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Faculty of Graduate Studies

Effect of Spinal and General Anesthesia over Apgar score and blood PH of umbilical cord in Neonates Born after Elective Cesarean Section in Jenin governmental hospital

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الإهداء

بسم الله الرحمن الرحيم

(قل اعملوا فسيرى الله عملكم ورسوله والمؤمنون)

صدق الله العظيم

إلهي لا يطيب الليل إلا بشكرك ولا يطيب النهار إلى بطاعتك .. ولا تطيب اللحظات إلا بذكرك ..

ولا تطيب الآخرة إلا بعفوك .. ولا تطيب الجنة إلا برؤيتك

الله جل جلاله

إلى من بلغ الرسالة وأدى الأمانة .. ونصح الأمة .. إلى نبي الرحمة ونور العالمين..

(سيدنا محمد صلى الله عليه وسلم)

الي من كلله الله بالهيبة والوقار ...الي من علمني العطاء بدون انتظار ...الي من أحمل أسمه

بكل افتخار...أرجو من الله أن يمد في عمرك لتري ثمارا قد حان قطافها بعد دول انتظار وستبقي

كلماتك نجوم اهتدي بها اليوم والغد والي الابد

(والدي العزيز)

الي ملاكي في الحياه ...الي معني الحب والي معني الحنان والتفاني ...الي بسمة الحياه

وسر الوجود

الي من كان دعائها سر نجاحي وحنانها بلسم جراحي الي اغلي الحبايب

(أمي الحبيبة)

الي توأم روحي ورفيقه دربي ... الي صاحبه القلب الطيب والنوايا الصادق ...

الي الروح التي سكنت روحي...بيا من رزقني الله بكي يا اجمل واروع نعمة اعطاها الله الي يا

بسمة رسمت علي شفاهي

يا نور عيني ومصباح طريقي يا شمعة أضاءت ظلام حياتي يا من تملأ قلبي بحبكي لي وتملأ حياتي بفرحي معك

(زوجتي الغالية)

الي اجمل هديه من الله عز وجل ...يا من ابتسامتك تنسيني تعب الحياه

(ابني الحبيب)

الي من حبهم يجري في عروقي ويلهج بذكراهم فؤادي الي أخواتي وأخوتي

الي الأخوة التي لم تلدهم امي...الي من تحلو بالإخاء وتميزوا بالوفاء والعطاء الي ينابيع الصدق الصافي الي من معهم سعدت، وبرفقتهم في دروب الحياه الحلوة والحزينة سرت الي من كانوا معي علي طريق النجاح والخير.. الي من عرفت كيف اجدهم وعلموني ان لا اضيعهم

(اصدقائي)

الي من علمونا حروفا من ذهب وكلمات من درر وعبارات من أسمي وأجلي عبارات في العلم الي من صاغو لنا علمهم حروفا ومن فكرهم مناره تنير لنا سيرة العلم والنجاح الي أساتذتنا الكرام

إلي الصداقة التي تدوم للأبد

الشكر والتقدير

في مثل هذه اللحظات يتوقف اليراع ليفكر قبل أن يخط الحروف ليجمعها في كلمات... تتبعثر الأحرف وعبثاً أن يحاول تجميعها في سطور

إلى من وقف على المنابر وأعطى من حصيلة فكره لينير دربنا، الدكتورة عايده القيسي، د. مريم الطل، د. نجي نزال، جزاهم الله عنا كل خير فلنا منهم كل التقدير والاحترام

سطوراً كثيرة تمر في الخيال ولا يبقى لنا في نهاية المطاف إلا قليلاً من الذكريات وصور تجمعنا برفاق كانوا إلى جانبنا، فواجب علينا شكرهم ووداعهم ونحن نخطو خطوتنا الأولى في غمار الحياة.

ونخص بالجزيل الشكر والعرفان إلى كل من أشعل شمعة في دروب عملنا

إلى الذين كانوا عونا لنا في بحثنا هذا ونورا يضيء الظلمة التي كانت تقف أحيانا في طريقنا التفاؤل في دربنا وقدموا لنا المساعدات والتسهيلات والمعلومات

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الإقرار

أنا الموقع ادناه، مقدم الرسالة التي تحمل العنوان:

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Effect of Spinal and General Anesthesia over Apgar score and blood PH of umbilical cord in Neonates Born after Elective Cesarean Section in Jenin governmental hospital

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أقر بأن ما اشتملت علية هذه الرسالة انما هو نتاج جهدي الخاص، باستثناء ما تمت الإشارة اليه حيثما ورد، وأن هذه الرسالة كاملة، أو أي جزء منها لم يقدم من قبل لنيل أي درجة أو لقب علمي أو بحثي لدى أي مؤسسة أو بحثية أخرى

</div>

Declaration

The work provided in this thesis, unless otherwise referenced, is the researcher's own work, and has not been submitted elsewhere for any other degree or qualification.

Student's Name: إسم الطالب:

Signature: التوقيع

Date: التاريخ:

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List of Abbreviations

GA	General Anesthesia
APGAR	**A**ppearance, **P**ulse, **G**rimace, response, **A**ctivity, and **R**espiration
C/S	Cesarean Section
PH	potential of hydrogen
NICU	Neonatal Intensive Care Unit
CD	Cesarean Delivery
USA	United Stat of America
CDMR	Cesarean Delivery On Maternal
UK	United Kingdom
ECG	Electrocardiograph
SA	Spinal Anesthesia
ASA	American Society of Anesthesiologist
PCO2	Partial Pressure of Carbon Dioxide
HCO3	Bicarbonate
PO2	Partial Pressure of Oxygen
N	The size of the Populations
Z	Class standard corresponding to the level of significance (0.95) and is equal to (1.96)
Q	The error rate is equal to (0.05)
P	Ratio provides a neutral property and equal (0.50)

Definitions of terms:

Regional anesthesia: Is a form of local anesthesia in which an anesthetic agent is injected around nerves so that the area supplied by these nerves is anesthetized, (Smeltzer& Bare, 2006).

APGAR score: Is a test performed to evaluate the physical condition of the newborn at birth; the newborn baby is rated 1minute after birth and again at 5 minutes, (London et al., 2006).

General anesthesia (GA): Is the state produced when a patient receives medications for amnesia, analgesia, muscle paralysis, and sedation. An anesthetized patient can be thought of as being in a controlled, reversible state of unconsciousness,(Smeltzer& Bare, 2006).

Cesarean section: Is the birth of the infant through an abdominal and uterine incision, (London et al., 2006).

PH: A measure of the acidity or alkalinity of water soluble substances (PH stands for potential of Hydrogen' .A Ph value is a number from 1 to 14, with 7 as the middle (neutral) point. Values below 7 indicate acidity which increases as the number decreases, 1 being the most acidic .Values above 7 indicate alkalinity which increases as the number increases .14 being the most alkaline. It is algorithmic scale in which two adjacent values increase or decrease by factor of 10, (PH scale, 2017).

Newborn: A human infant from the time of birth to the 28th day of life, (London et al., 2006)**.**

Gestation week: The number of weeks of pregnancy since the first day of the last menstrual period, (London et al., 2006).

Spinal anesthesia: is an invasive anesthetic procedure as insertion of spinal needle between lumbar vertebrae (3-4 or 4-5) levels to inject local anesthetic intrathecal space (subarachnoid) to block sensory and motors from fourth thoracic to fourth sacral dermatomes, leads to sympathetic block out flow (sensory and motors) .Its most early complications is hypotension due vasodilatation vessels ,so patients should be receive bolus intravenous fluids mostly crystalloids before procedure 20ml/kg, (John Nagelhout, 2010).

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Abstract

Introduction: During pregnancy many physiological changes happens to prepare mother for labour and delivery, and developing of the fetous include renal vasodilatation, cardiac changes, renal plasma flow and glomerular filtration rate both increase. There is a rising in the number of woman underwent caesarean section, and this was noted in all over countries in the world. Different anesthetic method can be used to perform the C/S, as general or regional. The choice of anesthesia for cesarean section depends upon indication for operation, its urgency, or patients, obstetrician and anesthesiologist preferences.

Aim: To compare the effect of general anesthesia and spinal anesthesia on Apgar score and umbilical cord PH to newborns baby to patients undergoing elective C/S.

Material and methods: interventional study was used, to investigate which anesthesia type (spinal or general) have minimal or no effect over umbilical cord PH and Apgar score baby born after elective caesarian section. It was done in Jenin Governmental Hospital, in operation ward and recovery room. Randomization technique was used in this study. The

sample size was (103) dividing in two groups 53 participants in G/A and 50 participants in spinal anesthesia. The following information was obtained from medical records for analysis: Demographic data , type of anesthesia ,obstetric factors gender, past medical history to mothers, past surgical history, newborn status, Apgar score to baby, Blood analysis PH: which taken from arterial cord blood. The neonatologist do assessment to baby, and researcher sent PH sample to analysis.

Result: Regarding result in the study showed that the average of Apgar score at one minute in G /A group was 7.4 ±.94, in spinal anesthesia was 8.3±1.01 (p< 0.001). The average of Apgar at minute 5 in General anesthesia group was 9.9±0.26, and in Spinal anesthesia was 9.9±0.44 (p=0.95). Umbilical artery blood PH of umbilical cord blood sample of newborns in general anesthesia group was acidosis or alkalosis 11.5% and 3.8% respectively ,while it was in spinal anesthesia group acidosis and alkalosis (2.1% and 0.0%) respectively.

Conclusion and recommendation: Spinal anesthesia is safer than general anesthesia, for both mother and fetus; it's associated with better neonatal out come as compared to general anesthesia. Apgar score and PH is a reliable predicator for neonate outcome. Umbilical cord arterial blood gases should be taken immediately after delivery from the umbilical cord to newborn has low Apgar score. One minute Apgar score in spinal anesthesia group was better and fetal acidosis was lower than general anesthesia group.

