

COMPARISON BETWEEN EFFECT OF GENERAL AND SPINAL ANESTHESIA ON APGAR SCORES IN THE NEONATES DELIVERED BY ELECTIVES CESAREAN SECTIONS

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ABSTRACT

Delivering of the pregnant woman by the caesarean section, become increasingly common, caesarean section deliveries account for (25 to 30) % (range 1.8-40.5 %) of deliveries nationally and internationally, despite that most patients undergoing cesarean section included healthy and young; who represent a more risk groups of patients. Selection of an appropriate anesthesia (either general anesthesia or regional which include spinal or epidural) for cesarean section has studied for a longtime and depend on several factors.

This, study was conducted to comparing effect of both spinal and general anesthesia on the newborn fetus by caesarean section through monitoring of Apgar score of the newborn.

A prospective randomized study, 60 pregnant women (36-40 weeks gestational age) planned for elective caesarean section were divided into two group as (A&B) groups, (group A 30 cases) receiving general anesthesia, (group B 30 cases) receiving spinal anesthesia, after the delivery of fetus Apgar score was recorded at 1st, 5th and 10th minute, with proper resuscitation was done if needed.

Apgar score was statistically higher scores at 1st, 5th minutes in general anesthesia compared to spinal anesthesia. Neonatal Apgar score of whose mother receiving spinal anesthesia was better than neonate, who mother receiving general anesthesia.

Keywords: Apgar score, spinal anaesthesia, general anaesthesia.

INTRODUCTION

Delivering of pregnant women by caesarean section becomes increasingly common, caesarean section deliveries account for 25% to 30% (range 1.8%-40.5%) of deliveries nationally and inter-nationally (Longnecker *et al.*, 2012).

According to the Iraq Multiples Indicator Cluster Survey, 2006 about 20% of births were delivered by caesarean section (Central Organized for the Statistic and Information Technology, 2006). Obstetrician anesthesia requires special skills because this procedure involves two lives [mother and fetus] (Imtiaz *et al.*, 2010), Despite that many patients underwent cesarean section are young and healthy; they represent a high-risk group of patients (Wu 2006).

Since a long time Selection of an appropriate anesthesia (either general anaesthesia or regional which include spinal or epidural) for cesarean section have been discussed and depends upon several factors which includes the maternal status; patient's tendency; surgical indications; emergency status and so, with regard to that's effect on blood flow of uterus; and its effect on placental perfusion pressure which can be affects the out-come of uterine vascular resistance and pregnancy (Rasooli *et al.*, 2014) for cesarean delivery, choosing appropriate anesthetic technique depends also on obstetric maternal and fetal factors; and the expecting duration time of the operation playing important role in choosing of best technique for anaesthesia; although each method of anesthesia for cesarean section has advantage and dis-advantage to both neonates and mothers and may be result in short- and long- term that effect on the neonates (Yegin *et al.*, 2003) , so as a result to the factors mention above the aim of anaesthetist is selecting the appropriate methods that was most comfortable and safest for the pregnant, Less

depressant to the fetus and also provides the obstetrician with optimal working conditions (Wiswell , 2000).

Internationally, obstetrics Guidelines recommended regional type of anaesthesia (epidural and spinal anesthesia) for cesarean sections practice guidelines for obstetric anesthesia 2007 (Cyna and Dodd, 2007).

The intubation failure risk of and gastric contents aspiration of in pregnant women under general anaesthesia are the primary reasons to recommending regional blocks (Algert *et al.*, 2009), that was reported as the main important causing of maternal mortality due to anesthesia with increased rates of 16.2 times greater than spinal anesthesia (Chestnut *et al.*, 2009). Despite that, in top emergency cases; general anesthesia could be considered as faster anesthetic method (Rasooli *et al.*, 2014). Although in spinal anaesthesia, the fetus was not exposing to the depressant effect of some anesthetic drugs; but increase rate of the incidence of hypotension after the spinal anesthesia that is leading to the decreasing in uteroplacental blood flow also impairment in perfusion that can has side effect on the fetus; so can be mention that drugs threat effect on fetuses in two ways; indirectly via maternal physiological and biochemical change which is most important, if hypotension occur and not treated properly and directly by crossing via placental transmission such a way which using in general anesthesia, and these effect was very negligible in the spinal anesthesia (Reynolds & Seed , 2005) .

APGAR scores were the best parameter to assessing immediately the condition of the new-born baby (Brown, 1995, Drowning *et al.*, 1997).

