COMPARISON OF GENERAL AND EPIDURAL ANESTHESIA FOR CESAREAN DELIVERY IN HEART DISEASE COMPLICATING PREGNANCIES – A RANDOMIZED PROSPECTIVE STUDY

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Abstract

Background: Significant cardiovascular system hemodynamic alterations during pregnancy have been linked to increased morbidity and mortality in women with underlying heart disease.

Objective: Study to compare hemodynamic changes and complications in General and Epidural anesthesia for cesarean delivery in Heart disease complicating pregnancy.

Methods: A total of 100 patients were randomly allocated into two groups. After approval by ethical committee, informed consent to be obtained. Information to be collected including age, gestational age, parity, cardiovascular disease. Baseline physical examination, Basic investigations to be done. The patients undergoing general anaesthesia are premedicated with i.v. glycopyrrolate (0.2 mg). Preoxygenation with 100% oxygen for 3 min. Patient induced with inj.Thiopentone 3-5mg/kg, Intubated with appropriate size ET tube after Inj. Succinylcholine 1.5mg/kg IV. After delivery, anaesthesia maintained with oxygen in nitrous oxide (33:66), with the addition of i.v. fentanyl. Relaxation to be maintained with inj. Atracurium 0.5mg/kg. The patients undergoing epidural anaesthesia, 18 G Tuohy needle inserted into L2-L3 space, Test dose of 3ml 1.5% lidocaine and 1:2,00000 epinephrine to be injected into the catheter, when patients shown no ill effects, 10ml of 1.5% lignocaine to be injected. Hemodynamic changes and complications to be noted.

Results: cardiovascular events decreased in epidural group. Complications occurred in general anesthesia, not in epidural group.

Conclusion: Epidural anesthesia is better than general anesthesia in maintaining hemodynamics & less complication.

Keywords: Epidural anesthesia, General anesthesia, Cesarean delivery, Heart disease

1. Introduction

In the industrialized world, the prevalence of heart disease during pregnancy is rising. Modern medication therapies and surgical methods have increased the number of women with congenital heart disease who live to adulthood. Since many of these women have fulfilling lives, it's possible that they are unaware of the potential threats pregnancy and childbirth pose to their hearts (1). Since rheumatic fever is still frequent in underdeveloped nations, women who reach reproductive age are more likely to have severe uncorrected valvular heart disease. The mitral valve is most frequently affected by rheumatic heart disease (2), leading to stenosis or regurgitation, although it can also affect the aortic and, less frequently, the pulmonary valves.

It is important for mothers who have a history of cardiac illness to be evaluated early in pregnancy, or better yet, before getting pregnant, in order to provide them with information on any risks to their unborn child and themselves. Pregnancy termination may be advised for some disorders, such as Eisenmenger syndrome and pulmonary hypertension, because of the potentially 60% chance of maternal mortality (3-5). A multi-professional team of cardiologists, obstetricians, and anesthetists should ideally manage pregnant women with cardiac disease in specialized centers. They will plan the delivery and monitor cardiac function throughout the pregnancy through routine clinical examinations and investigations, such as echocardiograms, ECGs, and, in certain cases, cardiopulmonary exercise testing.

Prenatal therapy should be centered on using the right medications to optimize cardiovascular function beforehand. Medication adjustments may be necessary in specific circumstances to prevent possible teratogenicity. A low threshold for admission and inquiry is necessary because bed rest, or minimal exercise, can significantly relieve symptoms (6-8). When a mother experiences symptoms comparable to those of a later stage of pregnancy, such as exhaustion, swollen ankles, shortness of breath, reduced exercise capacity, murmurs, third heart sound, and arrhythmias, it can be challenging to identify her with incipient cardiac illness in late pregnancy. An ECG and echocardiogram should be carried out as well as any necessary examinations if there are any of the following symptoms: a loud fourth heart sound, diastolic murmur, grade 3/6 systolic murmur, fixed splitting of the second

heart sound, or opening snap (9-12). In this study aimed to compare hemodynamic changes and complications in General anaesthesia and Epidural anaesthesia for cesarean delivery in Heart disease complicating pregnancy.

