Guiding Neurosurgery by Evidence
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Volume Editor

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6 figures and 23 tables, 2006
To Kristen, for whom all the evidence shows how lucky I am to share my life with her.
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I am indebted to Bruce Pollock for agreeing to sponsor this superb text on evidence-based medicine as it applies to the field of neurological surgery. Dr. Pollock has put together a tremendous team of experts, and the enclosed volume should be must reading for all neurosurgeons as well as trainees. We all try to practice some form of evidence-based medicine. We all try to resist at the same time the concept of cookbook medicine. In a series of well-documented and erudite chapters beginning with Dr. Mark Linskey, the authors outline the pros and cons of an evidence-based medicine approach. Primary foci include brain tumors, pediatric neurosurgery, cerebrovascular and endovascular surgery, spine disease, radiosurgery, traumatic brain injury, and chronic pain management. These chapters cover a large component of modern-day neurosurgery. The authors rightfully show the potential value of evidence-based medicine while emphasizing the absence of a clear-cut prospective documentation that the application of its principles has a measurable impact on the delivery of medical care for individual patients or populations at large. Neurosurgeons, however, must take note of the many recent advances in health care delivery and technology, and strive to understand the rationale of current procedures and approaches. A commitment to understanding evidence-based medicine helps.

L. Dade Lunsford, MD
The history of medicine is marked by a series of important changes that have advanced its science and benefited patients worldwide. Progress is notable in our understanding of a vast array of pathologic states, the medical and surgical treatment of these diseases, and innovative technologies that constantly permit patients to be managed more effectively. Despite the significant changes that have occurred in our delivery of medical care, for the most part, medical decision making has been rooted in the subjective opinions of individual or groups of physicians based largely on local traditions and anecdotal experience. Evidence-based medicine (EBM) arose as a philosophical alternative to this dogmatic approach to medical care, and has attempted to reduce the importance of intuition and unsystematic clinical experience to permit a more detached, objective basis for clinical decision making. The field of EBM has developed from the 1970s until the present due to advancements in epidemiology, biostatistics, and information technology. The science of EBM recognizes that the quality of data in the medical literature can be ranked with information derived from randomized clinical trials (RCT) having the greatest validity, and that lower sources of information need to be assessed based on the rules of evidence. When multiple RCTs are available and all provide the same conclusion, then guidelines can be developed to assist physicians about appropriate health care for individual patients. In practice, EBM defines the question of interest, guides a search of the appropriate medical literature, aids in a critical methodological assessment of the data available, and then applies these findings to aid in diagnosis and treatment of patients.
The field of neurological surgery takes great pride in the development and incorporation of novel technologies allowing the treatment of a wide variety of conditions including cerebrovascular disease, neuro-oncology, spinal pathologies, and functional disorders. However, the exponential growth of information that must be deciphered by each practicing neurosurgeon makes it incumbent that they learn the basic methods of EBM so that they can effectively prioritize the published literature and condense its contents into a more understandable and useful form. Yet, despite an appreciation that RCT represent the ‘gold standard’ of medical evidence, a variety of reasons exist that limit the practical ability of neurosurgeons to perform RCTs for each situation. First, and particularly relevant to neurosurgery, is that the condition of interest may be rare. Second, for benign tumors such as meningiomas or vestibular schwannomas, the success of an operation in preventing tumor recurrence or progression may not be evident for 10 or more years after surgery. Thus, the information derived from case series (level 4 evidence) may be the best available data to base clinical decision making for patients with benign tumors and extended life expectancies. Third, few patients are willing to participate in randomized trials in which one group has open surgery whereas the other group is managed by a less invasive method such as endovascular therapy or stereotactic radiosurgery. For these and many other reasons, neurosurgeons most often have to base their daily decision making on rather poor quality evidence.

The goal of this book is to provide a succinct review of contemporary neurosurgical practice when evaluated by EBM standards. The first chapter introduces the reader to the concept and principles of EBM. The subsequent chapters address the topics of brain tumor epidemiology, benign adult brain tumors, pediatric neurosurgery, endovascular treatment of cerebrovascular disorders, lumbar spine surgery, minimally invasive spine surgery, stereotactic radiosurgery, trauma, and the treatment of chronic pain disorders by neurostimulation. Each chapter summarizes the available literature and grades it according to the quality of the evidence. In addition, the book highlights not only the usefulness of EBM in neurosurgical practice, but also its limitations with regard to neurosurgical disorders that are frequently rare and therefore impossible to evaluate in RCTs. It is hoped that this book will be worthwhile for neurological surgeons and neurologists, both practicing physicians and residents in training.

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Editor