Chapter One
Introduction

Introduction

During pregnancy many physiological changes happens to prepare mother for labour and delivery and at the same time for the developing of the fetous include renal vasodilatation, cardiac changes , renal plasma flow and glomerular filtration rate both increase as recorded by Pillay et al in (2016). Also many hormones like progesterone and estrogen have an important role connected with other hormones in pregnancy, and have a strong effect involves endocrine and metabolic changes on the mother and fetus,(Kumar and Magon,2012)

Jurdi and Khawaja in (2004) reported that there is a rising in the number of woman underwent caesarean section, and this was noted all over the world. Also Wang et. al (2017) mentioned that the rate of C/S raised from 2004 to2008. The average was 25.7%, with 27.3% in Asia, 19.0% in Europe and 29.2% in Latin America. In Palestine the rate of C/S increased from6.0% in 1996 to 14.8% in 2006. The rational of this globally increase the rates as indicated by (Abdul-Rahim et al. (2009) was due to its role in reducing the maternal and infant morbidity and mortality, (Wang et. al, 2017).

Different anesthetic method can be used to perform the C/S, as general or regional (Solangi et al. ,2012), and due to the increasing the rate of (C/S) globally special obstetric anesthesia is crucial considering the

two lives that involved, (Imtiaz et al., 2010) . So the best way which is the safe and comfortable for the mother and at the same time has better out come for the newborn is the aim for the obstetrician and anesthetist, (Wiswell et al., 2000).

The choice of anesthesia for cesarean section depends upon indication for surgery, its urgency, patients, obstetrician choice and anesthesiologist. Either of the general and spinal anesthesia is not ideal for cesarean section because each one has advantages and disadvantages for both mother and fetus. Although most pregnant women undergoing cesarean section are young and healthy, they didn't represent a high risk group of patient,(Imtiaz et al, 2010).

Many parameters were used to evaluate neonate outcome after C/S, related to changes in neonatal outcome according to use of many method of anesthesia, and most of these parameters were used include umbilical cord blood PH and Apgar scoring, (Rasooli& Moslemi, 2014).

Umbilical artery can be affected by difference in the cord blood flow during delivery stages, and umbilical cord blood (arterial pH) is considered representative of the fetal metabolic condition as Solangi et al. in (2012) mentioned. The clinical value of cord blood gas analysis lies in its ability to provide objectives evidence of asphyxia at the time of birth, (Skyes et al., 1982).

Apgar score was developed by Dr. Virginia Apgar in 1952, which used to evaluate health status of newborns after delivered, and this score also used to determine if need for quick intervention to establish breathing, (Li et al., 2013). And in (2012) Solangi et al. reported that Apgar score and umbilical artery pH provides best measures of neonatal outcome after elective C/S to mother underwent general and spinal anesthesia.

This study aimed at finding out the effect of general and spinal anesthesia on the condition of the baby using PH parameter and Apgar score.

Problem statement

Obstetric anesthesia has been studied by many investigators, regarding the effect on the mothers and baby, several indications for C/S increasing the number of it in the world, Include big baby, emergency cases, bleeding, maternal request, allows parents to know exactly when the baby will be born, and avoid any complication may be happened in normal delivery. Abdul-Rahim et al. in (2009) reported that C/S deliveries in Palestine increase from 6.0% in 1996 to 14.8% in 2006.

Most of mothers who went elective C/S requested general anesthesia in both government and private hospitals without knowing the advantages and disadvantages of both types of anesthesia on her infant, or any indications or reasonable cause, related to their thinking it's safe and painless; moreover spinal anesthesia, have many complications, than general anesthesia include paralysis, and have feel with pain.

In the world many studies have been implemented in many countries to determine which is best choice of anesthesia the general or the spinal method either for the mother or her infant by using many parameters, include Apgar scores .Some have shown no difference in Apgar scores between general and spinal anesthesia. Some have reported lower Apgar scores and worse outcomes with the use of general anesthesia, and may be these outcomes related to anesthetic agents which use in general anesthesia.

In Palestine no studies have been conducted to investigate which is best anesthesia general or spinal on outcome to baby.

Significant of the study

Finding studies may help mothers, parents, medical team, in deciding and selecting the most appropriate type of anesthesia that minimizing the rate of morbidity among infants. In addition the study will be beneficial for policy makers to develop or modify a policy/protocol to anesthesia team and hospitals about the risk from consequences of spinal and general anesthesia methods.

Aim of this study

To compare the effect of general anesthesia and spinal anesthesia on Apgar score and umbilical cord PH to newborns baby to patients undergoing elective C/S.

Objective

To find out:

❖ The effect of general vs. spinal anesthesia on Apgar score

❖ The effect of general and spinal anesthesia on PH of umbilical cord.

❖ The relationship between the result of PH reading and Apgar score results at one minute

❖ The indication for the selection of anesthesia type.

Research question

❖ What is the effect of general vs. spinal anesthesia on Apgar score?

❖ What is the effect of general and spinal anesthesia on PH of umbilical cord?

❖ What is the relationship between the result of PH reading and Apgar score results at one minute?

❖ What is the indication for the anesthesia method selection?

Hypothesis

▪ There is no deference's between general and spinal anesthesia on the Apgar score reading at 01, 05 minutes

▪ There is no deference's between general and spinal anesthesia on PH of umbilical cord reading

▪ There is no deference's between the result of PH reading and Apgar score results at one minute

Background

1. Child birth

Between 1900 1nd 1940 there was a big shift in birth; the place of birth was shifted from outside hospital to hospital with rate reached more than the half. In 1969 only 1% of birth was occurred outside the hospital, and during these stages medical technology was developed and has made childbirth safer to mothers and baby. (Health, 2015)

There are two type of childbirth include vaginal delivery and C/S each type have benefited and indication, in vaginal birth, the baby is born through birth canal. And the most benefits of vaginal delivery "shorter hospital stays, lower infection rates, quicker recovery, babies born vaginally have a lower risk of respiratory problems", (Health, 2015).

WHO in (2015) recorded that international healthcare community has considered the ideal rate for caesarean sections to be between 10- 15% .It mentions that caesarean sections have become increasingly common in both developed and developing countries.

Many studies done and reported the rate of cesareans section as study done by (Mousavi et al. in (2013) in Iran the rate increased from 35.4% of deliveries in 1999 to 42.3% in 2003.Study done by Yilmaz,et al. in (2013) reported that the rate of C/S was increased in developing and developed

countries, and was found to be just 5% in 1970s, to increase to 25% from all deliveries in 1988,in USA during the year 2007 the rate was 32%. Abdul-Rahim et al. in (2009) reported that C/S deliveries in Palestine increased from 6.0% in 1996 to 14.8% in 2006.

Overall rate reached up to 20%, while it was 26% in Egypt during 2003 it was 20% in Sudan during 1993. It reached up to above 15% in other six countries including the West Bank and it ranged between 5-15% in Gaza strip, (Khawaja et al., 2009).

2. Anesthesia

a- General and regional anesthesia is used to perform C/S.

General anesthesia as: drug-induced reversible depression of the central nervous system (CNS) resulting in the loss of response to and perceptions of all an external stimuli, (Barash, 2009).

They are many complication related to G/A includes: Failed intubation is encountered almost 10 times more often than in an obstetric population (1 in 300 compared with 1 in 3000). The incidence of aspiration in caesarean section under general anesthesia is 1 in 400–600. A higher incidence of awareness has traditionally been associated with general anesthesia for Caesarean section. A fear of over sedating the fetus and reducing the contractility of the uterus led to the deliberate use of low doses of anesthetic agents. In its patient leaflet, the Royal College of Anesthetists estimate that awareness occurs during 4 in every 1000 general anesthetics

for Caesarean section. The average blood loss during a Caesarean section under general anesthesia is estimated to be 100–200 ml more than under regional anesthesia, (Mcglennan et al., 2009).

Medication use in G/A:

1- Nitrous oxide: Is inhalational anesthetic gas

Nitrous oxide is a very common inhalational anesthetic that offers analgesia, anxiolysis, and sometimes amnesia. It's a colorless, non-flammable gas with a slightly sweet taste. Due to its euphoric and hysterical effects, the substance is also called "laughing gas." It's been a recreational drug since the late 1700s and is currently one of the most common inhalants. It is a cerebral depressant and produces light anesthesia without demonstrably depressing the respiratory or vasomotor centre provided that normal oxygen tension is maintained. Induction is rapid and recovery time rarely exceeds 1-4 minutes even after prolonged administration. The Nitrous oxide must be mixed with at least 30% oxygen and this is usually accomplished using a compressed-gas anesthetic machine, (Barash et al.,2009).

2- Propofol: (2,6 di-isopropylphenol) is a very short acting non-opioid sedative–hypnotic agent. It is thought to work by potentiating the binding of γ-amino butyric acid to receptor sites in the central nervous system (CNS). It has recognized antiemetic and euphoric effects. Onset of action is <60 seconds (one arm–brain circulation). Despite a half life of 13–44 hours, duration of action is approximately 10 minutes, owing to rapid

redistribution from CNS tissue to muscle and fat. Pharmacokinetics are unaffected by renal or hepatic disease but dose reduction is required in the elderly, as volume of distribution falls with age,(Symington and Thakore, 2006).

