Original Article (APMC – 576) DOI: 10.29054/APMC/19.576

Comparison of Fetomaternal Outcome of General Anesthesia vs Spinal Anesthesia in Women Having Elective Cesarean Section

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ABSTRACT

Objective: The objective of this study was to compare Apgar-score and maternal satisfaction in women having elective cesarean section under general and spinal anesthesia. **Study Design:** Randomized Controlled Trial. **Settings:** Department of Obstetrics and Gynecology, Sir Ganga Ram Hospital Lahore -Pakistan. **Duration:** Six months (January 2017 to June 2017). **Methodology:** A total of 108 cases were taken who fulfilled the inclusion criteria and informed consent was taken. All subjects were randomly divided into two groups (Group-A or Group-B) using lottery method. Group-A received general anesthesia with pre-oxygenation for 3 minutes and in Group-B, patients were given spinal anesthesia. Data was collected on predesigned proforma by researcher herself. Apgar score at 5 minutes after birth was calculated by researcher herself and patient's satisfaction was calculated at time of discharge as per operational definition. **Results:** In this study mean age of cases was 30.62±4.87 years with age range of 18-40 years. In spinal group mean age were 30.57±5.25 years while general anesthesia group the mean age was 30.67±4.51 years. In spinal group Apgar score ≥ 7 was seen 52(96.3%) neonates and in general anesthesia group the Apgar score ≥ 7 was calculated in 47(87%) of the neonates. There was no significant difference in Apgar score ≥ 7 in both study groups, p-value > 0.05. According to operational definition in spinal group 43(79.6%) and general anesthesia group 23(42.6%) females were satisfied, the satisfaction rate in spinal anesthesia group was significantly higher, p-value < 0.005. **Conclusion:** The results of this study show no significant difference in Apgar score at 5 minutes but maternal satisfaction was significantly higher in spinal anesthesia group when compared to general anesthesia group. So, in future we can adopt spinal anesthesia in elective cesarean section to gain more mother satisfaction and better fetomaternal outcome.

Keywords: Cesarean section, Anesthesia, Spinal anesthesia, General anesthesia, Side effects, Neonatal outcome, Maternal complication.

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Submitted for Publication: 23-02-2019 *Accepted for Publication: 18-04-2019*

Citation: Munir SI, Shahzadi I, Tahira T, Aslam S. Comparison of Fetomaternal Outcome of General Anesthesia vs Spinal Anesthesia in Women Having Elective Cesarean Section. APMC 2019;13(1):100-3.

INTRODUCTION

Women undergo pregnancy and child delivery as a normal physiological process. Among those deliveries 10% are classified as high risk in which cesarean section (CS) may be required.[1] This process of cesarean section is considered a major operation which involves making an incision in abdomen of pregnant woman and eventually uterine muscles are cut for successful delivery of the baby.[2] With the advancement of medical procedures the cesarean section deliveries have become safer to carry out but it is not replaceable with vaginal delivery when maternal and neonatal morbidity and mortality is considered along with less medical cost.[3] Cesarean section rate is increasing overall throughout the world and have been continuously increasing in developed countries reaching 30% of total births.[4,5]

One of the reasons for initiation of CS is gradually increasing demands by pregnant women for cesarean section when medical indications are not crystal clear, such as breech presentation or previous cesarean section, placenta previa, contracted pelvis etc. Women ask for CS because of more safety for the baby, to avoid labor pain, for convenience of the family and less pelvic floor trauma.[6]

General and regional anesthesia have their own merits in lower abdominal surgery.[7] Regional anesthesia is now considered to be a technique of choice as it is safer for both baby and mother. Maternal satisfaction regarding CS is also a factor that compels spinal anesthesia to be made a technique of choice. Irrespective of the fact which technique is used a general precautionary standard should be maintained throughout whole procedure.[8,9] In CS spinal anesthesia is preferred over general anesthesia, as it gives better health outcomes when shorter duration of stay in hospital and maternal satisfaction and eventually good fetal APGAR scores are considered.[8,9]

Imtiaz A et al, reported that an APGAR score ≥ 7 at 5 minute in Spinal anesthesia was seen in 30(100%) and in general anesthesia in 20 (96.66%) women, with no significant difference in both groups, p-value > 0.05.[10] While another study reported contradictive statistics, i.e. they concluded that APGAR score ≥ 7 was higher in general anesthesia (92.5%) when compared to Spinal anesthesia (75%) at 5 minutes after delivery, p-value ≤ 0.001.[11] A local study reported higher satisfaction level [they assessed it on a subjective score from 3-5] in spinal group (92%) and in general anesthesia (31%), p-value < 0.001.[9]

