

Comparison of Spinal Versus General Anesthesia for Caesarean Section in Patients with Severe Preeclampsia

Ushma H Thakar, Gauri M Panjabi, Dev Desai and Vismit Gami*

Department of Anesthesiology, NHL municipal Medical College, India

***Corresponding Author**

Vismit Gami, Department of Anesthesiology, NHL Municipal Medical College, India.

Submitted: 2024, Jun 01; **Accepted:** 2024, Jun 20; **Published:** 2024, Jul 23

Citation: Thakar, U. H., Panjabi, G. M., Desai, D., Gami, V. (2024). Comparison of Spinal Versus General Anaesthesia for Caesarean Section in Patients with Severe Preeclampsia. *J Anesth Pain Med*, 9(3), 01-05.

Abstract

Preeclampsia is a potentially fatal and multi-system disorder with significant maternal, fetal and neonatal morbidity and mortality. Preeclampsia is a triad of new onset of hypertension (BP>140/90mmhg), proteinuria (>0.3gm/day) and nondependent oedema after 20 weeks of pregnancy while severe preeclampsia is defined as BP > 160/110 mm of hg.

The goals are optimization of maternal BP, cardiac output, and uteroplacental perfusion and prevention of seizures and stroke. Risk-benefit considerations strongly favor neuraxial techniques over GA for caesarean.

Aim: Compare hemodynamic stability & feto-maternal outcome.

Objectives: This study aims to investigate intra-operative complications, assess total intravenous fluid and vasopressor requirements, analyze post-operative complications, evaluate Apgar scores, and explore fetomaternal morbidity and mortality.

Methodology:

Observational prospective study

Inclusion criteria:

Severe preeclampsia
ASA grade II/III/IV
18-40 years

Exclusion criteria:

Coagulopathy
Impending eclampsia
HELLP Syndrome

Associated cardiovascular & pulmonary disease. After explaining and taking informed written consent taken. Non-invasive monitors applied. In general anesthesia Etco2 monitor was also applied. Before induction, pre-operative vitals noted.

The patients were randomized in to two equal groups (n=30)

GROUP S: Spinal anesthesia

GROUP G: General anesthesia

Results: All vital parameters decreased after giving SA in Group S, while it was increased in Group G (p<0.001). Intraoperative bradycardia, hypotension and vasopressor requirement was more common in Group S. Postop complications were more in Group G. Fetomaternal outcome was better in Group S than Group G.

Conclusion: Relative risk of general and regional anesthesia must be properly assessed. Spinal anesthesia could be considered as better alternative to GA for severe preeclampsia patients undergoing caesarean section without coagulopathy.

1. Introduction

Preeclampsia is a potentially fatal and multi-system disorder with significant maternal, foetal, and neonatal morbidity and mortality [1]. Anaesthetic management in preeclamptic patients remains a challenge. Spinal anaesthesia was once considered controversial in preeclampsia due to sympathetic blockade which results in severe hypotension and compromise utero placental blood flow [2].

Recent studies show that parturient with severe preeclampsia experience less frequent, less severe hypotension than healthy parturient. General anaesthesia has advantages of good oxygenation and maintenance of uteroplacental blood flow, but it is associated with difficult intubation due to airway oedema, aspiration pneumonitis and hypertensive crisis leading to morbidity and mortality [3,4]. Therefore, the present study was designed to compare spinal versus general anaesthesia for caesarean section in patients with severe pre-eclampsia.

2. Materials and Methodology

The primary aim of study was to compare hemodynamic stability & fetomaternal outcome. The objectives of study were:

- 1) Block characteristics: sensory and motor block.
- 2) Hemodynamic parameters
- 3) Total intravenous fluid and vasopressor requirement
- 4) Complications.
- 5) Apgar score
- 6) Feto-maternal morbidity and mortality

INCLUSION CRITERIA

- 1) ASA grade II/III/IV
- 2) Age 18-40 years.
- 3) severe preeclampsia

EXCLUSION CRITERIA

- 1) coagulopathy.
- 2) Impending eclampsia
- 3) HELLP Syndrome
- 4) associated cardiovascular & pulmonary disease

- Preoperative assessment:
 - History.

