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Original Article

Neonatal Outcomes of Spinal Versus General Anesthesia among Women Undergoing Elective Cesarean Section in Erbil City

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ABSTRACT

Background and aims: General anesthesia and spinal anesthesia are the primary anesthetic techniques for cesarean deliveries. Both the mother and the fetus are affected by each of these anesthestics. Due to its safety profile and advantages for both mother and fetus, the choice of anesthetic procedures for cesarean birth may occasionally depend on the mother's or doctor's request. This study compared how general anesthesia and spinal anesthesia affected newborn outcomes during cesarean delivery.

Methods: A quantitative comparative study on 200 Kurdish women who were undergoing a cesarean section with a spinal anesthesia and general anesthesia preference for mothers or physician was included in a purposive sample carried out in the operating theatre at Maternity Teaching Hospital from 2021 to 2023. The assessment of newborn outcomes related to weight, APGAR score, well and alive status or immediate admission to intensive care unit was done using a questionnaire method. The data interpretation, the statistical program for social science SPSS (version 26), frequency and percentages, mean and standard division was used. For determining the acceptance rate of participants, chi-square test and independent sample t-test with p-value were employed.

Results: the study shows that the most (54%, 44%) of the participants in both groups general and spinal anesthesia were in the age group 20–29 years old, and 35%, 44% were in the group 30-39 years old respectively. 25% of the general anesthesia group held a primary school degree and 30% of the spinal anesthesia group held an institute or university degree. 65% and 45% of the participants in both were in multi-gravity respectively. 87% and 53% responded that the decision to choose types of anesthesia was made by the Physician's request for both groups. A statistically significant difference between both groups general and spinal anesthesia regarding newborn APGAR score in the first and five min P-value 0.007 and P-value 0.017 respectively.

Conclusion: There was a statistically significant difference between both groups regarding newborns alive and well and immediately admitted to the intensive care unit P-value 0.001.

Keywords: Spinal Anesthesia; Cesarean Section; General Anesthesia; Neonate Outcome; APGAR score.

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INTRODUCTION

Today, having children is still regarded as one of the divine favors for human reproduction. Cesarean section (CS) has been utilized to assist moms with high-risk pregnancies in recent years because one of the purposes of the birth control policy is to ensure safe and healthy birthing. [1]. A surgical procedure known as a cesarean section can save both the mother's and the baby's lives. It is crucial to understand the potential public health risks brought on by the overuse of cesarean sections. [2].The overall cesarean section rate in Iraq in 2012 was 24.4%, which was comparable to the rates in the Kurdistan region (25.4%) and Central/Southern Iraq (24.3%). Iraq's cesarean rate is significantly higher than the 10% WHO-recommended rate. From 2008 to 2012, Iraq's cesarean section rates grew sharply, with the Kurdistan region mostly to blame for the rise. [3]In both developed and developing nations, general anesthesia is still frequently used when mothers request this practice. Because the mother refused to employ spinal methods, general anesthetic was used in 20% of cesarean deliveries in England and Wales [4]. General anesthesia was used for elective cesarean deliveries in 5% of reported instances in the United States. About 15% of elective cesarean deliveries in Great Britain, 4% in Belgium, 30% in Spain, 34% in Italy, 10% in Germany, and 44% in the Czech Republic involved general anesthesia. [5, 6]Due to a lack of understanding and common misconceptions about spinal anesthesia, women typically favored general anesthesia. When the mother's or the fetus's life is in immediate danger, this situation becomes even more essential. For many years, general anesthesia was the most often used kind of anesthetic during caesarean sections. Utilizing anesthetics that pass the placental barrier has many benefits, including quicker induction, improved cardiovascular stability with a decreased incidence of hypotension, and good control over ventilation, but it can also result in newborn depression. [7, 8, 9] Spinal anesthesia (SA) has recently seen an increase in caesarean section rates, and is currently the preferred anesthetic method for preventing difficulties for both the mother and the fetus. [10,11]. Spinal anesthesia-related hypotension brought on by sympathetic blockade may have an impact on neonatal short-term outcomes by impairing uteroplacental perfusion, despite numerous studies showing that general anesthesia and spinal anesthesia have nearly identical indexes of neonatal well-being [12]. A growing number of anesthesiologists prefer spinal anesthesia when performing elective procedures. Additionally, headache, nausea, and vomiting may occur as a result of cerebrospinal fluid (CSF) leaking during lumbar puncture [9, 13, 14, and 15]. In several investigations, clinical outcomes such as maternal mortality, postoperative discomfort, and hemorrhage were compared between anesthetic techniques used during caesarean sections. For the majority of caesarean sections (CSs), spinal and epidural anesthesia are preferred over general anesthesia (GA) due to a number of variables, including increased maternal and fetal safety with spinal anesthetic [14, 16]. The danger of unsuccessful endotracheal intubation and aspiration of gastric contents in pregnant women who receive general anesthesia is the main justification for advising regional blocks, even if there is evidence that general anesthesia is linked to an increased requirement for newborn resuscitation [17]. This study aimed to compare fetal outcomes among women undergoing scheduled cesarean section under general and spinal anesthesia. Since the choice of anesthesia for cesarean delivery is very important for both maternal and fetal outcomes.

