimate the relative risk of prolonged times to tracheal extubation with desflurane versus sevoflurane or isoflurane. Prolonged times to tracheal extubation are defined as ≥ 15 minutes from end of surgery (or the anesthetic drug) to extubation in the operating room [1-5]. Prior studies showed that prolonged extubations are associated with reintubations, administration of naloxone and flumazenil, longer times from procedure end to operating room exit, greater differences between actual and scheduled operating room times, longer times from operating room exit to procedure start of the next case in the room, longer durations of the workday, and more operating room personnel idle without activity waiting for extubation [1-5].

METHODS

Published randomized clinical trials of humans were included, from PubMed or Web of Science through January 1, 2023, and earlier meta-analyses [1]. Generalized pivotal methods were used to estimate the relative risk of prolonged extubation for each study from reported sample sizes and means and standard deviations of extubation times. The relative risks were combined among studies using DerSimonian-Laird random effects meta-analysis with Knapp-Hartung adjustment. The PRISMA registration was CRD42022385081.

RESULTS

From 67 papers, there were 78 two-drug comparisons, including 5167 patients. Studies were of high quality (23/78) or moderate quality (55/78), the latter due to lack of blinding of observer to group assignment and/or patient attrition because patients were extubated after operating room exit. Desflurane resulted in a 65% relative reduction in prolonged extubations compared with sevoflurane (95% confidence interval 49% to 76%, $P < .0001$) and a 78% relative reduction compared with isoflurane (58% to 89%, $P < .0001$). There were no significant associations between studies' relative risks and study quality, industry funding, or year of publication (all six meta-regressions $P \geq .35$).

DISCUSSION

When emergence from general anesthesia with different drugs are compared with sevoflurane or isoflurane, suitable benchmarks quantifying rapid emergence are reductions in the incidence of prolonged times to tracheal extubation achieved by desflurane, approximately 65% and 78%, respectively. These estimates with desflurane are important

scientifically because they give realistic context for interpretation of results of future studies that may compare new anesthetic agents or techniques to other volatile anesthetics.

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