Maternal and fetal outcomes in women undergoing caesarean section under general and spinal anesthesia

Thesis

For partial fulfillment of master degree in Obstetrics & Gynecology

By

Hanan Mohammed Ateeyah

M.B.B.Ch, (2007)-AL-Mergeb University

Supervised by

Prof.Mohamed Ahmed Elkady

Professor of Obstetrics & Gynecology,

Faculty of Medicine - Ain Shams University

Ass. Prof. Mohammed Hussain Mostafa

Assistant Professor of Obstetrics & Gynecology

Faculty of Medicine - Ain Shams University

Ass. Prof. Mahmoud Hasan Mohamed

Assistant Professor of Anesthesia and Intensive Care Unit

Faculty of medicine - Ain shams university

Faculty of Medicine

Ain Shams University

2018

Acknowledgments

First, I feel always indebted to **Allah,** *for Blessing this work until it has reached its end, as a part of his generous help throughout our life.*

My profound thanks and deep appreciation goes to **Prof. Dr. Mohamed Ahmed Elkady,** *Professor of Obstetrics & Gynecology, Faculty of Medicine, Ain Shams University, for his great support and advice, she gave me the confidence and encouragement to fulfill this work.*

My profound thanks and deep appreciation also goes to **Prof. Dr. Mohammed Hussain Mostafa,** *Assistant Professor of Obstetrics & Gynecology, Faculty of Medicine, Ain Shams University, for his great support and advice, she gave me the confidence and encouragement to fulfill this work.*

I am deeply grateful to **Dr. Mahmoud Hasan Mohamed,** *Assistant Professor of Anesthesia and Intensive Care Unit, Faculty of Medicine - Ain Shams University, for his supervision, guidance and support throughout this work.*

Words fail to express my love, respect and appreciation to my husband for his unlimited help and support

Last but not least, I dedicate this work to my family, whom without their sincere emotional support, pushing me forward this work would not have ever been completed

Hanan Mohammed Ateeyah

List of Contents

List of Abbreviations

AAGA	:	Accidental awareness during general anesthesia
ARDS	:	Acute respiratory distress syndrome
BMI	:	Body mass index
CBC	:	Complete blood picture
CNS	:	Central nervous system
CSE	:	Combined spinal and epidural
CSF	:	Cerebrospinal fluid
DM	:	Diabetes mellitus
EBP	:	Epidural blood patch
GA	:	General anesthesia
GI	:	Gastro-Intestinal
GIT	:	Gastro-Intestinal Tract
IV	:	Intravenous
LAST	:	Local anesthetic toxicity
LSCS	:	Lower segment caesarean section
MAP	:	Mean arterial pressure
MAC	:	Minimum alveolar concentration
NSAID	:	Non-steroidal anti-inflammatory drugs
PDPH	:	Post dural puncture headache
POI	:	Post-operative ileus
SD	:	Standard deviation
UK	:	United Kingdom
USA	:	United states of America
VBAC	:	Vaginal birth after caesarean

List of Figures

List of Tables

Introduction

Delivery by caesarean section is by far one of the most commonly performed operations all over the world. Approximately 18.5 million caesarean sections are performed yearly worldwide ***(WHO, 2010).***

About 40% of the countries have CS rates <10%, about 10% have CS rates between 10 and 15%, and approximately 50% have CS rates>15%. Countries with CS rates <10% account for only 25% (4.5 millions) of the global CS but for 60% (77 millions) of the total number births worldwide. On the other hand, 73% (13.5millions) of the total number of CS are performed in the countries with CS rates >15% where 37.5% (48.4 millions) of the total number of births occur ***(WHO, 2010).***

In Egypt, more than one-half of deliveries in the five-year period before the 2014 were by caesarean section. Caesarean deliveries were more common in the urban areas than in rural areas (60% and 48% respectively) ***(El-Zanaty and Associates, 2014).***

When medically justified, caesarean section can effectively prevent maternal and perinatal mortality and morbidity. However, there is no evidence showing the benefits of caesarean delivery for women or infants who do not require the procedure. As with any surgery, caesarean sections are associated with short and long term risk which can extend many years beyond the current delivery and affect the health of the woman, her child and future pregnancies. These risks are higher in woman with limited access to comprehensive obstetric care ***(Lumbiganon et al., 2010).***

This operation requires effective anaesthesia which can be regional (epidural or spinal) or a general anaesthesia. The type of anaesthesia used and the care with which it is administered is an important determine of the outcome of caesarean section ***(Anderson et al., 1987).***

Both spinal and general anaesthesia used for caesarean section have certain advantages and disadvantages and there is no method which is completely ideal. The most important factors for choice of anaesthesia are; pregnant systemic problems and wishes, the urgency of the operation, and the surgeon and the anesthetists experience ***(Wu, 2006).***