3. Results

- Details of antihypertensive medications
- Basic routine investigations
- Written informed consent was taken.
- Non-invasive monitors were attached.
- Randomization in to two equal groups (n=30)
 - GROUP S: Spinal anaesthesia
 - GROUP G: General anaesthesia
- In Group S patients, preloading: 7-8ml/kg of ringer lactate.
 - left lateral position/sitting position
 - all aseptic precaution
 - midline approach in L3-L4 sub-arachnoid space
 - 25 G spinal needle
- Inj. Bupivacaine heavy (0.5%) 2 cc injected after clear & free flow of CSF aspiration. Level of anaesthesia was checked and noted.
- In Group G, Pre-oxygenation: with 100% O2
 - Induction: done with Inj. Thiopentone sodium 5-7mg/kg & inj. Glycopyrrolate 0.004mg/kg
 - Inj. succinylcholine 1-2 mg/kg
 - Intubation done with appropriate sized oral cuffed ET tube.
 - Maintenance: O2 + Sevoflurane + Inj Atracurium 0.5 mg/kg bolus and 0.1 mg/kg maintenance given for neuromuscular blockade.
 - Reversal: At the end of surgery, patients were reversed by Inj. glycopyrrolate 0.008 mg/kg and Inj. Neostigmine 0.05mg/kg.
- Extubation: Thorough oral suctioning was done, and Patients were extubated after all extubation criteria fulfilled. Any post-operative complication was recorded and treated accordingly.

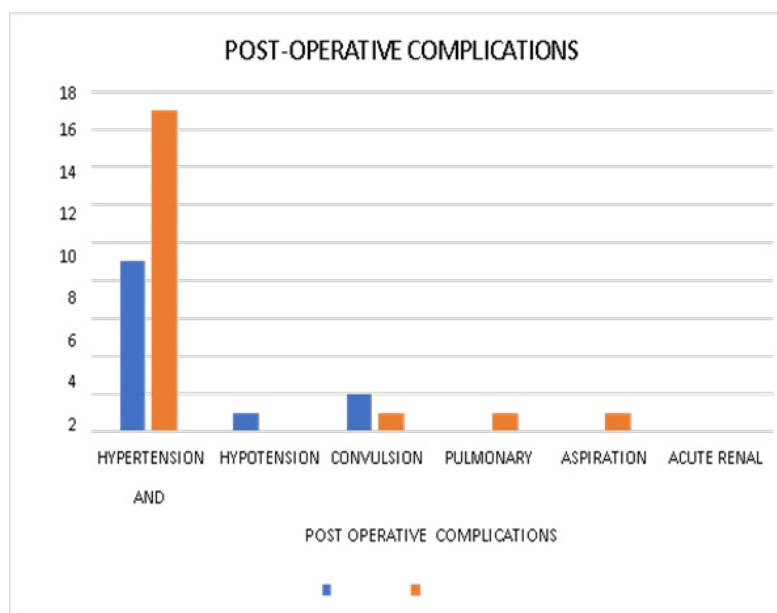
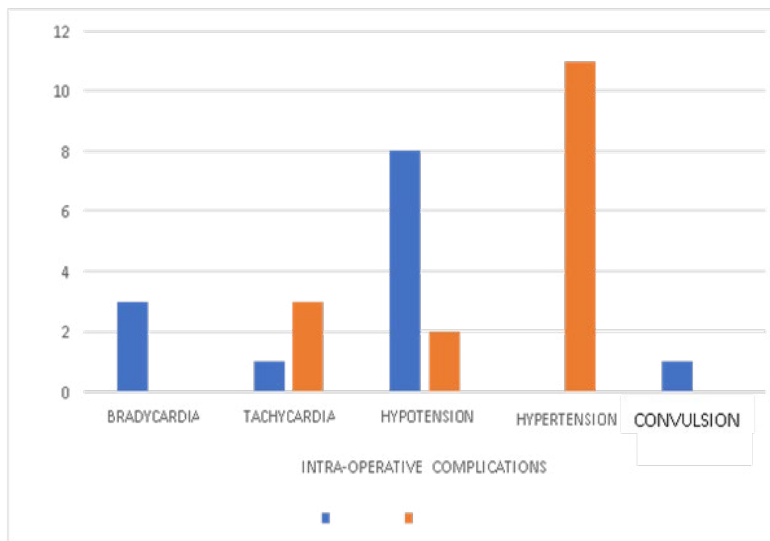
Hemodynamic parameters were noted at regular intervals. Intraoperative complications and postoperative complications were noted. Total fluid requirement was noted. Total duration of surgery was noted. Apgar score was noted. Feto-maternal morbidity and mortality were recorded. Statistical analysis was done using “SPSS” software. “P” value of <0.05 was considered as statistically significant.