The rational of this study is to compare effect of general and spinal anesthesia, in elective cesarean section, on short term

neonatal and maternal outcome. As a lot of data is available but recent researches has reported a clear controversy in APGAR score at 5 minutes after cesarean section. As one study reported no significant difference in an APGAR score after 5 minutes in general anesthesia (96.66%) and spinal anesthesia (100%)[10] and another local study reported higher APGAR score (≥7) in general anesthesia (92.5%)[11] as compared to spinal anesthesia (75%)[11] with significant p-value. Hence this study is designed to rule out these controversies and to compare maternal satisfaction in general and spinal anesthesia.

METHODOLOGY

Study Design: Randomized Controlled Trial.

Settings: Department of Obstetrics and Gynecology, Sir Ganga Ram Hospital Lahore -Pakistan.

Duration: Six months (January 2017 to June 2017)

Sample Size: A total of 108 cases (54 females undergoing cesarean section in each group) was taken. The sample size was calculated using 80% power of study, 95% confidence level and 5% level of significance taking expected Apgar score ≥ 7 in General Anesthesia group 92.5%[10] and in spinal anesthesia was 75%[10] at 05 minutes. We used WHO software for sample size calculation.

Sampling Technique: Non-Probability Consecutive Sampling was used to collect the data

Inclusion Criteria: All the female Aged 18-40 years, with any parity, booked for elective C/Section having gestation age ≥ 37 weeks (was confirmed by dates or on dating scan)

Exclusion Criteria:

1. Females with previous cesarean section
2. Placental abnormalities e.g. placenta previa, placenta accreta
3. Females with co-morbidities such as gestational diabetes, pregnancy induced hypertension, preeclampsia, cardiac diseases etc. (assessed by medical record)
4. Females with any fetal compromise like intra-uterine growth restriction, fetal distress and congenital fetal abnormalities
5. Multiple pregnancy

Data Collection Procedure: The study was started after taking permission form hospital ethical committee, 108 cases were enrolled in the study who met the inclusion criteria. The informed consent forms each subject was taken. All subjects were randomly divided into two groups (Group-A or Group-B) using lottery method. Group-A received general anesthesia with pre-oxygenation for 3 minutes and in Group-B, patients were given spinal anesthesia. Data was collected on predesigned proforma by researcher herself. Apgar score at 5 minutes after birth was calculated by researcher herself and patient's satisfaction was calculated at time of discharge as per given following criteria.

Satisfaction of Mothers: Maternal satisfaction was recorded subjectively using a score (1-5) depending upon post-operative pain. Mother was asked to circle on self-generated score given as

1 2 3 4 5

Satisfaction score of 1 was highly unsatisfied, 2 unsatisfied, 3 neutral, 4 satisfied and 5 was highly satisfied. [8]

Neonatal Outcome

Apgar Score: Apgar score is calculated for a newborn infant based on a scoring of 0-2 for five different characteristics such as 1. appearance 2. pulse rate, 3. Grimace (response to stimulation), 4. activity, and 5. Respiratory effort with 10 being a perfect score. Apgar score ≥ 7 was considered a good score.

Data Analysis: Data was entered and analyzed by computer software SPSS version 20.0. Qualitative variable like Apgar score ≥ 7 at 5 minutes and maternal satisfaction was presented in the form of frequency and percentages and was compared between both groups using Chi-square test. Quantitative variables like age and gestational age was presented in form of mean ± S.D. P- value ≤ 0.05 was considered as significant. Data was stratified for maternal age, gestational age and parity to address effect modifiers with help of post stratified chi-square test.

