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A Comparison of Spinal Anaesthesia with Levobupivacaine Plus Fentanyl And Hyperbaric Bupivacaine Plus Fentanyl In Elective Caesarian Section.

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I. Introduction

The increasing trend of caesarean section in the last two decades not fest in developed countries but also in developing countries like India. Due to more advanced intrapartum monitoring lead to an increase in emergency caesarean section. There is a big challenge to obstetric anaesthesiologist as parturient have physiological changes during pregnancy as well as effects of numerous drugs and techniques on parturient and foetus.

The neuraxialanaesthesia used for caesarean section are single shot spinal anaesthesia, Epidural anaesthesia &combined spinal& epidural anaesthesia.

Single shot spinal anaesthesia is by far the most common method for both elective& emergency caesarean section. When co-administer analgesics such as opioids with local anaesthetic provide advantages of post-operative analgesia for prolonged period as spinal anaesthesia is cost effective compared to epidural anaesthesia.

Hyperbaric bupivacaine in 8% glucose is very frequently used. But pain bupivacaine which is hypobaric in comparison with human CSF hypobaric or truly Isobaric L.A solutions have an unpredictable medium sensory block height & occasionally associate with block failure. This Isobaric solution is less sensitive to position issues when Pts move from the lateral or sitting position rapidly to supine position. Whereas hyperbaric L.A solution has dense Sensory block & high spread for surgery. This high extension ofsympathetic block may cause sudden cardiac arrest.

In present study we compare the intra-operative & immediate post-operative clinical effects of intrathecal 0.5% plain levobupivacaine(9mg) + fentanyl and 0.5% hyperbaric bupivacaine (9mg) + fentanyl (10 micrograms)

II. Aims & Objectives

The aim of the study is to evaluate following factors-

1. Onset & duration of motor block
2. Onset & duration of sensory block
3. Intra operative hemodynamic changes
4. Post-operative analgesia
5. Adverse effects

III. Review Of Literature

WASUDEO SADASHIO BARSAGDE, NARESH GANPAT TIRPUDE, AND KAMLESH SARANGDHAR PILLEWAN, 2017 did a comparison of levobupivacaine plain and levobupivacaine with fentanyl in caesarean cases. The patients were randomly allocated into two groups of 30 patients in each group. The group LF received levobupivacaine 10mg(2ml) + fentanyl 20mcg (0.4ml) and normal saline (0.4ml) group LNand found prolonged duration of intrathecal block.

Levobupivacaine 10mg (2ml) + N.S (0.4ml). group LF was found to improve the quality and prolonged duration of intrathecal block.

RASHMI DUGGAL, RUCHI DAPOOR, GAJENDRA MOYAL, 2015, did a study to compare the quality of sensory and motor block following intrathecal levobupivacaine& hyperbaric bupivacaine InparturientUndergoing elective caesarean section. In group L 2ml of 0.5% isobaric levobupivacaine & in other group B 2ml 0.5% hyperbaric bupivacaine given. Both theduration of sensory and motor block was shorter in group L than those group B.

IV. Materials And Methods

The study group comprised of 60 term parturient women with singleton pregnancy of ASA grade I between the age groups of 20-30., admitted in NMCH, Patna between January 2019 to Dec 2020. The patients scheduled to undergo caesarean section under spinal anaesthesia for indications like cephalous pelvic disproportion breach presentation, repeat caesarean section operation.

After approval form the hospital ethical committee & taking written, informed consent. They were randomized to one of the two groups of equal sized prospective comparative study group using an open protocol design to receive.

Group BF - 1.8 ml of 0.5% hyperbaric bupivacaine + 10µg of fentanyl intrathecal – 30 cases.

Group Lf - 1.8ML (Img) 0.5% levobupivacaine + 10µg of fentanyl intrathecally – 30 cases

INCLUSION CRITERIA –
1. Age between 20-30yrs
2. ASA 1 and 2
3. Term gestation
4. Single live foetus

EXCLUSION CRITERIA
1. Multiple Pregnancy
2. Pregnancy induced hypertension
3. Placenta Previa
4. Antenatal patients with acute fetal distress
5. patients with previous abdominal surgery
6. Body wt.> 80Kg

Standard pre-operative preparation of all patient was done. The pts were brought in the operation theatre on the left lateral position with a wedge under the right hip.
Monitoring of patients was done with NIBP, Pulse Oximetry. The baseline B.P, O2 saturation was recorded.

