

**Original Research Article**

# Efficacy of epidural and spinal anesthesia techniques in preeclampsia parturients

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## Abstract

**Background:** Preeclampsia is a hypertensive related complication of pregnancy; Parturients with pregnancy induced hypertension may present to the labor and delivery unit with or without a prior diagnosis of preeclampsia and may pose a significant anesthetic challenge. Administration of anesthesia in such cases leads to worse cardiovascular response.

**Objectives:** To determine the efficacy of epidural and spinal anesthesia techniques in preeclamptic parturients.

**Materials and methods:** A total 60 women with severe preeclampsia who required anti-hypertensive therapy and suitable to either spinal or epidural anesthesia were included and were divided in to epidural and spinal groups with equal number of distribution.

**Results:** There were significant differences in SAP at 1 to 15 min ( $P < 0.0001$ ) and at 16 to 20 min ( $P < 0.005$ ) and DAP at 1 to 15 min ( $P < 0.0001$ ) and at 16 to 20 min ( $P < 0.01$ ) between the 2 groups. There were no significant differences in SAP and DAP at 22 to 30 min between groups.

**Conclusion:** Spinal anesthesia for cesarean delivery in severely preeclamptic patients causes slightly more hypotension than epidural anesthesia during the induction to delivery period. The duration of hypotension, however, was short and there was no difference in neonatal status.

## Key words

Preeclampsia, Hypotension, Spinal anesthesia, Epidural anesthesia.

## Introduction

Preeclampsia is part of a spectrum of pregnancy related hypertensive disorders; it affects 6-8% of all pregnancies and increases the risk of maternal and fetal morbidity and mortality. Anesthesia in preeclampsia similarly carries a relatively increased risk to mother and foetus, a problem that was recognized few decades ago [1].

Severe preeclampsia was defined as a systolic arterial blood pressure (SAP) of 160 mm Hg or more or a diastolic arterial blood pressure (DAP) of 110 mm Hg or more and proteinuria of 100 mg/dL or more. The main anesthetic issues are related to endotracheal intubation. It can not only be technically difficult due to airway edema, but may also cause acute reflex hypertension leading to eclampsia. The alternative regional anesthetic techniques such as spinal or epidural, have been known to cause hypotension in normal pregnancy since the 1950's. However, in preeclampsia, autonomic instability and a relatively reduced plasma volume were contribute to the risk of even more profound hypotension after regional anesthesia [2]. Also there was thought to be a risk of pulmonary edema resulting from resuscitation attempts with uncontrolled administration of intravenous fluids and vasopressor drugs [3, 4].

There were no strong literature evidence in support of the view that spinal anesthesia would cause severe hypotension. Clinical practice was therefore based on a consensus of theoretical considerations and the opinion of leading practitioners in the, still developing, specialty of obstetric anesthesia. By the above view, the present study was designed to determine the efficacy of spinal and epidural anesthesia in preeclamptic patients.

## Materials and methods

In present study was carried out in Department of Anesthesiology, MNR Medical College and Hospital, Sangareddy during 2014 to 2015. A total 60 women with severe preeclampsia who required anti-hypertensive therapy and suitable to

either spinal or epidural anesthesia were included. All participants were divided in to epidural and spinal groups with equal number of distribution. Informed consent was obtained from all the patients and study protocol was approved by institutional ethics committee.

### Inclusion criteria

- Non-emergency labouring,
- Above 20 weeks of gestation
- Severe hypertensive more than 110 mm of Hg,
- Proteinuria

### Exclusion criteria

- Not willing to regional anesthesia
- Eclampsia
- With obesity
- Coagulopathy

### Epidural group

As initial test dose 3 mL of 1: 200,000, 2% lidocaine with epinephrine was given, followed by 1:400,000, 5 mL of 2% lidocaine with epinephrine and 50 µg of fentanyl. Till the loss of sensation 5 mL of 2% lidocaine with epinephrine was administered increasingly. Mean arterial blood pressure (MAP) was measured initial 20 minutes as minute based which helps to detect the severity and duration hypotension, then two min once for 10 minutes and finally 5 minutes once based until the end of cesarean ends. Ephedrine in 6 mg increments was given at 2 min intervals if the patient exhibited symptoms associated with hypotension such as nausea, vomiting, dizziness or if the systolic blood pressure fell below 30% of the baseline. Intraoperative blood loss was replaced as judged clinically appropriate. The presence of nausea, vomiting or bradycardia was recorded. 3 mg of preservative-free 100µg of Buprigesic was administered after delivery. Post-operative complications by 100µg of Buprigesic were observed.

### Spinal group

After similar fluid administration as in epidural group, 2.2 mL of 0.5% bupivacaine with 0.2 mg

of 25 $\mu$ g of Buprigesic was injected into the subarachnoid space. Post-operative mean arterial blood pressure was measured (method followed during epidural group). Neonatal Apgar scores were recorded at 1 and 5 min. Further neonatal outcome was obtained from the pediatric case notes.