METHODS

A quantitative comparative study design was carried out to assess the neonatal outcome among women undergoing elective cesarean section under general and spinal anesthesia. The current study was conducted on 200 non-probability purposive pregnant mothers who underwent cesarean section due to elective indications. The data were collected during the period from January/ 25th / 2022 to July / 28th /2022. The patients were divided into general anesthesia (n = 100) and spinal anesthesia (n = 100) groups in the operation room, postoperative and emergency ward at Maternity Teaching Hospital in Erbil City, Kurdistan region, Iraq. It is the only governmental maternity teaching hospital established in 1984 in Erbil City; it contains 200 beds. The maternity hospital has eight main departments including (the consultation department, emergency department, delivery room, operative room, postpartum department, postoperative department, intensive care unit (NCU) neonatal intensive care unit, and high-risk department) which give maternal health care service, especially emergency and special care to all populations of Erbil Governorate. The study commenced during the period from 1st November 2020 to 1st November 2023. After taking oral permission from the participant and inclusion criteria included: primigravida and multigravida pregnant women and their gestational age between 37-42 weeks. Female age 18 and over who were scheduled for elective cesarean section, Kurdish nationality, could communicate properly and accepted to participate in the research. Patients presenting the following were not included in the study: those who had converted to general anesthesia from spinal anesthesia, patients undergoing emergency caesarean section for any reason, those who refused to give informed consent, those refused to participate in this study and women with mental disorders. Questionnaires were applied to gather data that included three parts: first part: Sociodemographic characteristics of pregnant women including age, educational level, occupation, residence, and their body mass index (BMI). Second part: Obstetrical history: this includes the number of gravida, para, miscarriages, gestational age of the fetus by ultrasound report, previous type of anesthesia, number of cesarean section and indication of cesarean section. Third part: Neonatal outcomes such as: weight, APGAR score, well and alive baby and early administration to neonatal care unit and Dead baby. Questionnaires were filled by the researcher in 30-45 minutes. The newborn assessment was made by a pediatrician who was present in the operating room. Information about the newborns existence of meconium, sex of the newborn, his/her weight, first and fifth minute APGAR scores, information about hospitalization in the pediatric clinic and indications for hospitalization was all recorded in the mothers chart. The validity of tools was assessed by a panel of experts from health specialties (maternity and community nursing). A pilot study was done on 20 pregnant women who were not part of the samples for simplicity, objectivity, applicability, and possibility of the tools. It also was carried out to know any difficult situations dealing with providing the tools and to know the period required for the collection of data. Consistency of questionnaires; the p-value significance of the Mann-Whitney U-test was 0.131, which means that there were no statistical differences between the two groups with the same questionnaire. Ethical approval was achieved from the Ethics Committee of the College of Nursing/ Hawler Medical University as the code number is 144 on 7/10/2021.

