# Comparison of Subcuticular Non absorbable Suture and staples in Cesarean Skin Closure: A Randomized Controlled Trial

*Thesis*

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**Presented by**


**Aml Abd-Elnaser Alkelani**

*M.B., B.ChAlkhoms University (2007 )libya*


**Supervised by**


**Prof. Dr. Ahmed Mohammed Nour-Eldine Hashaad**

*Professor of Obstetrics and Gynecology*

*Faculty of Medicine, Ain Shams University*

**Dr. Walid Elbasuony Mohammed**

*Lecturer of Obstetrics and Gynecology*

*Faculty of Medicine, Ain Shams University*



**Faculty of Medicine**

**Ain Shams University**

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# مقارنة بين غلق الجلد بواسطة الخياطة تحت الأدمة مقابل التدبيس في العمليات القيصرية

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الطبيبة/أمل عبدالناصر عبدالمولى الكيلاني
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تحت إشراف

**أ.د/أحمد محمد نورالدين حشاد**
أستاذ أمراض النساء والتوليد
كلية الطب- جامعة عين شمس

**د/ وليد البسيونى محمد**
مدرس أمراض النساء والتوليد
كلية الطب- جامعة عين شمس

كلية الطب
جامعة عين شمس
القاهرة

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***AmlAbd-ElnaserAlkelani***

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# List of Abbreviations

| | | |
|---|---|---|
| **2-OCA** | **:** | 2-Octyl –cyanoacrylate |
| **ASA** | **:** | American Society of Anesthesiologists |
| **BMI** | **:** | Body Mass Index |
| **CAMs** | **:** | Cell adhesion molecules |
| **CDC** | **:** | The centers for Disease Control and Prevention |
| **CDMR** | **:** | Cesarean Delivery On Maternal Request |
| **CI** | **:** | Confidence Interval |
| **CS** | **:** | Cesarean section |
| **CTGF** | **:** | Connective Tissue Growth Factor |
| **E-coli** | **:** | Escherichia coli |
| **EGF** | **:** | Epithelial Growth Factor |
| **ERCS** | **:** | Elective Repeat Cesarean section |
| **FDA** | **:** | Food And Drug Administration |
| **FGFs** | **:** | Fibroblast Growth Factors |
| **HCAI** | **:** | Health Care Associated Infection |
| **HIV** | **:** | Human Immunodeficiency Virus |
| **IL** | **:** | Interleukin |
| **KGFs** | **:** | Keratinocyte Growth Factors |
| **MMPs** | **:** | Matrix Methalloproteinases |
| **NICU** | **:** | Neonatal Intensive Care Unit |
| **NIH** | **:** | National Institutes of Health |
| **NNIS** | **:** | National nosocomial infection surveillance |
| **OECD** | **:** | Organization For Economic Co-Operation And Development |
| **PDGF** | **:** | Platelet-derived growth factor |
| **PDO** | **:** | Polydioxanone |
| **RDS** | **:** | RespiratoryDistress Syndrome |
| **SAP** | **:** | Surgical antimicrobial prophylaxis |
| **SPSS** | **:** | Statistical program for Social Science |
| **SSI** | **:** | Surgical site infection |
| **TGFs** | **:** | Transforming growth factors |
| **TIMPs** | **:** | Tissue inhibitors of metalloproteinases |
| **TNF-α** | **:** | Tumor necrosis factor alpha |

| | | |
|---|---|---|
| **VAS** | **:** | Visual analogue scale |
| **VBAC** | **:** | Vaginal Birth After Cesarean Section |
| **VEGF** | **:** | Vascular endothelial growth factor |

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# Abstract

**OBJECTIVE** : The current study aimed on assessing cesarean wound complication after skin closure with surgical staples compared with no absorbable subcuticular suture.

**METHODS**: The study was a prospective randomized controlled clinical trial carried on262womenpresented to Ain Shams University Maternity Hospital, and scheduled for caesarean delivery in the period from March 2016 till September 2016. A total of two hundred sixty two women were randomly divided into subcuticular group (n=131) and stapler group (n=131) according to skin closure at cesarean delivery. Only those patients who were eligible were enrolled in the study. The primary outcome of the study was a composite wound morbidity outcome (including wound disruption or infection) and the secondary outcomes included post-operative pain, procedure time (skin closure), and patient satisfaction.