General anaesthesia refers to the loss of the ability to perceive pain associated with loss of consciousness produced by intravenous or inhalational anaesthetic agents. For caesarean section, this involves the use of thiopentone for induction, tracheal intubation facilitated by suxamethonium, positive-pressure ventilation of the lung with a nitrous oxide/ oxygen mixture plus a volatile agent, and a muscle relaxant ***(Thorburn, 1998).***

Spinal anaesthesia refers to the use of local anaesthetic solutions to produce circumscribed area of loss of sensation. The spinal anaesthesia used for caesarean section involves the infiltration of a local anaesthetic agent, usually bupivacaine, into the surroundings of the spinal cord through the lower back of the woman (the drug is injected directly into the subarachnoid space) ***(Thorburn, 1998).***

Over the last 30 years, the use of spinal anaesthesia is rapidly increasing ***(Ashok, 2010).***

Regional anaesthesia nowadays, has gained worldwide acceptance and its physiological effects provide a rationale for expecting a better outcome with this technique ***(Crawford and Anmette, 2001).***

Spinal anaesthesia is relatively easy to perform, gives excellent anaesthesia a low potential of toxicity, allows mother to be awake and interact immediately after the birth of the baby. Compared to general anaesthesia it offers less maternal morbidity, comparable less blood loss ***(Danelli et al., 2009).***

It also enables early recovery of gastrointestinal functions, prolonged interval to first analgesic requirement, less analgesic consumption and early ambulation ***(Haves et al., 2013).***

However, spinal anaesthesia is not free from side effects and has its own complication like maternal hypotension, hypothermia, post-operative headache, accidental total spinal anaesthesia and patients at risk of heavy peripartum haemorrhage may not tolerate the haemodynamic effects of regional anaesthesia ***(Jenkins and Khan, 2003).***

The lack of medical personnel trained in the technique would also exclude the use of spinal anaesthesia ***(Cunningham et al., 2010).***

General anaesthesia is a more quickly administered procedure and is often preferred in cases where speed is important ***(Enkin et al., 2001).***

It also used in certain situation like contraindication to regional anaesthesia, failed regional anaesthesia and maternal request ***(Afolabi et al., 2010).***

The risks include aspiration of stomach contents, awareness to surgical procedure (due to inadequate anaesthesia), failed intubations, and respiratory problems for both mother and baby ***(Afolabi et al., 2003).***

In general, general anaesthesia is preferred for emergency caesarean section since it provides rapid onset of action and more stabilization of the patient's circulation and vital signs, on the other hand regional anaesthesia is preferred for elective operations because of its lower risk of drugs complications to the mother and the fetus ***(Almomany, 2012).***

Aim of the Work

Research hypothesis:

In pregnant women undergoing elective caesarean section and have spinal or general anaesthesia, maternal and fetal outcomes may be similar.

Research question:

In pregnant women undergoing elective caesarean section and have spinal or general anaesthesia do maternal and fetal outcomes similar?

This study aims to compare maternal and fetal outcomes in women undergoing elective caesarean section and have spinal anaesthesia with those having general anaesthesia.

Caesarean Section

Cesarean delivery is defined as the birth of a fetus through incisions in the abdominal wall and the uterine wall. This definition does not include removal of the fetus from the abdominal cavity in the case of rupture of the uterus or in the case of an abdominal pregnancy ***(Diemunsch and Noll, 2017).***

Incidence of cesarean birth:

According to the most recent estimates, the average global rate of CS is 18.6%, ranging from 6.0% to 27.2% in the least and more developed regions, respectively.

The lowest rates of CS are found in Africa (7.3%) and more specifically in Western Africa (3%). The highest rates of CS are found in Latin American and the Caribbean (40.5%) and South America is the subregion with the highest average CS rates in the world (42.9%) (***Betrán et al., 2016).***

Countries with the highest CS rates in each region are Brazil (55.6%) and Dominican Republic (56.4%) in Latin America and the Caribbean, Egypt (51.8%) in Africa, Iran and Turkey in Asia (47.9% and 47.5%, respectively), Italy (38.1%) in Europe, United States (32.8%) in Northern America, and New Zealand (33.4%) in Oceania ***(Betrán et al., 2016).***

At country level, Egypt, Tunisia and Morocco witnessed the largest rise in the African region. CS rates in Egypt rose from 4.6% to 51 In Asia, Turkey, Georgia and China had absolute increases of 39.5, 32.9, and 31.8 points, respectively and all three had an AARI of about 10%. In Europe, Romania

stands out as the country with the largest absolute increase (29.1 points, from 7.2% to 36.3%). In Latin America, the three countries with the highest absolute increases in CS rates were Dominican Republic, Mexico and Colombia (36.4, 32.8, and 27.4 points, respectively) (***Betrán et al., 2016).***

.8% (47.2 points) over the 24 year period. Along with Morocco, these two countries had the largest worldwide average annual rate of increase (AARI) in CS rates (11.6%).