Permission was obtained from the Director of Health/Erbil. Official permission (written and oral consent) was also obtained from participants. The data were interpreted by using SPSS software for statistical analysis version 26, for calculating descriptive statistical analysis frequency, percentage, mean, and standard deviation. Inferential statistical analysis such as chi-square and independent sample t-tests was used to find the association between variables. The P-value is considered statistically significant if it's ≤ 0.05 which rejects the null hypothesis.

RESULTS

Table 1 shows that the most (54%) of the participants in general anesthesia were in the age group 20–29 years, while 44% in spinal anesthesia were between 30-39 years. Regarding education level, the result indicates that the highest percentage 25% of the general anesthesia group held a primary school degree in comparison with 30% of the spinal anesthesia who held an institute or university degree. The majority of participants 93% and 77% in both groups were housewives respectively. The same table indicates that the highest percentage 54% of women in general anesthesia live in rural areas while 52% of women in spinal anesthesia live in urban areas. Regarding body mass index, the result mentioned that the highest percentage 40% and 38%of women in both groups were in the group of BMI that represent overweight respectively.

Table 1: Socio demographic characteristics of the study sample no. = 200

	Variables	General=100 F (%)	Spinal=100 F (%)
Age (year)	>20	7(7)	4(4)
	29-20	54(54)	41(41)
	39-30	35(35)	44(44)
	40≤	4(4)	11(11)
		Mean (SD) = 27.880 (5.8175)	Mean (SD) =30.090 (6.7136)
Education Level	Illiterate	19(19)	13(13)
	Can read and Write	7(7)	8(8)
	Primary School	25(25)	27(27)
	Intermediate School	17(17)	13(13)
	High School	10(10)	9(9)
	Institution and University	22(22)	30(30)
Occupation	House wife	93(93)	77(77)
	Governmental- employment	6(6)	18(18)
	Student	1(1)	5(5)
Residency	Urban	46(46)	52(52)
	Rural	54(54)	48(48)
BMI	Under weight	8(8)	18(18)
	Normal	39(39)	28(28)
	Over weight	40(40)	38(38)
	Obese	13(13)	16(16)
		P-value= 0.310	

Table 2 reveals that the highest percentages 65% and 45% of the participants in both general and spinal anesthesia were in multi-gravity respectively, also the percentage 60% and47% of both general and spinal group had1-2 Para respectively. Regarding miscarriage, the result indicates that the highest percentage 63% and 51% of the women in both groups had previously miscarriage zero respectively. In addition, over half 68% and 63% of study sample in both general and spinal anesthesia were between 38-39 weeks of gestational age of pregnancy respectively.

Table 2: Obstetric history regarding the spinal and general anesthesia No.= 200

Variables		General Anesthesia F (%)	Spinal Anesthesia F (%)
Gravida	Primigravida	15(15)	22(22)
	Multi gravity	65(65)	45(45)
	Grand multi gravity	20(20)	33(33)
Para	None	21(21)	22(22)
	2-1	60(60)	47(47)
	4-3	16(16)	23(23)
	5 and above	3(3)	8(8)
Previous miscarriage	None	63(63)	51(51)
	3-1	36(36)	47(47)
	4and above	1(1)	2(2)
GA (gestational age)	37Weeks	27(27)	26(26)
	39-38	68(68)	63(63)
	42-40	5(5)	11(11)
Total		100	100

Table 3 revealed the results of the study sample in both groups who had general anesthesia and spinal anesthesia. The highest percentage 87%& 53% responded that the decision to choose types of anesthesia was made by Physician's request for both general and spinal anesthesia. In addition, the highest percentage 56% and 55% of study sample of participant in both groups had previous 1-2 cesarean sections. Regarding the previous spinal anesthesia, the finding showed that the majority 92% and 78% of study sample in both groups did not have the previous type of anesthesia. Otherwise, more than half 65% of the women in general anesthesia have previous general anesthesia, while over half 56% of study sample in spinal anesthesia have previous general anesthesia.