	Group S(n=30)	Group G(n=30)
Age (Years)	26.26±5.48	27.96±5.91
Height (Cm)	155.1±4.79	153.46±7.63
Weight (Kg)	74.66±8.91	78.6±12.20
Residence (Urban/Rural)	22/08	24/06
ASA Grading (II/III/IV)	8/16/6	3/14/13

Table 1: Demographic Data

	Group S (No. of Patients)	Group G (No. of Patients)
Sensory Block Level		
T4	4(13.33%)	-
T6	26(86.66%)	-
Motor Block		
1	20(66.66%)	-
2	7(23.33%)	-
3	3(10%)	-
Laryngoscopy (Cormack lehane Grading)		
1	-	12(40%)
2	-	14(46.66%)
3	-	4(13.33%)
4	-	0

Table 2: Patients Characteristics According To Anesthesia Technique



COMPLICATIONS

	Group S	Group G	P- VALUE
Total intra-venous Fluid Requirement	1390±168.87	1306.66±88.79	p=0.42
Vasopressor requirement (no of patients)	8 pts (26.66%)	2 pts (6.66%)	

Table 3: Total Fluid and Vasopressor Requirement

	Group S	Group G	P-VALUE
Apgar Score at 1 Minute	8.13±0.47	7.06±0.73	p<0.0001
Apgar Score at 5 Minute	9.066±0.78	9.06±0.73	p>0.05
Apgar Score<7(No. of patients)	3 pts (10%)	7pts (23.33%)	
Mean Birth Weight (Kg)	2.56±0.63	2.34±0.53	p=0.14

Table 4: Apgar Score

Morbidity/Mortality	Group S (No. of Patients)	Group G (No. of Patients)
Foetal morbidity and /or Mortality	1 (3.33%)	5 (16.66%)
Maternal morbidity and/or Mortality	7 (23.33%)	15 (50%)
Hospital stay (in days)	6.06±1.43	9.66±2.50

Table 5: Foetal and Maternal Morbidity and Mortality

4. Discussion

Anaesthesia for caesarean delivery in patients with preeclampsia has been a debated issue over years. Historically it was believed that spinal anaesthesia in patients with severe preeclampsia causes severe hypotension and decreased uteroplacental perfusion, but studies show that it is mainly theoretical because of increased vascular wall tone in these patients. Further, hypotension is transient, within acceptable limit and easily treatable [5]. Babies born to mothers having spinal anaesthesia were more alert allowing early breast feeding.

In contrast, general anaesthesia in these patients has advantages of good oxygenation and maintenance of utero-Placental blood flow but potential complications such as difficult intubation, hypertensive crisis and stroke causes higher incidence of foetal and maternal morbidity/mortality. Peripartum pharyngeal and glottic oedema are accentuated in severe preeclampsia which can lead to difficult or failed intubation [6].

However, patients with coagulopathy or thrombocytopenia, spinal anaesthesia is contraindicated, and general anaesthesia should be preferred. For general anaesthesia all the necessary equipment should be kept readily available to manage difficult airway and reduce hemodynamic stress response to laryngoscopy [7,8]. Babies born to mothers receiving general anaesthesia required advanced resuscitation as supplemental oxygen and bag mask ventilation [9].

In 2014, Suman Chattopadhyay et al observed foeto-maternal outcome in several preeclampsia women undergoing emergency caesarean section under either General or spinal anaesthesia. They

concluded that spinal anaesthesia is a safer alternative to general anaesthesia in severe preeclampsia with less maternal as well as neonatal mortality [10].

In 2016, Pacharla Indira et al studied that spinal anaesthesia has better maternal outcome in terms of hemodynamic stability and postoperative complications when compared to general anaesthesia [11].

In 2018, Tsehay terefe et al, compared general vs spinal anaesthesia for caesarean delivery among preeclamptic woman concluded that spinal anaesthesia could be considered as first choice for severe preeclamptic patients, associated with less intraoperative hypertension [12].

