

To Study Assess the Efficacy of Epidural Bupivacaine with Sufentanil for Pain Relief in Labor and to Assess the Complications and Neonatal Outcome

Amitha P. Rao

Anesthesiology, District Hospital, Davanagere

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Corresponding Author: Dr Amitha P. Rao

Conflict of interest: Nil

Abstract:

Introduction: Labor pain produces significant deleterious effect on mother and the fetus. It Increases the maternal mean arterial pressure due to stress induced release of catecholamines that cause concomitant decrease in uterine blood flow and subsequent fetal adverse effects.

Materials and Methods: This study done at Dept of Anaesthesiology the Study was conducted on 30 parturient in Gravida I and II and American Society of Anaesthesiologist classification I.

Results: The height distribution of the parturients in this study ranges between 145 and 160cms. 13 patients were in the range of 145 to 150 cm and 14 patient had range of 151 to 155 cm and 3 patient were in the range of 156 cm to 160 cm

Conclusion: This study proves that the combination of 0.0625% bupivacaine and sufentanil 1 micro gram/ml of local anesthetic is effective in relieving labor pain. The motor blockade is very minimal which makes the parturient ambulant.

Keywords: Labor Pain, Epidural.

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Introduction

Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage[1]. Among this labor is a very painful process. It represents the most common form of acute severe pain in adult life, the severity compared to that of causalgia, cancer pain and amputation of digit and expressed as worst pain experienced by the patient. Labor pain produces significant deleterious effect on mother and the fetus. It Increases the maternal mean arterial pressure due to stress induced release of catecholamines that cause concomitant decrease in uterine blood flow and subsequent fetal adverse effects[2,3]. Pain induced hyperventilation shift O₂-Hb dissociation curve to the left. This causes increased affinity of hemoglobin for oxygen which makes unloading of O₂ to fetus unfavorable. After initial period of hyperventilation parturient may hypoventilate which may lead to decrease in arterial oxygen saturation[4]. This decrease in oxygenation may cause fetal acidosis. Labor pain increases incoordinate labor with irregular contractions. Among the various methods of labor analgesia, epidural analgesia is the effective method to combat this unfavorable pain and it is widely practiced⁵

Materials and Methods

This study done at Dept of Anaesthesiology the Study was conducted on 30 parturient in Gravida I and II and American Society of Anaesthesiologist classification I. For the purpose of standardization, selection criteria were fixed as age between 20 and 32 years, weight between 50-65 kg and height between 145 and 160cms. Informed consent was obtained from the patients after explaining the procedure in detail. All the parturients were thoroughly examined and basic data like blood pressure, heart rate, status of cardio-vascular, respiratory and neurological system were recorded. Patients with Pregnancy Induced Hypertension, respiratory problems, cardiovascular, neurological or any other systemic disorders, Anemia, multiple pregnancies, abnormal presentation were excluded from the study.

The total number of patients in this study group is 30. Only Gravida I and II patients were selected with American Society of Anaesthesiology classification I. The drug administered was 10ml of 0.0625% bupivacaine with sufentanil 1micro gm/ml.

Results

Age Distribution: The minimum age in this study group is 20 years and the maximum age is 32 years. 22 patients were between 20 and 25 years and 7 patients were between 26 to 30 years and 1 patient was above 30 years.

Age Group	No. of Patients
20-25 years	22
26-30 years	7
30-32 years	1

Weight Distribution: The Weight of the patients in this study group ranges between 50 to 65kg. 24 patients were between 50 to 55kg and 6 were between 56 to 60 kg and 3 patients had weight above 60kg.

Weight Range	No. of Patients
50 – 55 kg	21
56 – 60 kg	6
61 – 65 kg	3

Height Distribution: The height distribution of the parturients in this study ranges between 145 and 160 cms. 13 patients were in the range of 145 to 150 cm and 14 patient had range of 151 to 155 cm and 3 patient were in the range of 156 cm to 160 cm.

