A systematic review and network meta-analysis of different forms of phenylephrine in the prevention of oxytocin-induced hypotension in cesarean section

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Abstract

Introduction: The present study was performed with aim to compare the safety and efficacy of different forms of phenylephrine to prevent oxytocin-induced hypotension in cesarean section with spinal anesthesia. Methods: In this systematic review and network meta-analysis, databases of PubMed, EMBASE, Cochrane Central Register of Controlled Trials (CENTRAL), Web of Science, ClinicalTrials.gov, and Scopus and Persian language databases of SID and Elmnet were searched with keywords of "Phenylephrine", "Caesarean section", "blood pressure", "Oxytocin" and their Persian synonyms. The occurrence of hypotension in different groups of clinical trial studies was considered as the effect size. The safety and efficacy of study arms based on different pharmaceutical forms of phenylephrine were investigated with network meta-analysis review techniques. Results: A total of 6 interventions including low dose bolus (50 micrograms) or high dose (75 or 100 micrograms), intramuscular injection of 1, 2 and 3 milligrams of drug and no injection of phenylephrine (injection of normal saline) and totally 4 studies with a total of 9 pairwise comparisons with direct data were available. Also, 6 nonrealistic (indirect) comparisons were synthesized with predictions based on the Baysesian model. Based on the random effect model, injection of bolus of 75/100 µg significantly with a risk ratio of 0.07 (95% confidence interval 0.01 to 0.48) less than low dose bolus (50 µg) was associated with the occurrence of blood pressure drops. Risk of the occurrence of hypotension in the group of bolus injection of a high dose of phenylephrine (75 or 100 micrograms) was 0.04 times (95% confidence interval 0.01 to 0.31) of normal saline injection. There was no significant difference in other comparisons. Conclusion: Bolus injection with a high dose of phenylephrine is associated with the lowest chance of hypotension; while other methods of drug administration are not different. The synthesis of hypothetical studies based on Baysesian statistics helps researchers predict the results of future clinical trials on these subjects.

Keywords: Caesarean section, Hypotension, Oxytocin, Phenylephrine, Spinal anesthesia