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EFFECT OF ADDITION OF DEXMEDETOMIDINE 0.5 mcg/ml WITH 0.2% ROPIVACIANE AND 0.2% ROPIVACAINE ALONE IN EPIDURAL LABOUR ANALGESIA: A RANDOMIZED COMPARATIVE STUDY

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Abstract

Introduction: The pain of childbirth is often rated by women as being most painful experience of their lives. It is estimated that about two third of normal healthy pregnant women, suffer severe intolerable pain during labour and only 2% describe it as little or no discomfort. There are several factors which influence parturition pain and its severity varies widely. It is influenced by parity, primiparous women experience more pain during early labour while multiparous women feel greater pain in the second stage.

Materials and Methods: This prospective, comparative study was conducted at Department of Anaesthesia, ESIC Medical College and Hospital, Kalaburagi during the period of January 2022 to December 2022, written consent was obtained from all parturients in the study. The sample size obtained was 60 for each group. So final sample size estimated was 120. Group RS received 0.2% ropivacaine epidurally as bolus dose of 8 mL followed by intermittent top ups as and when required and Group RD received 0.2% ropivacaine with 0.5 mcg/mL of dexmedetomidine epidurally 8 mL as bolus dose followed by intermittent top ups as and when required. A complete history of each patient was obtained, and clinical examination was done. Routine investigations along with coagulation profile was obtained and noted. All baseline parameters like Heart Rate, Blood Pressure, ECG, SpO2, Foetal Heart Rate were recorded

Results: Demographic and obstetric variables were comparable in both the groups and with no statistical significance which was calculated by calculated by independent sample t-test with Levene's test for equality of variances. To assess the neonatal status APGAR score (table 1) at 1 and 5 mins was evaluated. It was found that there was NO statistically significant difference in mean APGAR score at1 min (p=1.000) and 5 mins (p=0.309).

Conclusion: Epidural labour analgesia is considered to be a gold standard for pain management during labour, when ropivacaine along with dexmedetomidine is used. Many studies have been

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conducted to prove the use of dexmedetomidine in obstetric anesthesia in optimal doses. This wonder drug provides excellent maternal satisfaction and good progress of labour with minimal side effects to mother and foetus.

Key Words: ropivacaine, Child birth, dexmedetomidine, Epidural labour analgesia.

INTRODUCTION

The pain of childbirth is often rated by women as being most painful experience of their lives. It is estimated that about two third of normal healthy pregnant women, suffer severe intolerable pain during labour and only 2% describe it as little or no discomfort.[1] There are several factors which influence parturition pain and its severity varies widely. It is influenced by parity, primiparous women experience more pain during early labour while multiparous women feel greater pain in the second stage.[2]

Maternal hyperventilation causes an increase in oxygen consumption, plasma catecholamine concentrations, hypertension and tachycardia. In addition, maternal hyperventilation may reduce foetal oxygenation, resulting in abnormal foetal heart rate patterns and an increased operative delivery.[3]

Superficially, obstetric anaesthesia appears to be a simple field with a limited range of interest, but it is a deceptively demanding subspecialty. The dynamic events of normal labour require that the muscles concerned with delivery retain their power and coordination to the full. Attempts to alleviate pain during labour have been made by different researcher & scientists that ranged from psychological, pharmacological, physical or combination of these techniques but all with limited success.[4]

Of all labour analgesia techniques, epidural analgesia is the most effective form of analgesia and has become the “gold standard” in obstetric care. Ropivacaine has been used commonly for epidural labor analgesia, because of less motor block and stable haemodynamics. dexmedetomidine, an alpha 2-agonist for alpha 2-adrenergic receptors, possesses properties of analgesia and sedation without any respiratory depression effect and enhances their effects without increasing the incidence of side effects when added to local anesthetic agents. It has a opioid sparing effect and hence included in labour analgesia to reduce the side effects caused by opiod when added to local anaesthetics.[5]

We wanted to compare efficacy, safety, quality of analgesia, total drug requirement, effect on the course and duration of labour, neonatal outcome, maternal satisfaction and adverse events if any, of ropivacaine 0.2% + 0.5mcg/mL of dexmedetomidine with that of 0.2% of ropivacaine alone, for epidural labour analgesia.

