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Research Article

EFFICACY OF PROPHYLACTIC COMBINATION THERAPY OF INTRAVENOUS EPHEDRINE WITH FLUID PRELOAD IN PREVENTING MATERNAL HYPOTENSION DURING SPINAL ANESTHESIA FOR CAESAREAN SECTION COMPARED TO INTRAVENOUS EPHEDRINE ALONE OR FLUID PRELOADING ALONE

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Abstract:

Objectives: To compare the efficacy of prophylactic combination therapy using IV ephedrine in bolus doses in conjunction with fluid preload as compared to fluid preload alone or IV ephedrine alone, for prevention of maternal hypotension after spinal anesthesia for caesarean section.

Methodology: This in-hospital study was conducted at the Department of Anesthesiology Bahawal Victoria Hospital, Bahawalpur for one-year duration from April 2019 to April 2020. Ninety Grade I ASA patients undergoing spinal anesthesia for elective caesarean section were randomized into three groups. Group I (Crystalloid group) received only a pre-fluid load with Ringer's solution of 20 ml / kg body weight; Group II (ephedrine group) received IV ephedrine 0.25 mg / kg body weight only after initiation of SAB, and group III (combined group) received an initial Ringer's solution fluid load of 20 ml / kg body weight plus ephedrine 0.25 mg / kg body weight administered intravenously after the start of spinal anesthesia. Intraoperative hemodynamic changes and fetal outcomes were monitored, recorded and the data statistically analyzed.

Results: Although the incidence of hypotension was not significant in all three groups, hemodynamic stability was significantly better and sustained in group III receiving combination therapy.

Conclusions: Prophylactic combination therapy with preloading fluids in combination with intravenous ephedrine 0.25 mg / kg BW can effectively prevent spinal hypotension in the mother during cesarean section.

Keywords: combination therapy, spinal anesthesia; Caesarean section; ephedrine; hypotension.

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INTRODUCTION:

Spinal anesthesia is often used for surgery on the lower abdomen and lower extremities. It is caused by the injection of small amounts of a local anesthetic into the cerebrospinal fluid (CSF). It is economical, simple to make and takes relatively less time to produce a faster onset of a good quality sensory and motor block. It has been shown to block the stress response to surgery, reduce intraoperative blood loss, reduce the incidence of postoperative thromboembolism, and reduce morbidity and mortality in high-risk patients. However, one of its important and anticipated physiological effects is hypotension, with an incidence of 80-90% or more in an untreated control group undergoing Caesarean section with spinal anesthesia. The causes of this hypotension are multifactorial, including sympathetic nerve block to T5, resulting in a decrease in systemic vascular resistance (SVR) leading to a reflex increase in heart rate and cardiac output. However, the denervation of the splanchnic autonomic ganglia (T5-11) also causes a significant expansion of the veins in the mesenteric bed with an increase in venous capacity. This reduces venous return to such an extent that the reflex increase in cardiac output may be impaired or even suppressed. These factors are exacerbated by the decreased venous return due to compression of the aorta and vein in the third trimester of pregnancy. Spinal anesthesia extending above T4 directly affects the sympathetic innervation of the heart, thus weakening the compensatory tachycardia, and therefore a high core block may further slow the heart rate. Harrop-Griffiths has suggested that a different reflex (Bezold-Jarisch) may contribute to episodes of maternal hypotension under these conditions. This reflex involves baroreceptors, in the insufficiently filled left ventricle, mediating the neural response that leads to increased parasympathetic activity over sympathetic tone. This reflex (though not fully understood) may explain why vasopressors and anticholinergics sometimes fail to produce the expected results, and may also explain the bradycardia seen in mothers with spinal block well below T3-5 dermatomes. It is also worth mentioning here that the incidence of arterial hypotension is lower in women during labor and in patients with pre-eclampsia, hence there is less support for the prophylactic use of vasopressors in these patients. Pre-eclampsia patients to maintain arterial pressure after spine block. In preeclampsia, the vascular epithelium is damaged by a process involving placental proteins, leading to an imbalance between pro and anti-angiogenic growth factors, resulting in permanent vasoconstriction. In our study, we assessed the effectiveness of combined use of preload and vasoconstrictor drugs in preventing postpartum hypotension compared with preload alone or with

vasoconstrictor agents alone, and obtained better results from combination therapy. The aim of the research was to find a safe and highly effective method of preventing spinal hypotension in the mother that does not cause side effects in labor.

