



COMMENTARY

Cutting Monopolar Needle Electrode of Electrosurgery, a Safe Tool for Skin Incision in Neurosurgery

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Abstract

In ancient time heat was used to treat wounds. Now a days electrosurgery unit (ESU) is an important part of operation theatre equipments utilized by almost every surgeon. Electrocautery and diathermy are the term used by many operations theatre medical and paramedical persons including surgeons for electrosurgery. They altogether are three different things. Cutting monopolar needle electrode of electrosurgery is a safe tool for skin incision in neurosurgery but hardly very few surgeons are utilizing it as a tool for making skin incision. Reason for not using it probably is the fear of poor wound healing and deep burn of underline tissue or awareness about it. This is to bring awareness about 'cutting monopolar needle electrode of electrosurgery' as an available tool for skin incision in neurosurgery with less blood loss and marked reduction in incision time than stainless steel surgical blade.

Keywords

Monopolar needle, Electrode, Electrosurgery, Skin incision, Neurosurgery

Introduction

It is to provide awareness about electrosurgery which is called as electrocautery or diathermy erroneously by most of medical and para medical persons, and monopolar cutting electrosurgery as a tool for skin incisions in neurosurgery. Neurosurgeons are not dependent only on stainless steel blade but have another equally safe tool in the form of monopolar cutting needle electrode of electrosurgery, which is not being utilized by most of them. Probably reason for not using monopolar cutting electrosurgery for making skin

incision in surgery, is fear of deep skin burns and poor wound healing or awareness about the technique.

Heat was applied to treat wounds since ancient era in the form of heated stones and metals. Bleeding from war wounds stopped by application of hot sword. Same principle was used in electrocautery, in which heated probe by direct electric current is applied to stop bleeding. Electrocautery cannot be used to cut, as it only coagulates the tissue. Electrosurgical device was first developed by William T. Bovie, an electro physicist in Harvard University. Credit goes to legend in neurosurgery, Harvey Cushing using electrosurgical unit first time in operation theatre for removing a mass from a patient's head, at Peter Bent Brigham hospital in Boston, Massachusetts on October 1, 1926 [1].

In Electrosurgery high-frequency (radio frequency) alternating electrical current is used to cut, coagulate, desiccate, or fulgurate biological tissue [2,3]. Mostly surgeons of almost every specialty are using electrosurgery but calling it as electrocautery or diathermy [4-7]. Electrocautery, diathermy and electrosurgery are three different things. Electrocautery uses the direct current which does not pass-through patient's body, only heated electrode touches tissue to get desired effect. In diathermy electric heat produced due to rotation of molecular Dipoles in a high frequency electromagnetic field. In electrosurgery alternating current is converted into high frequency (radio frequency) of more than 100,000 cycles per second (100 kilohertz) by electrosurgical unit, which passes

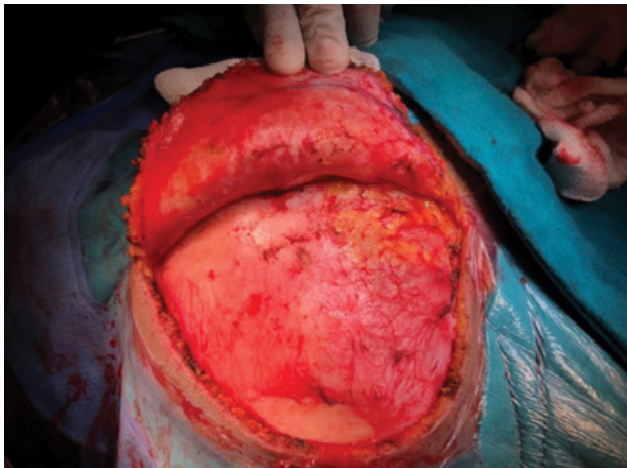


Figure 1: Skin incision with electrocautery, cutting monopolar needle electrode.