## Results

Total 60 women with severe preeclampsia who required anti-hypertensive therapy and suitable to either spinal or epidural anesthesia were included. All participants were divided in to epidural and spinal groups with equal number of distribution (**Table – 1**).

**Table – 1:** Demographic values of Spinal and epidural groups.

	Epidural	Spinal
Age (Years)	30 (24-36)	29 (23-35)
Gestational week	33.5 (29-39)	35 (26-41)
Anaesthesia duration	20 $\pm$ 9	13 $\pm$ 9
Surgical duration	41 $\pm$ 14	44 $\pm$ 13
<b>Fluid (mL)</b>		
6 h preinduction	600 (350-1250)	600 (240-1500)
Intra-operative	1000 (500-1700)	1000 (600-1800)
New born weight	2199 $\pm$ 802	2167 $\pm$ 817
Placental weight	227 $\pm$ 79	241 $\pm$ 76
<b>Apgar score</b>		
1 min	7	7
5 min	9	9

There were significant differences in SAP at 1 to 15 min ( $P < 0.0001$ ) and at 16 to 20 min ( $P < 0.005$ ) and DAP at 1 to 15 min ( $P < 0.0001$ ) and at 16 to 20 min ( $P < 0.01$ ) between the 2 groups. There were no significant differences in SAP and DAP at 22 to 30 min between groups Ephedrine was used to treat hypotension before delivery more frequently in the spinal group than in the epidural group. The amount of Predelivery ephedrine and total ephedrine were also larger in

the spinal group than in the epidural group (**Table - 2**).

**Table – 2:** Hemodynamic data in spinal and epidural group and ephedrine use.

	Epidural	Spinal
<b>Blood pressure (mm of Hg)</b>		
<b>Before surgery (Highest value)</b>		
SAP	180 $\pm$ 19	179 $\pm$ 17
DAP	114 $\pm$ 15	112 $\pm$ 14
MAP	140 $\pm$ 17	139 $\pm$ 14
<b>During induction to delivery (Lowest value)</b>		
SAP	119 $\pm$ 21	111 $\pm$ 16
DAP	72 $\pm$ 17	68 $\pm$ 18
MAP	87 $\pm$ 18	78 $\pm$ 15
<b>Delivery to the end of surgery (Lowest)</b>		
SAP	121 $\pm$ 17	116 $\pm$ 19
DAP	62 $\pm$ 14	61 $\pm$ 17
MAP	75 $\pm$ 16	73 $\pm$ 14
<b>Incidence of hypotension during post induction period</b>		
SAP $\leq$ 80 mm of Hg	1	1
SAP $\leq$ 81-100 mm of Hg	7	15
SAP $\leq$ 101-120 mm of Hg	9	7
SAP $>$ 120 mm of Hg	13	7
Ephedrine dosage (mg)	9.8 $\pm$ 4.6	14.6 $\pm$ 5.9

## Discussion

The present study was designed to identify the efficacy of spinal and epidural anesthesia in preeclamptic patients. The present study includes 60 preeclamptic patients and were divided equally under spinal and epidural anesthesia groups and results shown that spinal anesthesia for cesarean delivery in severely preeclamptic patients causes slightly more hypotension than epidural anesthesia during the induction to delivery period. The duration of hypotension, however, was short and there was no difference in neonatal status.

Wallace, et al. [1] studied the efficacy of Epidural, general and CSE anesthesia techniques

in severe preeclamptic patients for cesarean delivery and found similar SAP and DAP mean values after CSE technique, approximately 110 and 60 mm of Hg respectively and few studies raised a doubt on spinal anesthesia that it leads to severe hypotension in preeclampsia patients and suggested for reassessed [5, 6, 7]. Few decades ago, Assali and prystowski reported in a series of severely preeclamptic patients receiving dilute procaine total spinal anesthetics that blood pressures decreased moderately [8].

An UK based study reveals, epidural anesthesia for labour had relatively little effect in reducing blood pressure in preeclampsia; but, in an apparent paradox, there was also still thought to be a risk of regional anesthesia causing severe hypotension in Caesarean section [9]. Epidural anesthesia was most preferably using method for Caesarean section in preeclampsia due to its slower incremental onset of sensory and autonomic blockade with an epidural was thought to be more controllable and therefore less likely to precipitate hypotension [10]. However, even in North America, spinal anesthesia was still not recommended [11].

Few studies have been confirmed that epidural anesthesia has come to be accepted as suitable for severe preeclampsia than spinal anesthesia. Three recent studies have raised a doubt on spinal anesthesia that leads to severe hypotension in preeclamptic patients. One among three studies, suggested that spinal anesthesia is contraindicated in the severely preeclamptic patient and should be reassessed [12, 13, 14].

## Conclusion

The present study shown that spinal anesthesia for cesarean delivery in severely preeclamptic patients causes slightly more hypotension than epidural anesthesia during the induction to delivery period. The duration of hypotension, however, was short and there was no difference in neonatal status.

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