Efficacy of Diathermy on Healing Power of Cesarean Section Scar:
A Randomized Control Trail

Thesis

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By

Amgad Mohamed Abdelmonem Mehawed
M.B.B.Ch

Under Supervision of

Prof. Mohammed AbdElHameed M.NasrAdDeen
Professor of Obstetrics and Gynecology
Faculty of Medicine, Ain Shams University

Dr. Kareem Mohamed Labib
Assistant Professor of Obstetrics and Gynecology
Faculty of Medicine, Ain Shams University

Dr. Mohamed Abd Elfattah Elsenity
Lecturer of Obstetrics and Gynecology
Faculty of Medicine, Ain Shams University

Faculty of Medicine, Ain Shams University
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Amgad Mohamed Abdelmonem Mehawed

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Abb.	Full term
AC	*Alternating current*
AVBRH	*Acharya Vinoba Behave Rural Hospital*
BMI	*Body mass index*
CIED	*Cardiovascular implantable electronic device*
CS	*Cesarean section*
CTG	*Cardiotocography*
DC	*Direct current*
ESUs	*Electrosurgical units*
Hz	*Hertz*
PML	*Polymorphonuclear leukocytes*
VAS	*Visual Analogue Scale*
WES	*Wound Evaluation Scale*

INTRODUCTION

Over several decades, has come to a dramatic increase In the number of cesarean sections performed across the world, especially in developed country. The frequency of cesarean section increased from 5% to 15%. However, the rate of births by cesarean sections still varies significantly in different countries and regions, in different hospitals, by the various factors such as social and economic health or individual factors, partly due to different perceptions of health workers and pregnant women about benefits and risks of cesarean sections ***(Scott et al., 2006).***

Cesarean section (CS) is the delivery of a living baby by a surgical incision through the anterior abdominal wall and uterus and has been associated with severe maternal morbidity and mortality in the past ***(Cluver et al., 2010).***

Consequently, obstetricians around the world concerned about decreasing risks and complications for cesarean sections as the scar of a lower-segment CS has become the most common scar encountered in obstetric practice and its cosmetic effect is one of our concerns.

On 1 October 1926, Dr Harvey Cushing performed the first operation using William T. Bovie's electrosurgical device ***(O'Connor et al., 1996).*** Electrosurgery is the use of an alternating current through tissue resistance to raise tissue

temperature to achieve vaporization or the combination of desiccation and protein coagulation ***(Feldman et al., 2012; Dodde et al., 2011).*** It is commonly used in dermatological, cardiac, plastic, ocular, spine, otorhinolaryngological, orthopedic, urological, neurosurgical and general surgery procedures ***(Dodde et al., 2011).***

Previous studies showed encouraging results about using the vessel-sealing electrosurgical systems in abdominal hysterectomy ***(Petrakis et al., 2005),*** vaginal hysterectomy ***(HefniMA et al., 2005)*** and in a wide scope of non-gynecologic surgical procedures ***(Palazzo et al., 2002).***

The reported complications for electrosurgery include burns at the patient plate ***(Hay 2005),*** explosion and fire ***(McCauley 2010),*** surgical smoke ***(Fitzgerald et al., 2012),*** direct coupling ***(Wang et al., 2010)***, capacitive coupling and insulation failure ***(McCauley, 2010).***

Multiple human studies have been performed illustrating the safety and efficacy of diathermy for dividing subcutaneous, muscle and fascial layers ***(Watt et al., 2010).***

As a result of its convenience and advantages with respect to haemostasis and sharps safety ***(Aird et al., 2012),*** However, its use for incising the epidermis and dermis of the skin remains controversial as concern exists that diathermy

creates a thermal burn, resulting in a scar that is cosmetically inferior to that resulting from use of a scalpel.

Some authors tried to compare the use of diathermy versus scalpel during anterior abdominal wall incision and many of them showed that electrocautery incision is better than scalpel incision in terms of time taken for the incision, pain levels, wound healing and blood loss ***(O'Connor et al., 1996).***

Thus, the aim of this work was to compare the rates of wound complications and wound-related blood loss in surgical incisions made with a scalpel and incisions made using electro-surgery in the Department of Gynecology and Obstetrics in Ain Shams University using non inferiority trial.

A non-inferiority trial is different as it is designed not to show that treatments are equal, or 'not different', but that the new method is not unacceptably worse than, or 'non-inferior' to control ***(Smith et al., 2009).***

AIM OF THE WORK

In women undergoing CS using diathermy is superior, or 'non-inferior' to scalpel from skin to peritoneal covering.