RESULTS

In this study mean age of cases was 30.62±4.87 years with age range of 18-40 years. In spinal group mean age were 30.57±5.25 years while general anesthesia group the mean age was 30.67±4.51 years. In total 13(12.04%) females had first parity, 18(16.67%) had 2 parity, 22(20.37%) had 3 parity, 19(17.59%) had 4 parity, 17(15.74%) had 5 parity, 13(12.04%) had 6 parity and 6(5.56%) had 7 parity. The mean gestational age in this study was 38.96 ± 1.86 weeks. In spinal group the mean gestational age was 38.80 ± 1.77 weeks and in general anesthesia group the mean gestational age was 39.13 ± 1.95 weeks. The mean Apgar score in spinal group was 8.24 ± 1.13 and in general anesthesia group was 8.06 ± 1.94, the mean Apgar score in spinal group was higher but was not significant, p-value > 0.05. In spinal group Apgar score ≥ 7 was seen 52(96.3%) neonates and in general anesthesia group the Apgar score ≥ 7 was calculated in 47(87%) of the neonates. There was no significant difference in Apgar score ≥ 7 in both study groups, p-value > 0.05.

Table 1: Comparison of different variables in both study groups (n = 54)

	Study groups	Mean	SD	p-value
Age Groups (years)	Spinal Anesthesia	30.57	5.25	0.922
	General Anesthesia	30.67	4.51	
Gestational Age (weeks)	Spinal Anesthesia	38.80	1.77	0.355
	General Anesthesia	39.13	1.95	
Apgar Score at 5 minutes	Spinal Anesthesia	8.24	1.13	0.545
	General Anesthesia	8.06	1.94	
Satisfaction Score	Spinal Anesthesia	3.46	1.21	<0.001
	General Anesthesia	2.37	1.14	

The mean satisfaction score in spinal anesthesia was significantly higher (3.46±1.21) when compared to general anesthesia group (2.37±1.14), p-value < 0.05. According to operational definition in spinal group 43(79.6%) and general anesthesia group 23(42.6%) females were satisfied, the

satisfaction rate in spinal anesthesia group was significantly higher, p-value < 0.005.

Table 2: Comparison of Satisfaction in both study groups

		Study groups		Total
		Spinal Anesthesia	General Anesthesia	
Satisfaction	Yes	43(79.6%)	23(42.6%)	66(61.1%)
	No	11(20.4%)	31(57.4%)	42(38.9%)
Total		54(100.0%)	54(100.0%)	108(100.0%)

Chi-square = 15.58, p-value <0.001

DISCUSSION

In CS we use regional and general anesthesia as the two major techniques. Physician's preference is regional anesthesia but when patient requests to opt general anesthesia and when patients have back deformities, then only option is to utilize this technique. Commonly used induction agents include thiopental, propofol, and ketamine and it depends upon availability of instruments and the maternal health condition.[11]

A research study reported that Spinal versus GA groups had no significant difference regarding age 28.3 ± 0.74 VS 28.2 ± 0.95 (value represent mean ±SD) and parity as 3.421.12 VS 3.72 ± 1.03.[12] This is similar to our study, we also found no significant difference in age and parity i.e. the mean age of cases was 30.62 ± 4.87 years and spinal group mean age were 30.57 ± 5.25 years while general anesthesia group the mean age was 30.67±4.51 years. The mean parity in in spinal and general anesthesia was 3.77±1.73 and 3.55 ± 1.74.

Same researchers that carried out this study also reported that mothers who had spinal anesthesia have babies with significant better one minute and five-minute Apgar score as 8.6 ± 0.52 and 6.4 ± 0.67, p<0.05 while babies of mothers having general anesthesia had 9.6 ± 0.47 and 8.27 ± 0.50, p<0.05 respectively. Maternal satisfaction was also better with spinal anesthesia.[12] In spinal group and in general anesthesia group 52(96.3%) neonates had Apgar score > 7 and 47(87%) of the neonates had Apgar score ≥ 7 respectively with p-value >0.05. 43(79.6%) females in spinal group and 23(42.6%) females in general anesthesia group were satisfied according to operational definition, so more mothers were satisfied in spinal anesthesia group with p-value < 0.005. The findings regarding Apgar score is comparable with above study the statistics regarding satisfaction is similar to their study.