MATERIALS
(A) Spinal Anaesthesia Kit
(b) Safety measures for cardiovascular & pulmonary resuscitation of mother &foetus Following equipment's & drugs checked& kept ready-

I. Boyle's apparatus
II. laryngoscope with blades Adult & paediatric
III. Endotracheal tubes 6,6.5,7,7.5, ID Sizes
IV. Suction apparatus
V. Emergency Drugs

TECHNIQUE-

The patient was placed in sitting position. The skin over the back was thoroughly prepared with savlon, spirit & betadine solution The spinal needle was introduced in L3-L4 inter vertebral space in midline free flow of CSF conformed. The needle in the subarachnoid space. The study drugs were administered to the respective study groups into subarachnoid space at the rate of 0.25 ml/sec. The spinal needle withdrawn &the patients was slowly turned down supine with the left tilt by placing a wedge under the right hip.

The following para meter were assessed.
1. The onset of sensory block and the height of block were noted & recorded.
2. Duration of sensory blockade as follows-

(a) Regression segments: -The time of onset of sensory loss at T6 dermatomes Level to bilateral regression of two dermatomes.
(b) Regression to T12 segment: The time from onset of sensory loss to bilateral regression to T12 dermatome.

3. Duration of analgesia:
Assessment of degree of intensity of sensory block was done using visual analogue scale score on a 10 cm scale.

Grade-0	0	No Pain
Grade-1	1-2.5	- Mild Pain
Grade-2	2.6-5	-Moderate pain
Grade-3	5.1- 7.5	- Several Pain
Grade-4	7.6-10	Worst possible pain

Side effects recorded during and after surgery are-
- Nausea & Vomiting

- Hypotension

- Bradycardia

- Drowsiness

- Pruritus

- Shivering

- Respiratory depression

- post Dural puncture headache

- Urinary retention

Table -1

Systolic pressure (Mean ± SD)

Minutes	Group LF	Group BF	P Value
Pre-operative	117.4± 9.35	114±6.25	þ=0.09
2	112.13±8.18	106.5±13.4	þ=0.055
4	107.5±9.5	99.3±16.45	þ=0.022
6	98.50±11.43	100.2±11.36	þ=0.565
8	104.86±11.46	98.70±10.4	þ=0.035
10	109.37±9.13	97.8±4.3	þ=0.000
15	108.21±9.147	108±8.75	þ=0.952
30	109.53±8.076	112±5.83	þ=0.180
45	112.33±6.51	113.5±4.57	þ>0.05
60	113.07±5.98	113.5±4.57	þ=0.0754

120	115.00±5.09	112.00±6.10	þ>0.05
180	118.33±5.92	117.00±4.66	þ>0.05

The above table describes the changes in systolic blood pressure in two groups, Isobaric levobupivacaine (LF) and Hyperbaric Bupivacaine (BF) in the intra operative and post-operative period. Pre-operative the mean SBP was 117 mm Hg which dropped to 98.5 at 6 Minutes and gradually stabilized and returned to 118 mm Hg at 180 minutes. Whereas in group BF the pre-operative SBP was 114mm HG which dropped to 97.8 mm HG at 10 Minutes and then reached pre-operative levels and remained constant. There was significant difference in both groups (P<0.05) at 4,8,10 minutes respectively.

Tabe-2 Diastolic Blood pressure (Mean ISD)

Minutes	Group LF (n=30)	Group BF(n=30)	T-test
Pre-Op	72.37±8.7	73.33±5.4	p>0.05
2	68.89±8.8	69.00±11.2	p>0.05
4	69.43±9.39	67.47±15.7	p>0.05
6	68.60±9.02	62.17±9.6	p>0.05
8	66.03±10.12	64.73±12.22	p>0.05
10	70.57±10.0	66.43±9.28	p>0.05
15	69.20±8.56	71.17±9.2	p>0.05
30	74.07±6.19	73.57±5.59	p>0.05
45	71.93±7.196	76.33±4.90	p>0.05
60	73.80±7.5	76.3±4.9	p>0.05
120	74.33±5.04	74.67±5.71	p>0.05
180	77.67±5.04	75.33±5.71	p>0.05

The above table shows the mean DBP values in two groups LF and BF along with the test values for each at given time intervals and there is no significant different in both groups with regards to mean DBP. The mean pre-operative DBP in group was 72.37 which remained almost constant without much fall throughout the period where as in group BF mean pre-operative DBP was 73.31 mm Hg which came down 62.17 at 6min, then slowly increased to 64.73 at 8 min, 66.43 at 10 min then reached pre-operativelevel and remained constant. There was no significant difference between both the groups (P>0.05)

