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THE COMPARATIVE STUDY OF CRYSTALLOID PRELOAD V/S PHENYLEPHRINE & CRYSTALLOID COLOAD FOR PREVENTING HYPOTENSION FROM SPINAL ANAESTHESIA FOR CESEREAN DELIVERY

Anaesthesiology

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ABSTRACT

Aim & Objective: To compare the effectiveness of Crystalloid preload versus Phenylephrine & crystalloid coload during lower segment cesarean section (LSCS) & prevent hypotension following spinal anaesthesia. **Material & Methods:** This randomized controlled hospital based study was carried out in the Anaesthesiology Department, Rajshree Medical Research Institute Bareilly, Uttar Pradesh after the approval of proposal by subject committee & Ethical Committee & written informed consent. **Results:** The 2,4,6,8 &10 mins interval mean SBP, DBP &MAP,MHR,Mean Infusion rate,Mean Rescue Bolus was more among Group F (Phenylephrine Crystalloid Coload) compared to Group C (Crystalloid Preload Group). **Conclusion:** It was seen that Colloid preload is preferred over crystalloid preload to reduce the decrease in blood pressure by spinal anesthesia, requirement of the vasopressors , occurrence of nausea/vomiting in a pregnant female otherwise healthy going for elective caesarean delivery .

KEYWORDS

APGAR,SBP,DBP,MAP.

INTRODUCTION

Obstetric Anaesthesia is a special field of anaesthesia requiring extra care & attention as it involves two lives. The increasing trend of cesarean section owes to the provisions of better perinatal services & increased vigilances for high risk pregnancy.[1] Regional Anaesthesia is safe & effective in emergency (92.87%) & elective ceserean section (84.21%).

SA includes injecting small amounts of local anaesthetic in subarachnoid space & reversible loss of sensory & motor function . It gives excellent relaxation of the skeletal muscle , good analgesia, better post-operative inhibition of the stress & pain control, avoids airway instrumentation, decrease chances of post-operative pulmonary embolism & deep vein thrombosis.[2] The most common adverse effect being hypotension due to Spinal anaesthesia with 20-100% reported [3] & bradycardia.

Both the non-pharmacological as well as pharmacological methods are being used. Nonpharmacological [4] includes the Trendelenburg position, left uterine wedging displacement, compressive bandage, leg wrapping.

Crystalloids effectively prevent hypotension among the parturients,[5] is cheaper highly available so it's infused in larger amounts & consumes more time.

Phenylephrine, a selective alfa-1 adrenergic agonist is synthetic non-catecholamaine [6], sympathomimetic agent is a potent vasoconstrictor that increases systemic vascular resistance & arterial B.P. Phenylephrine 50-100mcg I.V bolus[7] completely absorbed orally , undergoes 1st pass metabolism. I.V. bolus rapidly distributes in peripheral tissues.

It's controversial whether to use crystalloid or colloid preload to stabilize haemodynamics of the mother posted for elective LSCS via spinal.

Hence, hereby a study was conducted comparing effectiveness of preloading Phenylephrine and phenylephrine & crystalloid coload to decrease the intraoperative lowering of B.P. in women posted for LSCS.

OBJECTIVES :

To compare the effectiveness of Crystalloid preload versus Phenylephrine & crystalloid coload during lower segment cesarean section (LSCS) & prevent hypotension following spinal anaesthesia.

METHODOLOGY

This randomized controlled hospital based study was done in Anaesthesiology Department, RMRI Bareilly, U.P. during 2020-2022 after the approval of subject committee & Ethical Committee & written informed consent.

SELECTION OF STUDY POPULATION

Patients for delivery by LSCS were selected for the study & examined for Pre Anaesthetic Check up & Fitness & it was carefully satisfied that the patient is fulfilling the inclusion criteria .

An informed consent was taken from the patient . History & systemic examination done to rule out the exclusion criterias. Routine Investigations were done.