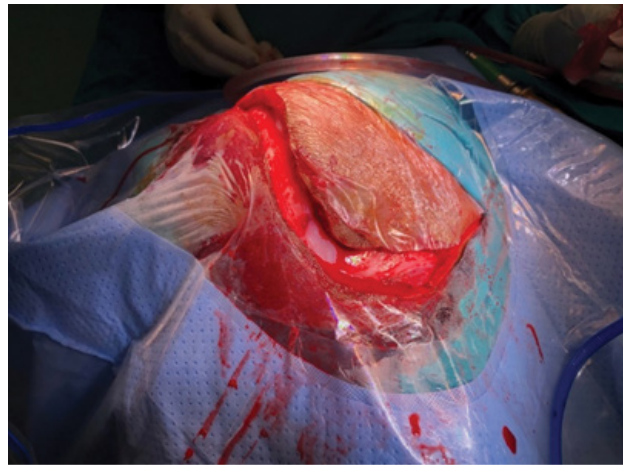


Figure 3: Skin incision with stainless steel surgical blade.



Figure 2: Skin incision with electrocautery, cutting monopolar needle electrode.



Figure 4: Proper wound healing after suture removal on 7th post stitch day, electrocautery skin incision of [Figure 2](#).

through body or human tissue. Standard alternating electric current at 60 cycle per second stimulates nerves and muscles giving rise to electric shock like effect. Nerve and muscle stimulation ceases at 100,000 cycles per second (100 kilohertz) and there is no electrocution. For electrocautery, standard alternating electric current is converted into high frequency (radio frequency) by electrocautery generator also called electrocautery unit (ESU). Hand piece connected to the ESU, is applied to the tissue for desired effect. Hand piece is either monopolar or bipolar, difference between two is that in monopolar hand piece has one electrode while in bipolar both electrodes are in design of hand piece. Constant waveform of low voltage generated from ESU gives cutting effect to the tissue, while intermittent waveform of high voltage coagulates.

In monopolar electrocautery, hand piece is active electrode attached to ESU requires another electrode called dispersive electrode elsewhere on patient's body. Dispersive electrode is also attached to ESU. Electric circuit in monopolar electrocautery is composed of ESU, hand piece, patient, dispersive electrode and back

to ESU. In bipolar electrocautery, hand piece is having both electrodes at the tip of a forceps. Current travels through tissue between two tips of bipolar forceps, not through patient.

Technique: Needle electrode of monopolar hand piece on cutting electrocautery is used for making skin incision. Blunt monopolar hand piece electrode should not be used. Gentle retraction on skin edges applied to widen gap between skin edges. Vessels are identified and coagulated by bipolar forceps before cutting. Bleeding and blood ooze from cut skin edges is remarkably less with skin incision by monopolar cutting needle electrode of electrocautery (as shown in [Figure 1](#) and [Figure 2](#)) while more in a skin incision by stainless steel surgical blade ([Figure 3](#)). No normal saline or xylocaine infiltration required in subcutaneous plain before putting skin incision with monopolar cutting needle electrode of electrocautery. Incision in fascia also made with needle monopolar cutting electrocautery showed proper healing of wound after stitch removal on 7th post stitch day (as shown in [Figure 4](#)).

Initially, electrosurgery was used for haemostasis by coagulating bleeding vessels. It was not used for making skin incisions, because fear of poor wound healing, deep burns, bad excessive scarring, and infection. Due to continuous upgradation and improvement in electrosurgical units, now electrosurgery is safe for making skin incisions by monopolar needle electrodes. Electrosurgical skin incision is faster with less bleeding and results are comparable [8,9] with skin incision by stainless steel blade in terms of wound healing, infection & pain at incision site and scar formation. In a survey conducted among neurosurgeons worldwide site on telegram "Neurosurgery cocktail", one out of ten responded that monopolar electrosurgery used for making skin incision during neurosurgery, rest nine are using stainless steel blade. Probably reason for not using monopolar cutting electrosurgery needle electrode for making skin incision in surgery, is fear of deep skin burns and poor wound healing or awareness about it. There are no added complications while using needle electrode of monopolar cutting electrosurgery over Stainless steel surgical blade for making skin incision in Neurosurgery.

Cutting monopolar needle electrode of electro surgery is a safe available tool for making Skin incision in neurosurgery, with less blood loss and marked reduction in incision time. Available as equally good alternative to stainless steel surgical blade. Most of the Neurosurgeons are not using Cutting monopolar Electrosurgery for making skin incisions either because of awareness about the technique or, due to fear of poor wound healing and deep burn which is not true.

Disclosure and Conflicts of Interest

None.

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