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MATERIALS AND METHODS

This prospective, comparative study was conducted at Department of Anaesthesia, ESIC Medical College and Hospital, Kalaburagi during the period of January 2022 to December 2022, written consent was obtained from all parturients in the study.

The sample size obtained was 60 for each group. So final sample size estimated was 120. Reference article for sample size calculation is made based on the study conducted by Zhao Y et al Total of 60 parturients of age group 20-35yrs., Heights in cm: >150 cms, full term singleton vertex presentation, previous normal vaginal delivery, consented for the study, Primigravida and multigravida of physical status ASA grade II, foetus having normal heart rate pattern before induction of Epidural, Cervical dilatation of 3-5 cms were included in group and divided in 2 group using computer generated randomization technique.

Group RS received 0.2% ropivacaine epidurally as bolus dose of 8 mL followed by intermittent top ups as and when required and Group RD received 0.2% ropivacaine with 0.5 mcg/mL of dexmedetomidine epidurally 8 mL as bolus dose followed by intermittent top ups as and when required.

A complete history of each patient was obtained, and clinical examination was done. Routine investigations along with coagulation profile was obtained and noted. All baseline parameters like Heart Rate, Blood Pressure, ECG, SpO2, Foetal Heart Rate were recorded. Lignocaine sensitivity test was done. Intravenous access was achieved with 18G intravenous cannula. Preloading was done with ringer lactate solution 10mL/Kg. With Patient in sitting position, her back was cleaned, painted and draped, to achieve and maintain asepsis. A 2 ml Lignocaine 2% of solution was injected locally in L3-L4 space into the skin and subcutaneous tissue. An 18G epidural needle was advanced up to Interspinous ligament. A 10cc loss of resistance syringe with 2mL of air in it was attached at the hub of the needle after removing the stylet. The needle was then advanced slowly until loss of resistance felt. An 18G epidural catheter was threaded through the needle and secured in the epidural space with 5cms of length into the epidural space. Following this, needle was removed, and catheter strapped firmly to the back of the patient with an adhesive tape. Distal end of the catheter was covered with a sterile gauge piece and a cover. During this whole procedure care was taken not to advance either the needle or the catheter during contractions as chance of piercing the dura or a blood vessel is maximum during contractions. After fixing the catheter patient was made to lie down with a wedge placed on her left side to avoid aortocaval compression. After negative aspiration for blood and CSF a test dose of 3mL of 2% Lignocaine with adrenaline was administered to confirm epidural placement of the catheter. Maternal heart rate every 5mins in initial half an hour after the drug was administered and thereafter every 30 minutes. Maternal hypotension was considered if fall in blood pressure was 20% or more in comparison to baseline value and it was treated with increased rate of intravenous fluids and if needed injection ephedrine 6mg bolus. Bradycardia (less than 50 beats/minute).6It was treated with atropine given in bolus of 0.6mg.The intensity of pain was

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assessed using a 10 cm visual analogue scale. All patients were made familiar with VAS scoring system earlier.

The patient was asked to point to the position on the line between 1-10 cm to indicate how much pain they were currently feeling. The far-left end indicates 'NO PAIN' and the far-right end indicates 'WORSTPAIN'.0-no pain, 1-3-mild pain, 4-7 moderate pain, 8-10 severe pain. Pain scale was assessed every 5mins after the drug was given and thereafter every 30 minutes on a scale of 0-10. Sensory level was assessed by absence of sensation to pin prick. Foetal heart rate was monitored by obstetrician by using Foetal Doppler. Incidence of motor blockade, hypotension, bradycardia, nausea, vomiting, motor blockade were also looked for and appropriately treated. Neonatal status was assessed by APGAR score at 1 min and 5 mins. Using parameters of Heart rate, Respiratory rate, Color of the skin, muscle tone and grimace response to stimulus<7 considered significant. The assessment of maternal satisfaction was done by asking the parturient about pain relief and acceptance of this technique in view of rural myths and belief.