3- Atracuriom: is an intermediate-duration, nondepolarizing, skeletal muscle relaxant for intravenous administration. Atracurium besylate is designated as 2,2'-[1,5-pentanediylbis[oxy(3-oxo-3,1-propanediyl)]] bis[1-[(3,4dimethoxyph enyl)methyl]-1,2,3,4-tetrahydro-6,7-dimethoxy-2methylisoquinolinium] dibenzenesulfonate. Adult dose of tracurium recommended not to exceed0.5 mg/kg because of hypotension and histamine release, neuromuscular block achieved approximately 3 to 5 minutes after injection. Clinically required neuromuscular block generally lasts 30 to 40 minutes, (Barash et al., 2009).

b- Spinal anesthesia was define as an invasive anesthetic procedure as insertion of spinal needle between lumbar vertebrae (3-4 or 4-5) levels to inject local anesthetic intrathecal space (subarachnoid) to block sensory and motors from fourth thoracic to fourth sacral dermatomes, leads to sympathetic block out flow (sensory and motors) .Its most early complications is hypotension due vasodilatation vessels ,so patients should be receive bolus intravenous fluids mostly crystalloids before procedure 20ml/kg,(John Nagelhout , 2010).

In 1899 Spinal anesthesia was introduced and developed by Bier, and it was remarkably to make it widespread and the technique achieved many acceptances by Tuffier. And by the time it become more common and by 1907 it was mostly used in all types of surgery and obstetrics, (Palan & Agrawal, 2015).

The complications of spinal anesthesia have been observed and include: transient and prolonged arterial hypotension as Zhang et al. reported in (2017) that it was because of a slower-onset sympathetic block allows more time for physiologic compensation. And Semenikhin et al. in (1991) mentioned some complication marked with respiratory and circulatory depression; neurological consequences and early and late respiratory depression associated with intrathecal administration of narcotic analgesics. Side effects comprised vomiting, nausea, transitory urination disturbances, and itching. The dependence of the number of complications and side effects on the level of puncture, the patient's age and concentration of the anesthetic introduced into sub-arachnoidal space has been established

And Alnour et al. in (2015) mention about low back pain and recorded that is common after spinal injection, but is expected to resolve within 2 weeks and a specific type of headache, called a post spinal headache, this headache can be mild or severe and usually resolves spontaneously over 1-3 weeks. Local anesthetic solutions can be described as hyperbaric, hypobaric, or isobaric in relation to the specific gravity of CSF (1.004 to 1.007 g/ml), (Keles et al, 2013).

Medication uses in spinal anesthesia were:

-Bupivacaine is a commonly used agent during deliveries as it has a long-lasting effect, it is more markedly selective over sensory neural fibers than to motor fibers, it has a lower fetal-maternal blood ratio, (Keleş et al,2013).

-Fentanyl: first synthesized in 1960, is structurally related to the phenylpiperidines, it has a clinical potency ratio 50 to 100 times that of morphine. Fentanyl is opioid receptor agonist, produce profound dose dependent analgesia ,ventilatory depression, sedation and high doses it can produce unconsciousness .A single intravenous dose of fentanyl 3mic/kg, (Barash et al .,2009).

3-APGAR Scores

The Apgar score was firstly proposed by Dr. Apgar in 1952 who is an obstetric anesthesiologist as a means of rapid evaluation of the physical condition of infants shortly after the birth. The scores are taken at 01 and 05 minutes after delivery. Of the two scores, the 05 minutes score is regarded as the better predictor of survival in infancy in the long term. Whereas the 01 minute score definitely has the value for assessing the effects of different drugs that given to the mother during the C/S. This method is even more appealing because it is noninvasive. (Khoury et al, 1994).

A score of 0, 1, or 2 is assigned to each of the 5 physical signs at 1 and 5 minutes after birth. The maximum score that can be assigned is 10. Scores ranging from 8-10 are indicates a newborn in good condition who requires only nasopharyngeal suctioning and perhaps some oxygen near the face. If the 5-minute Apgar score is abnormal ($<$ 8), appropriate measures should be taken and resuscitation measures may be needed. Apgar scores should be assigned every 5 minutes until the infant is stabilized, (London et al., 2007).

Table (1): The Apgar score

SCORE Physical signs	0	1	2
Heart rate	Absent	$<$ 100 beats/min	$\geq$100 beats/min
Respiration	Absent	Irregular/weak/slow breathing/gasping	Regular breathing/strong cry
Muscle tone and movement	None/limp	Some flexion	Good flexion/action motion
Skin color / oxygenation	Completely blue	Blue at extremities; pink body	Body and extremities pink
Reflex irritability to tactile stimulation	Silence; no response to stimulation	Grimace/feeble cry when stimulated	Cry/cough/sneeze

4- Blood analysis: cord blood ph

In the past decade the use of umbilical cord blood gas analysis has increasingly been consider as the most reliable indication of newborns oxygenation and acid-base condition at time of delivery , (Thorp& Rushing, 1999).

The blood in umbilical cord provides important information about infants biochemical situation at the time of childbirth, although the technique of taken the sample immediately from umbilical cord is not easy and sometime impossible, especially in case on resuscitation all team at this moment focus on baby heath status, (Armstrong and Stenson ,2006). More over 60 min cord arterial or venous pH can decrease by more than 0.2 pH units. Loh et al. in (1998) mentioned that umbilical cord blood gas values are considered more objective in the assessment of fetal oxygenation at delivery.

Table (2): The normal values in an umbilical arterial sample in a term newborn

Parameters	Normal values
PH	7.18 – 7.38
PCO2	32 – 66
HCO3	17 – 27
PO2	6 – 31
Base excess (mmol/L):	8.3-2.6

(Armstrong and Stenson ,2006)

Chapter Tow
Literature review

Literature review

Many studies were initially identified and reviewed in this study , The following search terms were used as keyword in searches include: Apgar score, umbilical cord, PH blood, C/S, Preterm, ABGs, general anesthesia, spinal anesthesia, obstetric and newborn.

Systematic review

The systematic review of literature was conducted after reading 2500 articles from the following databases (Science Direct, Pub Med, Google Scholar, and Med Line). The following sentences were used for searching, after reviewing the title and abstract a total of 30 articles have been selected based on the following criteria; at the beginning some articles were excluded after reviewing the title and another by reviewing abstract, and others were excluded after reviewing the full article.

Inclusion and exclusion criteria of articles

The review of literature was in English language, and searches were in human studies. The systematic review targeted articles published between 2005 and 2017. However, some articles were included in the literature review regardless of being published before 2005, as they were valuable and have relationship to the topic.

Zahir et al. in (2011) reported the rate of C/S has dramatically increased in recent years in developing world, while same direction has been found in developed countries 30 years ago.And in (2014) Rasooli & Moslemi reported that more than 30% of birth were cesarean delivery and most common surgical procedure performed in the United States, 1 million recorded per year; while in other developed countries the cesarean delivery rate varies between 15% and more than 30%.

Kavak et al. in (2001) conducted a study aimed at evaluate outcome of newborns after C/S delivery to mothers underwent general and regional (epidural and spinal) anesthesia. The result showed that there is no significant differences between groups, and the outcome in neonates born by both groups was same (*P*>0.05) according to Apgar score.

Imtiaz et al. in (2010) conducted a study in Abbasi Shaheed Hospital, the study aimed at comparing between general and spinal anesthesia to C/S and outcome on Apgar score to baby .Sixty one underwent C/S included in study, the women was divided in two group each group have thirty women, first one were given general anesthesia and the second group was received spinal anesthesia. In the study the newborns were evaluated by using Apgar scores to estimate outcome to newborns in both groups, Apgar score was recorded at 1 minute and 5 minutes respectively after each delivery. Regarding to Apgar score at 5 minute the result shown that; there is no significant difference at newborns outcome between the affects of general anesthesia and spinal anesthesia after elective cesarean section.

Zahir et al. (2011) conducted a study in Holy Family Hospital in Rawalpindi in Pakistan, aimed at comparing maternal and neonatal outcome after spinal and general anesthesia for the women underwent C/S. The sample of study was 160 patients, who chosen randomly according to patient's choice or indication for caesarean section, 80 women underwent G/A and 80 patients underwent S/A. The result of study shown that babies born to mothers who underwent spinal anesthesia had significantly better at one minute and five minute Apgar score than general anesthesia and at the end NICU admission was significant in babies born with general anesthesia (28%) as compared to babies born under spinal anesthesia (06%).

In addition another study done in (2010) by Mancuso et al. aimed at comparing neonatal outcome to mothers who underwent elective C/S under spinal vs. general anesthesia vs. conversion from spinal to general anesthesia. One hundred seventy-nine pregnant women were divided in three group; group one general anesthesia (n=89) and group two underwent spinal anesthesia (n=90), and third group 63 patients who required conversion to general anesthesia. The result showed no significant differences were found in pH between groups, and the rate of depressed newborns was least in the spinal group 1.1%, then12.7% in the conversion group and general group with 25.9% significant difference for all comparisons. And regarding to Apgar score it was a higher at 1st min for each parameter in spinal group with respect to general group, while 'activity', 'grimace' and 'respiration' showed a higher score in conversion group than in general group.

A cross-sectional observational prospective study was done in Kasr El Aini hospitals-Cairo University, to determining the effects of combined spinal epidural anesthesia and general anesthesia on the newborns to the mother undergoing elective cesarean section. The study conducted on 60 women at term (>37 completed weeks) which scheduled for elective cesarean section , the sample were divided into two groups each group was contain 30 women, a general anesthesia group (A) and combined spinal–epidural anesthesia group (B). At the end of the study the result shown that there is statistically significant differences between the two groups at 1 min and 5 min according to Apgar score recorded, where with combined spinal–epidural anesthesia the Apgar score readings were higher than with general anesthesia. And HCO3 readings showed a statistically significant difference between the two groups after 1 and 5 min, where the newborns in general anesthesia group had a statistically significant lower HCO3 compared to the newborns in combined spinal–epidural group, (Abdallah et al. ,2013) .

