Original Research Article

Comparative study of epidural labour analgesia and programmed labour analgesia in relation to fetal and maternal outcome

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Abstract

Background: Every labouring women experiences pain during labour, depending on their emotional, psychological, social, motivational and cultural circumstances. The aim should be relief of pain without compromising maternal safety, progress of labour and fetal wellbeing. In present study we compared epidural labour analgesia and programmed labour analgesia in relation to fetal and maternal outcome at our tertiary health center. **Material and Methods:** Present comparative and interventional study was conducted in term singleton pregnancy with vertex presentation with spontaneous or induced labour, Reactive NST, Requested labour analgesia for pain relief in active stage of labour and willing to participate. 80 parturient females fulfilling the inclusion criteria were randomized into two groups of 40 each for epidural labour analgesia, programmed labour analgesia. **Results:** The mean age (years), parity distribution, mean period of gestation, mean cervical dilatation at entry in study were comparable Mean maternal heart rates, mean oxyhemoglobin saturation were comparable ($p>.05$) in both the groups during whole observation period. Mean VAS was highly significant ($p<.0001$) between both the groups, the highly significant difference continued throughout labour. The mean APGAR scores, mean duration of labor were comparable($p>.05$) in both the groups. In group 1 no one required rescue analgesia whereas in group 2, all of them required rescue analgesia. **Conclusion:** Epidural labour analgesia resulted in better pain relief, minimum effect on maternal hemodynamics, slightly less duration of labour as compared to the programmed labour analgesia. No adverse maternal/ fetal effects or outcome were noted in both groups. It does not increase the duration of labour and has no significant effect on mode of delivery.

Keywords: epidural labour analgesia, programmed labour analgesia, APGAR score, duration of labour

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Every labouring women experiences pain during labour, depending on their emotional, psychological, social, motivational and cultural circumstances.[1] An array of regional techniques, non-pharmacological methods, systemic analgesia have remodeled pain management in parturient resulting in better satisfaction.[2] Central neuraxial analgesia includes both subarachnoid as well as epidural block. Among these epidural blockade comes close to being the ideal analgesic technique in labour.[3] It provides continuous analgesia for an unpredictable period of time and to convert analgesia to anaesthesia if an

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operative intervention becomes necessary. While programmed labor is a method of providing labor analgesia by providing pain relief using analgesics and antispasmodics, ensure adequate uterine contractions and monitoring of labor events.[4] Maternal and fetal effects of analgesia during labour remain central to discussions among patients, anaesthesiologist and an obstetrician.[5] The aim should be relief of pain without compromising maternal safety, progress of labour and fetal wellbeing. In present study we compared epidural labour analgesia and programmed labour analgesia in relation to fetal and maternal outcome at our tertiary health center.

MATERIAL AND METHODS

Present comparative and interventional study was conducted in department of Anaesthesia at Kamla Nehru State Hospital for Mother and Child, Indira Gandhi medical College Shimla. Study was conducted during August 2018 to July 2019 (1 year). Ethical committee approval was taken prior to start of study.

Inclusion criteria

- Patients 18- 40 years age
- Term singleton pregnancy with vertex presentation with spontaneous or induced labour, Reactive NST,
- Requested labour analgesia for pain relief in active stage of labour
- Wiling to participate

Exclusion criteria

- Contraindications to epidural analgesia such as spinal column deformities, spine surgery, Bleeding disorders, Decreased platelet counts
- Malpresentation, Cephalopelvic disproportion, Previous lower segment cesarean section and placenta previa
- Delivery within 2 hours of labour analgesia
- Hypersensitivity to study drugs

Study was explained to patients in local language and a written informed consent was taken. Randomization was done using random allocation software.