The patients were divided into 2 groups as per computer generated random number table: Group C & Group PC. The patients in preloading group (C) given 500ml of Ringer Lactate infusion rapidly over 15-20 min before instituting spinal block & group (CP) given 50mcg I.V Phenylephrine bolus coloading with Crystalloid 500ml R.L .S A was given with the same spinal anaesthetic agent at L2-3, L3-L4 space via median/paramedian approach in sitting position.

All patients in both the groups were given R.L. infusion according to the appropriate fluid calculation & need . A constant watch over the SBP, DBP , MAP, every 2 mins after that until 10 mins & then every 5 mins until 30 mins following S.A.was recorded , SPO2, pulse rate, urine output, nausea, vomiting monitored . The need for intraoperative phenylephrine & its amount was recorded.

Statistical Analysis

Microsoft word & Excel were used to make graphs & tables.Results were calculated by student's t test & chi square test .The SPSS 18.0 version statistical software was used to analyse the data.

RESULTS

Table 1: Distribution Of Study Population According To MAP

MAP	Group C (Crystalloid Preload Group)		Group F (Phenylephrine Crystalloid Coload)		Mean Difference	p-value
	Mean	SD	Mean	SD		
0 minute	106.37	6.09	107.50	1.63	-1.13	0.139

2 minutes	95.79	7.73	102.17	1.11	-6.37	0.001*
4 minutes	95.32	7.41	104.17	1.20	-8.85	0.001*
6 minutes	93.36	7.96	102.17	1.16	-8.81	0.001*
8 minutes	99.37	6.56	105.50	1.23	-6.13	0.001*
10 minutes	103.73	5.85	103.50	1.50	0.23	0.002*
15 minutes	104.73	6.14	105.50	1.57	-0.77	0.891
20 minutes	103.93	5.99	105.17	1.17	-1.24	0.112
25 minutes	106.15	4.64	106.83	1.16	-0.69	0.101
30 minutes	106.29	4.93	105.50	1.14	0.79	0.350
35 minutes	105.68	4.85	104.50	1.15	1.18	0.107
40 minutes	106.93	4.53	106.17	1.44	0.76	0.113
45 minutes	105.37	5.19	104.50	1.41	0.87	0.297