METHODOLOGY:

This in-hospital study was conducted at the Department of Anesthesiology Bahawal Victoria Hospital, Bahawalpur for one-year duration from April 2019 to April 2020. patients with ASA I and II degrees who underwent elective Caesarean section under subarachnoid anesthesia were enrolled in the study. In addition, patients with any other contraindications for spinal anesthesia were excluded from the study. Patients were randomly assigned to three groups of 30 people. Patients in Group I (crystalloid group) received a preload of 20 mL / kg body weight of Ringer's lactate for 10 to 15 minutes using a fluid pusher prior to subarachnoid block. Patients in group II (vasoconstrictor group) received an intravenous bolus of 0.25 mg / kg of ephedrine body weight from a pre-filled syringe, immediately after turning the patient into a supine position after the onset of effective spinal anesthesia. Patients in Group III (combination group) received a pre-load of 20 ml / kg body weight of Ringer's lactate for 10 to 15 minutes prior to spinal block, followed by an intravenous bolus of 0.25 mg / kg body weight ephedrine. Hypotension, nausea and vomiting were reported. All data was entered into PSS version 11 and analyzed. The mean and standard deviation of the age were calculated. The incidence of hypotension, nausea, and vomiting was also compared in the three groups, the significance test was the Chi-square test with $p < 0.05$.

RESULTS:

The mean age of patients in group I was 31.5 ± 7.5 years, in group II it was 31.4 ± 8.3 , and in group III it was 31.6 ± 7.8 years, respectively. The incidence of hypotension was significantly lower in the combined group compared to the single therapy groups, i.e. Group I vs Group II vs Group III (3.33% vs 8 (38.1%) vs 18 (85.7%) ($p < 0.001$). In the combined group, the incidence of nausea and vomiting was significantly lower compared to the other two groups (3.33%) vs 4 (19%) vs 12 (57.1%) ($P < 0.05$). The analysis of neonatal outcomes was clinically assessed by the pediatrician using only the Apgar scale and showed no significant differences between the study groups ($P > 0.05$). The incidence of hypotension was 23.33%, 13.33%, and 6.67% in groups I, II and III, respectively. The incidence of hypotension was significantly lower in group III receiving the combination therapy (Table 1).

Table 1: Haemodynamic effects (Hypotension) requiring rescue treatment

Haemodynamic parameters	Crystalloid group	Ephedrine group	Combination group	P value
Hypotension	7(23.3%)	4(13.3%)	2(6.7%)	0.001
Reactive hypertension	0(0.0%)	0 (0.0%)	1(3.3%)	0.8

This group also required salvage doses of IV ephedrine to treat hypotension in only one patient, which is highly insignificant (Table 1). The incidence of nausea and vomiting was higher in group I and was associated with hypotension. There was no statistically significant difference between groups II and III related to NV. No patient developed severe NV. Patients were administered Inj. maxolone 10 mg IV condition after vomiting once.

DISCUSSION:

With spinal anesthesia compared with the epidural technique, the haemodynamic changes are rapid, leading to clinical symptoms and maternal-fetal complications related to hypotension, which often occur with spinal anesthesia. In one combination therapy approach, Akhtar et al. Found that a modified back wedge position with table tilt, crystalloid cohydration, and atropine i / v prophylaxis is an effective combination technique to prevent spinal hypotension in cesarean delivery. Another group of academics from Dicle University and Mustafa Kamal University in Turkey used a combination of more than two methods to prevent spinal hypotension in the c / section. The combined use of low doses of bupivacaine, colloid preloading and Esmarch bandage wrapping on the legs has been found to be effective in preventing spinal hypotension. One study by Kee et al found that crystalloid hydration along with phenylphedrine infusion could be used as an effective technique to prevent extra-vertebral hypotension during routine cutting / cutting in their study results. Only 1 of 53 patients (1.9% in the treatment group) The combination experienced hypotension compared with 15 of 53 patients (28.3% in the Crystalliod group (P = 0.0001). Compared to group 0, patients in group 1 had higher values for the following parameters: serial measurements of systolic blood pressure (p = 0.02), minimum systolic blood pressure recorded (P = 0.0002) and minimum recorded heart rate (P = 0.013). Neonatal outcomes and maternal side effects were similar in both groups. Bhagat et al. Also conducted a similar therapy study combination, which found that the combined use of a relatively low preload volume and a reduced dose of vasoconstrictor drugs is a very effective method of reducing the incidence, severity and duration of spinal hypotension and symptoms, and provides better haemodynamic stability compared to vasoconstrictor or loading agents alone. Reducing the dose of a vasoconstrictor in the combination group could prevent this problem. Moreover, a small preload volume, as in the combination group, can be safely administered to pregnant and elderly patients. Prophylactic ephedrine infused in combination with crystalloid was found to be more effective than

crystalloid prehydration alone in preventing hypotension during spinal anesthesia for elective caesarean section. This was proven by Khooshideh M and Heidari MH from the Department of Obstetrics and Gynecology at the Zahedan University of Medical Sciences in Zahedan, Iran. Combination therapy has been found to be highly satisfactory in preventing spinal hypotension during cutting / cutting without significant maternal side effects and good fetal outcomes. It has also been shown that compared to bolus intravenous ephedrine or prophylactic use of pretension alone, spinal anesthesia in elective caesarean section virtually eliminates the need for emergency treatment.

