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COMPARATIVE STUDY OF ULTRA LOW DOSE OF INTERMITTENT EPIDURAL BUPIVACAINE WITH BUTORPHANOL VS BUPIVACAINE WITH FENTANYL FOR AMBULATORY LABOUR ANALGESIA.

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ABSTRACT

Introduction- We used epidural butorphanol or fentanyl in combination with bupivacaine to establish their efficacy on labour pain, delivery, maternal satisfaction and neonatal outcome. **Method-** The study was conducted on 50 full term pregnant women of ASA grade I & II with spontaneous onset of labour who gave consent for lumbar epidural analgesia with catheter technique. The study was undertaken after approval of Institutional Ethical Committee. The parturient were randomly allocated into two groups- Group A & B of 25 each. Group A patients received 0.5 mg(0.5 mL) butorphanol with 11.5 mL of 0.0625% bupivacaine and Group B patients received 25 mcg fentanyl(0.5 mL) with 11.5 mL of 0.0625% bupivacaine(total volume 12 mL in each group). All patients were monitored for progress of labour, duration of analgesia, maternal well being, neonatal outcome, side effects and maternal satisfaction at 15, 30, 60, 90 minutes interval. **Result-** Pulse rate, SpO_2, blood pressure was stable in all patients. Combination of butorphanol with bupivacaine resulted better or equal analgesia than fentanyl with bupivacaine with minimal side effects.

KEYWORDS: Epidural analgesia, bupivacaine, butorphanol, fentanyl, obstetrics.

INTRODUCTION

Lumbar epidural analgesia is the widely accepted safe practice for pain relief in labour parturient. After establishment of epidural analgesia by bolus dose, subsequent maintenance of analgesia is usually done by intermittent boluses, continuous epidural infusion or patient controlled epidural analgesia. However, the motor block may be distressing to the patients, whereas the sympathetic block may result in high incidence of hypotension. Use of narcotics with local anaesthetic decreases the incidence of hypotension but with increased risk of nausea, vomiting, pruritus, respiratory distress and foetal distress.[1,2]

Butorphanol is a lipid soluble narcotic with weak μ receptor agonist and antagonist activity with strong Ƙ receptor agonist involved in visceral pain modulation. In view of these considerations, this study was designed to compare the pain relief and complications of epidural butorphanol with fentanyl.

Material and methods- The study was conducted on 50 full term parturients of ASA grade I & II with spontaneous onset of labour using lumbar epidural analgesia with catheter technique. The parturients included in this study had mixed parity without any complication like cephalo-pelvic disproportion (CPD), contracted pelvis, spinal deformity, local site infection, pregnancy induced hypertension (PIH), patients with vertex presentation in active phase of labour (3 cm dilation), without any bleeding disorder or foetal distress. Participants were randomly allocated in two groups.

Group A: n= 25 received 0.5 mg (0.5 mL) butorphanol+11.5 mL of 0.0625% bupivacaine through epidural catheter.

Group B: n= 25 received 25 mcg (0.5 mL) fentanyl with+11.5 mL of 0.0625% bupivacaine through epidural catheter.

The epidural catheter was placed in L_2-L_3 disc space before the active phase of labour, in sitting position for the patients comfort and ease of positioning. But the drugs were given only after the labour was well established. Top-up of 0.0625% bupivacaine was given on patients demand. All patients were monitored for HR, RR, NIBP, SpO_2 and sedation score at 15, 30, 60, 120, 150, 180 minutes after injection.

Analgesia related factors- Onset and duration of analgesia (in minutes), sedation and its duration, extent of sensory and motor block (Bromage scale). Pain was assessed by VAS (0-100) showing pain score 0-100 as follows.

Pain score	measurement
0	no pain
1-25	mild pain
26-50	mod pain
51-75	severe pain
76-100	as bad as

In addition to above readings fetal heart rate (FHR), fetal heart sound (FHS) by cardiotocography and uterine contraction were recorded at regular intervals. The occurrence of maternal side effect such as pruritus, hypotension, nausea, vomiting and weakness of limbs were observed and recorded regularly.

