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Dr. Anders J. Cohen
Assistant Professor of Neurological Surgery
Weill Cornell Medical Center / New York Hospital
525 East 68th Street
New York, NY 10021 USA
212-746-2104
212-746-5592 fax

High Frequency Radiosurgery: Novel Energy Source for Intracranial and Intraspinal Neurosurgery with Monopolar Indications

INTRODUCTION

High Frequency Radiosurgery has been utilized in medicine for over 30 years and 8 years in Neurosurgery. High Frequency Radiosurgery is a unique energy source which differs greatly from cautery and LASER. The combination of amplification and modulation of energy allows for a more efficient transfer of energy from electrode to tissue. Electrocautery and LASER energy has more conversion of energy into heat. This results in more damage to adjacent tissue. The precise nature of neurosurgery demands that regard for all vital neuro structures thus prohibiting electrocautery and minimizing LASER as useful energy sources in the brain and spinal cord.

Our clinical trials demonstrated a paucity of lateral heat spread with High Frequency Radiosurgery when properly used in intracranial and intraspinal procedures. Histological analysis revealed tissue alteration of well under 100 microns in human brain specimens.

This lack of lateral heat spread allows for dissection in vital neurological structures. It also permits the surgeon to develop new techniques for tumor resection. Bipolar cautery has been the gold standard to date, mostly due to the control of heat spread. High Frequency Radiosurgery not only offers a favorable bipolar option, but also gives the ability to use monopolar techniques for dissection and tumor resection.

OBJECTIVES

1) To evaluate High Frequency Radiosurgery as a useful energy source in neurosurgical applications of tumor excision.
2) To evaluate safety and efficacy of monopolar techniques for intracranial and intraspinal tumor resection.

MATERIALS AND METHODS

High Frequency Radiosurgery was used for surgical dissection and tumor excision in a variety of neurosurgical procedures. Electrode configurations varied per case. Electrodes most often used included: Empire Conical Tip, Loop, Vari-Tip, Ball

CONCLUSION

High Frequency Radiosurgery is a useful adjunct for surgical resection of Intracranial and Intraspinal tumors. When properly utilized, it offers precision and versatility for dissection in delicate areas with greater safety to adjacent structures. In addition, monopolar techniques can be used. This empowers the surgeon by providing more options for tumor resection. It also may reduce surgical time for resection when using microdissection.