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The Use Of Electrocautery In Lower Segment Caesarean Section

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Abstract

Introduction: The surgical technique for caesarean section has undergone multiple changes aimed at improving patient outcomes. Among these changes, the use of electrocautery for obstetrical procedures was introduced according to recommendations arising from developments in general surgery.

Aim and Objective: To evaluate the safety of electrocautery during caesarean section.

Material and methods: A well controlled, randomized study was conducted at Rajdhani Hospital, a private hospital in Dausa, Rajasthan. A total of 100 women scheduled for elective caesarean section underwent spinal anesthesia, Pfannenstiel transverse skin incision with scalpel blade, and subsequent subcutaneous incisions until the peritoneum with a cold-scalpel or electrocautery blade. Perioperative blood loss, postoperative pain and duration of surgery were evaluated.

Result: In the electrocautery group , the operating time was <30 minutes in 22% of the patients as compared to 4% patients of scalpel group. Intraoperative blood loss was < 25 grams in 74% patients in contrast to 26% patients of scalpel group. Additional analgesics was required in 52% patients of scalpel group in contrast to only 20% patients of electrocauetry group.

Conclusion: This study demonstrated that the use of electrocautery for subcutaneous incisions resulted in less blood loss and postoperative pain than traditional scalpel incisions in pregnant patients with Pfennensteil transverse skin incision.

Keywords: electrocautery, pfennensteil, caesarean

Introduction

Cesarean section is the delivery of a baby by a surgical incision through the anterior abdominal wall and intact uterus and has been associated with severe maternal morbidity and mortality in the past. In the last decades, increasing rates of cesarean delivery have been a common trend throughout the world [1, 2]. Currently, caesarean section is the most common surgical procedure .Emergency CD operations are most commonly due to failure to progress for vaginal delivery, non-reassuring fetal heart rate tracing, and malpresentation, while the fear of labor pain is one of the most common reasons for elective CD operations [3].

The Healthy People target for 2020 is a cesarean delivery rate of 23.9% in low-risk full term women with a singleton, vertex presentation. This is much higher than the never achieved target cesarean rate of 15% for Healthy People 2010. [4.] 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.[5]

Electrosurgery involves manipulation of electrons through living tissue using an alternating current density sufficient to create heat within tissue cells to destroy them. Two different surgical effects can be achieved with Electrosurgery, namely cutting (of tissue) and coagulating. In the cutting mode, a continuous current rapidly produces extreme heat

causing intracellular water to boil and cells to explode into steam (vaporization). By moving the electrode quickly, more cells vaporize and the tissue is divided with minimal devitalized or charred tissue left along the margin of the cut surface. Thermal damage is minimal since heat evaporates as steam and is not conducted through the cut tissues, which would dry out the adjacent cells. In the coagulating mode, short bursts of electrical current are applied with a pause between each burst. As a result, the heat produced in the cells dries up the tissue but is not intense enough to evaporate intracellular water. [6]. The potential benefits of Electrosurgery have been suggested to include reduced blood loss, dry and rapid separation of the tissue, and a possible decrease in the risk of accidental injury caused by the scalpel blade to operative personnel [6]. There are concerns about the impact of electrosurgery on wound infection, wound healing, scarring, and adhesion formation, which have limited the use of electrosurgery for surgical wound creation. [7]

Aims & Objectives

1. To compare the use of electrocautery versus scalpel in caesarean section.
2. To evaluate the safety of electrocautery in caesarean section

Material And Methods

A prospective, well controlled, randomized study was conducted in Rajdhani hospital, Dausa over a period of one year from September 2022 to August 2023 on 100 antenatal patients giving consent with singleton pregnancy undergoing caesarean section.

An informed verbal and written consent was taken from all patients after full clarification about the nature of trail, advantages and probable complications. Enrolled patients underwent history taking, clinical examination and obstetrical ultrasound for fetal wellbeing, placenta, liquor, gestational age.

Inclusion Criteria:

Singleton pregnancy

Exclusion Criteria:

1. Patients with >2 previous caesarean sections
2. Multiple pregnancy

For a completely randomized design to allocate the patients into two groups, a total of 100 labelled envelopes were prepared, with electrocautery written in 50 and scalpel in 50 envelops and then mixed. When patient was taken into operating room, an envelope was opened randomly and surgeon operated using the method written in the envelope.

Surgeries were performed at Rajdhani hospital. All patients underwent spinal anaesthesia through L4-L5 space. For all patients, Pfannensteil transverse skin incision was made with a cold scalpel blade when the sensory block was at T8. Subsequent incisions of the subcutaneous tissues until the peritoneum were performed with a scalpel or electrocautery blade. The decision for the incision method was made on the spot based on the directions given to the surgeon in a closed envelope at the time of incision. In scalpel incision, bleeding control was done with gauze pads or by suturing the vein if the bleeding was severe. In electrocautery incision, bleeding was stopped with cauterization, and the subcutaneous tissue was incised with the coagulation mode of the electrocautery table.

