# Subcuticular Stitching versus Staples in Skin Closure of Elective Term Lower Segment Cesarean Section A Comparative Study

*Thesis*

Submitted for Partial Fulfilment of Master Degree
in Obstetrics and Gynecology

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**2014**

# Acknowledgments

*First of all, thanks to* ***ALLAH*** *for giving me the strength to complete this work.*

*This thesis would not have been possible without the help, support and patience of my supervisors. I would like to thank* ***Prof. Dr./ Mohammed Abdallah El Maraghy,*** *Professor of Obstetrics and Gynecology, Faculty of Medicine – Ain Shams University for his outstanding supervision and guidance. I really have the honor to complete this work under his supervision.*

*I would like to express my gratitude to* ***Dr./ Hossam Mohammed Hemida,*** *Lecturer of Obstetrics and Gynecology, Faculty of Medicine – Ain Shams University, for his remarkable efforts, considerable help and guidance for whole of this work.*

*I can't forget to thank* ***Dr./ Ayman Ahmed Abd El-Salam El-Meleigy,*** *Lecturer of Plastic Surgery, Faculty of Medicine – Ain Shams University, for his great efforts and cooperation to achieve this work.*

*Last but not least, I would like to thank with great appreciation* ***Dr. Khaled Mohamed El-Gazzar and Dr. Mohammed Amin,*** *Lecturers of Plastic Surgery, Faculty of Medicine, Ain Shams University, for their great efforts and cooperation in revising photos of cases and scar evaluation.*

*Ayman Mahmoud Hassan*

# List of Contents

# List of Abbreviations

**AVMs** : Arterio venous malformations

**CAMs** : Cell adhesion molecules

**CDC** : Centers for disease control and prevention

**CDMR** : Cesarean delivery on maternal request

**CS** : Cesarean section

**CSF** : Cerebrospinal fluid

**CTGF** : Connective tissue growth factor

**DVT** : Deep venous thrombosis

**FGF** : Fibroblast growth factor

**HIV** : Human immunodeficiency virus

**IL** : Interleukin

**IV** : Intravenous

**KGFs** : Keratinocyte growth factor

MMPs : Matrix metalloproteinases

**NIH** : National Institutes of Health

**NNIS** : National nosocomial infection surveillance

**NRs** : Numerical rating scale

**PDGF** : Platelet-derived growth factor

# List of Abbreviations *(Cont...)*

**SAP** : Surgical antimicrobial prophylaxis

**SSI** : Surgical site infection

**TGFs** : transforming growth factors

**TIMPs** : Tissue inhibitors of metalloproteinases

**TNF-α** : Tumor necrosis factor alpha

**UTI** : Urinary tract infection

**VAS** : Visual analogue scale

**VEGF** : Vascular endothelial growth factor

**VRs** : Verbal rating scale

**2-OCA** : 2-Octyl –cyanoacrylate

# List of Tables

# List of Figures

# List of Figures *(Cont…)*

# Introduction

The number of deliveries by cesarean section is increasing steadily worldwide in recent decades. Cesarean section improves the maternal mortality, however, the maternal morbidity still high. The safety of cesarean however, has increased owing to improvement in surgical and anesthetic techniques, increased safety of blood transfusion and routine use of antibiotics and thrombophylaxis ***(Jolly et al., 1991).***

Cesarean section is also associated with long-term risk such as postoperative pelvic adhesions, uterine scar rupture, and placental complications such as placenta previa and accreta ***(Miller et al., 1997).*** For many years, the incidence of the procedure was stable (3-5%) yet since 1960s, the rate of cesarean section was rising steadily reaching (20-25%) in the late 1980s ***(El-Mahallawy et al., 2006).***

The risk factors for surgical site infection in association with cesarean section are many, including those issues present in the surgical patient population such as age, factors such as presentation to surgery (elective vs emergency) and patient care practices such as antibiotic prophylaxis ***(Reilly et al., 2001).***

Analysis of the combined effects of the intrinsic and extrinsic risk factors predisposing patients to surgical site infection (SSI) is necessary in order to detect the common links.

The intrinsic factors are patient related and the extrinsic factors are related to management and care. Although the intrinsic factors can not be changed, the risk they present in terms of infection is identifiable and manageable ***(Reilly et al., 2001).***

Current techniques for all types of skin closure include interrupted and subcuticular sutures, staple, tape, tissue adhesives, delayed closure and absorbable pins ***(Pearl et al., 2004),*** and a novel device under investigation for all types of skin closure is an absorbable subcuticular staple device (insorb, polymouth MN) ***(Tellis, 2007).***

Conflicting evidence exists regarding the ideal method of skin closure following abdominal surgery. Choice of skin closure according to experience and the patients clinical presentation to surgery.