One more study in Baghdad Hospital was done to see and compare the effect of general anesthesia vs spinal anesthesia on Apgar score of babies born by CS in Baghdad Teaching Hospital. The 1 minute and 5-minute interval Apgar score was recorded for each delivery. From total 30 mothers receiving general anesthesia researchers noted that 25 patients (83.3%) gave birth to neonates with Apgar score ≤ 6 and Apgar score of ≥7 for the remaining 5 babies (16.7%) at one minute after birth. Contrarily of 30 mothers receiving spinal anesthesia only 10 mothers gave birth to baby with Apgar score ≤ 6 and Apgar score were ≥7 at one minute after birth and 5 minutes time respectively. Babies born with G.A were found to be having ten times more chance of Apgar score < or = 6 in first minute compared with spinal anesthesia group, p=0.00024 which is highly significant. In this study General Anesthesia had more risk on babies at the first minute interval. So this study shows us that a significant difference is present between the clinical effects of G.A and S.A on Apgar score of babies one minute after delivery of full term neonate by on choice caesarean section of mother, but this study also shows us that no significant difference is present between the clinical effects of G.A and S.A on Apgar score 5 minutes interval after birth.[13] Recently a meta-analysis & systematic review that involved 10 studies with 782 participants was carried out. The Apgar score at one minute after birth was less than seven in G.A than in S.A was reported as OR=0.24, in 5 trials with 548 participants. But no significant relativity at five-minute interval Apgar score less than seven was found as OR= -0.02, in 3 trials with 260 participants.[14]

The results of index study are also in agreement to these results. We found a study that reported contradictive results and statistics related to Apgar score ≥ 7 at 5 minutes interval as they reported that there was no significant difference between the clinical effects of G.A and S.A on Apgar score of babies at 5 minutes interval after delivery, born after elective cesarean section at term.[15] One more study was in disagreement to our statistics it involved 43 (57.3%) neonates in the general group receiving propofol and having an Apgar score < 7 when compared with 31 (41.3%) neonates in the group receiving thiopental with p = 0.05.[11]

A cross sectional study was conducted by Siddiqui et al. to find out the level of satisfaction considering intra-operative pain and postoperative nausea, backache and vomiting in women undergoing S.A for cesarean section. In this study total of 246 pregnant women having cesarean section with S.A were surveyed. This survey showed that their satisfaction score was high for Post-Operative Nausea more than 98%; but the maternal satisfaction to intra operative pain, post-operative backache was low as it is shown by a relatively low 74.09% and 76.83% respectively. When overall satisfaction level with spinal anesthesia is considered it is found to be 81.40%. 53.66% of patients would choose for S.A in future, and if it is required, 90 (36.59%) would not and 8 patients or 9.8% were not sure. This research study is showing us that patients mostly were satisfied with experience undergoing spinal anesthesia although frequency of postoperative backache was a higher.[16] We in this found that in spinal group 43(79.6%) and general anesthesia group 23(42.6%) females were satisfied, the satisfaction rate in spinal anesthesia group was significantly higher, p-value<0.005. Moreover, other benefits of spinal anesthesia are also reported in literature i.e. women who had spinal anesthesia had significantly less days of hospital stay than those women who had general anesthesia (3.14 ±0.56 VS 4 ± 0.65, p <0.05). Nursery admission was 28% in neonates born with general anesthesia as compared to neonates born under spinal anesthesia i.e 06%. These result show us that S.A is better form of CS anesthesia than general anesthesia, as it is related with

better out comes when shorter duration hospital stay, better fetal Apgar scores and greater maternal satisfaction is considered.[12] The recovery time of mothers was relatively shorter in the group of propofol than in the group of thiopental patients (25 min vs. 31 min, respectively, p = 0.003). This research study shows that Apgar scores have no significant difference irrespective of whichever drug is used for anesthetic induction in women undergoing emergency CS.[11] Artery blood in umbilical cord with pH>7.2 was significantly higher in group A with 93.8% and compared to group B that was 83.8% (p=0.045). It was also found that average pH was much higher in group A than group B reported as 7.38±0.15 vs 7.21±0.16 (p=0.017) respectively. So, this study shows that S.A is related with better neonatal results as compared to G.A in elective cesarean sections.[17]

CONCLUSION

Through the findings of this study we found that at 5 minutes of life there was no significant difference in Apgar score es but maternal satisfaction was significantly higher in group having spinal anesthesia when compared to group having general anesthesia. So, in future we can adopt spinal anesthesia in elective caesarean section to gain more mothers' satisfaction and better fetomaternal outcome.

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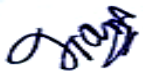
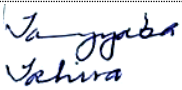
Dr. Iram Shahzadi Medical Officer, Gynecology Fatima Jinnah Medical University, Lahore	Original work, data collection, discussion	
Dr. Tayyaba Tahira Assistant Professor, Gynecology Fatima Jinnah Medical University, Lahore	Data collection, analysis of results	
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