RESULTS

Demographic and obstetric variables were comparable in both the groups and with no statistical significance which was calculated by calculated by independent sample t-test with Levene's test for equality of variances. To assess the neonatal status APGAR score (table 1) at 1 and 5 mins was evaluated. It was found that there was NO statistically significant difference in mean APGAR score at1 min (p=1.000) and 5 mins (p=0.309).

APGAR	Group RS (N=60)		Group RD (N=60)		P Value
	Mean	SD	Mean	SD	
1 Min	8.00	0.35	8.00	0.36	1.000
5 Min	8.90	0.30	8.96	0.18	0.309

Table 1: Details of APGAR at Baseline and 5 Mins of the Study Population

APGAR	Group RS (N=60)		Group RD (N=60)		P Value
	Mean	SD	Mean	SD	
Stage I	163.76	18.23	158.00	15.27	0.293
Stage II	34.73	7.57	36.22	8.79	0.566
Total	98.40	24.12	180.73	21.27	0.003

Table 2: Details of Duration of Labor (Mins) among the Study Population

Variable	Group RS	Group RD
Age	26%	24.66%
Weight	55.93%	78.76%
Height	105.73%	84.53%

Table 3: Details of Age (Years), Weight (kg) and Height (cm) of the Study Population

Dose	Group RS	Group RD
First dose (8 ml)	100%	100%
Second Dose (8 ml)	100%	100%

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Third Dose (8 ml)	100%	83%
Fourth Dose (8 ml)	83%	56.70%
Fifth Dose (8 ml)	20%	3.30%

Table 4: Distribution of Bolus Requirement among the Study Population

	Group RS	**Group RD**
Total Drug Requirement	30.93%	27.46%

Table 5: Comparison of Mean Drug Requirement between the Two Groups

Maternal Satisfaction	**Group RS**	**Group RD**
Excellent	26.70%	73.30%
Good	53.30%	46.70%

Table 6: Comparison of Maternal Satisfaction between the Two Groups

DISCUSSION

Labour analgesia has grown from chloroform to the queen in the19th century to automated central neuraxial delivery devices of the 21st century.[6] The search for an ideal technique or drug continues as it has to produce effective pain control to the mother without any effect on foetus. Ropivacaine has been introduced into obstetric anesthetic practice with the proposed advantage of causing less motor blockade. Previous studies proved that dexmedetomidine could extend the duration of local anesthetics when added as an adjuvant for epidural analgesia.[7]

In our study, we found that dexmedetomidine could decrease the total drug requirement when combined with ropivacaine for labor analgesia without increasing side effects.[8] The present study compared the quality of analgesia, total drug requirement, effects on course and duration of labour, neonatal outcome (APGAR Score), adverse events if any and maternal satisfaction while using intermittent epidural bolus doses of 0.2% ropivacaine and 0.2% ropivacaine plus 0.5 mcg/ml dexmedetomidine.[9]

S. Fyneface-Ogan et al, studied the role of dexmedetomidine in labour outcome when added as adjuvant with intrathecal bupivacaine in comparison with fentanyl in bupivacaine. There was no significant difference in Apgar score and umbilical venous blood pH in both the group's also foetal heart rates and maternal blood pressure were unchanged after injection of drug in both the groups. Similar trends of foetal heart rate were seen in our study.[10]

In our study most significant findings were less total drug requirement in ropivacaine with dexmedetomidine group than in plain ropivacaine group. Tao Zang et al concluded that dexmedetomidine is better than sufentanil in terms of analgesic effect and low drug requirement.

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CONCLUSION

Epidural labour analgesia is considered to be a gold standard for pain management during labour, when ropivacaine along with dexmedetomidine is used. Many studies have been conducted to prove the use of dexmedetomidine in obstetric anesthesia in optimal doses. This wonder drug provides excellent maternal satisfaction and good progress of labour with minimal side effects to mother and foetus.

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