In addition another study was conducted in Government Medical College and General Hospital, Andhra Pradesh. The target of the study was sixty full term mothers underwent elective C/S, the sample divided in tow group each one contain 30 pregnant women. The Apgar scores to the neonates were recorded at1minute and 5 minute immediately after each delivery. At the end of study the result showed that there are significant differences between outcomes to neonate according to type of anesthesia, S/A have better outcome than G/A. In spinal anesthesia only 8 newborns

having Apgar score <7 at one minute after birth, and at 5 minutes it was > than 7 for all 30 neonates. While 30 patients who received general anesthesia, 20 neonate having Apgar score <7 at one minute ,and at 5 minutes two babies did not show any improvement with Apgar score of, (KL, AV and VB ,2015).

Haider, Mahdi, and Kadhim did a study in (2013) to compare the effect of spinal anesthesia versus general anesthesia on Apgar score of neonates born by elective caesarean section in Baghdad teaching hospital. The duration of collecting sample was from February 2011 to July 2011. The study conducted on 60 mothers who divided in two groups (general and spinal anesthesia) each one contains thirty mothers. Apgar score was used to assess the baby at 1minute and 5 minute intervals after each delivery. The result of study showed that those neonates born under G/A were ten folds more likely to have Apgar score less than or equal to 6 at first minute compared to those with spinal anesthesia, the odds ratio=10 and 95%confidence interval of the odds ratio (2.94-34) and p=0.00024 which is highly significant, G/A had greater risk on infant at the first minute.

In addition other randomized control trial study was conducted in (2012) by Solangi et al. the study aimed at comparing the effects of general and spinal anesthesia in patients undergoing elective cesarean section in terms of neonatal outcome. This study was conducted in many departments of hospital, and conducted on 160 patients were having elective cesareans section. Two parameters were used to evaluate neonates

(Apgar score and umbilical artery blood sample). At the end of study the result shown that there is statistical significance differences for newborn to Apgar score of neonates at 01 and 05 minutes in relation to the type of anesthesia (p<0.01), and the average of pH was significantly high in spinal group as compared to general anesthesia group (p=0.017).

Another study was conducted at Al-Zahra Obstetrics and Gynecology University Hospital of Tabriz, Iran. Aimed at evaluating the outcome to newborns after elective C/S according to type of anesthesia, the study used Apgar scores and umbilical arterial blood gas after C/S with general or spinal anesthesia. The study conducted on 662 mothers, 190 mothers underwent general anesthesia and 472 mothers given spinal anesthesia. The result showed that there is significant differences at 1st minute Apgar score in the spinal anesthesia group was significantly higher than the general anesthesia group (P = 0.01), and there is a statistically significance correlation between umbilical cord blood sample PH and type of anesthesia, general anesthesia developed fetal acidity (low pH) more than spinal anesthesia, (Rasooli & Moslemi,2014)

At the end of study the literature review conducted many articles which done in many country over the world, Arabic and foreign, but they didn't have any articles about this topics in Palestine.

Chapter Three
Methodology

Methodology

This chapter was discuss design, setting, sample, population, inclusion and exclusion criteria, tools, reliability, validity, technique and ethical considerations.

Design

Interventional analytical design was used to investigate which anesthesia type (spinal vs general) has minimal or no effect over umbilical cord PH and Apgar score baby born after elective cesarean section.

Site and Setting

It was done in Jenin Governmental Hospital, in gynecological ward, recovery and operation ward. Jenin government hospital provides medical service to all people located in Jenin governorate. Hospital includes 21 ward, 4 operation rooms, 250bed, 192 nurse and 86 doctors. A total of 1400 elective C/S done during one year (2016) .

Population

Number of pregnant women who went through an elective C/S under either general or spinal anesthesia in 2016 was 1400 case, 120 women per one month according to internal hospital statistic.

Sample size and sampling method

The sample size was calculated based on the below equation and it was 92 and it was determined to increase it to reach (103) healthy pregnant women.

The equation was to Steven Thampson including:

$$n = \frac{N \times P(1-P)}{[N - 1 \times (d^2 \div z^2) + P(1-P)]}$$

N: Size of Populations.

Z: Class standard corresponding to the level of significance (0.95) and is equal to (1.96)

Q: Error rate is equal to (0.05)

P: Ratio provides a neutral property and equal (0.50)

n = 120 * 0.50 (1 − 0.50) / [120 − 1 * {(0.05)2 / (1.96)2] + 0.50 (1 − 0.50)]

= 120 * 0.50 * 0.50 / [119 * (0.0025 / 3.841)] + 0.50 * 0.50]

= 120 *0.25 / [119 * 0.00065] + 0.25]

= 30 / 0.0773 + 0.25

= 30 / 0.327 = <u>91.7</u>

Simple random method was used to select pregnant women who participated in the study. It was divided in two groups, the first group was allocated for G/A, and the second one was allocated for spinal technique through which odd number was assigned for first group and even number for second group. The time of data collection was from October, 2017 to February in 2018.

Eligibility criteria

Inclusion criteria

- Women in ASA I grade

- Pregnancy with birth weight>2500 g and <4000g who were indicated to undergo elective caesarean section.

- Pregnant women with gestational age 37-40 weeks.

- Pregnant women have history of previous C/S.

- Pregnant women by In Vitro Fertilization (IVF).

Exclusion criteria

- Women have any systemic disease that may have bad impact on result.

- Any baby takes more than 90 second to be out after uterus incision.

- Any woman with obstetric complications such as hypertension.

- Any women complain of this complication before or during C/S: oligohydroamnios, polyhydramnios, and antepartum hemorrhage.

- Women suspected have fetal abnormality, any coagulopathies,

- Women have allergy/ sensitivity to any drugs was be used.

- Women with history of spine and brain deformity or infection at site of regional anesthesia.

- Woman given narcotic pain killer before sugary.

- Mother with twins and more.

Data collection tools

The data was collected by using questionnaire which was fulfilled through interview and physical assessment to baby by pediatrician, and PH test.

-Data collection tool was consist of two parts: (annex 1)

Part one: Mothers Data

Demographic data**:** ID, date of admission, age, education, occupation, marital status and level of family income.

 Previous history: Medical and surgical history.

History of Obstetric & gynecology

Number of gravity, number of parity, has any previous delivery and type of previous delivery, previous CS, present cesarean indication and gestational age (week).

Anesthesia type

Type of anesthesia: General or Spinal.

Part two: Newborn data .

a- Anthropometric measurements to newborn:

Newborn weight range (grams), newborn head circumference (cm), newborn chest circumference (cm), and length range (cm).

Table (3): Normal range to anthropometric measurements

Anthropometric parameters	Normal range
head circumference(cm)	32-37 cm
chest circumference(cm)	30-35 cm
Length range (cm)	48 to 53 cm

(London et al., 2007)

Apgar score: physical signs

Apgar score: (Solongyet al., 2009)

The Apgar score is used as a part of early assessment of newborn. In 1952 Dr. Apgar an obstetric anesthesiologist proposed Apgar score as a means of rapid evaluation of the physical condition of infants shortly after the birth, and reported that scores taken at 01 and 05 minutes after delivery.

Of the two scores, the 05 minutes score is regarded as better predictor of survival in infancy a long term. Whereas the 01 minute scores definitely has the value for; assessing the effects of different drugs given to the mother during the Cesarean section. This method is even more appealing because it is noninvasive

A score of 0, 1, or 2 is assigned to each of the 5 physical signs at 1 and 5 minutes after birth. The maximum score that can be assigned is 10. Scores ranging from 8-10 are considered normal. If the 5-minute Apgar score is abnormal (< 8), appropriate measures should be taken. Apgar scores should be assigned every 5 minutes until the infant is stabilized, (London et al., 2007).

b- Blood analysis: cord blood ph: (Armstrong L, Stenson B, 2006).

Happened within 60 sec of delivery (Ullrich& Ackerman, 1972). And over 60 min cord arterial or venous pH can decrease by more than 0.2 pH units. Similar changes occur in blood sampled from placental surface vessels except that they are bigger and less predictable, (Lynn A, Beeby P, 2007). These changes are not noted if the cord is doubly clamped at delivery, isolating a segment of cord blood from both placenta and environment. The pH of blood then remains relatively fixed at room temperature for an hour.

Ethical consideration

1. Permission from IRB was taken from An-Najah National University.

2. MOH ethics committee was taken.

3. Consent form was taken to each patient and participants were assured that all data collected was confidential, voluntary and privacy. (Annex 2)

Validity and reliability

The tools were reviewed by three anesthesiologist and four gynecologist doctors and head nurse of gynecological ward, their comments was add more indication for C/S and deleted medication was used in G/A and S/A.

Pilot study was done to calculate crombachs alpha, tool of the present study demonstrated an acceptable level of reliability. Pilot study done nearly on 10 participants and Crombach alpha was 0.74%, and the pilot study was included from total sample.

Field work

At the beginning before one day of an operation, the list of elective C/S was used in reviewed and according to the inclusion and exclusions criteria the subject was chosen. Subjects were met at the day of operation and the purposes of the study were explained to ensure their agreement to be included in the study. Data collection was done in three wards include:

Gynecological ward: In this ward the researcher were met the subject and demographic data were collected include: past medical and surgical history, indication for current C/S, number of parity and gravity, height and weight to mother, previous delivery to mothers and type, and gestational age.

Recovery room: The subject were assess by anesthesia doctors according to classification of the ASAPS, ASA I was included according to inclusion and exclusions criteria. And 18 gauge cannula was inserting in peripheral vein and intravenous fluid (ringer lactate) was start 20ml/ kg.

In this ward it was determine the type of anesthesia general or spinal to each spatient. Randomization technique was used to achieve the aim of the study. This was the odd number assigned for group (A) spinal anesthesia and the even number of the group (B) general anesthesia; if any patient was refused any type of anesthesia they dropped and move to another patient.