Unpaired t-test

*** Significant Difference**

Table 2: Distribution Of Study Population According To Heart Rate

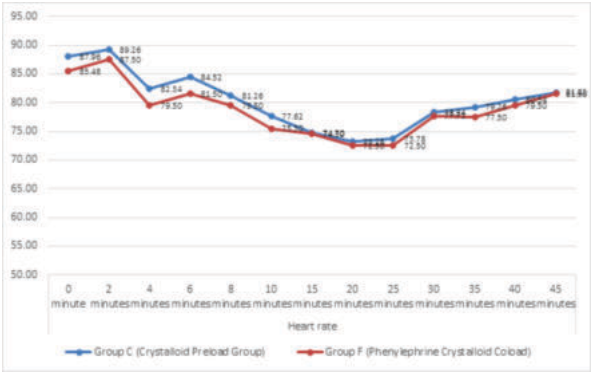


Table 3: Distribution Of Study Population According To Infusion Rate

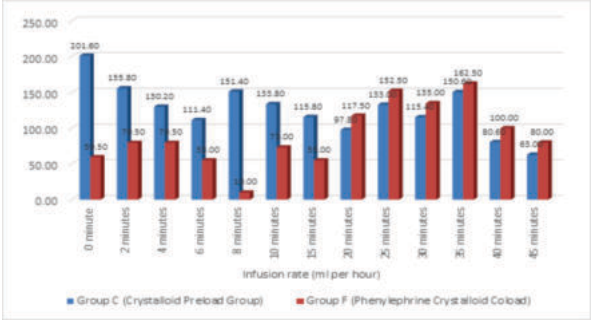


Table 4: Distribution Of Study Population According To Rescue Bolus

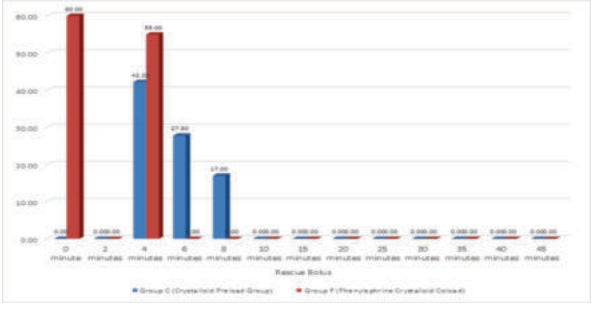
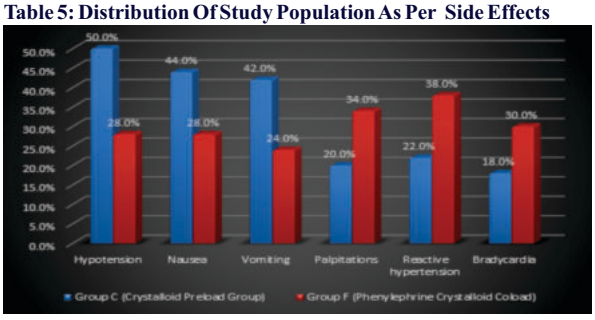


Table 5: Distribution Of Study Population As Per Side Effects



DISCUSSION

Spinal anesthesia is a common technique employed in Lower segment cesarean deliveries because its safe , reliabile , simple, fast in onset and low in cost.[8]Hypotension occurs due to Sympathectomy after spinal anesthesia in a number of cases even after left uterine displacement causing maternal morbidity like nausea / vomiting, altered consciousness, cardiac collapse.[9]

Prophylactic ephedrine/ phenylephrine infusion, lower leg compression reduces the episodes of hypotension. Maternal hypotension occurs despite loading fluid .Most patients demand prophylactic/ therapeutic vasopressors. Delaying a surgery is futile just to give a fluid preload .

AGE , WEIGHT & HEIGHT :

No significant difference in mean Age (in years), Weight (Kgs) and Height (Cms) between Group C (Crystalloid Preload Group) and Group F (Phenylephrine Crystalloid Coload) was noted .

HAEMODYNAMIC PARAMETERS:

Mean SBP, DBP & MAP at 2,4,6,8 &10 minutes was significantly more among Group F (Phenylephrine Crystalloid Coload) compared to Group C (Crystalloid Preload Group).

INFUSION RATE :

In current study, mean infusion rate (ml/hour) at 0,2,4,6,8,10 &15 minutes was significantly more among Group C (Crystalloid Preload Group) compared to Group F (Phenylephrine Crystalloid Coload).

Jalandhara and Makwana[2] found that intraoperative fluid requirement was high in crystalloid group compared to colloid. (1662.33 ml vs 1260.67 ml).

RESCUE BOLUS :

In our study, the mean Rescue Bolus at 4 minutes, 6 minutes and 8 minutes was significantly more among Group C (Crystalloid Preload Group) compared to Group F (Phenylephrine Crystalloid Coload). Similar study of **Dyer et al.,**[10] comparing RL preload & coload 20 ml/kg & 50 patients included & Preferred coload as vasopressor was needed lesser among coload.

ADVERSE EVENTS:

In our study, palpitations, reactive hypertension & bradycardia was significantly more among Group F (Phenylephrine Crystalloid Coload). In present study, Hypotension was reported among 50.0% patients among Group C (Crystalloid Preload Group) & 28.0% patients among Group F (Phenylephrine Crystalloid Coload).

Thus phenylephrine infusion produces stable blood pressure management as it has uniform plasma level .

SUMMARY & CONCLUSION

Spinal anaesthesia although is majorly used for deliveries by caesarean section. It also produces detrimental effect as it can cause rapid onset maternal hypotension which has bad effects on mother & neonate. So various strategies have been tested for treating hypotension . Careful position & preload with crystalloid / colloids are used to prevent it, but these aren't total measures & vasopressor is needed to correct hypotension rapidly.

SA has got its own drawbacks, major being hypotension due to sympathectomy. Although conventional methods have been tried to curtail this, no method proved effective. Only treatment with vasopressors was considered an effective method to treat this. But the side effects of hypotension had detrimental effect on mother & foetus. Hence vasopressors were started prophylactically to avoid this.

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