In Asia, Turkey, Georgia and China had absolute increases of 39.5, 32.9, and 31.8 points, respectively and all three had an AARI of about 10%. In Europe, Romania stands out as the country with the largest absolute increase (29.1 points, from 7.2% to 36.3%). In Latin America, the three countries with the highest absolute increases in CS rates were Dominican Republic, Mexico and Colombia (36.4, 32.8, and 27.4 points, respectively) (***Betrán et al., 2016).***

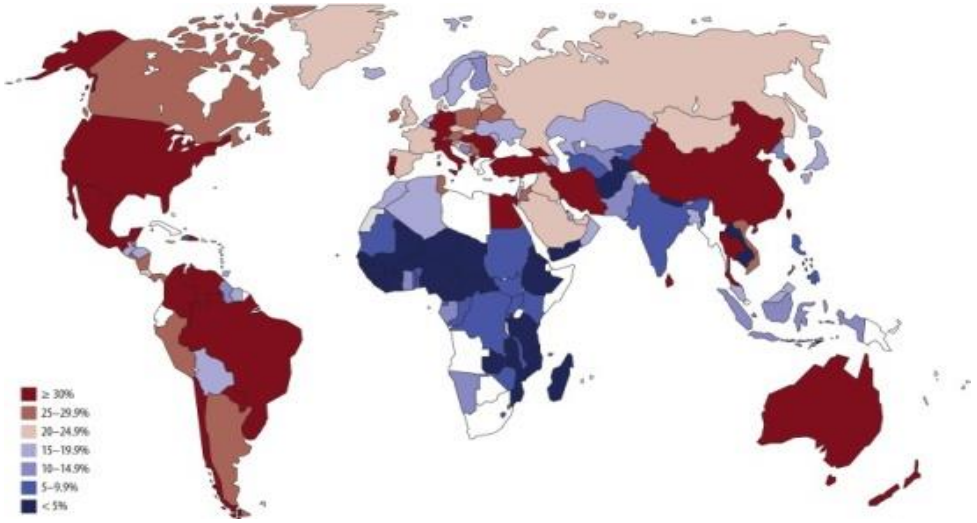

Fig (1): *shows country variation of c/s rates according to latest nationally – representative data*

Reasons for the Continued Increase in the Caesarean Rates:

The reasons for the continued increase in the caesarean rates are not completely understood, but some explanations include the following:

1. One of the repeatedly reported reasons is fear of pain and concerns about genital modifications after vaginal delivery ***(Hellerstein et al., 2015)***.
2. The incidence of forceps and vacuum deliveries has decreased ***(Martin et al., 2009)***.
3. Rates of labor induction continue to rise, and induced labor, especially among nulliparous, increases the risk of cesarean delivery. According to National Center for Health Statistics, the incidence of labor induction in the United States more than doubled from 9. 5 percent in 1991 to 22.5 percent in 2006 ***(Martin et al., 2009).***
4. Rates of cesarean delivery for women with preeclampsia have increased, whereas rates of labor induction in these patient has declined ***(Basso et al., 2006)***.
5. Vaginal birth after cesarean (VBAC) has decreased from 26% in 1996 to 8.55% in 2007 ***(Hamilton et al., 2009).***
6. Most fetuses presenting as breech are now delivered by cesarean, the incidence of forceps and vacuum deliveries has decreased and rates of labor induction continue to rise, and induced labor, especially among nulliparous patient, increases the risk of cesarean delivery ***(Ananth et al., 2005).***

Indications of Caesarean Deliveries:

Caesarean delivery is performed when the clinician and/or patient believe that abdominal delivery is likely to provide a better maternal and/or fetal outcome than vaginal delivery Indications for caesarean delivery fall into two general categories: "medically/obstetrically indicated" or "on maternal request ***(Boyle et al., 2013).***

The three most common indications for primary caesarean delivery in the United States account for almost 80 percent of these deliveries:

- Failure to progress during labor (35 percent).
- Nonreassuring fetal status (24 percent).
- Fetal malpresentation (19 percent).

Additional, less common indications for caesarean delivery include, but are not limited to:

- Abnormal placentation (eg, placenta previa, vasa previa, and placenta accreta).
- Maternal infection with significant risk of perinatal transmission during vaginal birth.
- Some fetal bleeding diatheses.
- Funic presentation or cord prolapse.
- Suspected macrosomia (typically 5000 grams in women without diabetes, 4500 grams in women with diabetes).
- Mechanical obstruction to vaginal birth (eg, large fibroid, severely displaced pelvic fracture).
- Severe fetal hydrocephalus.
- Uterine rupture. ***(Boyle et al., 2013)***