2. Materials and methods

After obtaining ethical committee approval, the informed written consent was obtained from the patients. This study includes 100 pregnant women those who were posted for cesarean section with mild to moderate heart disease complicating pregnancy, whose mallampatti grading was I and II, and with BMI <30 kg/m^2 . Those patients have coagulopathy, mallampatti grading >III and severe heart disease were excluded in this study. After selection of study participants, they were divided into two groups. Group A patients undergoing general anesthesia and Group B patients undergoing Epidural anesthesia.

Information on maternal background collected including age, gestational age, parity, parity, cardiovascular disease, other comorbidities and drug history. Baseline physical examination including weight, heartrate, blood pressure, oxygen saturation and systemic examination done. Basic investigations done, coagulation profile done if need.

Patients undergoing general anaesthesia were premedicated with i.v. glycopyrrolate (10 mcg/kg). Preoxygenation with 100% O2 for 5min. Induction with inj.Thiopentone 3mg/kg, inj.Fentanyl 1mcg/kg initially and patient intubated with appropriate size ET tube after Inj. Succinylcholine 1.5mg/kg IV. Anaesthesia maintained with nitrous oxide and oxygen 66%:33%, after delivery, with the addition of i.v Fentanyl. Muscle relaxation maintained with inj.Atracurium 0.5mg/kg. After completion of procedure reversal with inj. Neostigmine 40mcg/kg and inj. Glycopyrrolate 10mcg/kg and Patient was extubated.

The patients undergoing epidural anaesthesia, under strict aseptic precaution, 18 G Tuohy needle inserted into L2-L3 space, 18G catheter passed, and tip of catheter placed at T12. Test dose of 3ml 1.5% lidocaine injected into the catheter, when patients shown no ill effects, 15ml of 1.5% Lignocaine injected. After delivery, 3 mg of morphine was administered via the epidural catheter.

3. Data collection

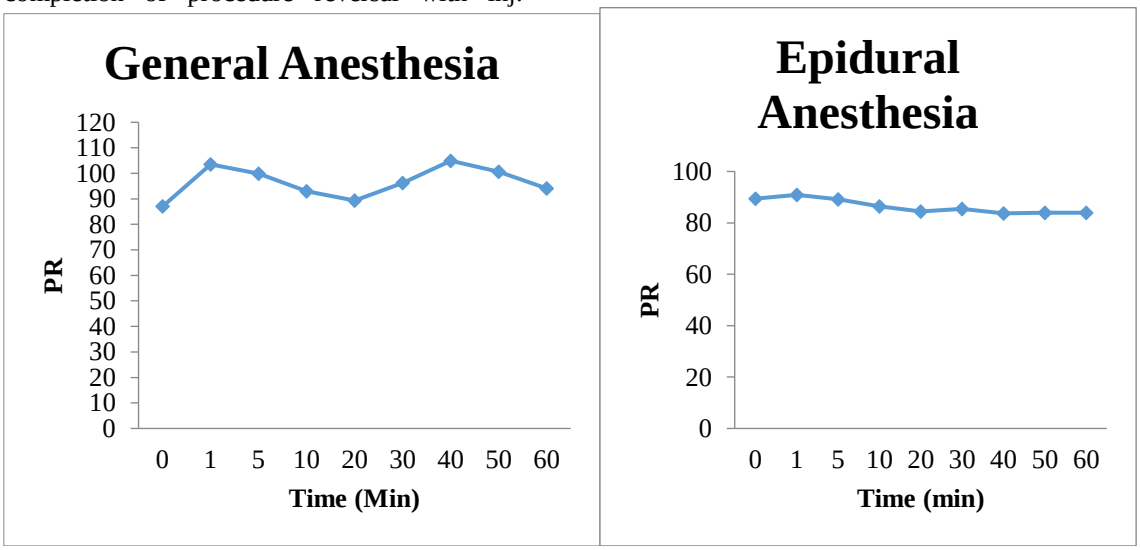
- Pre-operative: Pulse rate, Blood Pressure, SPO2, ECG.
- Intra operative: Pulse rate, Blood Pressure, SPO2, ECG,
- Post-operative: Pulse rate, Blood Pressure, SPO2
- Complications like hypotension, tachycardia, pulmonary edema, arrhythmias.

