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Review

Cephalad–caudad versus transverse blunt expansion of the low transverse uterine incision during cesarean delivery

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ABSTRACT

It is imperative to have evidence-based guidelines for cesarean delivery. The aim of this meta-analysis was to evaluate the effectiveness of a cephalad–caudad compared to transverse blunt expansion of the uterine incision to reduce blood loss in women who underwent low-segment transverse cesarean delivery. We therefore performed a systematic search in electronic databases from their inception until March 2016. We included all randomized trials comparing cephalad–caudad versus transverse (control group) blunt expansion of the uterine incision in women who underwent a low transverse cesarean delivery. The primary outcome was postpartum blood loss, defined as the mean amount of blood loss (mL). Two trials (921 women) were analyzed. After the transverse uterine incision in the lower uterine segment with the scalpel, the uterine incision was then bluntly expanded by the designated method. Blunt expansion of the primary incision was derived by placing the index fingers of the operating surgeon into the incision and pulling the fingers apart laterally (transverse group) or cephalad (cephalad–caudad group). Women who were randomized in the cephalad–caudad group had lower: mean of postpartum blood loss, hemoglobin drop and hematocrit drop 24 h after cesarean, unintended extension, uterine vessels injury, blood loss >1500 mL and need for additional stitches. There was no statistically significant difference in the incidence of blood loss >1000 mL, in the operating time and in post-operative pain. In conclusion, expansion of the uterine incision with fingers in a cephalad–caudad direction is associated with better maternal outcomes and, therefore, should be preferred to transverse expansion during a cesarean delivery.

Contents

Abbreviations: CD, cesarean delivery; RCTs, randomized clinical trials; Hgb, hemoglobin; Hct, hematocrit; RR, relative risk; MD, mean difference; CI, confidence interval.

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Introduction

Cesarean delivery (CD) is one of the most common surgical procedures performed in the Western world and rates are increasing despite efforts to the contrary [1]. It is imperative to have evidence-based guidelines for each surgical step, in order to minimize morbidity and mortality [2,3].

The most common complication of CD is hemorrhage [2]. Researchers have identified the following surgical steps as crucial moments for reducing blood loss during the operative abdominal delivery: use of uterotonics, spontaneous placental removal and blunt expansion of the uterine incision with fingers, rather than scissors [3]. Indeed, compared to sharp uterine incision expansion, blunt expansion is associated with less unintended extensions and favorable maternal outcomes [3]. However, whether the blunt expansion of uterine incision should be performed cephalad–caudally or transversely is still a matter of debate.

The aim of this study was to evaluate the effectiveness of a cephalad–caudad compared to transverse blunt expansion to reduce blood loss in women undergoing a low-segment transverse CD.

Materials and methods

This review was performed according to a protocol designed a priori and recommended for systematic review [4]. Electronic databases (i.e. MEDLINE, PROSPERO, Scopus, ClinicalTrials.gov, EMBASE, Sciencedirect, the Cochrane Library, Scielo) were searched from their inception until March 2016. Search terms used were the following text words: "cesarean," "caesarean", "cephalad–caudad blunt expansion", "transverse blunt expansion", "expansion of uterine incision", "obstetric haemorrhage", "randomized," "randomized controlled trial" and "randomized clinical trial." No restrictions for language or geographic location were applied. In addition, the reference lists of all identified articles were examined to identify studies not captured by electronic searches. The electronic search and the eligibility of the studies were independently assessed by two authors (SX, VB). Differences were discussed and consensus reached.

We included all randomized clinical trials (RCTs) comparing cephalad–caudad (i.e. intervention group) versus transverse (i.e. control group) blunt expansion in women who underwent a low-segment transverse CD. Selection included women undergoing a low-segment transverse CD after 30 weeks of gestation, either planned or urgent. Quasi-randomized trials (i.e. trials in which allocation was done on the basis of a pseudo-random sequence, e.g. odd/even hospital number or date of birth, alternation) were excluded.

After the transverse uterine incision in the lower uterine segment with the scalpel, the uterine incision was then bluntly expanded by the designated method. Blunt expansion of the primary incision was derived by placing the index fingers of the operating surgeon into the incision and pulling the fingers apart laterally (i.e. transverse group) or cephalad–caudad (i.e. cephalad–caudad group). Women in the transverse expansion group had the uterine incision extended by the insertion of both index fingers of the operator into the opening who then pulled the finger apart laterally. In the cephalad–caudad expansion group, a transverse opening of the lower uterine segment was created by separation of the fingers of the surgeon in a cephalad–caudad direction along the midline (Fig. 1).

The risk of bias in each included study was assessed by using the criteria outlined in the Cochrane Handbook for Systematic Reviews of Interventions. Seven domains related to risk of bias were assessed in each included trial since there is evidence that these issues are associated with biased estimates of treatment effect: (1) random sequence generation; (2) allocation concealment; (3) blinding of participants and personnel; (4) blinding of outcome assessment; (5) incomplete outcome data; (6) selective reporting; and (7) other bias. Review authors' judgments were categorized as "low risk", "high risk" or "unclear risk" of bias [4].

Two authors (SX, GS) independently assessed inclusion criteria, risk of bias and data extraction. Disagreements were resolved by consensus with a third reviewer (VB). Data from each eligible study were extracted without modification of original data onto custom-made data collection forms. Differences were reviewed, and further resolved by common review of the entire process. Data not presented in the original publications were requested from the principal investigators.

All analyses were done using an intention-to-treat approach, evaluating women according to the treatment group to which they were randomly allocated in the original trials. Primary and secondary outcomes were defined before data extraction. The primary outcome was postpartum blood loss, defined as the mean amount of blood loss (mL) in case of CD. Secondary outcomes included incidence of unintended extension, uterine vessels injury,

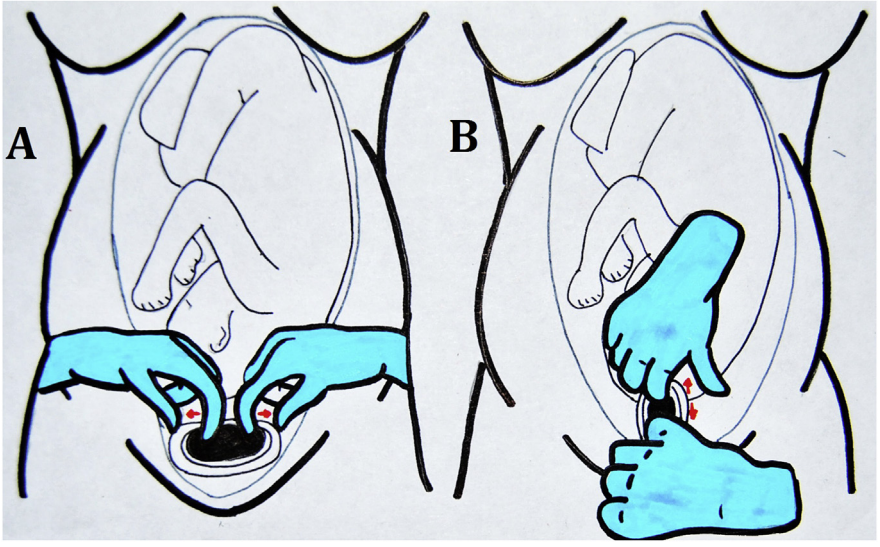

Fig. 1. The transverse (A) or cephalad–caudad (B) blunt expansion of the low transverse uterine incision during cesarean delivery.