Operation ward

1- Mother management

On arrival to operation room all women was receive same standard include continuous monitoring in the form of 3 lead Electrocardiograph (ECG), automated non-invasive blood pressure(NIBP) and heart rate monitoring ,pulse oximetry, after that the subject was divided in tow group according to anesthesia performance:

Group (A): General Anesthesia.

Patients was put on supine position, preoxygenate with 100% oxygen for 3-5 minutes, induction was done with injecting propofol 2-3mg/kg intravenously, Non depolarizing muscle relaxant atracurium 0.5 mg/kg intravenously was given. After endotracheal intubation maintenance was achieved with 50 % nitrous oxide with 50% oxygen.

GROUP (B): Spinal Anesthesia.

After preloading the patient with 20ml/ kg ringer lactate each patient was place in siting position and space between 3rd and 4th lumbar spine was be identified. After taking all aseptic precautions lumbar puncture was done with 25 gauge spinal needle (quinke) and 0.5 %, 3ml (15 mg) hyperbaric bupivacaine was administered with 25 mcg fentanyl.

Immediately after injection patient was placed in supine position with wedge under right hip for left uterine displacement. Coppejans et al in (2006) reported that means time interval from injection of an anesthetic drug to placement in the supine position was 129 seconds in lateral position.

After giving a spinal anesthetic, the first 5-10 minutes are critical so that the patients were monitoring, the cardiovascular response as well as level. Assessment of block height by the anesthetist was performed on both sides using touch, pinprick and cold in a standardized manner on each patient, explanation to patients. Ice was applied above the patient's clavicle as a reference point and then applied to the L1 dermatome, asking the patient Can you feel me touch you?' If the woman stated that they could not feel

anything, women were asked to report when they first felt touch as the ice was moved continuously cephalad in the mid-clavicular line. Once the patient stated at which dermatome level they were. Then beginning at L1, the vial access cannula was applied to the skin to successively more cephalad dermatomes until the woman perceived the sensation to be as sharp as that felt at the reference point. The block heights was done at T5, and for each modality were assessed and recorded when the anesthetist considered that the woman had a satisfactory spinal anesthesia block for caesarean to proceed was done .

Table (4): List some common surgical procedure that are readily performed under spinal anesthesia and the block height that is usually sufficient to ensure patient comfort.

surgical procedure	Suggested block height	Technique	Comments
Perianal Perirectal	L1-2	Hyperbaric solution/sitting position. Hypobaric Solution/jackknife position.Isobaric solution/ horizontal position	Patients must remain in relative head –up or head down position when using hypobaric and hyperbaric solutions to maintain restricted spread during the procedure
Lowe extremity Hip Transurethral resection of the prostate Vaginal/cervical	T10	Isobaric solution	Hypobaric and hyperbaric solution are also suitable but may produce higher blocks than necessary
Herniorrhaphy /Pelvic procedures/Appendectomy	T6- 8	Hyperbaric solution/ horizontal position	Isobaric solution injected at L2-3 interspaced may also be suitable
Abdominal Cesarean section	T4-6	Hyperbaric solution/ horizontal position	Upper abdominal procedures usually require concomitant general anesthesia l to prevent vagal reflexes and pain from traction on diaphragm, esophagus.

(Barash et al.2009)

After anesthesia doctor finish he asses the patient in both type of anesthesia G/A and S/A if the surgery can be started. The time of induction of anesthesia to incision to-delivery intervals not more than 7 minutes and to skin and delivery of baby was less than 120 second.

During general anesthesia, induction-to-delivery intervals of more than 8 minutes and uterine incision-to-delivery intervals of more than 3 minutes were associated with significantly more instances of neonatal acidosis (umbilical artery pH 7.31 versus 7.22) and a greater incidence of low 1-min Apgar scores (4% versus 73%). In the groups receiving spinal anesthesia, prolongation of uterine incision-to-delivery interval by more than 3 minutes was found to be the only important factor influencing fetal outcome, as determined by an increased acidosis (umbilical artery pH 7.30 versus 7.18) and by depressed Apgar scores (0% versus 62%),(Data et al.,1981).

There was no significant difference in the rate of hypoxic morbidity with increasing increments of 60 seconds from uterine incision to delivery ($p = 0.35$). There was a significantly increased risk of hypoxic morbidity in those delivered at the highest quintile (>240 seconds) compared with those in the lowest quintile (≤60 seconds) in cesareans performed for an indication other than non reassuring fetal status, (Spain et al., 2015).

In (1991) Kamat et al. reported that induction-delivery intervals (< 5 min and > 15 min) and uterine-delivery intervals < 90 sec have less effect on Apgar scoring of neonates of mothers who are administered spinal anesthesia as compared to general anesthesia.

Newborn management: after baby born there were being assessed and done to them physical assessment by pediatrician, and it was done as following:

1-Recording of Apgar score:

After babies born immediately at 1 minute and 5 minute interval, the pediatrician were assess the Apgar score and Anthropometric measurements include (head, chest, length, and weight, and during assessment the pediatrician give reading to the researcher to record it.

2-Collection and recording blood analysis:

Immediately after delivery a segment of cord was isolated between two sets of clamps which was done by gynecologist, after that it was recommended a segment of cord (5 cm) be separated from the rest of the cord and placenta and then passed out of the room for analysis. Collection of sample was done by anesthesiologist by using hepranized syringe 5cm and needle 22 gauges. Arterial blood sample was sent by researcher to machine which available in Intensive Care Unit (ICU) to investigate about result and documented.

The variables

Independent variables

Type of anesthesia: Spinal anesthesia and general anesthesia

Dependent variables:

- Umbilical cord PH reading

- Apgar score reading

Data analysis plane:

The statistical package of social sciences (SPSS) version 17 was used for data entry and in statistical analysis.

Chapter Four
Results

Introduction

This chapter presents the findings of the data collected from sample out of the targeted population, in the form of tables. The results presented as: first, demographic characteristics of the whole sample. Then results is comparing between those who did cesarean section under general anesthesia with those who did it under spinal anesthesia.

Descriptive and inferential statistics were used to analyze data; descriptive statistics (frequency, percentage, mean, standard deviation, and median) were used to describe the distribution of variables. Inferential statistics were used to assess the relation between type of anesthesia with apgar score at 1st and 5th minute and then with PH of the umbilical cord blood sample.

Participants' demographic characteristics and past surgical history

Table 5: The distribution of percentage of participants according to their demographic data and past surgical history (N= 103)

Variable		No.	%
Type of present anesthesia	General	53	51.5
	Spinal	50	48.5
Age	18- 25 years	30	29.1
	26- 30years	50	48.5
	31-35years	23	22.3
Marital Status	Married	99	96.1
	Divorced	4	3.9
Education	School level	48	46.6
	University level	55	53.4
Occupation	Housewife	71	68.9
	Worker	32	31.1
Level of Family Income	Less than 1500 NIS	28	27.2
	1600-3000 NIS	58	56.3
	3100-4500 NIS	17	16.5
Past surgical history	Minor surgery	8	7.8
	Major surgery	73	70.9
	None	22	21.4
BMI categories	Normal	13	12.6
	Over weight	70	68.0
	Obese	20	19.4

Table (5) showed that (51.5%) of participants were operated under general anesthesia and (48.5%) of them were aged between 26-30years, (96.1%) of the participants were married, (53.4%) of the participants were had a university educational level. And (68.9%) of them were housewife, (56.3%) of participants have income between 1600-3000 NIS per month. (21.4%, 7.8%, and 70.9%) of participant had not past surgical history while the rest of cases had either minor or major past surgery respectively. (68%) and (19.4 %,) of participants were overweight and obese respectively.

Table 6: Distribution of anthropometric measurements of participants (N=103).

Variable	Mean ± SD	MIN	MAX
Height	161.4 6.1	148.0	176.0
Weight	72.6 9.5	53.0	100.0
BMI	27.8 3.3	22.1	39.5

Table (6) showed the mean of height and weight was 161.4 ±6.1and 72.6±9.5 respectively. And the mean of their BMI were 27.8±3.3.

Table 7: Distribution of participants' in relation to their obstetrics characteristics (N=103).

Variable		No.	%
Number of Gravity	Gravida 1	21	20.3
	Gravida 2	39	37.9
	Gravida 3	16	15.5
	Gravida 4	21	20.4
	Gravida more than 4	6	5.8
Number of Parity	Null	24	23.3
	Para1	31	30.0
	Para2	24	23.3
	Para3	14	13.6
	Para 4	5	4.9
	Para more than 4	5	4.9
Previous delivery	No	24	23.3
	Yes	79	76.7
Type of previous delivery	Null	24	23.3
	Vaginal delivery	12	11.7
	Caesarean section	67	65.0
Number of previous CS?	Null	36	35
	One	28	27.2
	Two	23	22.3
	Three	15	14.5
	More than three	1	1.0
The indication of present cesarean	Maternal request	11	10.7
	Previous C/S	64	62.1
	In Vitro Fertilization (IVF)	1	1.0
	Placenta Praevia grade 4	2	1.9
	Malpresentation of the baby	19	18.4
	Other	6	5.8

Table (7) showed that (37.9%) of the participants were gravida 2. And 30% of participants were para one. It also showed that (76.7%) of them have history of previous delivery, and (65%) of those delivery by cesarean section. The result recorded that (27.2%) of participants have only one previous C/S. The indications of present C/S were (62.1%) previous CS, and (18.4%) malpresentation of the baby.

Table 8: Distribution of newborn characteristics.