4.Results

All 100 women had their hemodynamic examinations successfully finished. There were no side effects from the anesthetic methods used. The estimated blood loss for individuals receiving epidural anaesthesia (range 500-800 ml) and general anaesthesia (range 500-1000 ml) did not differ significantly from one another. The newborns were evaluated using Apgar scores at one and five minutes. There were no discernible variations between the patient groups based on the anaesthetic technique.

4.1 Heart rate

Figure 1 shows heartrate of both patients undergoing general anesthesia and epidural anesthesia. There were more fluctuations of heartrate in general anesthesia group compared to epidural anesthesia group.



4.2 Blood pressure and mean arterial pressure

Figure 2 & 3 shows comparison of both systolic and diastolic blood pressure in both groups.

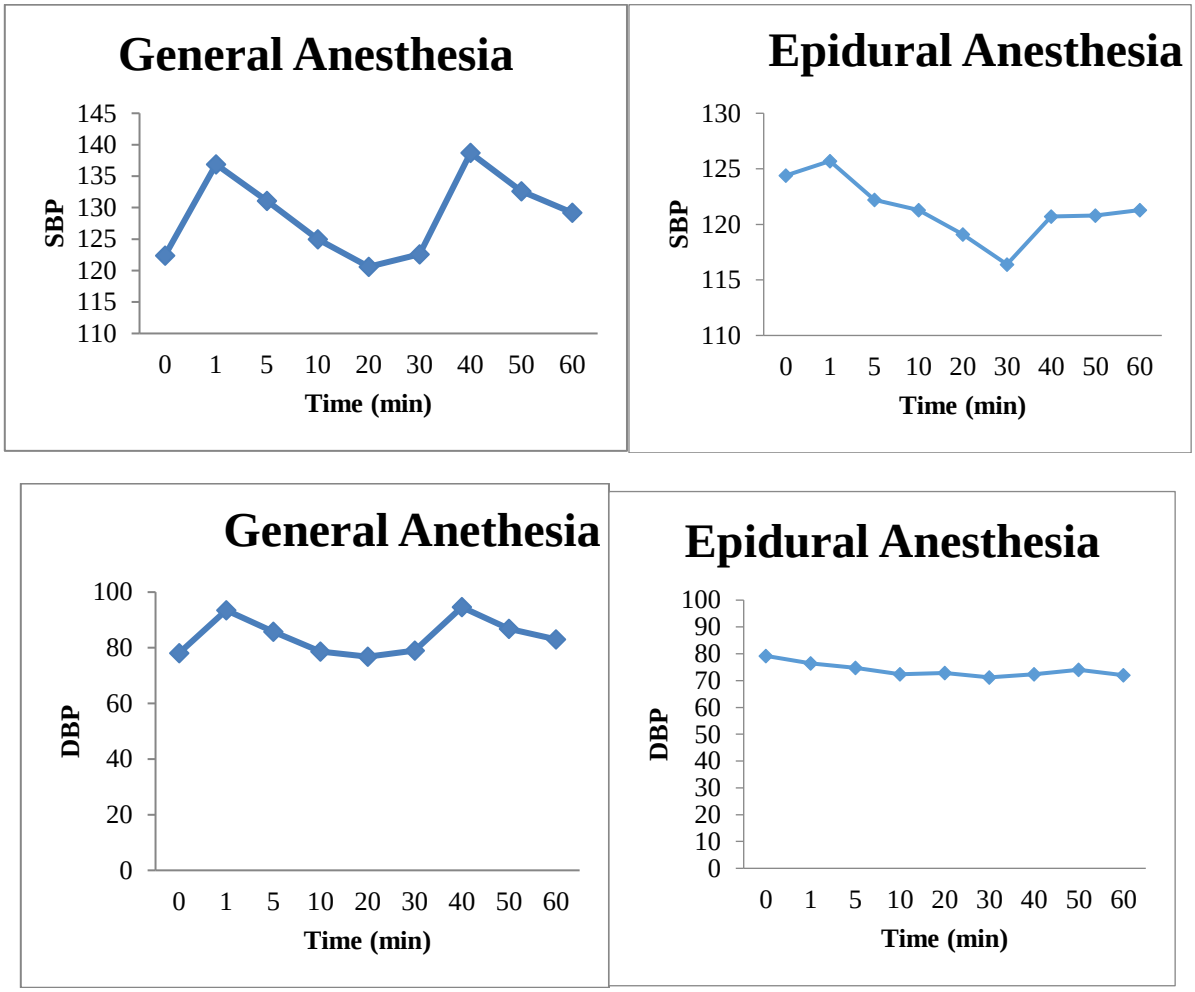
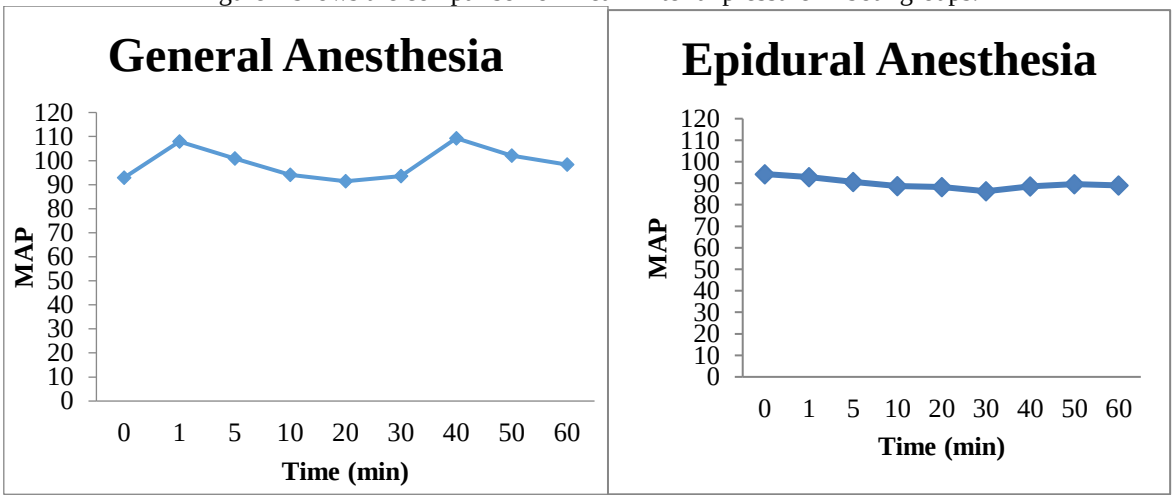


Figure 4 shows the comparison of Mean Arterial pressure in both groups.



There was no significant change in blood pressure before anesthesia in both groups. Before delivery, during epidural anaesthesia, systolic and diastolic blood pressure as well as mean arterial pressure dropped significantly, but they remained mostly constant in the postpartum period. Prior to delivery, there was a substantial increase in the mean arterial pressure and systolic and diastolic blood pressure in patients

receiving general anaesthesia. After giving birth, blood pressure dropped dramatically to a level that was comparable to what was measured prior to anaesthesia.

Table 1 shows comparison of heart rate, blood pressure, mean arterial pressure and their significance in general anesthesia and epidural anesthesia group.