Blood loss was calculated by weighing the gauze pads used during the surgery (by subtracting the baseline weight before the surgery). Patients were given the same analgesia protocol after the surgery. Patient's pain level was evaluated by the requirement of additional analgesics post-operatively and by using Visual Analogue Scale (VAS) at postoperative 6th and 12th hours. The study protocol was executed in double blinded manner; that is, patients were blinded, and the personnel who performed the interventions and collected the data were blinded. The same surgeon operated all the cases and the surgeon was not included in other parts of the study.

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Results

Table 1: Demographic Characteristics

	SCALPEL	ELECTROCAUTERY
MATERNAL AGE (YEARS)		
18-25	14	15
25-30	25	27
>30	11	8
WEIGHT (KG)		
<50	4	3
50-60	12	10
60-70	23	22
>70	11	15
GESTATIONAL AGE(WEEKS)		
<37	13	12
37-42	33	36
>42	4	2
PREVIOUS MODE OF DELIVERY		
PRIMIGRAVIDA	11	9
PREVIOUS NORMAL DELVERY	2	3
PREVIOUS CS	19	22
PREVOUS 2 CS	17	17

Table 2: Comparsion Between Scalpel And Electrocauetry On The Basis Of Parameters

	SCALPEL(n=50)	ELECTROCAUTERY(n=50)
OPERATING TIME (MINUTES)		
<30	2	11
30-60	37	35
60-120	10	4
BLOOD LOSS (grams)		
<5	0	2

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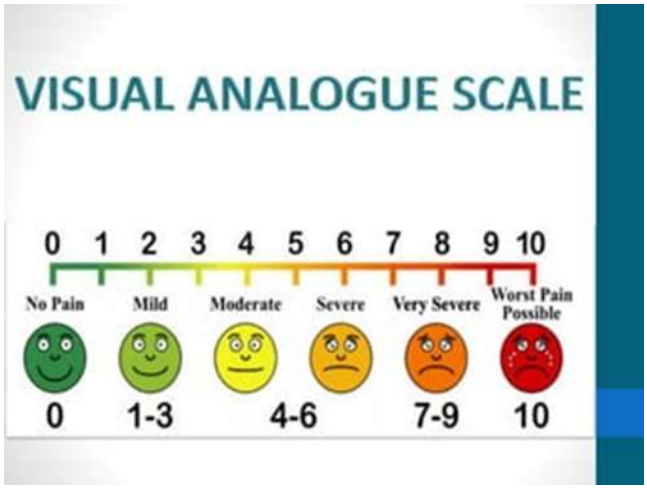
5-10	3	13
10-25	10	22
25-50	23	9
>50	14	4
POSTOPERATIVE PAIN		
NO. OF PATIENTS WHO REQUIRED ADDITIONAL ANALGESICS	26	10
VAS SCORE AT POSTOPERATIVE 6 HOURS		
1-3	8	23
4-5	20	25
6-7	7	1
8-9	4	1
10	1	0



Discussion

Caesarean delivery is a common elective procedure. Total 100 participants were included in the study which were divided into 2 groups, 50 in the scalpel group and 50 in the electrocautery group.

There was no statistical difference between the two groups in terms of demographic characteristics. Majority of the patients, i.e. 50% of scalpel group and 54% of electrocautery group were in the age group of 25-30 years. Majority of the patients had their weight in the range between 60-70kg, i.e. 46% of scalpel group and 44% of electrocautery group. Most of the patients who underwent caesarean sections were at term. Maximum patients were falling in the group of previous caesarean sections.

The average time for caesarean section was between 30-60 minutes in 74% of the patients in the scalpel group and 70% of the electrocautery group. 22% of the patients in the electrocautery group underwent caesarean section in less than 30 minutes in contrast to 4% patients of scalpel group.

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In the electrocautery group, 4% patients had blood loss <5 grams, while 26% had blood loss in the range of 5-10 grams in contrast to 6% patients of scalpel group. Blood loss >50 grams was seen in 28% of the scalpel group in contrary of only 8% patients of electrocautery group.

52% patients of scalpel group required additional analgesics in contrast to 20% patients of electrocautery group. On analyzing postoperative pain in terms of visual analogue score, maximum patients, i.e 40% of scalpel group and 50% of electrocautery group had their score in the range of 4-5. 24% of scalpel group had their score above 5 in contrary to 4% patients of the elctrocautery group.

Conclusion

This study demonstrated that the use of electrocautery for subcutaneous incisions resulted in decreased operating time, less blood loss and postoperative pain than traditional scalpel incisions in pregnant patients with Pfennensteil transverse skin incision.

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