Group 1 received epidural analgesia with 0.2% ropivacaine and 2 mcg/ml fentanyl.(total volume 15ml)

Group 2 received programmed labor analgesia. Parturient received Inj. Pentazocine 6mg intravenous + Inj. Diazepam 2mg intravenous + Inj. Tramadol 1 mg/kg deep intramuscular and thereafter Inj. Drotaverine 40 mg intravenously half hourly (maximum of 3 doses). Inj ketamine 0.25-0.5mg/kg was given as rescue analgesia if required at cervical dilatation of 7cm-8cm. A pre designed structured proforma was used to collect the information about patients from her hospital records. Various independent(age, study group, drugs, dosing, baseline vitals etc.) and dependent variables (Vitals, VAS, Ambulation, APGAR, Side effects etc.) of interest were recorded in same proforma for further analysis. Partographic monitoring of fetal heart rate was done throughout the labour. Oxygen Saturation, VAS score were recorded at 0, 5, 15mins and then every 15mins till 1 hour and then every 30 min until delivery. At delivery duration of first stage and second stage of labour, Type of delivery(vaginal/LSCS/instrumental), Local infiltration of LA required for episiotomy or not, APGAR score, Side effects. Neonatal assessment was done by assessing APGAR score at 1 and 5 min by neonatologist. The data of the study were recorded in the record chart and results were evaluated using statistical tests (student t test and chi square test), p value <.05 was considered as significant and p value <.001 was considered as highly significant.

RESULTS

80 parturient females fulfilling the inclusion criteria were randomized into two groups of 40 each. The mean age (years), parity distribution, mean period of gestation, mean cervical dilatation at entry in study were comparable

Table 1: General characteristic

Characteristic	Group 1	Group 2	P value
Mean age (years)	26.72 ± 4.26	25.17 ± 4.17	.104
Parity			
Primiparous	23 (57.5%)	21 (52.5%)	.653
Multiparous	17 (42.5%)	19 (47.5%)	
Period of Gestation (weeks)	37.97 ± 1.14	38.25 ± 1.25	.30
Cervical dilatation (cm)	4.95 ± 1.01	5 ± 0.78	.805

In present study, we noted that the mean SBP at 0 min was 130.6 ± 11.76 min in group 1 and 127.2±10.43 min in group 2 and were comparable (p>.05) in both the groups till 5min. At 15 min the mean SBP started to increase in group 2 as compared to group 1 and the difference between the mean SBP became highly significant (p<.001) till 150 min. Thereafter the mean SBP was comparable (p>.05) in both the groups till the end of observed period. Mean maternal heart rates, mean oxyhemoglobin saturation were comparable (p>.05) in both the groups during whole observation period. Mean VAS was highly significant (p<.0001) between both the groups, the highly significant difference continued throughout labour. The

mean APGAR scores, mean duration of labor were comparable(p>.05) in both the groups. In group 1 no one required rescue analgesia whereas in group 2, all of them required rescue analgesia. In study group 1, out of total 40 parturient females 38(95 %) delivered by normal vaginal delivery, 2(5%) delivered by Caesarean section for non-progress of labour and deep transverse arrest. Whereas in group 2, 39 (97.5%) delivered by normal vaginal delivery and 1(2.5%) delivered by caesarean section for fetal distress. No parturient in group 1 required local anaesthetic for episiotomy whereas in group 2 all parturient were given local anaesthetic before giving episiotomy. Out of 40 parturient females in group 1, 2 (5%) had complaint of pruritis, 2 (5%) had hypotension. In group 2 , 7 (17.5%) had nausea / vomiting and 3 (7.5%) had drowsiness.

Table 2; Maternal and neonatal findings

Maternal and neonatal findings	Group 1	Group 2	P value
Duration of labour (min)	289.02 ± 28.3	295.02 ± 24	.3
Mode of delivery			
Normal vaginal delivery	38 (95%)	39 (97.5%)	
Caesarean section	2 (5%)	1 (2.5%)	
APGAR score			
At 1 min	7.52 ± 0.64	7.52 ± 0.50	>.99
At 5 min	8.55 ± 0.59	8.70 ± 0.46	.21
Side effects			
No side effects	36 (87.5%)	30 (75%)	
Pruritus	2 (5%)	0	
Hypotension	2 (5%)	0	
Nausea/ vomiting	0	7 (17.5%)	
Drowsiness	0	3 (7.5%)	