Data presentation and statistical analysis were performed using IBM© SPSS© Statistics version 17 (SPSS© Inc., Armonk, NY, USA).

**RESULTS:** This study showed that staples were associated with increased rates of wound separation, peripartum medication use of antibiotics for wound care. However, There was no statistically significant difference between the two groups as regards the incidence of wound infection.

**CONCLUSIONS** : This study demonstrated that there was no significant difference between staples and subcuticular sutures cesarean wound closure regarding SSI and postoperative pain. However, there was significant difference between two techniques of cesarean wound closure as regard wound disruption and woman's satisfaction which was in favour of subcuticular sutures. Occurrence of wound complications is the most important factor that influenced patient satisfaction.

# INTRODUCTION

Caesarean section is the most common major surgery in many developed countries, and is performed on tens of millions of women annually worldwide. It is, therefore, paramount that this laparotomy be performed following the best technique. Several randomized trials have evaluated the safety and effectiveness of many technical aspects of caesarean ***(Berghella 2005).***

Internationally, the rate of caesarean section (CS) has risen steadily and substantially in recent decades. Across Organisation for Economic Co-operation and Development (OECD) countries, the average rate of CS is now at one in four births, an increase from one in five in 2010**.** ***(OECD Health Statistics 2015).***

Although CS is often life-saving for both mother and fetus in instances such as placenta praevia and uterine rupture, this rising rate remains a cause for worry.

CS carries almost three times the risk of maternal morbidity and mortality than with vaginal delivery ***(Lius et al., 2007)***.

Other risks include surgical injuries and respiratory distress for the neonate, negative psychosocial implications such as poor perception of birth for the woman and recent evidence demonstrates a negative impact on future fertility.

***(Lius et al., 2007 –Deneux et al., 2006) (Oneill et al., 2014)*** Rising CS rates also have economic consequences.

The World Health Organisation has estimated the global cost of "excess" CS to be $2.3 billion dollars ***(Gibbons et al., 2010).***

Recognized complications of Cesarean section are excessive intra- and postoperative bleeding, wound complications and thromboembolism ***(Hadar et al., 2011).***

Long-term risks after a Cesarean section are less well documented, but they include menstrual problems, intrauterine adhesions, abnormally adherent placenta and Cesarean section, ectopic pregnancy ***(Wus et al., 2005).***

Pelvic pain may also occur following Cesarean section and is usually caused by postoperative pelvic adhesions ***(Tulandi et al., 2011)***.

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't be changed, the risk they present in terms of infection is identifiable and manageable ***(Reilly et al., 2001).***

A survey of skin closure techniques used in the UK ***(Tully, 2002)*** showed that the subcuticular skin stitch was the most commonly used (74%) followed by interrupted skin stitch (8%) and others (18%).While this survey suggests little variation in surgical technique within the UK, different situations may apply in other countries.

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).***

With the wide variety of materials and techniques used at skin closure in caesareans, there is a need to identify which provide the best outcomes for women.

This review was conducted to identify evidence regarding the most effective skin closure techniques.

Trials from general surgery can provide some information on the possible effects of the use of different techniques and materials, but it is important to analyze these interventions separately for caesareans**.**

# AIM OF THE WORK

The aim of this work was to compare wound morbidity in surgical staples versus prolene 2.0 subcuticular suture for skin closure at cesarean deliveries.

# CAESAREAN 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).***

Caesarean section, also known as **C-section,**is the use of surgery to deliver one or more babies. A Caesarean section is often performed when a vaginal delivery would put the baby or mother at risk. This may include obstructed labour, twin pregnancy, high blood pressure in the mother, breech birth, problems with the placenta, umbilical cord or shape of the pelvis, and previous C-section. ***(ACOG, 2014)***A trial of vaginal birth in some of these situations, including after C-section, may be possible. Some C-sections are also performed upon request. The World Health Organization recommends that they should be done based on medical need and in many cases they are lifesaving for the mother and baby ***(WHO, 2015).***

C-sections result in a small overall increase in poor outcomes in low risk pregnancies. They also typically take longer to heal from, about six weeks, than vaginal birth. The increased risks include breathing problems in the baby and amniotic fluid embolism and postpartum bleeding in the mother. Established guidelines recommend that caesarean sections not be used before 39 weeks of pregnancy without a medical reason ***(ACOG, 2013).***The