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Original Research Article

APGAR SCORE: COMPARISON OF GENERAL ANAESTHESIA VS SPINAL ANAESTHESIA

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Abstract: *Caesarean section is a common obstetric operation performed to save the lives of both the mother and baby. This study aimed to compare the APGAR score of neonates in patients who received general anesthesia or spinal anesthesia during the procedure. For this prospective randomized controlled trial, 160 ASA class I and II patients who underwent elective caesarean section at 37 weeks or more of gestation were selected. The patients were randomly divided into two equal groups, A and B, with 80 patients in each group. Group A received spinal anesthesia with a 25-gauge pencan spinal needle using hyperbaric bupivacaine 1.5ml, while Group B received general anesthesia with an endotracheal tube. After the baby's delivery, the APGAR score was assessed at 1 minute and recorded on a proforma. The results showed that the mean APGAR score at 1 minute in group A was 8.49, while in group B, it was 6.53. The mean age in group A was 30.09 ± 3.35 years, and in group B, it was 29.86 ± 3.16 years. The mean birth weight of neonates in group A was 2999.80 ± 275.78 grams, while in group B, it was 3066.25 ± 281.66 grams. In conclusion, the study found that the APGAR score was better in spinal than in general anesthesia.*

Keywords: APGAR Score, Caesarean Section, Spinal Anesthesia, General Anesthesia

Introduction

Caesarean section is a life-saving procedure for mother and baby when normal deliveries are failed (Salamat et al., 2021). The incidence of caesarean delivery is increasing in both developed and developing countries (Ghaffari et al., 2018) For caesarean section, anesthesia is required, and it can be general anesthesia or regional anesthesia. During induction of general anesthesia or regional anesthesia, hemodynamic changes occur like hypotension, hypertension, bradycardia, or tachycardia (Nazeer et al., 2012; Nazeer et al., 2021). These hemodynamic changes are more pronounced in diabetic and hypertensive patients (Nazeer et al., 2020). New-born assessed clinically by using the APGAR score immediately after delivery and this score was devised in 1952 by Dr. Virginia APGAR. It is a so simple, easy, and repeatable method (Obsa et al., 2020). APGAR score is a very important indicator, and it indicates the neonatal condition after birth and it helps the physicians to drive the resuscitation process (Ayrapetyan et al., 2019). APGAR score is influenced by different factors that occur before and during the pregnancy and these factors including the physical and emotional support during the labor and delivery time (Yeshaneh et al., 2021). The APGAR score is quantified at 1 min, 5 min, and 10 min after birth, and a low APGAR score is associated with increased risk and complications in neonate (Razaz et al., 2019). A low APGAR score is associated with a higher risk for psychiatric disorders and neurological disorders like cerebral palsy and intellectual disabilities (Dalili et al., 2016; Modabbernia et al., 2019). Along with the conventional APGAR score, the newly proposed combined APGAR score is also used to assess the neonatal condition (Getachew et al., 2020). The rationale of this study is to compare the mean APGAR score at 1 min in a neonate whose mother received either spinal or general anesthesia for elective caesarean section and the finding of our study can be used to guide the institutional policies about the ideal choice of anesthesia for mothers undergoing elective caesarean section in terms of neonatal outcomes.

Methodology

After approval of the study from the institutional review board of Services Hospital Lahore, 160 patients of ASA class I & II status of age 25 to 35 years undergoing elective caesarean section being done at ≥ 37 weeks of gestation were selected. Informed consent was taken from all participants one day before surgery, and the anesthesia plan was discussed with all patients. All patients were divided into two equal groups, A (Spinal Anesthesia) and B (General Anesthesia), with 80 patients in each group by using a random number table. I/V line was maintained with an 18-gage cannula in all patients on both forearms and preloaded with ringer solutions according to body weight (15 ml/kg). All patients excluded from the study who refuse to participate, emergency caesarean section, gestational age ≤ 37 weeks, ASA class III and above, obese patients (BMI ≥ 30) with coagulation derangement, skin to uterine incision time more than 10 min, and uterine incision to delivery time more than 3 min. In group A, spinal anesthesia was given in a sitting position, and placement a wedge under the right hip during a supine position. Stander II monitoring was done. Under the aseptic measure, a 25-gauge spinal needle was introduced

