Neuraxial Anesthesia Compared to General Anesthesia for Procedures on the Lower Half of the Body: Systematic Review of Systematic Reviews

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Summary: Barbosa FT, Castro AA, Miranda CT – Neuraxial Anesthesia Compared to General Anesthesia for Procedures on the Lower Half of the Body: Systematic Review of Systematic Reviews

Background and objectives: Systematic reviews organize literature data by combining results from published studies in order to resolve conflicts in the area of medical knowledge describing the interventions. The inadequate reporting of systematic reviews can damage the credibility and interfere in the results' quality. The objective of this study was to determine the frequency of good quality systematic reviews comparing neuraxial anesthesia with general anesthesia for procedures on the lower half of the body.

Methods: Systematic review of systematic reviews. Primary variable: The frequency of good quality systematic reviews. The information was analyzed from the following databases: LILACS (January 1982 to December 2010); PubMed (January 1950 to December 2010); The Cochrane Database of Systematic Review and Database of Abstracts of Reviews of Effects (volume 10, 2010); and SciELO (December 2010). The quality of systematic reviews was determined by the Overview Quality Assessment Questionnaire. The sample size calculation showed that it was necessary to analyze eight systematic reviews, taking into account that the frequency of good quality systematic reviews was 5%, an absolute precision of 15%, and a significance level of 5%.

Results: Were identified 1,995 articles. The selection process eliminated 1,968 articles. Twenty-seven articles of systematic reviews were read in full, 9 were excluded due to incompatibility with the inclusion criteria, and 8 were duplicate publications. Ten systematic reviews were assessed for their quality. The frequency of good quality systematic reviews was 40% (4/10; 95% CI 9.6 to 70.4%).

Conclusion: The frequency of good quality systematic reviews was 40%.

Keywords: Anesthesia; Anesthesia, General; Anesthesia, Conduction; Meta-Analysis; Publications.

INTRODUCTION

Systematic reviews organize data existing in the literature combining the results of individual clinical trials for the purpose of resolving conflicts in the medical knowledge investigating interventions such as: diagnostic, therapeutic or prophylactic approaches [1]. Several kinds of bias have been identified in this research, such as selection, publication, and pooling biases [2].

The systematic review of the systematic reviews is a research that assesses potential sources of bias in a systematic review to improve the quality of this type of publication [3]. It is a research designed primarily to summarize data of multiple reviews focusing on the effects of potential clinical interventions for a condition in health care [1]. The main objective is to analyze the quality of systematic reviews to inform readers how flaws can influence the results [1]. This research has been done to answer the following question:

What is the frequency of good quality systematic reviews comparing neuraxial anesthesia with general anesthesia for procedures on the lower half of the body?

The purpose of this review was to determine the frequency of good quality systematic review that compared neuraxial anesthesia with general anesthesia for procedures on the lower half of the body.

METHODS

This systematic review was carried out using methods established by the Cochrane Collaboration [1]. The protocol of this systematic review is available at http://tinyurl.com/timbo01. The inclusion criterion was: systematic reviews of the randomized controlled trials that compared neuraxial anesthesia and general anesthesia for surgeries on the lower half of the

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body. The exclusion criteria were: narrative reviews, case reports with appended literature review, economic evaluations, guidelines and systematic reviews of observational studies.

Cochrane Database of Systematic Review (CDSR) and Database of Abstracts of Reviews of Effects (DARE) were searched in The Cochrane Library (Issue 10, 2010), and conducted electronic searches were made on PUBMED (January 1950 to December 2010), LILACS (January 1982 to December 2010), and SCIELO (last search in December 2010). The following search strategy used for PUBMED was: ("anesthesia, general" [MeSH Terms] OR "anesthes*[Text word]) AND systematic [sb]. The terms "randomized controlled trials" for LILACS, "systematic review" for SCIELO and "anesthesia" for The Cochrane Database were used.

Two reviewers (Barbosa FT and Castro AA) independently assessed titles, abstracts, or both hits retrieved from the databases. Discrepancies were resolved by consensus meeting. There was no language restriction, but all systematic reviews included in this research were published in English. The systematic reviews identified according to the inclusion criteria were fully read to extract data.