Variable		No.	%
Gestational age (week)	37	10	9.7
	38	75	72.8
	39	17	16.5
	40 and more	1	1.0
Newborn weight range (grams	2500 - 3000 gm	14	13.6
	3001- 3500 gm	79	76.7
	3501- 4000 gm	10	9.7
Newborn head circumference (cm)	Less than 32 cm	13	12.6
	32 -37 cm	80	77.7
	More than 37cm	10	9.7
Newborn chest circumference (cm)	Less than 30cm	20	19.4
	30-35 cm	66	64.1
	More than 35 cm	17	16.5
Newborn Length range (cm)	Less than 48 cm	16	15.5
	48 to 53 cm	77	74.8
	More than 53 cm	10	9.7

Table (8) showed that (72.8%) of the newborn babies was among 38 weeks gestational age and (76.7%) born with weight ranged between 3001to 3500 gram. It also showed that (77.7%) of the newborn babies head circumference ranged between (32 to 37cm). And (64.1%) of newborn babies chest circumference were between 30-35 cm, (74.8%) length ranges of newborn babies were between 48 to 53 cm.

Table 9: Demographic characteristics and past surgical history of participants' distribution according to their type of anesthesia.

Variable		Type of Anesthesia				*P* value
		General		Spinal		
		N	%	N	%	
Age	18 - 25 years	13	24.5	17	34.0	0.56
	26 - 30 years	27	50.9	23	46.0	
	31 - 35 years	13	24.5	10	20.0	
Education	School level	25	47.2	23	46.0	0.36
	University level	28	52.8	27	54.0	
Occupation	Housewife	35	66.0	36	72.0	0.51
	Worker	18	34.0	14	28.0	
Marital Status	Married	49	92.5	50	100.0	0.04*
	Divorced	4	7.5	0	0	
Family Income	Less than 1500	15	28.3	13	26.0	0.14
	1600-3000	33	62.3	25	50.0	
	3100-4500	5	9.4	12	24.0	
Past surgical history	Minor	2	3.8	6	12.0	0.11
	Major	42	79.2	31	62.0	
	Null	9	17.0	13	26.0	

* Significant at the 0.05 level (2-tailed).

Table (9) showed that 50.9% of participants between age 26-30years were underwent G/A, and 54% of participants underwent spinal anesthesia have in university level. It also showed that 72% of participants underwent spinal anesthesia were housewife.

There was no correlation statically significant between demographic characteristics including (age, education, occupation, family income) and past surgical history of participants' according to their type of anesthesia that *p* value was between *0.11* and **0.56.**

There is a statistically significant correlation between variable of marital status to the participants between those who underwent cesarean section by general vs. spinal anesthesia (**p = *0.04***).

Table (10): Distribution of anthropometric measurements of participants and anthropometrics according to their type of anesthesia.

Variables	Type of Anesthesia				
	General		Spinal		
	Mean (SD)	MIN- MAX	Mean (SD)	MIN- MAX	*P. value*
Mother height (cm)	161.4 (5.9)	149 – 176	161.4 (6.3)	148-173	0.15
Mother weight (Kg)	72.7 (10.9)	53 – 100	72.6 (7.8)	59-100	0.23

Table (10) showed that mean of participants' height were 161.4 ± 6.3 of those who underwent spinal anesthesia, and 161.4±5.9 of participants underwent G/A. Mean of weight were 72.7 ± 10.9 and 72.6±.8 of participants underwent G/A and spinal anesthesia respectively. There were

no differences between mother groups of general anesthesia and spinal anesthesia regarding their height or weight. (*p =0.15 and p = 0.23*)

Table 11: Comparison between general and spinal anesthesia according to participants' obstetric characteristics.

| Variable | Category | Type of Anesthesia | | | | *P* value |
| | | General | | Spinal | | |
		N	%	N	%	
Number of Gravity	Gravida 1	9	17.0	12	24.0	0.80
	Gravida 2	21	39.6	18	36.0	
	Gravida 3	10	18.9	6	12.0	
	Gravida 4	10	18.9	11	22.0	
	Gravida more than 4	3	5.7	3	6.0	
Number of Parity	Null	12	22.6	10	20.0	0.10
	Para1	16	30.2	17	34.0	
	Para2	8	15.1	16	32.0	
	Para3	9	17.0	5	10.0	
	Para4	3	5.7	2	4.0	
	Para more than 4	5	9.4	0.0	0.0	
Have you any previous delivery?	No	12	22.6	12	24.0	0.87
	Yes	41	77.4	38	76.0	
Type of previous delivery	None	12	22.6	12	24.0	0.37
	Vaginal	4	7.5	8	16.0	
	CS	37	69.8	30	60.0	
How many previous CS?	Null	16	30.2	20	40.0	0.54
	One	14	26.4	14	28.0	
	Two	12	22.6	11	22.0	
	Three	10	18.9	5	10.0	
	More than three	1	1.9	0	0.0	
What is present cesarean indication?	Maternal request	4	7.5	6	14.0	0.66
	Previous C/S	36	67.9	29	56.0	
	In Vitro Fertilization	0	0	1	2.0	
	Placenta Praevia grade 4	1	1.9	1	2.0	
	Baby Mal presentation	8	15.1	11	22.0	
	Other	4	7.5	2	4.0	

CS: cesarean section

Table (11) showed that 39.6% and 36% of participants were gravida 2 of those who underwent GA and spinal anesthesia respectively, and 34% and 30.2% of particpants were para1 of those who underwent spinal anesthesia and G/A respectively. From the participants who underwent GA (77.4%) have previous delivery and 69.8% have history of previous C/S. The result showed that there was no statistical correlation to any variable of the obstetrics characteristics of the participants between the two groups (general vs spinal anesthesia), *P* values ranged between 0.10 (number of parity) to 0.87 (previous delivery).

Table 12: Comparison between types of anesthesia (general versus spinal) based on Gestational age and Newborn characteristics .

Variable		Type of Anesthesia				*P* value
		General		Spinal		
		N	%	N	%	
Gestational age (week)	37	3	5.7	7111111	14.0	0.24
	38	42	79.2	33	66.0	
	39	7	13.2	10	20.0	
	40 or more	1	1.9	0.0	0.0	
Newborn weight range (grams)	2500-3000	9	17.0	5	10.0	0.22
	3001- 3500	37	69.8	42	84.0	
	3501-4000	7	13.2	3	6.0	
Newborn head circumference (cm)	Less than 32	5	9.4	8	16.0	0.32
	32-37	41	77.4	39	78.0	
	Less than 37	7	13.2	3	6.0	
Newborn chest circumference (cm)	Less than 30	10	18.9	10	20.0	0.48
	30-35	32	60.4	34	68.0	
	More than 35	11	20.8	6	12.0	
Newborn Length range (cm)	Less than 48	10	18.9	6	12.0	0.62
	48 to 53	38	71.7	39	78.0	
	More than 53	5	9.4	5	10.0	

cm: centimeter

Table (12) showed that 79.2% and 66% of participants with gestational age 38 week underwent G/A and spinal anesthesia respectively, its 84% and 69.8% of newborn babies weight ranged between 3001-3500 their mothers underwent spinal anesthesia and G/A respectively. It also showed that 78% and 77.4% of newborn babies head circumference was32-37cm and their mothers underwent spinal anesthesia and G/A respectively.

The result revealed that there is no statistical correlation difference to gestational age to participants and newborn characteristics (weight, head circumference, chest circumference, and length circumference) between the two groups (general vs spinal anesthesia), *P* values was (p=0.24,0.22, 0.32, 0.48, and 0.62 respectively).

Table 13: Comparison between effect of type of anesthesia (general versus spinal) on Apgar score at 1ˢᵗ and 5ᵗʰ minute.

Variable	What type of anesthesia?				
		N	Mean ± SD	t	*P* value
Apgar score at 1st minute	General	53	7.4 0.94	- 4.52	< 0.001
	Spinal	50	8.3 1.01		
Apgar score at 5ᵗʰ minute	General	53	9.9 0.26	.063	0.95
	Spinal	50	9.9 0.44		

Table (13) The mean of the first mint apgar score for newborn of the participant's who underwent general anesthesia and spinal anesthesia were 7.4 ± 0.94and 8.3 ± 1.01 respectively with statistical significance correlation between apgar score and the type of anesthesia(*p <0.001*).

There is no statistical significance differences in the mean of 5th minute abgar score for newborn in relation to the type of anesthesia (***p= 0.95***).

Table 14: Correlations between type of anesthesia (general verus spinal) and apgar score at 1^{st}minuite, Apgar score at5minuite, and umbilical cord blood PH

Variable				What type of anesthesia?	
	N	Mean	**Mean ± SD**	R	P value
Apgar1	103	7.8447	1.08	0.411**	< 0.001
Apgar5	103	9.9223	0.36	- 0.006	0.950
PH	103	NA	NA	0.10	0.315

** Correlation is significant at the 0.01 level (2-tailed).

Table (14) showed that there is a medium to strong correlation (r = 0.41) and statistically significant (***p < 0.001***) between Apgar score at 1st minute and type of anesthesia (general versus spinal).There is a very low correlation (r = 0.006) with no statistical significance (***p = 0.95***) between apgar score at 5th minute and type of anesthesia (general versus spinal). There is a low correlation(r = 0.10) with no statistical significance (*p* = 0.31) between PH of umbilical cord blood sample and type of anesthesia (general versus spinal).

Table 15: Cross tabulation between the type of anesthesia (general versus spinal) and umbilical cord blood PH.

Variable						
		PH			Total	X^2 (p value)
Type of anesthesia		< 7.18	7.18 – 7.38	>7.38		
	General	6	45	2	53	
		11.5%	84.9%	3.8%	100.0%	
		5.8%	43.7%	1.9%	51.5%	5.5 (0.05)
	Spinal	1	49	0	50	
		2.1%	98.0%	0.0%	100.0%	
		1.0%	47.6%	.0%	48.5%	

Table (15) there is a statistically significance correlation **(p < 0.05)** between umbilical cord blood sample PH and type of anesthesia (general versus spinal). PH of umbilical cord blood sample of newborns in general anesthesia group was either acidosis and alkalosis 11.5% and 3.8% respectively ,while it was in spinal anesthesia group acidosis and alkalosis was (2.1% and 0.0%), respectively.