Height Range	No. of Patients
145 – 150 cm	13
151 – 155 cm	14
156 – 160 cm	3

Onset of Pain Relief: In this study the onset of analgesia ranged between 8 to 11 minutes. In 8 patients the onset time was between 8 to 9 minutes and in 16 patient the onset time was between 9 to 10 minutes and in 6 patient it is between 10 to 11 minutes.

Onset time	No. of patient	Percentage
8 – 9 min	8	26.6%
9 – 10 min	16	53.33%
10 – 11 min	6	20%

Satisfactory Analgesia[6,7]: Satisfactory analgesia was reported by 94% of the parturient. It is assessed by visual analogue pain score chart with numerical and descriptive scale which showed < 30mm on the scale at 15minutes. The visual analogue score before the administration of epidural analgesia was more than 70mm. 28 patient in the study group showed a score of less than 30mm after giving epidural analgesia.

Duration of Analgesia[8,9]: In this study the

duration of analgesia ranged between 96 to 124 minutes. In 12 patients the duration was between 96 to 110 minutes which is about 40% and in 18 patients the duration was between 110 to 124 minutes and this account to 60% of the total.

Level of Blockade: In this study the highest level of blockade as assessed by pin prick test was T8. 2 patients had level of blockade upto T8 and in 5 patients it was upto T9. In 23 patients the level was limited to T10 level.

Motor Blockade[10]: In this study group, none of the patient developed motor blockade of less than 4 according to the modified Bromage scale. All were ambulant.

Hypotension: In this study 3 patients developed fall in systolic blood pressure of less than 90mm Hg. In all the three patients, hypotension occurred after the initial bolus dose. They were treated with injection Ephedrine 6 mg intravenously and with crystalloids. The incidence of hypotension in this study is 10%.

Neonatal Outcome[11]: 90% of the babies had APGAR of 9 at 1 minute. All the babies had score of 9 at 5 minutes. 1 baby showed 1 minute APGAR of 7 which is about 3.3 % and 2 babies had score of 8 at 1 minute and this comes to about 6.6%. In all the three babies, the score improved to 9 at 5 minutes.

Instrumental / Caesarean Delivery: In this study the incidence of instrumental delivery occurred in one parturient which is about 3.3%. Outlet forceps was applied. The pain during the procedure was bearable by the patient. There is no incidence of caesarean delivery in this study.

Other Effects: Pruritus occurred in 4 patients in this study which is about 14%. It is mild and none of the patients required treatment. There is no incident of vomiting and respiratory depression in any of the parturients in this study.

Discussion

Pain experienced by the parturient during the process of vaginal delivery is one among the severe form of pain. Knowing this, measures were taken since the period of Grantly Dick-Read and then by Dr. Fernand Lamaze. Later, various methods were developed. Among these, epidural analgesia for labor pain relief remains the most effective method. Morgan BM and his colleagues in their comparative study of 1000 mothers confirmed that lumbar epidural analgesia provides superior pain relief and proved strikingly more effective than other modalities of pain relief. Studies analyzing the effects of labor on maternal and fetal physiology depicts that the unfavorable effects of labor pain are minimized by proper administration of epidural analgesia[12].

Stress and pain induced release of catecholamine

during labor causes decreased uteroplacental blood flow leading to deleterious fetal effects. Studies using xenon-133 clearance shows that epidural analgesia increases intervillous blood flow. Maternal oxygenation is also improved by epidural analgesia as shown by Deckardt in his study. Neonatal mortality is decreased especially in low-birth-weight babies when mothers had epidural analgesia as shown by David H. Rosen in his study.[11]

In this study, epidural injection of combination of 10 ml of 0.0625% bupivacaine and sufentanil 1 micro gram per ml in relieving labor pain is proved effective and beneficial. Phillips. G. in his comparative study found that addition of sufentanil to bupivacaine significantly improves analgesia than using bupivacaine alone.