The Overview Quality Assessment Questionnaire (OQAQ) was used to evaluate the quality of systematic reviews [4,5]. This index has 10 questions, with the first nine analyzing search strategy, selection strategies, quality assessment, pooling, and results [4]. These questions were answered as 'yes', 'no', or 'partially/can't tell'. The last question focusing on the overall scientific quality of the systematic review consisted of a 7-point scale: 1 and 2 for extensive flaws, 2 to 4 for major flaws, 4 to 6 for minor flaws, and 6 and 7 for minimal flaws [4,6]. Only one reviewer analyzed the quality.

As stated by Kelly et al.[6] "The results presented were adjudicated and for ease of interpretation the OQAQ scores were grouped to delete overlapping of scores as follows: one and two indicate extensive flaws, three and four indicate major flaws, five and six indicate minor flaws, and seven indicates minimal flaws". Six and seven points were considered as good quality systematic review.

The primary outcome was the frequency of good quality systematic reviews. The secondary outcomes were: frequency of the OQAQ questions answered, frequency of the PRISMA STATEMENT items reported [7]. Complementary data were: the number of clinical trials used, the number of databases used, and the number of reviewers.

Statistical analysis

Sample size calculation indicated that eight systematic reviews were needed, considering a 5% frequency for good quality systematic reviews, 5% significance level, and 15% absolute precision. Were used simple frequency for all outcomes, except for the number of clinical trials used and the number of reviewers who reported the median and total range of data. The 95% confidence interval for the main result was used. Concordance between the authors was analyzed with Kappa statistic. The main result was compared with data used to calculate the sample size using chi-square test. A significant level of 5% was considered.

RESULTS

The literature search identified 1,995 articles of potential relevance. The study selection process eliminated 1,968 articles reviewing only abstracts and titles. Only 27 systematic reviews were read in full text, but 9 were excluded because they were not compatible with the inclusion criterion, and 8 were published in more than one journal or cited more than once in databases. This process left us with 10 systematic reviews for qualitative analysis [8-17]. Kappa statistics for screening systematic reviews was 0.82. This research started in January 2010 and finished in January 2011. The last run of the search strategy was in December 2010.

The frequency of good quality systematic reviews were 40% (4/10, 95% CI 9.6% to 70,4%). The result was statistically different from data used in the hypotheses ($p < 0.0001$). Table I shows the frequency of the OQAQ questions answered. Overall scientific quality after adjudication was: 0% (0/10) for scores 1, 2, and 3; 50% (5/10) for score 4; 10% (1/10) for scores 5 and 6; and 30% (3/10) for score 7 (Table I).

Table I – Frequency of Each Answer in OQAQ Questions Reported

Index	No % (n/N)	Partially/ can't tell % (n/N)	Yes % (n/N)
1. Search methods stated	0 (0/10)	0 (0/10)	100 (10/10)
2. Search comprehensive	10 (1/10)	0 (0/10)	90 (9/10)
3. Inclusion criteria reported	0 (0/10)	60 (6/10)	40 (4/10)
4. Selection bias avoided	30 (3/10)	0 (0/10)	70 (7/10)
5. Validity criteria reported	0 (0/10)	50 (5/10)	50 (5/10)
6. Validity assessed appropriately	10 (1/10)	40 (4/10)	50 (5/10)
7. Combining methods reported	10 (1/10)	0 (0/10)	90 (9/10)
8. Finding combined appropriately	50 (5/10)	0 (0/10)	50 (5/10)
9. Conclusions supported by data	30 (3/10)	10 (1/10)	60 (6/10)

n = number of answers, partially/can't tell and yes presented; N = number of systematic reviews analyzed.

The frequency of the PRISMA STATEMENT items reported was 100% for rationale, information sources, and summary of evidence. The frequency of the other items is in Table II. The median of the clinical trial numbers was 17 (4 to 24). The frequency for each databases was: 100% (10/10) PUBMED; 80% (8/10) EMBASE; 70% (7/10) CENTRAL; 20% (2/10) CINAHL; and 10% (1/10) LILACS, ISI Web of Science, MD Consult, BIOSIS, Cochrane Bone, Joint and Muscle Trauma Group specialized register, and Cochrane Pregnancy and Childbirth Groups Trials Register. The reviewers median was 3.5 (one to five).