The evidence comparing sutures with staples focuses upon speed of insertion, cost, postoperative pain and cosmetic appearance rather than infection risk ***(Bhatia et al., 2002).***

# Aim of the Work

1- Compare postoperative pain, immediately, after 6 days and after 6 weeks after an elective term cesarean section, according to the skin closure via subcuticular sutures or metallic staples (main aim).

2- Compare surgical time, cosmetic appearance at 6 weeks postpartum, incidence of wound infection and women satisfaction (secondary aims).

# Cesarean Section

Caesarean section is the delivery of the fetus, placenta, and membranes after the age of viability through an abdominal and uterine incision ***(Incerpi et al., 2007).***

There is a wide global variation in the incidence of caesarean section. The general range is from 5% to 25% with a continued rise in developed countries while in developing countries the rate is relatively low ***(Jaiyesinmi et al., 2003).***

Caesarean section can be performed either as an elective or emergency procedure. The former constitutes bulk of the cases ***(Swende et al., 2007).***

The indications for elective caesarean section are many and varying and are often relative rather than absolute. They include contracted pelvis, major degree placenta previa, two or more previous caesarean section, malpresentation, HIV infection in pregnancy, previous vesico-vaginal fistula repair, intrauterine growth restriction, and bad obstetric history ***(Swende, 2008).***

## Frequency:

From 1910-1928, the cesarean delivery rate at Chicago Lying-in Hospital increased from 0.6% to 3%. The cesarean delivery rate in the United States was 4.5% in 1965. According to the National Hospital Discharge Survey, the cesarean rate

rose from 5.5% in 1970 to 24.1% in 1986. Fewer than 10% of mothers had a vaginal birth after a prior cesarean, and women spent an average of 5 days in the hospital for a cesarean delivery and only 2.6 days for a vaginal delivery ***(MacDorman et al., 2008).***

Increases in the primary cesareans with no specified indication were faster than in the overall population and appear to be the result of changes in obstetric practice rather than changes in the medical risk profile or increases in maternal request ***(MacDorman et al., 2008).***

In a 2006 publication reviewing cesarean delivery rates in South America, the median rate was 33% with rates fluctuating between 28% and 75% depending on public service versus a private provider. The authors conclude that higher rates of cesarean delivery do not necessarily indicate better perinatal care and can be associated with harm ***(Villar et al., 2006).***

In 1988, when the cesarean delivery rate peaked at 24.7%, 36.3% (351,000) of all cesarean deliveries were repeat procedures. Although reports concerning the safety of allowing vaginal birth after a cesarean delivery had been present since the 1960s, by 1987, fewer than 10% of women with a prior cesarean delivery were attempting a vaginal delivery ***(Cho et al., 2004).***

In 2003, the repeat cesarean delivery rate for all women was 89.4%; the rate for low-risk women was 88.7%. Today, low-risk women giving birth for the first time who have a cesarean delivery are more likely to have a subsequent cesarean delivery ***(Menacker et al., 2005).***

In the past decade, an increase in the percentage of births to women aged 30-50 years has occurred despite a decrease in their relative size within the population. The cesarean rate for mothers aged 40-54 years in 2007 was more than twice the cesarean rate for mothers younger than 20 years (48% and 23%, respectively).The risk of having a cesarean delivery is higher in nulliparous patients, and, with increasing maternal age, the risk for cesarean delivery is increased secondary to medical complications such as diabetes and preeclampsia ***(Hamilton et al., 2008).***

By 1985, almost 85% of all breech presentations (3% of term fetuses) were delivered by cesarean. In 2001, a multicenter and multinational prospective study determined that the safest mode of delivery for a breech presentation was cesarean delivery ***(Hannah et al., 2000).***

This study has been criticized for differences in the standards of care among the study centers that does not allow a standard recommendation ***(Glezerman et al., 2006).***

## History:

**Figure (1):** Imagination how the cesarean section was done in the past.

The mother of Bindusara (born c. 320 BCE, ruled 298 – c.272 BCE), the second Mauryan Samrat (emperor) of India, accidentally consumed poison and died when she was close to delivering him. Chanakya, the Chandragupta's teacher and adviser, made up his mind that the baby should survive. He cut open the belly of the queen and took out the baby, thus saving the baby's life ***(Geiger, 1908).***

According to the ancient Chinese *Records of the Grand Historian*, Luzhong, a sixth-generation descendant of the Yellow Emperor, had six sons, all born by "cutting open the body". ***(sima Qian, 2011).***

The Babylonian Talmud, an ancient Jewish religious text, mentions a procedure similar to the Caesarean section. The procedure is termed *yotzei dofen* ***(sima Qian, 2011).***