

Effect of General Anesthesia On Apgar Score In Relation To Induction-Delivery and Uterine-Delivery Interval

Saad Ismaiel Mohammad

Department of Anesthesia, College of Health and Medical Technology, University of Baghdad, Baghdad, Iraq

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Abstract

The anaesthetic drugs technique used in caesarean section should prevent fetal depressant resulting from passing of drugs through the maternal-placental barrier which can lead to adverse effects such as decreasing in Apgar score and respiratory depression in new born neonates. Apgar score is the first test given to newborn after delivery by caesarian section or normal vaginal delivery to evaluate a newborn physical condition after delivery and to determine any immediate need for extra medical or emergency care. To determine the effect of general anaesthetic drugs on the Apgar score of newborns in relation to the induction-delivery interval and uterine delivery interval. One hundred healthy full term pregnant women underwent elective C/S, on left lateral position the pre induction with 100% oxygen by face mask, then start induction with minimum dose of Thiopentone (3mg/kg) with ketamine (1mg/kg), followed by non-depolarization muscle relaxant atracurium(0.5 mg/kg). Endotracheal intubation was done and maintenance of anaesthesia with oxygen, 0.5% Halothane and atracurium (0.1 mg/kg) till the end of surgery. Neostigmine (2.5 mg) and atropine (1.2mg) was given as antidote. During operation the heart rates, blood pressures and oxygen saturation (pulse oxymeter) were monitored. Oxytocin (20 units) or ergometrine (0.8 mg) is injected intravenously after clamping the cord, then (tramadol 75 mg + midazolam 5mg) was given. Induction- delivery interval and uterine-delivery interval was noted using a stopwatch. After delivery the baby's Apgar score was noted at 1, 5 and 10 min. and proper resuscitation was done. Low Apgar score and low to moderate score at one minute was found when induction –delivery interval up to five minutes and more than 10 minutes also low and low to moderate score of infants when uterine – delivery interval more than 120 seconds. One minute Apgar score of infants were affected by induction-delivery time (≤ 5 min and > 10 min) and uterine –delivery interval (>120 sec).

Key words: caesarean section, Apgar score, induction- delivery interval, uterine delivery interval

المخلص

اجريت هذه الدراسة لمعرفة تأثير ادوية التخدير في العمليات القيصرية على نتيجة حساب الابكار من خلال حساب الوقت من اعطاء التخدير لحين ولادة الطفل وحساب الوقت من الشق الرحمي الى فترة تسليم المولود. تم اعطاء التخدير العام لمدة من النساء الخاضعات للعمليات القيصرية ثم تم حساب الوقتين المذكورين مع حساب نتيجة الابكار خلال دقيقة، خمس دقائق وعشر دقائق. اظهرت نتيجة الدراسة ان نتيجة الابكار قلت عندما كان الوقت من اعطاء التخدير لولادة الطفل اكثر او يساوي خمس دقائق او اكثر من عشر دقائق كذلك كانت نتيجة الابكار ايضا قليلة عندما كان الوقت المحسوب من الشق الرحمي لحين تسليم المولود اكثر من مائة وعشرون ثانية.

Introduction

Delivery of baby by caesarean section has become increasingly common. Obstetric anaesthesia requires special skills because two lives are involved (mother and infants) ⁽¹⁾. Induction of general anaesthesia (GA) in caesarean surgeries and the use of anaesthetic drugs is one of challengeable issues among anaesthesiologists ⁽²⁾. The anaesthetic technique should prevent maternal awareness while providing adequate oxygenation for her fetus and avoiding depressant effects of anaesthetic drug when passing through the maternal-placental barrier which can lead to adverse effects such as decreasing in Apgar score and respiratory depression in new born neonates ^(3 & 4). New-borns products of C/S can be assessed clinically using the Apgar score which was devised in 1952 by Dr. Virginia Apgar and used it to evaluate the health of new-born and assess the effects of obstetric anaesthesia on new-born at birth. It consists of 5 items to be evaluated at 1, 5 and 10 minutes after birth; those items are heart rate, breathing, muscle tone, reflex irritability, and colour ^(5 & 6). Five minutes score is regarded as the better predictor of survival in infancy in the long term where as the one -minute score definitely has the value for assessing the effects of different drugs given to the mother during the caesarean section ⁽⁷⁾. Apgar scores 4 or below are considered critically low while 4 to 6 are fairly low and 7 to 10 generally normal ⁽⁶⁾.

Aim of Study

Determine the effect of general anaesthesia on the Apgar scoring of new-borns in relation to the induction delivery interval and uterine delivery interval.