Table -3

Characteristics of sensory blockade (Mean±S.D) and t- Test

Parameters	Group LF	Group BF	LF Vs BF
Height of the Block	T_4-T_6	T_4-T_6	P>0.05
Onset (Min)	2+0.5	1.40±0.6	P>0.05
Time for max level	5.85+0.89	6.78+0.95	0.000

2 Segment regression (Min)	80.26±7.30	85.5±9.85	0.023 ✦
T_{12} Segment Regression (Min)	127.13±8.93	139.96±13.17	0.000 ✦
Ist analgesic requirement(min.)	141.5±10.38	159.3±14.30	0.000 ✦

Note: ✦ indicates significancei.e þ<0.05

The above table shows the characteristics of sensory blockade into groups LF and BF and their respective P Values. The maxim Sensory Dermatome Level reaches was same in the both groups T4-6.The onset of sensory block was similar in both groups (P>0.05). The time taken for sensory block to reach maximum level was shorter in group LF 5.85 min than BF(P<0.05). the time to regression by two dermatomes for the sensory block and its regression time to T12 were longer in group BF (P<0.05). Time for first analgesic requirement was 141.5 minutes in LF Group and 159.3 minutes in BF group which was statistically significant (P<0.05)

Table -4

Characteristic of motor Block (Mean ± SD)

Parameters	Groups LF (n=30)	Groups Bf (n=30)	P Value
Degree of Blockade	Grade 3	Grade 3	>0.05
Onset of motor block (Min)	6.32±1.17	4.89±1.29	0.000 ✦
Duration of motor block (Min)	96.57±11.66	152.26±15.9	0.000 ✦

Note – ✦ indicates significant ieP>0.05

The above table shows the degree of motor blockade as grade 3, according to modified bromage classification in both groups.

The onset of motor block in group LF was 6.32 minutes and group BF was 4.89 minutes. the different is statistically significant (P<0.05) among the both groups.

The duration of motor block was 96.56 minutes in group LF and 152.26 minutes in group BF. The different is statistically significant (P<0.05) among the both groups.

V. Discussion

Hypotension: -

	LF Group	BF Group
Present Study	5(16.67%)	12(40%
Gulen Guler	5(6.67%)	11 (36.67%)
Rashmi Duggal et at	3 (10%)	10 (33.3%)

Hypotension is the most common in spinal anaesthesia It is known that besides its Effects on the mother, it causes acidosis by altering utero Placental perfusion.Administering hydration using crystalloid or colloid before spinal anaesthesia has proven is sufficient.

In present study the incidence of hypotension was 5 cases (16.67%) in LF group & 12 cases in BF Group, which was treated with me phentermine 3-6 mg and total dose increased in LFup to 30 mg where as in BF group 72mg. The less Of hypotension in LF group was due to isobarisity of plainlevobupivacine, which causes less sympathetic blockade as compare to hyperbaric Bupivacaine groups(BF)

Characteristics of Sensory Blockade: -

The onset of sensory blockade was similar in both groups with mean onset time in LF 2 Min and BF 1.5 Min and there was no statistical different ({>0.05). In study by Gulen Guler et at 2012 this was similar.

The time for maximum sensory block was shorter in LF group (5.58 min) than BF group (6.78min) was similar to the study by Gulen Guler Et al 2012.

Characteristic of motor blockade: -

In present study the onset of motor block was longer in group LF (6.32 min) than Group BF (4.89 min). and mix was similar to Gulen Guler et at 2012

VI. Summary

The present study was done to evaluate the intraoperative and post-operative efficacy of levobupivacaine and hyperbaric Bupivacaine combined with fentanyl and the main observations were hemodynamic parameters sensory block and motor block:-

The following observations were made-
- Time for onset of sensory block and maximum dermatome level reached were similar in both groups.
- Time for maximum sensory level reached two segment regression time and time for 1st analgesic requirement were early in LF group.
- Onset of motor block was delayed in LF group.
- maximum degree of motor block was same in both group (Bromage 3)
- Hypotension was more in hyperbaric Bupivacaine group (BF)
- Complete regression of motor block was significantly lower in levobupivacaine group (LF)

VII. Conclusions

In the present study, we concluded that onset of sensory blockadewas similar in both groups whereas the time for maximum sensory level reached two segment regression time and time for first analgesic requirement were early in levobupivacaine+ fentanyl group. The maximum degree motor blockade was similar in both groups. Levobupivvacaine plus fentanyl also provide better haemodynamic stability than bupivacaine Plus fentanyl combination.

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