Obstetrics factors – Mode of delivery, foetal APGAR score at 1 and 5 minute interval, foetal cord blood analysis was recorded after vaginal delivery.

For statistical calculation the software SPSS version-11 was used. The data were presented as mean±SD or % or number of patients, $\chi 2$ test was used to compare analgesic quality and $p<0.05$ for significance.

Result- There was no significant difference between two groups regarding maternal demographic data and obstetrical characteristics.

Table 1 shows mean pain score at different observational times. No significant difference in VAS scores in both groups was observed. Onset of pain relief was rapid in Group B patients but the mean pain scores of both the group was same after the establishment of analgesia.

Table 1- Mean pain score.

Time interval(min)	Group A	Group B	P value	Result
15	10±5	20±5	>0.05	NS(Not significant)
30	00±0	00	>0.05	NS
60	00±0	00	>0.05	NS
90	00±0	30±5	>0.05	NS
120	00±0	100	>0.05	NS
150	25±5	100	>0.05	NS
190	60±5	100	>0.05	NS

Table2- Duration of analgesia.

Group	Mean±SD
Group A	90.70±20.21
Group B	60.80±10.12
HS- highly significant	<0.001

Table 2 shows the duration of analgesia was longer in Group A (90.70±20.21 min) than Group B (60.80±10.12 min). Thus Group A patients were experiencing longer duration of pain relief than Group B and the requirement of top up was more in Group B. The APGAR scores showed no difference in any group between 1 minute and 5 minutes of interval.

Table 3 shows that there was no significant difference in RR, NIBP, HR and SpO_2 in both groups at different time interval.

Table 3 (A).

Time interval	GROUP	Mean RR	HR	NIBP	SpO_2
15 min	A	14±1.2	101±10	130±50/80±30	98±0.5
	B	15±1.2	100±10	134±5/78±50	97±0.5
30 min	A	13±1.2	105±20	120±10/70±30	98±90
	B	13±1.5	100±30	110±10/68±50	99±01
60 min	A	14±10	100±30	112±10/70±10	100±10
	B	13±20	98±50	112±10/80±50	100±10
90 min	A	14±30	97±60	120±80/78±50	100±10
	B	14±40	100±10	121±81/72±30	100±10

Table 3 (B)

Time interval	GROUP	Mean RR	t value	p value
15 min	A	14±1.2	-0.725	>0.05
	B	15±1.2		
30 min	A	13±1.2	-0.884	>0.05
	B	13±1.5		
60 min	A	14±10	-0.915	>0.05
	B	13±20		
90 min	A	14±30	1.973	>0.05
	B	14±40		

Table 3 (C)

Time interval	GROUP	Mean HR	t value	p value
15 min	A	101±10	-0.635	>0.05
	B	100±10		
30 min	A	105±20	-0.644	>0.05
	B	100±30		
60 min	A	100±30	-0.824	>0.05
	B	98±50		

90 min	A	97±60	-0.775	>0.05
	B	100±10		

Table 3 (D).

Time interval	GROUP	Mean NIBP	t value	p value
15 min	A	130±50/80±30	-0.876	>0.05
	B	134±5/78±50		
30 min	A	120±10/70±30	-0.577	>0.05
	B	110±10/68±50		
60 min	A	112±10/70±10	-0.372	>0.05
	B	112±10/80±50		
90 min	A	120±80/78±50	-0.675	>0.05
	B	121±81/72±30		

Table 3 (E)

Time interval	GROUP	Mean SpO_2	t value	p value
15 min	A	98±0.5	-0.456	>0.05
	B	97±0.5		
30 min	A	98±90	-0.578	>0.05
	B	99±01		
60 min	A	100±10	-0.974	>0.05
	B	100±10		
90 min	A	100±10	-0.689	>0.05
	B	100±10		

There was no significant difference in HR, RR, NIBP and SpO_2 in both the groups in different time interval as shown in Table 3. Foetal cord blood gas analysis was also same in both the groups as shown in Table 4.