Adding sufentanil also decreases the requirement of local anesthetic, enables them to be used in low concentrations and decreases the side effects[13].

Boselli E. and his colleagues in their study on labor analgesia concluded that Sufentanil decreases the local anesthetic dose requirement by 30 to 40%. Naulty JS also showed that addition of even 5 micro gram of sufentanil to bupivacaine significantly potentiates analgesia and enables extremely low concentration of 0.0312% to be effective[5].

In this study the minimum time taken for onset of pain relief is 8 min and the maximum is 11 minutes with mean of 9.5 minutes.

Rolfse in his comparative study of epidural sufentanil and fentanyl with bupivacaine concluded that the mean onset time for sufentanil is 10 min. It is in concurrence with our study. Satisfactory analgesia is reported by 94% of parturients in this study. It is assessed by visual analogue pain score chart with numerical and descriptive scale. It showed less than 30mm at 15 minutes after administration of epidural analgesia[6].

Dahl V In his study of labor analgesia with combination of bupivacaine and sufentanil showed that 97% of the mothers had satisfactory analgesia. Rolfse also showed similar results in his study. Both are in concurrence with our study[14].

Duration of analgesia in this study ranges between 96 minutes and 124 minutes with mean duration of 110 minutes. Studies show that addition of sufentanil to bupivacaine increases the duration of action of bupivacaine and also shortens the onset time.

Vansteenberg and DE Broux in a study pointed out that addition of sufentanil to bupivacaine shortened the onset time and prolonged the duration of action from 86 minutes in control group to 130 minutes in sufentanil group.

Phillips in his comparative study concluded that sufentanil when added to bupivacaine prolongs duration of analgesia from 90 minutes to 144 minutes[13].

In this study motor blockade had not occurred in any patient. It is assessed by modified Bromage scale. According to this scale motor blockade is defined as scale of less than [4]. In this study group all the parturient can flex their hip and knees and all are ambulant.

Benhamon in his comparative study of 0.0625% and 0.125% bupivacaine with sufentanil 0.5 micro gram /ml concluded that 0.0625% bupivacaine produce less motor blockade. Rolfse in his comparative study using bupivacaine and sufentanil for labor analgesia showed that all parturient can walk for 20 meters without help[6].

There is only one incidence of instrumental delivery in this study. Studies show that epidural analgesia when instituted properly decreases the incidence of instrumental deliveries and dysfunctional labor. There is no incidence of caesarean delivery.

Benhamoh D in a comparative study showed that combination of bupivacaine and sufentanil decreases the rate of assisted delivery.

In our study three patients had fall in blood pressure of less than 90 mm Hg

systolic. All were treated with Injection Ephedrine and crystalloids. In all the three patients it occurred with the initial dose. In all other parturient the hemodynamics were stable[15].

H.J. Clement and his colleagues in a comparative study of bupivacaine and ropivacaine with sufentanil showed that incidence of hypotension was 10%. It is in concurrence with our study[9].

In this study [4] parturient had pruritus, which is about 14%. It is tolerable by the patients. Studies show that the range of incidence for pruritus is wide.

Dahl. V. and his colleagues in their study of epidural analgesia for labor with bupivacaine and sufentanil had 18% incidence of pruritus. But H.J. Clement and his colleagues in their comparative study came across with incidence of 45% for pruritus[14].

Neonatal outcome is not affected in this study. One minute APGAR is 7 in only one baby and 8 in two babies. It improved to 9 at five minutes score in all the three babies. All the others had score of [9].

Deckardt. R. and Fembacher in a study showed that epidural analgesia actually improves neonatal outcome by maintaining the neonatal acid- base status by virtue of increasing maternal oxygen saturation.

Conclusion

This study proves that the combination of 0.0625% bupivacaine and sufentanil 1 micro gram/ml of local anesthetic is effective in relieving labor pain. The motor blockade is very minimal which makes the parturient ambulant. There is no increased incidence of complications and assisted or caesarean deliveries. The neonatal outcome is good.

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