CONCLUSION:

We conclude that prophylactic use of a combination therapy with bolus fluid preload of 20 ml / kg bw with IV ephedrine at a dose of 0.25 mg / kg bw is highly effective routinely in preventing maternal hypotension.

REFERENCES:

1. Lee, Jennifer E., Ronald B. George, and Ashraf S. Habib. "Spinal-induced hypotension: Incidence, mechanisms, prophylaxis, and management: Summarizing 20 years of research." *Best Practice & Research Clinical Anaesthesiology* 31, no. 1 (2019): 57-68.
2. Chooi, Cheryl, Julia J. Cox, Richard S. Lumb, Philippa Middleton, Mark Chemali, Richard S. Emmett, Scott W. Simmons, and Allan M. Cyna. "Techniques for preventing hypotension during spinal anaesthesia for caesarean section." *Cochrane Database of Systematic Reviews* 8 (2019).
3. Saghafinia, Masoud, Alireza Jalali, Mahnaz Eskandari, Nahid Eskandari, and Marzieh Lak. "The effects of hydroxyethyl starch 6% and crystalloid on volume preloading changes following spinal anesthesia." *Advanced biomedical research* 6 (2019).
4. Hegde, Bharath Kumar, and Manjunath Timmappa Bhat. "Prophylactic crystalloids or prophylactic crystalloids with ephedrine: Comparison of hemodynamic effects during caesarean section under spinal anaesthesia using 0.5% bupivacaine." *Journal of Obstetric Anaesthesia and Critical Care* 7, no. 1 (2020): 26.
5. Ferré, Fabrice, Charlotte Martin, Laetitia Bosch, Matt Kurrek, Olivier Lairez, and Vincent Minville. "Control of Spinal Anesthesia-Induced Hypotension in Adults." *Local and Regional Anesthesia* 13 (2020): 39-46.

6. Bagle, Aparna Abhijit, Adithya Vishnu, Anil Kumar, Amit Malik, Vinit Garg, and Gayatri Khanvilkar. "Evaluation of leg wrapping for the prevention of postspinal hypotension in cesarean section under spinal anesthesia." *Anesthesia, Essays and Researches* 11, no. 2 (2019): 439.
7. Tan, Hon Sen, and Ashraf S. Habib. "The optimum management of nausea and vomiting during and after cesarean delivery." *Best Practice & Research Clinical Anaesthesiology* (2020).
8. Sullivan, Shelby. "A Systematic Review Comparing Ephedrine Versus Phenylephrine During Spinal Anesthesia for Cesarean Delivery." (2019).
9. Kaneko, Takahiko, Nobutaka Kariya, and Munetaka Hirose. "Association between intraoperative phenylephrine administration and umbilical artery pH in women with hypertensive disorders of pregnancy: a retrospective cohort study." *Journal of anesthesia* 32, no. 6 (2019): 893-900.
10. Mohamed, Mona Ahmed, Noha Mohamed Abd El Aziz, Mohsen Abdelghany Bassiony, Mona Refaat Hossny, and Abd El Aziz Abdallah Abd El. "Colloid Co-load versus Colloid Pre-load in a Parturient Undergoing Caesarean Delivery with Spinal Anaesthesia and Its Effects on Maternal Haemodynamics." *The Egyptian Journal of Hospital Medicine* 71, no. 4 (2020): 2858-2868.
11. OKONNA, DR FRIDAY. "Antiemetic prophylaxis during elective Caesarean section under spinal anaesthesia: Comparison of Cyclizine, Metocloparide and placebo." *Faculty of Anaesthesia* (2019).
12. Kinsella, S. M., B. Carvalho, R. A. Dyer, R. Fernando, N. McDonnell, F. J. Mercier, A. Palanisamy, A. T. H. Sia, M. Van de Velde, and A. Vercueil11. "Guidelines." (2019).
13. Ali, Irfan, Farrukh Afzal, Madiha Zafar, and Khawar Ali. "Comparison of two different infusion rates of Phenylephrine as a Prophylaxis against Spinal Anaesthesia induced Hypotension in Elective Caesarian Sections." *PAKISTAN JOURNAL OF MEDICAL & HEALTH SCIENCES* 11, no. 4 (2019): 1360-1364.
14. Clancy, Olivia, and Nuala Lucas. "Choice of Anaesthesia for Emergency Caesarean Section." In *Anesthesia for Cesarean Section*, pp. 111-124. Springer, Cham, 2019.
15. Adams, Samantha. "A randomised comparison of bolus phenylephrine and ephedrine for the management of spinal hypotension in patients with severe preeclampsia and a non-reassuring fetal heart rate trace." PhD diss., University of Cape Town, 2020.