	Preop		Significance Of difference between groups	During anesthesia		Significance Of difference between groups	Postop		Significance Of difference between groups
	General	Epidural		General	Epidural		General	Epidural	
Pulse rate	87±5.6	89.45±9.3	0.3(ns)	103.45±9.5	90.9±7.8	<0.001	94.05±6.73	83.9±7.3	<0.001
Systolic Blood pressure	122.4±4.2	124.4±5.6	0.2(ns)	136.9±5.6	125.7±8.0	<0.005	129.2±7.3	121.3±5.1	0.0003
Diastolic Blood pressure	78.1±3.4	79.2±1.6	0.2(ns)	93.5±9.01	76.4±3.9	<0.001	83±3.2	72±2.4	<0.001
Mean arterial pressure	92.8±2.6	94.2±2.7	0.05	107.9±7.3	90.6±4.9	<0.001	98.4±3.4	88.9±2.6	<0.001
Spo_2	99.1±0.3	99.2±0.4	0.5(ns)	100	100	Ns	99.1±0.3	99.1±0.3	Ns

Table 2 shows complications in general anesthesia group and epidural anesthesia group.

INFERENCE	GROUP A(GENERAL)	GROUP B(EPIDURAL)
TACHYCARDIA	3	1
HYPERTENSION	2	0
HYPOTENSION	1	1
NAUSEA/VOMITING	2	0
PULMONARY EDEMA	1	0
ARRYTHMIA	0	0
HYPOXIA	0	0

The noted complications were tachycardia, hypertension, and hypotension, nausea vomiting and pulmonary edema. Compared to epidural anesthesia group there were more number of complications in general anesthesia group.

5. Discussion

Pregnancy-related changes in hemodynamics act as a serious stress test. Therefore, the majority of asymptomatic women with heart disease who undergo labour and delivery manage it effectively. On the other hand, women who have dyspnea during rest or during light exercise typically have a difficult time coping with pregnancy, labour, and delivery. It may not be feasible or desirable to reverse anaesthesia right once following surgery in certain situations where general anaesthesia (GA) is required for surgical procedures like lower segment caesarean sections (LSCS).

Parturients with congenital cardiac disease have been effectively treated with general and regional anaesthetic methods. Airway protection is achieved using GA and endotracheal intubation. By removing the need for breathing, mechanical ventilation can lower oxygen use and increase arterial oxygen content. Reduced venous return, cardiac dysfunction, compression of the pulmonary arteries, hypoxemia, hypo- or hyper-carbia, and acidemia are among the side effects of regulated mechanical breathing.

In parturient women with complex heart defects, spontaneous respiration with minimal disturbance of V/Q connections is made possible by regional anaesthesia, which may be crucial. Double catheters—one directed cephaloid, the other caudal—offer flexibility during delivery, whereas epidural catheter techniques provide continuous, titrated anaesthesia or analgesia. When finding the epidural space, saline should be utilised to measure the loss of resistance in order to prevent paradoxical systemic air embolism and unintentional IV air administration. Additionally, this lessens the likelihood of patchy or partial block. While some researchers avoid using epinephrine in the test dose, others do.

When it comes to selecting anaesthesia for a parturient who has heart disease, obstetric anesthesiologists shouldn't be dogmatic. Every case needs to be evaluated on its own, with the functional disability receiving particular consideration. The key to ensuring ideal labour and delivery conditions is knowing the hemodynamics related to the structural lesion and using invasive monitoring appropriately.

In present study, there was little or no change in Heart rate in patients of Group B compared to Group A ($p < 0.001$). There was little or no fluctuations of Systolic ($p < 0.005$), Diastolic blood pressure ($p < 0.001$) and mean arterial pressure ($p < 0.001$) in patients of Group B compared to Group A. Complications were less in Group B compared to Group A. There is marked variation in hemodynamic changes in Group A compared to Group B.

Conclusion

Thus we conclude that Epidural anaesthesia provides more hemodynamic stability with less complication when compared to General anaesthesia in heart disease complicating pregnancy patient undergoing cesarean section and we are following it up in our Hospital.

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