Chapter Five
Discussion

Discussion

The primary purpose of this study was to comparisons of condition of neonate's outcome delivered by elective cesarean section under general vs. spinal anesthesia, our result showed that better clinical outcomes with spinal anesthesia to newborns than G/A. In this chapter it discusses the main result that found in the study.

Socio-demographic characteristic

The study review that one-third 37.9% of participants were gravida 1and nearly one –third 30% of participants were have Para one. Nearly two-third (65%) of them have history of previous C/S or previous delivery C/S, which in the same line with number of C/S delivery (31.7%) in Jenin city as mentioned   in annual report (2011) and this is the highest percent in Palestine, (Annual report in Palestine, 2011)

Regarding the indication for C/S nearly two-third (62.1%) of participants has previous C/S, in contrast to Nelson in (2017) mention the major indication of C/S was dystocia (43.5%), but in his study (64.5%) of sample was have no previous C/S in opposite to this study. In (2016) Suleiman mentioned the reason for request of C/S after precious C/S include the risk of complications in mother rises with increasing number of cesarean deliveries, especially the risk of placenta accreta.

More than two-third (72.8%) of participant were done to them C/S on 38 week gestation age ,the cause for C/S done on 38 weeks related to the most of C/S planed at this time by gynecologist in Jenin Government hospital. The result of this study also revealed that majority of new born babies (76.7%, 77.7% and 74.8%) were weight between 3001-3500, head circumference between 32-37(cm) and length range48-53 (cm) respectively. In Palestine 2016 annual report recorded about newborns that the percent of weight less than 2500gm were 9.5%, (Annual health report in Palestine, 2016).

According to thesis result reviewed that there was no correlation statistical significant between obstetric characteristics, Gestational age and newborn characteristics and past surgical history of participants' distribution according to type of anesthesia. At the same line a study done in (2012) by Umran et al. showed that no significant correlation (p >0.05) between spinal anesthesia and general anesthesia and neonatal outcome with the neonatal and maternal parameters.

The result of this study showed that there was a statistical significance correlation between Apgar score at the first minute to the newborns babies of women's according to their type of anesthesia .In fact many studies done and support the result, as a study done by Imtiaz in (2010) recorded that there was no significant difference between the affects of general anesthesia and spinal anesthesia on Apgar score of neonates at 5 minutes interval and there was a significant difference only at one minute after delivery. Another study done by Zahir et al. in (2011)

recorded that babies born to mothers who underwent spinal anesthesia had significantly better one minute Apgar (8.0+_0.6 VS 6.5+_0.7; p=<0.001) and five minute Apgar score (9.0+_0.8 VS 7.4+_0.9 p=<0.001), when compared to those who underwent general anesthesia for caesarean section. Solongey et al. in (2012) reported that Apgar score at 01 and 05 minutes was also significantly higher in spinal anesthesia than general anesthesia; 8.04±0.82 vs 7.10±0.92 (p=0.0001) and 9.89±0.32 vs 9.34±1.07 respectively (p=0.0001). At the same line with the present study study done by Saatsaz et al. in (2014) showed that there was a significant difference between Apgar minute 1 in both groups. The average of Apgar scores at 1 min and 5 min were respectively 8.64± 0.76 and 9.88± 0.32 in Spinal anesthesia, and 8.24± 1 and 9.83± 0.55 in general anesthesia. In contrast to present study, in (1995) study done by Krishnan et al. reported that at one minute Apgar scores showed no significant difference in either group general or spinal anesthesia. Babies delivered after general anesthesia appeared relatively depressed requiring more free flow oxygen bag and mask ventilation though. according to a study done by Krishnan et al in (1995) found that no significant difference was seen in the mean 1 ± minute Apgar scores in the two groups, however more neonates of the general anesthesia group appeared depressed soon after birth, needing free flow of oxygen bag and mask ventilation. Nayar et al. in (2016) revealed that neonatal apgar scores were normal both at one minute and 5 minutes in both groups spinal and general anesthesia studied.

These result showed that there was correlation and statistically significant between Apgar score at 1st minute and type of anesthesia (general versus spinal No statistical significance between apgar score at 5th minute and type of anesthesia (general versus spinal). The same result was found in studies recorded that at 1st minute Apgar score in the spinal anesthesia group was significantly higher and better than the general anesthesia group, (Rasooli and Moslemi ,2014; Ong et al.,1989; Iqbal et al., 2012) .

The result showed that newborn babies to mothers under G/A their PH of umbilical cord of blood sample develop acidosis (PH <7.18) was 5.8% and alkalosis (PH > 7.38) was 1.9% and newborn in spinal anesthesia developed acidosis (PH <7.18) was 1% and no one developed alkalosis. Newborn developed abnormalities in PH are treated in the same way to who have low Apgar score at 1st minute. After stabilization of newborn by pediatric doctor at 5 minute ABGs done again to them and tow from nine have abnormal PH and those the same how admission to neonate ward and have low Apgar score.

In same line of the result of present study ,a study done by Rasooli and Moslemi in (2014) recorded that mean fetal acidity (low pH) in general anesthesia group was higher than spinal anesthesia group; it means that the embryos were more acidotic . Solangi et al. in (2013) found that satisfactory pH > 7.30 was found high, 75 (93.7%) in spinal group as compared to general anesthesia group 67 (83.7%) and unsatisfactory pH < 7.30 was low, 5 (6.3%) in spinal as compared to general anesthesia group

13 (16.3%). .In contrast to result of present study ,studies done by (Mancuso et al. ,2010; Nayar et al. ,2016) mentioned that no differences were found in pH values between spinal and general anesthesia.

In this study most of newborn who have low Apgar at 1st minute less than 6 developed cyanosed, hypoactive, cold extremities, desaturation and decrease spo2, and immediately done to them stabilization in operation room until transfer to neonate ICU. The stabilization done by pediatric doctor and anesthesia doctor, resuscitation done to them by supplying oxygen therapy by face mask, apply suction, warming newborn body, at five minute reevaluation newborn and if still low Apgar score transfer to neonate ICU .If Apgar score from 8-9 put newborn3 hrs in neonate for observation, but if Apgar score less than 8 admitted to neonate. No one newborn need to apply ETT or put on mechanical ventilator. Seven newborn admit to neonate, 5 for observation and 2 admissions to ward.

Limitations

In this study, the limitations was pregnant women were dropped from study related to their fear from spinal anesthesia and refuse to go C/S under spinal anesthesia, thinking that spinal anesthesia do paralysis, this lead to increase the time for data collection to the study. More over related to drop pregnant women from the study it increases the time and effort to researcher.

Conclusions

- Apgar score in spinal anesthesia at one minute is better than G/A, and there is no differences at five minute in tow type of anesthesia.

- Spinal anesthesia is associated with better outcome for newborns than G/A.

- Apgar score and umbilical artery blood pH of neonates to mothers whose received G/A were lower than neonates whose mothers received spinal anesthesia

Recommendations

- Every newborn have low Apgar score at 1st minute arterial blood gases should be taken immediately after delivery from the umbilical cord. Umbilical arterial and venous samples should be ready and segment of cord that has been doubly clamped and isolate it from the placenta to all pregnant women underwent C/S.

- Apply spinal anesthesia as possible to pregnant women have elective C/S.

- Increase knowledge to hospital team include anesthesia doctor, midwifery and nurses about benefit, complication and how to deal with mothers who underwent C/S under spinal anesthesia.

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Annex

Annex (1)

بسم الله الرحمن الرحيم

موافقة للإشتراك في البحث العلمي

جامعة النجاح الوطنية – كلية الطب وعلوم الصحة اقسم التمريض

أختي المشاركه

السلام عليكم ورحمة الله وبركاته

أنت مدعوة للمشاركة ببحث علمي سيجرى في مدينة جنين الفلسطينيه. الرجاء أن تأخذي الوقت الكافي لقراءة المعلومات التالية بتأن قبل أن تقرري إذا كنت تريدين المشاركة أم لا. بإمكانك طلب إيضاحات أو معلومات إضافية عن أي شيء مذكور في هذه الإستمارة أو عن هذه الدراسة ككل من الباحث.

يقوم البحث بالأساس على دراسه تأثير التخدير الكلي مقارنة بالتخدير الشوكي على حموضة الدم في الحبل السري ومقياس "أبجر"(تقييم المولود الجديد على خمسة معايير بسيطة) في حديثي الولادة بعد العمليات القيصرية المبرمجة في مستشفى جنين الحكومي.

1-Part one: mothers data.

a- Demographic data:

1-Name (ID):_____

2-Date of Admission: _____

3-Age: a-18- 25 years _____ b-26- 30years _____ c-31-35years_____

4-Education: a- Illiterate_____ b-school level_____

  C-university level_____

5-Occupation: a-housewife_____ b-worker_____

6-Marital status: a- Married_____ b- Divorced _____

              c- Separated_____ d-Widowed_____

Level of family income: 1: <1500_____ 2- 1600-3000 _____3- 3100-4500_____

b- Physical assessment:

1- Height to the mothers (cm): _____Weight of the mother(kg): _____

2- Past surgical history: 1-minor surgery_____ 2- Major surgery_____
3- Null_____

c- History of Obstetric & gynecologist factors :

Number of Gravity: 1- Gravida 1_____ 2-Gravida 2 _____

    3-Gravida 3_____ 4-Gravida 4 _____ 5- more_____

Number of Parity: 1- Null_____ 2- Para1_____ 3-Para2 _____

              4-Para3_____5-Para4 _____ 6- more_____

Have you any previous delivery? Yes _____No_____

If yes: what is the Type of previous delivery:

1-Vaginal delivery_____ 2-Ceasarean section_____

How many previous CS? 1-null_____ 2-First _____ 3-Seconed___

              4-third ___ 5- more_____

What is present cesarean indication?