In the 1952, Dr. Apgar discovered scoring system that was considers rapid methods of assess the clinical status of newborn infants at 1stminute of age, so need for prompting intervention for established breathing

(Apgar, 1953). This scoring system provided good evaluation for the newborn. The Apgar score comprises five components: heart rate; reflexes; color; muscle tone and respiration, each these five-component was got a score of zero; one; or two. Thus, the Apgar score quantitates clinical sign of neonatal depression, as bradycardia; cyanosis or pallor; depressed reflex response to stimulation; hypotonia and apnea or gasping respirations. The score was reporting at (first and fifth) minutes afterbirth for all newborns and at five minutes intervals; after then until the twenty minutes for the newborns with a score less than seven (American Heart Association and Academy of Pediatrics, 2011 and The Apgar score, 2015).

Immediately after birth; Apgar score regarded as suitable methods for reporting the status of the newborn infant and their response to resuscitation if its needed, a five-minute Apgar scores of (seven - ten) is considered normal. Scores of four, five, and six are intermediate and are not considered to be a marker of increasing the risk of the neurologic dysfunction. An Apgar score of 0-3 at five minutes may be correlating with neonate's mortality but alone doesn't predict later neurologic dysfunction. The Apgar score is affecting by multiple factors which include: gestational age, maternal medications, resuscitation, and cardio-respiratory and neurologic conditions; other factors needing to be considered when defined an intra partum hypoxic – ischemic event as causing cerebral palsy, such as umbilical arterial blood gases (The Apgar Score, 2006).

Current study is conducting for comparing the effect of both spinal and general anaesthesia on the newborn fetus by caesarean sections through monitoring of Apgar score of the newborn.

PATIENT AND METHOD

A prospective randomized study was carried in Baghdad Teaching Hospital in a period from October 2016 till April 2017. A total 60 pregnant women (36-40 weeks gestational age) planned for elective caesarean section were dividing into two groups, group A: 30 cases received general anesthesia, whereas group B: 30 cases received spinal anesthesia.

In the general anaesthesia group, the patients were positioned with the table left tilted or with wedge under the right hip, that provide a lateral tilt of at least 15 degrees (to prevent aortocaval compression) after preoxygenation via facemask 100% O₂ for 3 minutes, anaesthesia was induced with ketamine 0.5mg/kg, thiopentone 3mg/kg, followed by muscle relaxant Atracurium 0.5mg/kg used for facilitating tracheal intubation, tracheal intubated was done with appropriate size endo-tracheal tube within one minute. Patients were adequately ventilated and anaesthesia maintained with 1.25 isoflurane and oxygen 100%. Atracurium 0.1mg/

kg was used as additional dose if needed. ECG, Blood pressure, SpO₂ and end tidal CO₂ monitored throughout the surgical procedure. The newborns were delivered maximum within 5 minutes of skin incision, and newborn was evaluated by a paediatrician using 1, 5 and 10 minutes Apgar scoring, Oxytocine 20units, fentanyl 0.5mg /kg, midazolam 2mg and paracetamol vial 1gm were given to the mother and at the end of the procedures; muscle relaxant was reversed by using atropine and neostigmine.

Regarding group B prepared for spinal anaesthesia by giving crystalloid 1000ml, the patients was placed in sitting position and (L3-L4) or (L4-L5) intervertebral space was used, needle size used was ranging between (G22 and G24), with the lumbar puncture done in median approach. Whenever it was difficult, para median approach was an alternative, bupivacaine 0.75 (1.5ml) was injected, then the patient is placing in recumbent position shortly after the spinal injection with slight Trendelenburg, Oxytocine 20units was given to the mother after delivery of the fetus. Any hypotension was treated with ephedrine in 3 mg increments doses, ECG, blood pressure, and SpO₂ were monitored throughout procedure. Induction delivery interval after the delivery of the fetus Apgar score was noted at 1st, 5th and 10th minutes intervals and proper resuscitation was done if it was needed.

STATISTICAL ANALYSIS: The continuous variable data was expressed as Mean \pm SD (standard deviation) and categorical variables are presented as absolute numbers with range. T-test was used to compare Mean \pm SD (standard deviation) of continues variables such as age, gestational age and body weight, while Chi-Square and Mann Whitney tests were using for comparing categorical data. The (p) value as < 0.05 that considers as significantly. All statistical of analysis done using Graph-Pad: InStat, Version (3.0).