DISCUSSION

The pharmacological characters of local anaesthetics for epidural analgesia include rapid onset, quality and duration of sensory blockade, no or minimal effect on motor blockade, and low systemic toxicity. Nowadays, less concentrations of local anaesthetics combined with opioids provides good analgesia with little motor blockade for labour analgesia known as "walking epidural".[6] The pain relief starts sooner and lasts longer than either drug alone. It allows both the drugs to be used in lower concentration, thereby reducing the risk of local anaesthetic systemic toxicity as well as opioids side effects.[7] Bupivacaine and Ropivacaine are commonly used for epidural analgesia in labour. Bupivacaine may increase the risk of motor blockade (associated with maternal dissatisfaction and increased instrumental deliveries) and cardiac toxicity.[6] Ropivacaine has the advantage of more sensory blockade, less motor blockade than bupivacaine and decreased risk of systemic toxicity. In study done by Chetty *et al.*.,[3] spontaneous vaginal delivery occurred in 95% of parturient and 2.5% parturient each had forceps and caesarean delivery who were given 0.2% ropivacaine in epidural. Similar results were noted in present study. A Cochrane review reported no increase in Caesarean delivery rates between women who received epidural vs systemic analgesia for labour.[8] Agarwal *et al.*,[9] and Patkar *et al.*.,[10] observed that the incidence of instrumental delivery does not relate to epidural analgesia or its method of administration or its time of initiation respectively, when low dose local anaesthetic with or without opioids were used. In our study the vaginal delivery in group 2 was 97.5% which is almost comparable to studies by Veronica *et al.*[11] (98 %) and more in comparison to Meena Jyoti *et al.*[12] (86.66%). In a meta-analysis, Halpren and Leighton[13] concluded that the risk of Caesarean delivery was no different between women who received systemic opioid vs neuraxial analgesia. In our study none of the parturients had motor blockade with 0.2% ropivacaine combined with 2µg/ml fentanyl as assessed by giving assisted trial walk. Addition of fentanyl have added benefits of both improving analgesia and also decreases the dose of local anaesthetics, thus decreasing local anaesthetic related side effects. Similar results were noted in other studies.[3,14] The duration of labour was slightly less in epidural group in present study and it was statistically not significant. Halpern and Leighton[13] reported no difference in duration of first stage of labour among women receiving epidural labour analgesia and those receiving systemic opioid analgesia or no analgesia. Similar findings were noted in Cochrane review.[8] G.Sravani *et al.*[15] studied programmed labour and its maternal and fetal outcome, they noted that total duration of labour in programmed labour group was 4.388±2.36 hrs. as compared to control group where it was 8.86±2.954 hrs. with p value of <.001 which was highly significant. While K.N.Madhvi *et al.*[16] noted that the duration of both first and second stage of labour was shortened in study group as compared to the control group. Neonatal outcome in our study was not affected in either group as assessed by APGAR score. A Cochrane study by Millicent Anim-Somuah *et al.*[17] noted that the incidence of fetal asphyxia (APGAR score <7 at 5 min) was not

increased among women using epidural compared with those not using epidural. Leighton and Halpern[13] noted that epidural reduces the risk of a low APGAR score at 1 minute suggesting positive effects of epidural use on placental circulation. Epidural labour analgesia resulted in better pain relief as compared to the programmed labour analgesia. Epidural analgesia has minimum effect on maternal haemodynamics, however parturients in programmed labour group did not show any adverse effect on maternal haemodynamics. Duration of labour in epidural group was slightly less than programmed labour group, but there was no significant difference between the two. Epidural as well as programmed labour do not prolong duration of labour. There was no effect on ambulation, no adverse effect on neonatal APGAR score at 1min. and 5min. in both the groups.

CONCLUSION

Epidural labour analgesia resulted in better pain relief, minimum effect on maternal haemodynamics, slightly less duration of labour as compared to the programmed labour analgesia. No adverse maternal/ fetal effects or outcome were noted in both groups. It does not increase the duration of labour and has no significant effect on mode of delivery.

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