1- Maternal request_____   2_ Previous C/S_____

  3- In Vitro Fertilization (IVF) _____   4-Placenta Praevia grade 4_____

  5-Malpresentation of the baby_____   6-Maternal infection _____

  7- Others_____

Gestational age (week): 1-37_____ 2- 38 ____   3- 39_____ 4- 40 and more___

d- Anesthesia factor:

   What type of anesthesia? 1- General_____   2- Spinal_____

2-Baby data:

c- Anthropometric measurements to newborn:

Gender: male_____ female_____

1-Newborn weight range (grams):

 2500-3000gm_____   3001- 3500 gm_____   3501-4000gm_____

2-Newborn head circumference (cm):
< 32cm_____32-37 cm_____>37cm_____

3-Newborn chest circumference (cm):
 < 30cm_____ 30-35 cm_____>35 cm_____

4-Length range (cm):

<48 cm_____48 to 53 cm_____>53 cm_____

b-Apgar score :physical signs

a- Heart Rate:

Score	0	1	2
	Absent	< 100 beats/min	≥100 beats/min
One minute			
5 Minute			

b-Respiration

Score	0	1	2
	Absent	Irregular/weak/slow breathing/gasping	Regular breathing/strong cry
One minute			
5 Minute			

C - Muscle tone and movement

Score	0	1	2
	None/limp	Some flexion	Good flexion/action motion
One minute			
5 Minute			

D - Skin color / oxygenation

Score	0	1	2
	Completely blue	Blue at extremities; pink body	Body and extremities pink
One minute			
5 Minute			

E - Reflex irritability to tactile stimulation

Score	0	1	2
	Silence; no response to stimulation	Grimace/feeble cry when stimulated	Cry/cough/sneeze
One minute			
5 Minute			

c-PH Umbilical Cord:

1-PH: <7.18 _____   7.18 – 7.38_____   >7.38_____

2-PCO2: <32_____   32 – 66_____   >66_____

3-HCO3: <17_____   17 – 27_____   >27_____

4-PO2: <6_____   6 – 31_____   >31_____

5-Base excess (mmol/L): <-8.3_____ -8.3-2.6_____   >2.6_____

Annex (2)

بسم الله الرحمن الرحيم

موافقة للإشتراك في البحث العلمي

جامعة النجاح الوطنية –كلية الطب وعلوم الصحة \قسم التمريض

أختي المشاركه

السلام عليكم ورحمة الله وبركاته

تحية طيبة وبعد،

أنت مدعوة للمشاركة ببحث علمي سيجرى في جنين في فلسطين. الرجاء أن تأخذي الوقت الكافي لقراءة المعلومات التالية بتأن قبل أن تقرري إذا كنت تريدين المشاركة أم لا. بإمكانك طلب إيضاحات أو معلومات إضافية عن أي شيء مذكور في هذه الإستمارة أو عن هذه الدراسة ككل من الباحث.

يقوم البحث بالأساس على دراسه تأثير التخدير الكلي مقارنة بالتخدير الشوكي على حموضة الدم في الحبل السري و مقياس "أبجر" في حديثي الولادة بعد العمليات القيصرية المبرمجة في مستشفى جنين الحكومي

و ذلك لتحقيق الأهداف التالية:1– تحديد طريقة التخدير التي يترتب عليها افضل النتائج وأقل الاضرار على صحة المولود. 2– مساعدة الام على اختيار طريقة التخدير المناسبة في الولادات القادمة.

التأثيرات السلبية او ردات الفعل التي يمكن ان يسببها الإشتراك في هذا البحث :

لا يوجد أي تأثيرات سلبية من هذا البحث، حيث أنه لا يعتمد على تقديم نوع جديد من العلاج أو أنه من نوعية الأبحاث المعتمدة على التجربة.

الفوائد الناتجة عن البحث :

أولاً : معرفه العلاقة بين طريقة التخدير وحموضة الدم في الحبل السري

ثانياً : معرفه العلاقة بين طريقة التخدير ومقياس الصحة الجسدية للمولود.

ثالثا:معرفة نوع العلاقة بين التغيرفي حموضة الدم ومقياس الصحة الجسدية للمولود.

في حال وافقت على المشاركة في هذه الدراسة، ستبقى اجاباتك في غاية السرية والكتمان. لا يحق لأي شخص كان الإطلاع على الأستبانة الخاصة بالمشارك بالبحث باستثناء الباحث المسؤول عن الدراسة ومعاونيه، ولجان الأخلاق المهنية المستقلة، و مفتشين من الإدارات الحكومية المنظمة.

موافقة المشترك:

لقد قرأت استمارة القبول هذه وفهمت مضمونها. تمت الأجابة على أسئلتي جميعها. وبناء عليه فأنني، حرا مختارا، أجيز إجراء هذا البحث و أوافق على الإشتراك فيه، وإني أعلم ان الباحث او مساعديه سيكونون مستعدين للإجابة على أسئلتي، وأنه باستطاعتي الإتصال بهم على الهاتف 0595065925 . واذا شعرت لاحقا ان الأجوبة تحتاج الى مزيد من الإيضاح فسوف أتصل بالباحث ، كما أعرف تمام المعرفة بانني حر في الإنسحاب من هذا البحث متى شئت حتى بعد التوقيع على الموافقة دون ان يؤثر ذلك على العناية الطبية المقدمة لي.

التوقيع:_____

التاريخ: _____

إسم الباحث: محمد خضر لطفي عواد.

مشرف البحث: د. مريم الطل (جامعة النجاح الوطنية\قسم التمريض).

عنوان البحث: تأثير التخدير العام مقارنة بالتخدير الشوكي على حموضة الدم في الحبل السري و

مقياس "أبجر" في حديثي الولادة بعد العمليات القيصرية المبرمجة في مستشفى جنين الحكومي–

فلسطين

مكان إجراء البحث: جنين

جامعه النجاح الوطنية

كليه الدراسات العليا

تأثير التخدير الكلي مقارنة بالتخدير الشوكي على حموضة الدم في الحبل السري ومقياس "أبجر" في حديثي الولادة بعد العمليات القيصرية المبرمجة في مستشفى جنين الحكومي

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الملخص

مقدمة: خلال فترة الحمل تحدث العديد من التغيرات الفسيولوجية لتحضير الأم للولادة، وفي الوقت نفسه لتطور الجنين تشمل توسع الأوعية الكلوي، تغيرات القلب، تدفق البلازما الكلوي ومعدل الترشيح الكبيبي كلاهما يزيدان. كما ان هناك ارتفاع في عدد النساء اللواتي خضعن لعملية قيصرية في جميع أنحاء دول العالم. يعتمد اختيار التخدير للعمليات القيصرية على عدة اسباب هل هي حالة طارئه،او رغبه الحامل او توصيات طبيب التوليد وطبيب التخدير.

هدف الدراسه:: تهدف الدراسة إلى معرفة تأثير التخدير العام والتخدير النخاعي على حالة الطفل باستخدام حموضة الدم ومقياس Apgar.

الخلفية: سيتم إجراء الدراسة باستخدام مقياس درجة حموضه الدم ومقياس Apgar، لتقييم حالة الطفل المولود لأم التي لديها عمليه قيصريه اختياريه وسيتم القيام به تحت التخدير العام اوالتخدير النخاعي.

تصميم الدراسه وطريقتها: تم استخدام الدراسة التحليلية المقطعية، للتحقيق في نوع التخدير (النخاع الشوككي أو الكلي) اذا سيكون له تأثير ضئيل أو معدوم على حموضه الدم للحبل السري او مقياس Apgar score. تمت الدراسه في مستشفى جنين الحكومي ، في جناح العمليات وغرفة الإنعاش. تم استخدام تقنية التوزيع العشوائي في هذه الدراسة. حجم العينة كانت (103) قسم على مجموعتين 53 مشتركه في مجموعة التخدير الكلي و 50 مشتركه في التخدير النخاع الشوكي. تم

الحصول على المعلومات التالية من السجلات الطبية للتحليل: البيانات الديموغرافية، نوع التخدير، جنس المولود، التاريخ الطبي السابق للأمهات، التاريخ الجراحي الماضي، حالة حديثي الولادة، درجه Apgar للطفل، تحليل الدم: حموضه الدم للحبل السري. سيقوم أطباء التخدير بعمل تخدير للأمهات، وقد قام أخصائيو طب الولادة بعمل تقييم للطفل، وارسل الباحث عينة الدم إلى التحليل.

النتائج: بالنسبة لنتائجنا في الدراسة، أظهرت أن متوسط درجة Apgar في الدقيقة 1 في مجموعة التخدير الكلي كان 94. ± 7.4، وفي التخدير الشوكي كان 8.3 ± 1.01 (p >0.001). كان متوسط أبغار في الدقيقة 5 في مجموعة التخدير العام 9.9 ± 0.26، وفي التخدير النخاعي كان 9.9 ± 0.44 (p = 0.95). حموضة الدم الشرياني من عينة دم الحبل السري من الأطفال حديثي الولادة في مجموعة التخدير العام كان الحماض والقلوية 11.5 % و3.8 % على التوالي، في حين كان في التخدير الحماضي النخاعي وكان القلاء (2.1 % و0.0%)، على التوالي.

التوصيات: التخدير النخاعي أكثر أماناً من التخدير الكلي لكل من الأم والجنين، درجة Apgar وموضة الدم هو مؤشّر موثوق لمخرجات الاطفال حديثي الولادة. يجب أن تؤخذ عينه دم شريانية من الحبل السري مباشرة بعد الولادة.