The incidence of maternal complication like nausea, vomiting was identical in both the groups, one patient in Group A and two patients in Group B. The incidence of pruritus was more in Group B than Group A.

None of the patients had headache, urinary retention and respiratory depression. One patient needed LSCS delivery from Group A and two patients from Group B. None of the parturients has forceps delivery in either group.

Table 4: Fetal cord blood gas analysis.

Cord blood	Group	Mean±SD	t value	p value
pH	A	7.35±0.034	-0.688	>0.05
	B	7.36±0.035		
PaCO2	A	32.32±1.08	-0.863	>0.05
	B	32.10±1.70		
PO2	A	56.20±1.78	-0.574	>0.05
	B	58.68±1.88		
SaO2	A	69.85±1.82	-0.453	>0.05
	B	68.72±0.85		
HCO3	A	16.69±1.47		
	B	17.15±1.00		

DISCUSSION

Wong et al.[3] reported that a randomised comparison of programmed intermittent epidural boluses for labour analgesia provide similar analgesia like continuous epidural infusion. So we decided intermittent epidural boluses for our study. We used 0.0625% bupivacaine 11.5 mL with 0.5 mg butorphanol and another group we used 0.0625% bupivacaine with 25 mcg fentanyl (Total volume - 12 mL). Both the groups provided equivalent labour analgesia, ambulation and maternal satisfaction.

Use of 0.0625% bupivacaine and fentanyl doesn't have any detrimental effect on the progress of labour on length of stage II and not increase the chance of instrumental delivery.[4,5,6]

The duration of analgesia was significantly more in butorphanol group than fentanyl. Differences was statistically significant ($p<0.05$). S. Prakash et al.[7] and Hund et al.[8] used 2 mg and 3 mg butorphanol respectively and observed that duration of analgesia increases with the use of butorphanol. Abbored et al.[9] also observed that use of adrenaline with butorphanol and fentanyl prolongs analgesia than use of butorphanol and fentanyl alone. The difference was statistically significant. Carnie et al reported that 60 minute duration of analgesia was produced by using 100mcg fentanyl alone.[10]

There was no difference between APGAR scores of both the groups at 1 and 5 minutes interval.[11] There was no decrease in RR, SpO_2 and NIBP in both the groups at different intervals.[10,11] Porter et al reported that maternal oxygen desaturation (<95%) was observed with high dose of opioids. The mean oxygen saturation was better in our study in both the groups.

Cord blood gas analysis of both the groups was same as compared to S. Prakash et al and statistically not significantly.[11] Author reported that mean pH was slightly different and statistically significant in both groups. The reason of this difference may be due to high dose of opioid. $PaCO_2$, HCO^{3-} was also statistically not significant in both the groups. Incidence of maternal complication, nausea and vomiting was not significant one from group A and two from group B. Pruritus appeared in group B only and none from group A.[11] Hund et al.[5,11] reported somnolence in two patients out of 22 who had received 2 mg of butorphanol. The incidence of somnolence was dose related and it occurred more with increasing dose of butorphanol. None of the patients in any group reported such as headache, retention of urine which is similar to observation like Hund et al.[5] and S. Prakash et al.[11] Foetal cord blood gas analysis is similar to study done by Hund et al.[5] and S Prakash et al.[11] In our study no patient was sedated but in study done by Kumar et al.[12] concluded that more patients were sedated in butorphanol groups than fentanyl.

CONCLUSION

We conclude that ultra low dose epidural bupivacaine with butorphanol and fentanyl results in better labour analgesia with ambulation with no detrimental effect of progress of labour, less instrumentation and less maternal and foetal side effect.

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