RESULTS

All patients with pregnancy who were advised to undergo Cesarean section were admitted in the Department of Gynecology and Obstetrics in medical city and were evaluated properly and pre-pared for elective caesarean section, the characteristics about patient demographics, including age, obstetrics history and gestational age were comparing between 2 study Groups and results are summarizing in Table-1. Values of age of patients in years and gestation age in weeks are expressed as (Mean \pm SD); results of this study showed that the baseline fetcher in both study groups are comparable ($p>0.05$).

Regarding maternal age and gestational age; between the 2 groups; there was not statistically significant differencing.

Table 1: distribution the patients with pregnancy according to maternal age and gestational age.

	Group(A) (No. = 30)		Group(B) (No. = 30)		P
	Means	S.D	Means	S.D	
Maternal age (by year)	29.5	± 5.96	33.4	± 4.9	0.799
Gestational age (week)	37.56	± 1.09	37.50	± 0.80	0.692

The Apgar score values at first minute, in the A- group was 5.1, whilst Apgar score in B-group at first minutes was 7.20.

Means Apgar score and at the 5th minute

was (6.78), while mean Apgar score in group B at fifth minutes was 8.60, mean Apgar score at tenth minutes in group A was 8.0, while mean Apgar score in group B was 9.50.

Table 2: Newborn outcome, Apgar score 1st, 5th and 10th min.

	Group (A) (No. = 30)		Group (B) (No. = 30)		P
	Mean	S.D	Mean	S.D	
Apgar score at 1 st min.	5.1	±2.31	7.20	±1.70	<0.026
Apgar score at 5 th min.	6.78	±1.64	8.60	±1.23	<0.013
Apgar score at 10 th min.	8.0	±1.33	9.50	±0.51	<0.023

There was statistically difference in both groups regarding Apgar score in 1st, 5th Apgar score as illustrated above in the table in regard to P-value, and there was no statistically difference regarding 10th minutes Apgar score.

DISCUSSION

During pregnancy period, it is an important factor that the health condition of fetus must be monitored continuously to know its condition of the health (Shamira and Tamilselvi, 2016).

Regional anesthesia (regarding spinal or epidural anaesthesia) is highly recommended nowadays for the pregnant over general anesthesia being safer for both mother and the neonate, providing the mother to be awake, so immediately interacted with the neonates (Abdallah *et al.*, 2014).

The results of current study were indicating the first and fifth minutes Apgar score of neonates in the group of spinal anesthesia was best than groups of general anesthesia, but there were no significantly differencing in tenth minutes Apgar scores.

Our results in comparison to other studies were almost the same in study was done by Nafie and Ismail (2015). There were significant differences between the effects of (general and spinal) anesthesia on Apgar score of neonates at 1 minute and 5 minutes interval, born after full term elective cesarean section of 100 healthy patients study between 2014-2015 (Nafie and Ismael, 2015).

Martin and Bell (2010) retrospective study included the period (2000 – 2003) which carried out in hospitals and included a number of 948 healthy women planned for elective cesarean sections, compared 64 case under went spinal anesthesia; also 425 case; underwent general anesthesia one and five minute Apgar scores and care in neonatal intensive care unit (NNICU); was investigating as well as these results showing that newborns whose mothers had cesarean section under spinal anesthesia, one (1st) and five (5th) minutes Apgar scores were more than those who underwent general anesthesia; and the difference was significant. The same results were observed in our study.

Whereas studies done by *Lucas et al.*, (2000) babies born through Cesarean surgeries with General anesthesia method, the Apgar score of minute one was significantly lower than Spinal anesthesia (anaesthesia

for caesareans sections; 2007). The same in compare to our study regarding first minutes Apgar score.

Yegin et al., (2003) reported the first and fifth minute Apgar scores of neonates in the general anesthesia groups were less than regional anesthesia groups; and the difference of fifth minute Apgar score were Significant. The same as current study in regard to (first & fifth) minutes Apgar score.

Evans et al., (1989) showed that the 1st and 5th Apgar scores of neonates delivering by general anesthesia were less than neonates delivering from mothers, undergone elective cesarean section by the regional anesthesia which including epidural and they concluding that general anesthesia, more than aortocaval or asphyxia compression, was important responsible for the most of the depression of neonate that delivering by the cesarean section (Lucas *et al.*, 2000).

CONCLUSION

Apgar score of neonate whose mother under-went spinal anaesthesia was bested than neonate whose mother underwent the general anaesthesia at the 1st minute and 5th minutes interval.

SIGNIFICANT STATEMENT

- In future, we recommend using spinal anaesthesia with sedation and compare the neonatal outcome with mother receiving spinal anaesthesia without sedation.
- Comparing study effects of epidural anaesthesia on the neonatal outcomes with general anaesthesia.

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