Table 4 indicated that the highest percentage 57% and 43% of participants in both general and spinal anesthesia believe that a previous cesarean section is the main reason for choosing the types of anesthesia by physician.

Table 5 regarding APGAR scores in the first minute, the majority 69% and 85% of newborns had APGAR scores equal or to higher than 7 in both groups of anesthesia. While, in 5 min, the result shows that most 92% and 99% of newborns have their APGAR scores equal to or higher than 7 in general and spinal anesthesia respectively, a statistically significant difference between both groups general and with spinal anesthesia regarding new born APGAR score in the first and five min p- 0.007 and p-0.017 respectively .

Table 3: Distribution of participants according to choose of anesthesia and previous anesthesia No. = 200

Variables		General Anesthesia F (%)	Spinal Anesthesia F (%)
The decision to choose types of anesthesia made by	Mother's request	13(13)	47(47)
	Physician request	87(87)	53(53)
Number of CS (cesarean section)	None	26(26)	38(38)
	2-1	56(56)	55(55)
	4-3	17(17)	7(7)
	5 and above	1(1)	0(0)
Prevoius spinal anesthesia	No	92(92)	78(78)
	Yes	8(8)	22(22)
Prevoius general anesthesia	No	35(35)	56(56)
	Yes	65(65)	44(44)
Total		100	100

Table 4: Distribution of obstetric history regarding indications of current cesarean section No=200

Variables		General Anesthesia F (%)	Spinal Anesthesia F (%)
İndication of Cesarean section	Cpd	16(16)	13(13)
	Oligohydramnious	1(1)	5(5)
	Polyhydramnious	2(2)	0(0)
	Breach presentation	7(7)	6(6)
	previouse cs	57(57)	43(43)
	post date	3(3)	2(2)
	hypertention	4(4)	15(15)
	Diabetese	3(3)	4(4)
	Meconium	(7) 7	5(5)
	tubal ligation	0(0)	5(5)
	Smoker	0(0)	2(2)
Total		100	100

Table 5: Distribution of newborn Apgar scores among study sample

Variables		General Anesthesia F (%)	Spinal Anesthesia F (%)	t-value	P-value
APGAR 1MIN	>7 score	31(31)	15 (15)		
	7≤score	69 (69)	85 (85)	2.725	0.007
Mean (SD)		1.6900 (0.46482)	1.8500 (0.35887)		
APGAR 5MIN	>7 score	8 (8)	1(1)		
	7≤score	92 (92)	99(99)	2.725	0.017
Mean (SD)		1.9200 (0.27266)	1.9900 (0.10000)		
Total		100	100		

Table 6 illustrates that there was the highest percentage 90% and 98%.of newborn in both general and spinal anesthesia with their body weight between 2500-2399mg, There was no a statistically difference between both groups regarding newborn weight p-0.566. The majority 68% and 88% of newborns in both groups were alive and well respectively. There were32% of newborn admission to the neonatal intensive care unit under general anesthesia compared to only 12% under spinal anesthesia. There was a statistically significant difference between both groups regarding newborns alive and well and immediately admitted to the intensive care unit p- 0.001. The same table shows that only 3% in general anesthesia and 1% of spinal anesthesia had fetal death.

Table 6: Distribution of newborn outcomes among study sample No. =200

Variables		General Anesthesia F (%)		Spinal Anesthesia F (%)		t-value	P-value
Wieght	>2500 (mg)	6 (6)		1(1)			
	3999-2500(mg)	90 (90)		98(98)			
	4000 ≤(mg)	4(4)		1(1)		0.575	0.566
Mean (SD)		1.9800	(0.31718)	2.0000	(0.14213)		
Alive And Well	No	32(32)		12(12)			
	Yes	68(68)		88(88)		3.500	0.001
Mean (SD)		0.6800	(0.46883)	0.8800	(0.32660)		
Immediate	No	68(68)		88 (88)			
Admit to NCU	Yes	32 (32)		12 (12)		3.345	0.001
Mean (SD)		0.3100	(0.46482)	0.1200	(0.32660)		
Early Fetal	No	97(97)		99(99)			
Death	Yes	3(3)		1(1)		0579	0.563
Mean (SD)		0.0200	(0.14071)	0.0100	(0.10000)		
Total		100			100		