between L3 – L4 inter spinous space by midline approach, and 1.5 ml of hyperbaric (0.75%) bupivacaine was used. Oxygen was provided at 4 litter /min via face mask. Immediately after delivery of neonate inj, oxytocin 10 iu was given intravenously, and 30 units were added in crystalloid infusion. APGAR score was assessed by a pediatrician at 1 min after delivery and recorded. In group B patients, general anesthesia was given using standard II monitoring. Pre- oxygenation was done with 100 % oxygen via face mask for 3 min. Inj.propofol (2 mg/kg), inj.suxamethonium (1.5 mg/kg), and application of Sellick's maneuver, rapid sequence induction done along with confirmation of ETT. Inj.atracurium (0.5 mg/kg) and isoflurane (1.2 MAC) was used. After delivery of neonate inj.nalbuphine, 0.1mg/kg was given along with midazolam 0.05mg/kg. APGAR score was assessed by a pediatrician at 1 min after delivery and recorded. At the end of the surgery, inj.neostigmine 2.5 mg and glycopyrrolate (0.5 mg) were used, and ETT was removed. All new born were attended by a pediatrician at the time of delivery. APGAR score of all neonates was assessed at 1 min intervals after delivery and recorded on our specific proforma. This study was a prospective randomized controlled trial, and the sampling technique was non-probability convenient sampling with 80 % power of the test and a significance level of 5 % with 95 % confidence level. Statistical analysis was done with SPSS (version 24). A student t-test was applied, and a p-value ≤ 0.05 was considered significant.

Results

The mean age of women in group A was 30.09±3.35 years; in group B, it was 29.86±3.16 years. The mean gestational age of women in group A was 39.44±1.11 weeks, and in group B, it was 39.54±1.16 weeks. The mean birth weight of neonates.

Table 1: APGAR score at 1 minute stratified for the age of the patient

Age (years)	N (160)	APGAR score at 1 minute		p-value
		Group-A	Group-B	
25-30	89	8.63±1.09	6.63±1.06	0.000
31-35	71	8.32±1.20	6.38±1.15	0.000

Table 2: APGAR score at 1 minute stratified for gestational age

Gestational age (weeks)	n (160)	APGAR score at 1 minute		p-value
		Group-A	Group-B	
38-39	85	8.50±1.25	6.49±1.16	0.000
40-41	75	8.47±1.03	6.57±1.06	0.000

Table 3: APGAR score at 1 minute stratified for birth weight

Birth Weight (grams)	n (160)	APGAR score at 1 minute		p-value
		Group-A	Group-B	
2500-3000	73	8.33±1.16	6.39±0.98	0.000
3001-3500	87	8.66±1.12	6.61±1.18	0.000

In group A was 2999.80±275.78 grams; in group B, it was 3066.25±281.66 grams. The mean APGAR score at 1 minute was higher in group A compared to group B patients. In group A, it was 8.49±1.14, while in group B it was 6.53±1.11.(Table1-3)

Discussion

Caesarean section is the most common surgery which is performed in modern obstetrics. Anesthetic technique in caesarean section is very important. It can be regional or general anesthesia; every technique has advantages and disadvantages. In our study, we observed that the mean APGAR score in the spinal anesthesia group was 8.49 ± 1.14; in the general anesthesia group, it was 6.53 ± 1.11, with the difference statistically significant ($P < 0.05$). Stratification of data for maternal age, gestational age, and birth weight of neonates also showed that the APGAR score at 1 min in the spinal anesthesia group was significantly higher than that of the general anesthesia group. The study of al-Husban supported my study's results and concluded that the APGAR score was higher with spinal anesthesia than with general anesthesia group patients (Al-Husban et al., 2021).

Similarly, the results of the study of Mohammad H Bokri favor the results of my study, and they found that APGAR scores were significantly better in the spinal than in the general anesthesia group (DODDS et al., 2018). Similarly, in the study of Chattopadhyay S et al., they found that spinal anesthesia is safer than general anesthesia, and it is an alternative to general anesthesia (Chattopadhyay et al., 2014). Similarly, the study of Tae-Yun-Sung found that patients in the general anesthesia group have more blood loss and a lesser APGAR score (< 7) than the spinal anesthesia group (Sung et al., 2021).

Conclusion

Both techniques have their merits, but spinal anesthesia is safer and better for neonates because it causes less neonatal depression and a better APGAR score.

Declarations

Data Availability statement
All data generated or analyzed during the study are included in the manuscript.
Ethics approval and consent to participate
Approved by the department Concerned.
Consent for publication
Approved
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Not applicable

Conflict of interest

The authors declared the absence of a conflict of interest.

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