Chapter 1

CESAREAN DELIVERY

As with most surgical procedures, there is no standard technique for cesarean delivery. In many cases, small absolute differences in outcome among surgical techniques are not clinically important; in these settings, time and cost savings assume greater importance ***(Temmerman et al., 2016).***

Opening the abdomen

The advantages and disadvantages of various incisions and the procedure for opening the abdomen from skin to peritoneum are generally the same as for and open abdominal surgery ***(Bamigboye et al., 2014).***

Skin incision

Choice of incision

For most patients, a transverse skin incision is preferred since it is associated with a better cosmetic appearance and possibly less postoperative pain and hernia formation than the vertical midline skin incision ***(Bickenbach et al., 2013).***

Although seldom performing a vertical midline incision, selection of this approach when: The incision-to-delivery time is critical, A transverse incision may not provide adequate exposure and the patient has a bleeding diathesis and thus is at increased risk of subcutaneous or subfascial hematoma formation ***(Brown et al., 2005).***

Transverse incisions

Two common transverse incisions for cesarean delivery are the Pfannenstiel type and the Joel-Cohen type incisions ***(Bennich et al., 2016).***

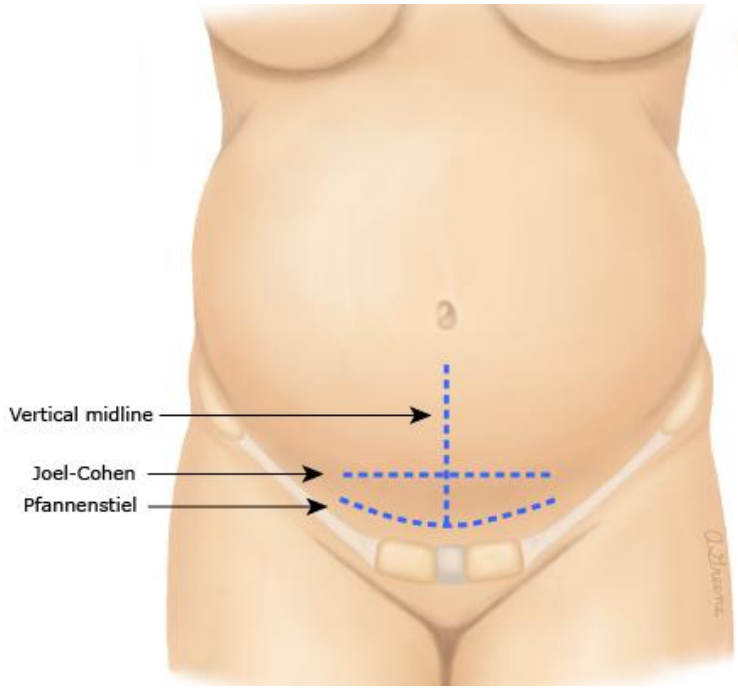

Figure 1: Transverse incisions

- The Pfannenstiel skin incision is slightly curved, 2 to 3 cm above the symphysis pubis, with the midportion of the incision within the clipped area of the pubic hair ***(Smin et al., 2011).***

- The Joel-Cohen type incision is straight, 3 cm below the line that joins the anterior superior iliac spines, and slightly more cephalad than Pfannenstiel ***(Dahlke et al., 2013).***

In severely obese women, a supraumbilical transverse incision may be preferable to a suprapubic incision ***(Ceci et al., 2012).***

Vertical incision

Compared with transverse incisions, a vertical midline incision generally allows faster abdominal entry, causes less bleeding and superficial nerve injury, and can be easily extended cephalad if more space is required for access ***(Roberge et al., 2014).***

In a prospective cohort study including over 3500 emergency cesarean deliveries, that median incision to delivery interval was faster for vertical than transverse skin incisions (three versus four minutes for primary cesareans and three versus five minutes for repeat cesareans), but neonatal outcomes were not improved, and some maternal and neonatal outcomes were worse in the vertical incision group (eg, need for postpartum maternal transfusion [8.5 versus 5.3 percent], neonatal intubation in the delivery room [17 versus 13 percent]) ***(Wylie et al., 2010).***

The poorer outcomes were attributed to unidentified confounders since the choice of skin incision is not independent of the indication for cesarean delivery ***(Chelmow et al., 2004).***

Subcutaneous tissue layer

There are no randomized trials comparing techniques for incision and dissection of the subcutaneous tissues at cesarean delivery. Blunt dissection (with fingers) is preferred over sharp dissection (with the knife), as blunt dissection has been associated with shorter operative times, less chance of injury to vessels, and less postoperative pain ***(Holmgren et al., 1999).*** The tissue is opened from medial to lateral ***(Wallin et al., 1999).***

Fascial layer

A small transverse incision is usually made medially with the scalpel, and then extended laterally with scissors. Alternatively, the fascial incision can be extended bluntly by inserting the fingers of each hand under the fascia and then pulling in a cephalad-caudad direction, which is part of the Joel-Cohen/Misgav-Ladach technique ***(Holmgren et al., 1999).***

A randomized trial of sharp versus blunt fascial incision used each patient as her own control (sharp dissection for half the incision and blunt dissection for the other half) and found no difference in postoperative pain scores, but was too small to detect modest differences ***(Silver et al., 2006).***