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Systematic review and meta-analysis of the impact of spinal versus general anesthesia on the variability of surgical times

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Introduction

Spinal versus general anesthesia has been compared for various patient related perioperative outcomes but whether the choice of anesthesia between the two modalities influences surgical times is currently debated. Various factors such as patients being awake or the finite duration afforded by the spinal anesthetic may influence the behavioral tendencies for surgical teams to work. Additionally, it has been learned that surgical times follow log-normal probability distributions, meaning that ratios of times are more interpretable than differences of times when studying many categories of procedures of widely different durations. With this background, we performed a meta-analysis to evaluate systematic differences in the standard deviations of surgical times from single-dose spinal anaesthetics. Ratios of means were compared as secondary endpoint.

Materials and Methods

Since the study did not involve the participation of human subjects, and this was a systematic review of published literature, institutional review board approval was not necessary. Literature searches were performed in PubMed, Web of Science, and Scopus databases. PROSPERO was used to register the systematic review, CRD42023461952. Randomized clinical trials conducted in human subjects were included when general or spinal anesthesia was used for one category of surgical procedure (e.g., cholecystectomy) and the article reported the means and standard deviations of operative durations. Studies were excluded if randomized patients among more than one category of surgical procedure (e.g., “gynaecological surgery”) or if included infants.

Results/Case Report

A total of 1153 references were retrieved from the literature searches and after various exclusions, a total of 78 studies were included for data synthesis. Of the included studies, 96% of them were high quality for our endpoint, because no (0%) study focused on comparing variabilities of surgical times and none had surgical time as the primary endpoint. Spinal anesthesia was not associated with significant differences in standard deviations of operative times versus general anesthesia (estimate 6.8% smaller, 95% confidence interval 15.8% smaller to 1.6% larger, $P=0.11$, Figure 1). Additionally, spinal anesthesia was not associated with a significant difference in means either when compared with general anesthesia (estimate 1.2% smaller, 3.8% smaller to 1.4% larger, $P=0.36$, Figure 2).

Discussion

The results show with high confidence that the effect of spinal anesthesia on variability of surgical duration, if present, is sufficiently small to have no substantive economic effect. The same conclusion applies for mean surgical time. Therefore, although anaesthetic choice has clinical (biological) impact and affects anesthesia times, the direct effects on surgical times and workflow are minimal, at most. Anesthetic choice does not influence operating room productivity via changes to operative times and the impact of spinal anesthetic effect is limited to the non-operative times. Hence, the literature evidence seems to indicate that the choice to offer either spinal or general anesthesia should not be made with the aim of having predictable operative duration.

References

NA

Disclosures

No

Tables / Images

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