In this study there was no significant difference between two groups with respect to demographic data. In Group S, commonest complication was intraoperative hypotension in 8(26.66%) patients, while in Group G, commonest complication was intraoperative hypertension in 11(36.6%) patients. Overall, post-operative complications were more common in Group G than Group S (66.66/36.66%) requiring more critical care support. Even foetal outcome was poorer in Group G than Group S. Feto-maternal outcome was better in Group S than Group G. Mean hospital stay was 6.06±1.43 days in Group s as compared to 9.66±2.50 says in Group G which was statistically highly significant (P<0.001) as shown in TABLE 5.

5. Conclusion

Spinal anaesthesia provides better hemodynamic stability and

feto-maternal outcomes and less mean hospital stay. The risk of difficult/ failed airway, hypertensive crisis, and delayed recognition of maternal stroke during general anaesthesia exceed the risk of adverse outcome from spinal anaesthesia.

To conclude with,

-Relative risk of general and regional anaesthesia must be properly assessed.

-Spinal anaesthesia could be considered as safer alternative to general anaesthesia for severe preeclampsia patients undergoing caesarean section without coagulopathy.

References

1. Flood, P., & Rollins, M. D. (2015). Anesthesia for obstetrics. *Miller's anesthesia*, 8.
2. Howell, P. (1998). Spinal anaesthesia in severe preeclampsia: time for reappraisal, or time for caution?. *International Journal of Obstetric Anesthesia*, 4(7), 217-219.
3. Pournajafian, A., Rokhtabnak, F., Kholdbarin, A., Ghodrati, M., & Ghavam, S. (2012). Comparison of remifentanyl and fentanyl regarding hemodynamic changes due to endotracheal intubation in preeclamptic parturient candidate for cesarean delivery. *Anesthesiology and pain medicine*, 2(2), 90.
4. Chumpathong, S., Sirithanetbol, S., Salakij, B., Visalyaputra, S., Parakkamodom, S., & Wataganara, T. (2016). Maternal and neonatal outcomes in women with severe pre-eclampsia undergoing cesarean section: a 10-year retrospective study from a single tertiary care center: anesthetic point of view. *The Journal of Maternal-Fetal & Neonatal Medicine*, 29(24), 4096-4100.
5. Santos, A. C., & Birnbach, D. J. (2005). Spinal anesthesia for cesarean delivery in severely preeclamptic women: don't throw out the baby with the bathwater!. *Anesthesia & Analgesia*, 101(3), 859-861.
6. Izci, B., Riha, R. L., Martin, S. E., Vennelle, M., Liston, W. A., Dundas, K. C., ... & Douglas, N. J. (2003). The upper airway in pregnancy and pre-eclampsia. *American journal of respiratory and critical care medicine*, 167(2), 137-140.
7. Park, B. Y., Jeong, C. W., Jang, E. A., Kim, S. J., Jeong, S. T., Shin, M. H., ... & Yoo, K. Y. (2011). Dose-related attenuation of cardiovascular responses to tracheal intubation by intravenous remifentanyl bolus in severe pre-eclamptic patients undergoing Caesarean delivery. *British journal of anaesthesia*, 106(1), 82-87.
8. Yoo, K. Y., Jeong, C. W., Park, B. Y., Kim, S. J., Jeong, S. T., Shin, M. H., & Lee, J. (2009). Effects of remifentanyl on cardiovascular and bispectral index responses to endotracheal intubation in severe pre-eclamptic patients undergoing Caesarean delivery under general anaesthesia. *British journal of anaesthesia*, 102(6), 812-819.
9. Jouppila, P., Kuikka, J., Jouppila, R., & Hollmen, A. (1979). Effect of induction of general anesthesia for cesarean section on intervillous blood flow. *Acta Obstetrica et Gynecologica Scandinavica*, 58(3), 249-253.
10. Chattopadhyay, S., Das, A., & Pahari, S. (2014). Fetomaternal outcome in severe preeclamptic women undergoing emergency cesarean section under either general or spinal anesthesia. *Journal of pregnancy*, 2014(1), 325098.
11. Indira, P., Raghu, R. (2016). Analysis of maternal outcomes in severe preeclampsia patients under general versus spinal anaesthesia for caesarean delivery. *IOSR Journal of Dental and Medical Sciences*. PP 33-39.
12. Aregawi, A., Terefe, T., Admasu, W., & Akalu, L. (2018). Comparing the effect of spinal and general anaesthesia for pre-eclamptic mothers who underwent caesarean delivery in a tertiary, Addis Ababa, Ethiopia. *Ethiopian Journal of Health Sciences*, 28(4).

Copyright: ©2024 Vismit Gami, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.