

Electrosurgery

Part I. Basics and principles

Arash Taheri, MD,^a Parisa Mansoori, MD,^b Laura F. Sandoval, DO,^a Steven R. Feldman, MD, PhD,^{a,b,c}
Daniel Pearce, MD,^a and Phillip M. Williford, MD^a
Winston-Salem, North Carolina

CME INSTRUCTIONS

The following is a journal-based CME activity presented by the American Academy of Dermatology and is made up of four phases:

1. Reading of the CME Information (delineated below)
2. Reading of the Source Article
3. Achievement of a 70% or higher on the online Case-based Post Test
4. Completion of the Journal CME Evaluation

CME INFORMATION AND DISCLOSURES

Statement of Need:

The American Academy of Dermatology bases its CME activities on the Academy's core curriculum, identified professional practice gaps, the educational needs which underlie these gaps, and emerging clinical research findings. Learners should reflect upon clinical and scientific information presented in the article and determine the need for further study.

Target Audience:

Dermatologists and others involved in the delivery of dermatologic care.

Accreditation

The American Academy of Dermatology is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians.

AMA PRA Credit Designation

The American Academy of Dermatology designates this journal-based CME activity for a maximum of 1 *AMA PRA Category 1 Credits*[™]. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

AAD Recognized Credit

This journal-based CME activity is recognized by the American Academy of Dermatology for 1 AAD Credit and may be used toward the American Academy of Dermatology's Continuing Medical Education Award.

Disclaimer:

The American Academy of Dermatology is not responsible for statements made by the author(s). Statements or opinions expressed in this activity reflect the views of the author(s) and do not reflect the official policy of the American Academy of Dermatology. The information provided in this CME activity is for continuing education purposes only and is not meant to substitute for the independent medical judgment of a healthcare provider relative to the diagnostic, management and treatment options of a specific patient's medical condition.

Disclosures

Editors

The editors involved with this CME activity and all content validation/peer reviewers of this journal-based CME activity have reported no relevant financial relationships with commercial interest(s).

Authors

Dr Feldman is a consultant and speaker, has received grants, or has stock options in Abbott Labs, Amgen, Anacor Pharmaceuticals, Inc, Astellas, Caremark, Causa Research, Celgene, Centocor Ortho Biotech Inc, Coria Laboratories, Dermatology Foundation, Doak, Galderma, Gerson Lehrman Group, Hanall Pharmaceutical Co Ltd, Informa Healthcare, Kikaku, Leo Pharma Inc, Medical Quality Enhancement Corporation, Mediscs Pharmaceutical Corporation, Medscape, Merck & Co, Inc, Merz Pharmaceuticals, Novan, Novartis Pharmaceuticals Corporation, Peplin Inc, Pfizer Inc, Pharmaderm, Photomedex, Reader's Digest, Sanofi-Aventis, SkinMedica, Inc, Stiefel/GSK, Suncare Research, Taro, US Department of Justice, and Xilibris. Drs Taheri, Mansoori, Sandoval, Williford, and Pearce have no conflicts of interest to declare.

Planners

The planners involved with this journal-based CME activity have reported no relevant financial relationships with commercial interest(s). The editorial and education staff involved with this journal-based CME activity have reported no relevant financial relationships with commercial interest(s).

Resolution of Conflicts of Interest

In accordance with the ACCME Standards for Commercial Support of CME, the American Academy of Dermatology has implemented mechanisms, prior to the planning and implementation of this Journal-based CME activity, to identify and mitigate conflicts of interest for all individuals in a position to control the content of this Journal-based CME activity.

Learning Objectives

After completing this learning activity, participants should be able to list the various electrosurgical modalities and describe their indications and contraindications; delineate the tissue effects of various electrical waveforms; recognize the factors influencing depth of tissue injury; and identify the sources of possible complications and describe strategies for the prevention of these complications.

Date of release: April 2014

Expiration date: April 2017

© 2013 by the American Academy of Dermatology, Inc.
<http://dx.doi.org/10.1016/j.jaad.2013.09.056>

Technical requirements:

American Academy of Dermatology:

- Supported browsers: FireFox (3 and higher), Google Chrome (5 and higher), Internet Explorer (7 and higher), Safari (5 and higher), Opera (10 and higher).
- JavaScript needs to be enabled.

Elsevier:

Technical Requirements

This website can be viewed on a PC or Mac. We recommend a minimum of:

- PC: Windows NT, Windows 2000, Windows ME, or Windows XP
- Mac: OS X
- 128MB RAM
- Processor speed of 500MHz or higher
- 800x600 color monitor
- Video or graphics card
- Sound card and speakers

Provider Contact Information:

American Academy of Dermatology
Phone: Toll-free: (866) 503-SKIN (7546); International: (847) 240-1280
Fax: (847) 240-1859
Mail: P.O. Box 4014; Schaumburg, IL 60168

Confidentiality Statement:

American Academy of Dermatology: POLICY ON PRIVACY AND CONFIDENTIALITY

Privacy Policy - The American Academy of Dermatology (the Academy) is committed to maintaining the privacy of the personal information of visitors to its sites. Our policies are designed to disclose the information collected and how it will be used. This policy applies solely to the information provided while visiting this website. The terms of the privacy policy do not govern personal information furnished through any means other than this website (such as by telephone or mail).

E-mail Addresses and Other Personal Information - Personal information such as postal and e-mail address may be used internally for maintaining member records, marketing purposes, and alerting customers or members of additional services available. Phone numbers may also be used by the Academy when questions about products or services ordered arise. The Academy will not reveal any information about an individual user to third parties except to comply with applicable laws or valid legal processes.