DISCUSSION

Although there is a global trend towards spinal anesthesia, there is still no unquestionably acknowledged and perfect cesarean procedure, and despite growing knowledge and competence, cesarean delivery still involves higher risks for maternal and neonatal death and morbidity than vaginal delivery. In a UK study by Kolas et al., the spinal anesthetic rate increased from 69.4% in 1992 to 94.9% in 2002. [18]. It is suggested that spinal anesthesia is preferable to general anesthesia in terms of fetal welfare because this is the largest study to examine the effect of anesthetic type for cesarean section on neonatal health. According to the findings of the current study, the majority of moms under general anesthesia were between the ages of 20 and 29, while those under spinal anesthesia were between the ages of 30 and 39. Additionally, the current outcome is remarkably similar to that of the study conducted in India by Vishnuvardhan Reddy and Srikanth Chirra. [19] They performed a prospective, randomized, single-blind trial on 60 pregnant patients with spinal anesthesia class II who were scheduled for caesarean sections with general anesthesia or spinal anesthesia. The participants in a different trial, which involved 64 parturients having elective cesarean sections under spinal anesthesia, were all over

the age of 18 and under the age of 40. This study was conducted in an Indian medical college. The current study's findings showed the majority of the participants in both groups were housewives respectively. On the one hand, our research showed that newborns exposed to general anesthesia were more likely than those exposed to Spinal anesthesia to have APGAR scores of 7 at the first and fifth minutes and to be admitted to the intensive care unit. The APGAR scores of 7 at the first minute were higher in emergency cesarean section cases when the same newborns were evaluated according to whether they were delivered as an emergency or electively. However, newborn morbidity was not categorized in accordance with the cesarean section indication. Therefore, our findings imply that the emergency nature of the procedure and the rationale for the cesarean section surgery may have an impact on the majority of unfavorable newborn outcomes associated with general anesthesia. Al- Husban et al [20] investigated both elective and emergency cesarean section procedures and found that there was no significant difference in the elective category12 and that the APGAR scores were higher in emergency category cases that had spinal anesthesia as opposed to those who received general anesthesia. In contrast spinal anesthesia had a better impact on APGAR scores in elective cesarean section than general anesthesia, according to Mancuso et al. and Sayg et al. [21]. This result is consistent with research by Taşgöz et al. [22]. There were substantially more newborns in the general anesthetic group than the spinal group who had an APGAR score of less than seven during the first and fifth minutes of life. The current study, which involved 3599 cesarean sections and was conducted in Amman, Jordan, is in contradiction with another retrospective comparative study by Naser Al-Husban et al [20]. (Emergency and elective categories). In the emergency category, the mean APGAR score was statistically higher under spinal anesthesia than under general anesthesia (P-value < 0.001 and 0.026, respectively), but there was no discernible difference in the elective category. The present study illustrates there were statistically significant difference between both types of anesthesia regarding neonatal intensive care admission. Spinal anesthesia is associated with better neonatal outcomes than general anesthesia, according to research by Mitra et al [23], which was conducted in West Bengal, India during elective Caesarean deliveries.

CONCLUSION

According to the present research, newborns exposed to general anesthesia were considerably more likely than those exposed to spinal anesthesia to have APGAR scores of <7 in the first and fifth minutes and to be admitted to the intensive care unit. In addition to avoiding the hazards associated with a general anesthetic, such as the chance of unsuccessful intubation and its repercussions, spinal anesthesia is the preferred method for caesarean deliveries. The better fetal and maternal outcomes of spinal anesthesia also make it appear to be a preferable choice. However, cesarean deliveries continue to be performed under both spinal and general anesthesia.

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CONFLICT OF INTEREST

The authors have no conflict of interest.

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