Table II – Frequency of the PRISMA STATEMENT Items Reported

Topic	Item	% (n/N)
Title	Identify the report as a systematic review, meta-analysis, or both.	60 (6/10)
Structured summary	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	0 (0/10)
Rationale	Describe the rationale for the review in the context of what is already known.	100 (10/10)
Objectives	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	0 (0/10)
Protocol and registration	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	0 (0/10)
Eligibility criteria	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	70 (7/10)
Information sources	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	100 (10/10)
Search	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	0 (0/10)
Study selection	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	80 (8/10)
Data collection process	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	90 (9/10)
Data items	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	0 (0/10)
Risk of bias in individual Studies	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	50 (5/10)
Summary measures	State the principal summary measures (e.g., risk ratio, difference in means).	90 (9/10)
Synthesis of results	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	90 (9/10)
Risk of bias across studies	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	40 (4/10)
Additional analyses	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	40 (4/10)
Study selection	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	70 (7/10)
Study characteristics	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	60 (6/10)
Risk of bias within studies	Present data on risk of bias of each study and, if available, any outcome level assessment.	50 (5/10)
Results of individual studies	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	90 (9/10)
Synthesis of results	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	90 (9/10)
Risk of bias across studies	Present results of any assessment of risk of bias across studies.	40 (4/10)
Additional analyses	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression.	40 (4/10)
Summary of evidence	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	100 (10/10)
Limitations	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	70 (7/10)
Conclusions	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	60 (6/10)
Funding	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	40 (4/10)

n = number of item reported; N = number of systematic reviews analysed; PICOS: patient, intervention, comparison, and outcomes.

DISCUSSION

Ten systematic reviews with potential to answer the research question were found. Four systematic reviews were considered as good quality. There was no sufficient information available to consider other six as good quality because there were missing data and their results cannot be considered reproducible in clinical practice. Only 50% of reviews combined the results properly because few authors reported if a sensitivity analysis was performed after combining the results.

Analyzing the methods to execute this research, there were some doubts when question six was marked in OQAQ scale. Some authors did not state one clear way to analyze the validity of the randomized controlled trial included in their systematic review. The authors of the present study contacted Oxman et al. [4] by email to elucidate doubts about question six and received some instructions about this analysis.

There were three limitations: First, the PRISMA STATEMENT has some topics with items composed for multiple components and the recommendation is that all components must be reported. For example, "Provide a general interpretation of the results in the context of other evidence, and implications for future research". In such cases if only one component of the item was reported adequately the item was considered as reported correctly and marked as present in the systematic review. This may have overestimated the results. Second, only one reviewer conducted the score (OQAQ), thus some bias may have occurred in the final result. Third, review's authors were not contacted to clarify the negative points because this approach is not generally used by readers.

Some considerations are possible after analyzing OQAQ: all systematic reviews stated the research methods to search for studies, and 90% of these systematic reviews used more than MEDLINE to identify relevant studies. This approach is correct to identify relevant studies and is recommended to improve quality [18]. Fifty percent of the systematic reviews reported the way to assess the validity of the randomized controlled trial. The quality of the studies included in a systematic review should be assessed because the inclusion of trials with lower quality is more likely to produce positive results and compromise the results of the systematic review [19]. Findings that combined results properly were seen in 50% of the systematic review analyzed. The reviewers need to report the sensitivity analysis, how heterogeneity was evaluated, and the number of reviewers who evaluated the quality of the review to make it clear that their work has been performed correctly [1].

Analyzing the frequency of the PRISMA STATEMENT items reported, it was identified that only rationale, information sources, and summary of evidence were reported in 100% of the systematic reviews (Table II). In other items, the reviewers did not describe the methods used in sufficient detail to allow a proper analysis, so it was not possible to evaluate the review's quality. Reviewers should pay more attention to their reviews to improve the quality of their work [19].

In view of these results, an implication for future researches can be made. Authors of systematic reviews should report the approach used in their work to analyze the studies and describe in detail what was done and how they performed the work. This attitude offers the reader a good overview of the quality present in a systematic review and gives more credibility to the results presented.

The implication for clinical practice is that the anesthesiologists need to pay attention to the methods used in a systematic review before making decisions about their own practices when choosing the best anesthetic technique for surgical procedures on the lower half of the body. Reading only one systematic review and making decisions about which anesthetic technique should be used can be misleading, as approximately 60% of systematic reviews in this area of knowledge are regarded as poor quality. The anesthesiologist must have the ability to make a critical analysis of this type of publications to evaluate advantages, disadvantages, and limitations and then identify the results that can be reproducible in clinical practice to select the best anesthetic technique at the time of choice.

CONCLUSIONS

In conclusion, the frequency of the good quality systematic reviews that compared neuraxial anesthesia with general anesthesia for procedures in inferior half of the body was 40%.

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