Material and Methods

The study was carried out at Al Salama Private Hospital- Baghdad / Operation theatre in a period from November 2011 till March 2012. A total 100 healthy full term pregnant women (36- 40 gestation weeks) planned for elective

C/S were included in this study. Patients were investigated and selected on the basis of criteria laid by the Committee of American Society of Anaesthesiologists (ASA) grade I. Women of intra-uterine fetal growth retardation or malformation or of expected low birth weight were excluded from this study. All patients should never take analgesic or sedative drugs before operation. The patient is positioned with the table tilted or with a wedge under the right hip. This should produce a lateral tilt of at least 15 degrees. The patient should be pre-oxygenated with 100% oxygen via a face mask for 3 minutes before induction. Intravenous induction by Minimum dose of Thiopentone (3mg/kg) with ketamine (1mg/kg), followed by non-depolarization muscle relaxant atracurium (0. 5 mg/kg). Endotracheal intubation then done and after it anaesthesia was maintained with oxygen and 0.5% Halothane with atracurium (0. 1 mg/kg) till the end of surgery. The action of the latter was reversed by antidote neostigmine (2.5 mg) and atropine (1.2 mg). Heart rates, blood pressures and oxygen saturation (pulse oxymeter) were monitored during operation. Once the umbilical cord is clamped, oxytocin (20 units) or ergometrine (0.8 mg) is injected intravenously to contract the uterus then (tramadol 75 mg + midazolam 5mg) was given. Induction-delivery interval {the time interval from the beginning of induction with anaesthesia to the delivery of the baby (I-D)} and uterine-delivery interval {the time interval from the uterine incision to the delivery of the baby (U-D)} was noted using a stopwatch ⁽⁸⁾. After delivery the baby's Apgar score was noted at 1, 5 and 10 min. and proper resuscitation was done.

Results

Forty-three patients had induction- delivery interval up to 5 min. Fifty-one had an interval between 6-10 min and six had an interval 10 min. as shown in (Table 1). When I- D interval up to 5 min the Apgar scoring done at the end of 1 min in new-borns revealed that two infants had low score (0-3), thirty-eight

infants had low to moderate Apgar score (between 4 and 6) and three infants had high score (7-10), when I-D interval was 6-10, one new-born infant had 0-3 score, ten infants when score (4-6) and forty had high score. When I-D interval was 10 the number of new-

borns that had low scoring (0 - 3) was four and two new-borns had low to moderate Apgar score (4-6). Regarding 5 and 10 min Apgar score all the new-born infants achieved high score (7-10).

Table (1) :- Induction – delivery interval following general anaesthesia and Apgar score in new-borns

Induction delivery interval (min)	No. of cases	Apgar score at 1 min			Apgar score at 5 min			Apgar score at 10 min		
		0-3	4-6	7-10	0-3	4-6	7-10	0-3	4-6	7-10
Up to 5	43	2	38	3	-	-	43	-	-	43
6-10	51	1	10	40	-	-	51	-	-	51
>10	6	4	2	-	-	-	6	-	-	6
total	100	7	50	43	-	-	100	-	-	100

According to (Table 2) Forty-three patients had uterine-delivery interval of more than 120 seconds and rest of the cases had less than 120 seconds. When U-D interval <120 there is no new-born with Apgar score (0-3), fifty one new-borns has score (4-6) and only six had high score; while when U-D interval >120 the

new-borns that achieved the low Apgar score (0-3) was 6 and those of low to moderate score (4-6) was 37. After 5 and 10 minutes all neonates had high Apgar score (7-10)

Table (2):- Uterine- delivery interval following general anaesthesia and Apgar score.

Uterine delivery interval (sec)	No. of cases	Apgar score at 1 min			Apgar score at 5 min			Apgar score at 10 min		
		0-3	4-6	7-10	0-3	4-6	7-10	0-3	4-6	7-10
<120	57	-	51	6	-	-	57	-	-	57
>120	43	6	37	-	-	-	43	-	-	43
total	100	6	88	6	-	-	100	-	-	100

Discussion

The influences of general anaesthesia on neonates after elective caesarean section deliveries determined by obstetrician preferences and skill of the anaesthetics⁽⁹⁾. When I-D interval was up to 5 min there was two infants with low Apgar score and thirty-eight infants with low to moderate score this agree with study done by (kamat et al)⁽¹⁰⁾, This can probably due to the effects of the general anaesthetic drugs crossing the placenta and affecting the neonate. As thiopental is a lipid soluble and cross the placenta, reached umbilical venous blood within 30 sec. and reaches its peak concentration in 1-3 min⁽¹¹⁾ also the drugs level in increased because of compression of the cord and absent of uterine contraction. When I-D interval was 6-10, one new-born infant had 0-3 score, ten infants when score (4-6) this because the level of drug falls as result of redistribution, metabolism and excretion between maternal and fetal circulation⁽¹²⁾. When I-D interval was > 10 the number of new-borns with low scoring (between 0 to 3) was four and two had low to moderate Apgar score (4-6) same result found by (Martin et al)⁽¹³⁾. This may be due to higher degree of fetal acidosis as a result of longer duration of anaesthesia⁽¹⁰⁾. The neonates of mothers having uterine delivery interval of more than 120 second showed low and low to moderate Apgar scoring. (Zhao)⁽¹⁴⁾ found that interval more than 150 cause low score while (Martin et al)⁽¹³⁾ found that the 3 min interval cause low score. The low Apgar scoring at 1 min. may be the result of laryngeal spasm induced by aspiration of liquor or blood during intrauterine manipulation⁽¹⁵⁾. The level of circulating catecholamines increase during general anaesthesia this evoked by handling the uterus causing a reduction in placental blood flow⁽¹⁶⁾ leading to acidosis this occurs when uterine-delivery interval is prolonged.

Conclusion

New-borns infants with induction-delivery time (≤ 5 min and >10 min) and uterine – delivery interval (>120 sec) had low and low to moderate Apgar scores at one minute on

other hand all babies born were improved and show satisfactory Apgar score at 5 minute and 10 minutes interval after resuscitation (oxygenation and oral suction).

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