Cookies - A cookie is a small file stored on the site user's computer or Web server and is used to aid Web navigation. Session cookies are temporary files created when a user signs in on the website or uses the personalized features (such as keeping track of items in the shopping cart). Session cookies are removed when a user logs off or when the browser is closed. Persistent cookies are permanent files and must be deleted manually. Tracking or other information collected from persistent cookies or any session cookie is used strictly for the user's efficient navigation of the site.

Links - This site may contain links to other sites. The Academy is not responsible for the privacy practices or the content of such websites.

Children - This website is not designed or intended to attract children under the age of 13. The Academy does not collect personal information from anyone it knows is under the age of 13.

Elsevier: http://www.elsevier.com/wps/find/privacypolicy.cws_home/privacypolicy

The term electrosurgery (also called radiofrequency surgery) refers to the passage of high-frequency alternating electrical current through the tissue in order to achieve a specific surgical effect. Although the mechanism behind electrosurgery is not completely understood, heat production and thermal tissue damage is responsible for at least the majority—if not all—of the tissue effects in electrosurgery. Adjacent to the active electrode, tissue resistance to the passage of current converts electrical energy to heat. The only variable that determines the final tissue effects of a current is the depth and the rate at which heat is produced. Electrocoagulation occurs when tissue is heated below the boiling point and undergoes thermal denaturation. An additional slow increase in temperature leads to vaporization of the water content in the coagulated tissue and tissue drying, a process called desiccation. A sudden increase in tissue temperature above the boiling point causes rapid explosive vaporization of the water content in the tissue adjacent to the electrode, which leads to tissue fragmentation and cutting. (J Am Acad Dermatol 2014;70:591.e1-14.)

Key words: coagulation; current; electricity; electrocoagulation; electrodesiccation; electrofulguration; electrosurgery; high frequency; radiofrequency.

INTRODUCTION

Key points

- In electrosurgery, an electric current flows from the active electrode through the patient's body to the return electrode
- Electrocautery differs from electrosurgery in that an electrical current heats a metallic probe that is then applied to tissue (hot iron cautery). Because no heat is generated in deeper tissue, electrocautery is more suitable for the destruction of superficial tissue layers

The concept of using heat for hemostasis goes back hundreds of years. As technology evolved, devices were created that used electricity to heat tissue and control bleeding. These advancements eventually developed into modern-day electrosurgery. The term electrosurgery (also called radiofrequency surgery) refers to the passage of high-frequency electrical current through the tissue in order to achieve a specific surgical effect, such as cutting or coagulation (Table 1). Each electrosurgical device consists of a high frequency electrical generator and 2 electrodes (Fig 1). The electric current flows from the active electrode through the patient's body and then to the return (dispersive) electrode,

where current flows back to the electrosurgical generator. Adjacent to the active electrode, tissue resistance to the passage of alternating current converts electrical energy to heat, resulting in thermal tissue damage. While heat generation occurs within the tissue, the treatment electrode acts as a conductor that only passes the current and may remain cooler than the treated medium.^{1,2} Electrocautery differs from electrosurgery in that an electrical current heats a metallic probe that is then applied to tissue (hot iron cautery). In electrocautery, no current flows through the patient's body (Fig 2).³ Because no heat is generated in deeper tissue, electrocautery is more suitable for the destruction of superficial tissue layers.

The term diathermy was originally applied to the therapeutic (nonablative) heating effect of passing high-frequency electrical current through deeper parts of the body. This term was later used to describe cutting tissue.^{4,5} While the term diathermy is still used today, the term electrosurgery is preferred when referring to cutting or coagulation.

Although electrosurgical instruments are used routinely, familiarity with the principles behind how these instruments produce their effect is limited.^{6,7} An understanding of the basic principles of electrosurgery can help increase efficiency of use and reduce complications.

From the Center for Dermatology Research, Departments of Dermatology,^a Pathology,^b and Public Health Sciences,^c Wake Forest School of Medicine.

The Center for Dermatology Research is supported by an unrestricted educational grant from Galderma Laboratories, L.P.

Dr Feldman is a consultant and speaker, has received grants, or has stock options in Abbott Labs, Amgen, Anacor Pharmaceuticals, Inc, Astellas, Caremark, Causa Research, Celgene, Centocor Ortho Biotech Inc, Coria Laboratories, Dermatology Foundation, Doak, Galderma, Gerson Lehrman Group, Hanall Pharmaceutical Co Ltd, Informa Healthcare, Kikaku, Leo Pharma Inc, Medical Quality Enhancement Corporation, Medicis

Pharmaceutical Corporation, Medscape, Merck & Co, Inc, Merz Pharmaceuticals, Novan, Novartis Pharmaceuticals Corporation, Peplin Inc, Pfizer Inc, Pharmaderm, Photomedex, Reader's Digest, Sanofi-Aventis, SkinMedica, Inc, Stiefel/GSK, Suncare Research, Taro, US Department of Justice, and Xlibris. Drs Taheri, Mansoori, Sandoval, Williford, and Pearce have no conflicts of interest to declare.

Reprint requests: Arash Taheri, MD, Department of Dermatology, Wake Forest School of Medicine, 4618 Country Club Rd, Winston-Salem, NC 27104. E-mail: arataheri@gmail.com.
0190-9622/\$36.00

Download English Version:

<https://daneshyari.com/en/article/6072369>

Download Persian Version:

<https://daneshyari.com/article/6072369>

[Daneshyari.com](https://daneshyari.com)