

SCIENCE TIMES

New Antiepileptic Drugs Have Not Improved Treatment Outcomes

Amir H. Faraji, R. Mark Richardson

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Machine Learning as a Potential Solution for Shift During Stereotactic Brain Surgery

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Epigenetic Regulators of Glioma Stem Cells are Potential Therapeutic Targets

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Mechanical Thrombectomy for Stroke Effective Within 24-hour Window

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Addressing the Role of Intravenous Tissue-Plasminogen Activator in Patients with Large Vessel Occlusions

Benjamin Zussman, Gregory Weiner, Andrew Ducruet

Matter Over Mind: A Responsive Neurostimulation System for the Control of Undesirable Impulses

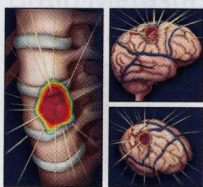
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Zika Virus has Oncolytic Activity Against Glioblastoma Stem Cells

Jonathan A. Lubin, Ray R. Zhang, John S. Kuo

A Shock to the System: Tumor-Treating Fields Plus Temozolomide for Glioblastoma

Nikita Alexiades, Guy M. McKhann, II



On the Cover

The Radiation Oncology Review Series highlights topical issues important to the treatment of CNS tumors with radiation. The cover illustrates the increasing technical ability to generate focused radiation for radiosurgical treatment of select sites in the brain and spine

for benign and malignant tumors/processes. Various aspects of brain and spinal radiosurgery are major areas of focus for several reviews in this series. Other review topics include primers on proton therapy and imaging modalities relevant to CNS tumors, an update on nomograms useful to the management of brain metastases and interactions of radiation with the immune system during brain tumor treatment. Image: © 2017, Hannah Ahn. Disclaimer: The artist's depiction of brain/spine radiosurgeries do not represent actual treatments and should not be used as a guide for planning such therapies.



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Neuronal Lethargy: Neurons Slow Down With Extended Wakefulness

Bornali Kundu, John D. Rolston

COVER ESSAY

Radiation Oncology Review Series

Hui-Kuo G. Shu

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RADIATION ONCOLOGY REVIEW SERIES

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EDITOR'S CHOICE

Current Predictive Indices and Nomograms To Enable Personalization of Radiation Therapy for Patients With Secondary Malignant Neoplasms of the Central Nervous System: A Review

Lucas Gilbride, Malika Siker, Joseph Bovi, Elizabeth Gore, Christopher Schultz, William A. Hall

The proper treatment of brain metastases continues to be a challenge for oncologists given the variability of prognoses and variety of treatment options available. There have been efforts since the 1990s to develop prognostic indices and nomograms to help clinicians determine the best approach for individuals with secondary malignant neoplasms of the central nervous system. A literature search was performed to identify prognostic tools published between January 1995 and January 2017. While there have been several reported indices, many are limited by the number of patients analyzed or lack of generalizability. The most robust prognostic tools available are the Disease Specific Graded Prognostic Assessment and the Barnholtz-Sloan nomogram, both of which have online tools available to help clinicians. While these tools are helpful in stratifying outcomes, they are limited by their retrospective nature and likely underestimate survival in the modern era, where there is a rapidly growing arsenal of systemic agents available.

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Neurosurgical Randomized Controlled Trials—Distance Travelled

Tej D. Azad, Anand Veeravagu, Vaishali Mittal, Rogelio Esparza, Eli Johnson, John P. A. Ioannidis, Gerald A. Grant

BACKGROUND: The evidence base for many neurosurgical procedures has been limited. We performed a comprehensive and systematic analysis of study design, quality of reporting, and trial results of neurosurgical randomized controlled trials (RCTs).

OBJECTIVE: To systematically assess the design and quality characteristics of neurosurgical RCTs.

METHODS: From January 1961 to June 2016, RCTs with >5 patients assessing any 1 neurosurgical procedure against another procedure, nonsurgical treatment, or no treatment were retrieved from MEDLINE, Scopus, and Cochrane Library.

RESULTS: The median sample size in the 401 eligible RCTs was 73 patients with a mean patient age of 49.6. Only 111 trials described allocation concealment, 140 provided power calculations, and 117 were adequately powered. Significant efficacy or trend for efficacy was claimed in 226 reports, no difference between the procedures was found in 166 trials, and significant harm was reported in 9 trials. Trials with a larger sample size were more likely to report randomization mode, specify allocation concealment, and power calculations. Government funding was associated with better specification of power calculations and of allocation concealment, while industry funding was associated with reporting significant efficacy. Reporting of funding, specification of randomization mode and primary outcomes, and mention of power calculations improved significantly over time.

CONCLUSION: Several aspects of the design and reporting of RCTs on neurosurgical procedures have improved over time. Better powered and accurately reported trials are needed in neurosurgery to deliver evidence-based care and achieve optimal outcomes.

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EDITOR'S CHOICE

Big Data Research in Neurosurgery: A Critical Look at this Popular New Study Design
Chesney S. Oravec, Mustafa Motiwala, Kevin Reed, Douglas Kondziolka, Fred G. Barker, II, L. Madison Michael, II, Paul Klimo, Jr

The use of "big data" in neurosurgical research has become increasingly popular. However, using this type of data comes with limitations. This study aimed to shed light on this new approach to clinical research. We compiled a list of commonly used databases that were not specifically created to study neurosurgical procedures, conditions, or diseases. Three North American journals were manually searched for articles published since 2000 utilizing these and other non-neurosurgery-specific databases. A number of data points per article were collected, tallied, and analyzed.

A total of 324 articles were identified with an exponential increase since 2001. The Journal of Neurosurgery Publishing Group published the greatest total number. The National Inpatient Sample was the most commonly used database. The average study size was 114 841 subjects. The most prevalent topics were vascular and neuro-oncology. When categorizing study objective (recognizing that many papers reported more than 1 type of study objective), "Outcomes" was the most common. The top 10 institutions by primary or senior author accounted for 45%–50% of all publications. Harvard Medical School was the top institution, using this research technique with 59 representations.

The increasing use of data from non-neurosurgery-specific databases presents a unique challenge to the interpretation and application of the study conclusions. These limitations must be more strongly considered in designing and interpreting these studies.

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