The use versus avoidance of neuromuscular blocking agents for improving conditions during tracheal intubation

A meta-analysis including a trial sequential analysis

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Introduction

A large cohort study\textsuperscript{1} has indicated that avoidance of neuromuscular blocking agents (NMBA) is a risk factor for difficult tracheal intubation (DTI). However, bias due to confounding by indication is a major problem when observational studies are used to evaluate interventions.

Our aim was to meta-analyse randomised trials evaluating the effect of using NMBA versus no use of NMBA on DTI for adults allocated to tracheal intubation with direct laryngoscopy.

Results

We included 9 randomised clinical trials with 1235 participants. Avoidance of NMBA significantly increased the risk of a DTI with direct laryngoscopy (relative risk 6.70, 95% confidence interval 2.89 to 15.50; P<0.0001) (Fig. 1).

We performed TSA of non-NMBA versus NMBA using a diversity-adjusted required information size of 2613 participants to detect or reject a 189% relative risk increase with a power of 95% and an overall type 1 error of 5% (Fig. 2). The cumulative z-curve crossed the trial sequential monitoring boundary for harm. This demonstrates firm evidence for even the lowest possible harmful effect in the traditional meta-analysis of avoiding NMBA compared to using NMBA on the proportion of DTI even when the significance level is adjusted for repetitive testing and sparse data in a cumulative meta-analysis.

Discussion

Our results are preliminary, as we have not yet performed a full-scale literature search in all electronic databases and the risk of bias in the included trials has yet to be assessed. Further, the definitions of DTI varied substantially among trials contributing to both considerable clinical and statistical heterogeneity in the analysis.

Conclusion

Despite the strong association between avoidance of NMBA and the occurrence of DTI found in this meta-analysis, an exhaustive literature search and a thorough bias evaluation is urgently needed.