



Original Article

Cautery versus scalpel - a study on surgical incisions

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ABSTRACT

Surgeons used to feel cumbersome with skin bleeding while making surgical Incisions with scalpel. After invention of diathermy surgeons felt comfort in controlling tissue bleeding. Even though we are traditionally using scalpel for skin incisions, incisions made by High Frequency cautery are of more cosmetic, less time taking, less bleeding, less post operative pain, no ill effects on wound healing. Present data & literature available suggests that diathermy incisions are better than scalpel Incisions. In the present study cautery incisions are compared with scalpel incisions

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1. Introduction

Skin bleeding is the problem after starting surgery. A continuous skin bleeding may obscure the operating field and surgeon feels discomfort, number of gauze pieces, suture material and precious operating time is also wasted. The usage of diathermy cautery decreases skin bleeding, total operative time also shortens. Electrosurgical Unit is an essential Instrument in Operation Theatres. Cutting mode Diathermy skin incisions are more comfortable to the patients and to the surgeons also. There is so much of literature that suggests the usage of high frequency cautery for making surgical incisions. A study to know how cutting mode electro cautery is superior in making skin incisions than scalpel incisions is reported in this article.

Objective:

The main objectives of this study are to evaluate the efficacy of cautery over scalpel in making skin incisions with regard to time, bleeding, post operative pain, suture material usage, cosmetic value and wound infection

Material Methods:

All the patients undergoing elective surgeries like Appendectomies, Hernia repairs, Laparotomies, Cholecystectomies, Lumbar Sympethectomies in operation theatres of surgery department, Rangaraya Medical College, Kakinada from June 2012 to December 2013.

Inclusion Criteria:

All elective open Hernia surgeries, all elective open Appendectomies, all open cholecystectomies, elective

laparotomies, Lumbar sympethectomies are included.

Exclusion Criteria:

All emergency laparotomies, complicated hernia surgeries, emergency cholecystectomies, Laparoscopic procedures, Thyroidectomies, Mastectomies, Hydrocelectomies, Haemorrhoidectomies are excluded.

Results:

200 cases are taken for study. In 100 cases incisions are made with scalpel. In another 100 cases incisions are made with cutting mode high frequency diathermy cautery. Each of the 100 cases consists of 45 hernia surgeries, 5 lumbar sympethectomies, 20 elective laparotomies, 20 Appendectomies, 10 Cholecystectomies. Both groups are compared in Incision time in seconds, blood loss assessment with soakage of gauze pieces, any suture material used, post operative pain, Incision length and cosmesis. Cautery incisions:

	Hernia surgeries	Appendectomies	Cholecystectomies	Laparotomies	Sympethectomies
Time in seconds	4 - 6	4 - 6	8 - 10	10 - 15	10 - 12
Blood loss(gauze)	Partly soaked	Partly soaked	Partly soaked	Partly soaked	Partly soaked
Usage of suture material	nil	nil	nil	nil	nil
Post operative pain	1 ampule of tramadol BD	1 ampule of tramadol BD	1 ampule of tramadol BD	1 ampule of tramadol BD	1 ampule of tramadol
Incision	5 - 6 cm	3 - 4 cm	6 - 8 cm	8 - 10 cm	6 - 8 cm
Cosmesis	good	good	good	good	good

	Hernia surgeries	Appendectomies	Cholecystectomies	Laparotomies	Sympethectomies
Time in seconds	10 - 12	10 - 12	40 - 50	40 - 60	40 - 60
Blood loss(gauze)	Fully soaked	Fully soaked	2 gauze fully soaked	3 gauze fully soaked	3 gauze fully soaked
Usage of suture material	used	used	used	used	used
Post operative pain	1 ampule of tramadol BD	1 ampule of tramadol BD	1 ampule of diclofenac BD	1 ampule of diclofenac BD	1 ampule of diclofenac BD
Incision	5 - 6 cm	3 - 4 cm	6 - 8 cm	8 - 10 cm	6 - 8 cm
Cosmesis	average	average	average	average	average

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Cautery incision no bleeding



Scalpel incision with bleeding



electrode touches the body tissues, and a pronounced local heating effect occurs. The current subsequently spreads out in the body and then returns to the diathermy machine via the patient plate electrode (a pad which is kept under the patient). Bipolar diathermy avoids the need for a plate and uses less power. The surgeon holds the tissue to be coagulated in a pair of forceps connected to the diathermy machine. The current passes down one limb of the forceps and then back to the machine via the other limb. It cannot be used for cutting tissues.

We have conducted 100 surgeries using High frequency cautery incisions & 100 surgeries using scalpel incisions. When compared to scalpel incisions, diathermy cutting mode incisions took less time and less bleeding, no need of suture material, post operative pain less and incisions are of more cosmetic.

These patients are followed for 4 weeks for any wound infection, erythema, and stitch abscess with high frequency electrocautery. The infection rate is nearly 3%.

The conclusion was that the use of electrocautery does not increase the chances of wound infection [3]

There is a randomized clinical trial (RCT) of diathermy versus scalpel incision in elective midline laparotomy, and the authors conclude that electrosurgical incision in elective surgery has significant advantages over scalpel use on the basis of incision time, blood loss, early postoperative pain, and analgesia requirements [4]

It is concluded that diathermy of skin incisions is safe, blood loss is minimal, and reduces the need for analgesics in the early postoperative period [5].

Conclusion:

Diathermy incisions do not increase the chance of wound infection. Diathermy incisions have advantages over scalpel because of reduced incision time, less blood loss, reduced early post operative pain, no usage of suture material, more cosmetic.

Summary:

As many authors reported that the surgical incisions by cautery has significant advantages such as less incision time, less blood loss and reduced post operative pain, we recommend high frequency cautery over scalpel for surgical incisions.

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Discussion:

Electro Surgical Unit (ESU) is the most common electrical equipment in operation theatres. Diathermy incision is quick and has reduced blood loss [1]. William T. Bovie, a biophysicist has been credited for producing the first ESU, capable of cutting and coagulating the human tissues [2]. Surgeons feel comfortable to see ESU in operation theatres.

ESU uses alternating high frequency current. Frequency is the number of times an AC current reverses its direction in 1 s, and this is measured in cycles per second or hertz (Hz).

Radiofrequency, 10,000 Hz, can pass through the human body without causing stimulation of the muscle or nerve. An ESU uses radiofrequency of 100,000 – 10,000,000 Hz to cut, coagulate and desiccate the tissues.

In our institute, we have two types of ESU – L&T 400 digital and ARC Surgical diathermy D- 400. In L&T digital 400, the settings are cut (1 – 9), coagulate (1 – 9), and we set at cut (3.5 – 4.5) and coagulate (3.5 – 4.5). Settings for ARC surgical diathermy D – 400 ---- cut (60 – 70) and coagulate (55 – 70)

Diathermy may be either monopolar or bipolar. Monopolar diathermy is the one most commonly used. In this high frequency current from diathermy machine is delivered to an active electrode held by the surgeon. Density of the current is high where the