

The Role of Neurosurgery Journals in Evidence-Based Neurosurgical Care



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KEYWORDS

- Review • Evidence-based medicine • Neurosurgery publishing • Reporting guidelines
- Meta-analysis • Clinical practice guidelines • Peer review

KEY POINTS

- Journals have played a key role in improving the quality of neurosurgical care over the past several decades, in part by endorsing an evidence-based view of neurosurgery practice.
- Reporting guidelines have emerged as a key tool for strengthening the quality of neurosurgery literature.
- Neurosurgery journals promote the organization of knowledge into clinically useful forms via the publication of systematic reviews, meta-analyses, and clinical practice guidelines.
- Peer review continues to be a core feature of neurosurgery publishing that serves to safeguard the quality of the literature.
- Through several initiatives, neurosurgery journals have undertaken a leadership position for the future of medical publishing.

INTRODUCTION

Throughout the past several decades, the neurosurgery publishing community has undertaken an active role in improving the quality of the neurosurgery literature. Notably, in recent years, neurosurgery journals have provided the main conduit through which the techniques of evidence-based medicine, originating outside the field, have illuminated the data produced by neurosurgery researchers. In particular, journals have promoted improvements in patient care by endorsing an evidence-based view of neurosurgery practice and actively safeguarding the quality of the review process.

In the early twentieth century, as neurosurgery matured, Osler's "medico-chirurgical neurologists" split from general surgery to form their

own discipline.¹ The Society of Neurologic Surgeons was founded in 1920, followed by the Harvey Cushing Society (now the American Association of Neurologic Surgeons [AANS]) in 1931. With these professional accretions, a gradual awareness of the need for neurosurgery-specific journals dawned on that burgeoning community. The *Journal of Neurosurgery* (1944), *Surgical Neurology* (1975), and *Neurosurgery* (1977) were among the earliest and most influential journals devoted to neurosurgery in North America.^{2,3} The emergence of such periodicals stemmed from the recognition that despite sharing subject matter with related fields, such as neurology and general surgery, the peculiar complexities of neurosurgical care and its reliance on new science demanded discipline-focused venues for publication. Harvey

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Cushing, writing in 1929, famously recognized the binding influence of scientific publications in cultivating disciplinary consensus.⁴ The promulgation of independent neurosurgery journals over the course of the twentieth century reflects, in microcosm, the evolution of neurosurgery itself as a self-governing specialty with its own set of professional mores and standards.

Over the past century, the quantity of scientific information available to neurosurgeons has expanded dramatically. Neurosurgery journals have proliferated at an exponential rate, reflecting a trend seen across all scientific disciplines. This has been accompanied by a concomitant increase in the number of published articles, and increased pressures to organize that knowledge into useful forms for the clinical practitioner. At the same time, as the sea change of evidence-based medicine swept through the medical world in the 1990s, exhortations for achieving an “evidence-based neurosurgery” resulted from convincing arguments that the insistence on evidence-based patient care is applicable to neurologic surgery.⁵ Quality and quantity of the data have become paramount.⁶

Organizing the ever-expanding mass of research data into the kind of knowledge that can guide clinical practice has proved a demanding feat. On this front, neurosurgery journals have been responsible for spearheading or facilitating many of the key initiatives. With assistance from professional societies, such as the AANS and Congress of Neurologic Surgeons (CNS), journals have improved the quality of neurosurgical knowledge by enforcing reporting standards, promoting meta-analysis, disseminating evidence-based clinical practice guidelines, and governing the process of peer review.

NEUROSURGERY JOURNALS AND PROLIFERATION OF SCIENTIFIC INFORMATION

The proliferation of neurosurgery journals and their quantitative impact over time is not well described in the primary literature, in part because categorizing scientific periodicals by discipline can be a deceptively difficult task. However, irrespective of which method is applied, it is clear that over several decades the number of neurosurgery journals has increased dramatically. In the mid-1970s, three major journals dominated the field. Today, there are dozens in the English language alone. One popular neurosurgery community World Wide Web portal lists 35 neurosurgical journals, rank-ordered by impact factor, in its resources section.⁷ Another source identified 182

neurosurgery-related journals and found 2522 distinct journals cited by neurosurgical literature during a 3-month period.⁸ New neurosurgery journals have been inceptioned de novo from professional interest groups, by evolution from pre-existing journals (eg, the continuation of *Surgical Neurology* as *World Neurosurgery*), or by splitting from a parent journal. The latter mechanism is represented, for example, by the recent spinoff of *Operative Neurosurgery* from its parent journal, *Neurosurgery*.⁹

The importance of a periodical within its field is classically measured by metrics based on citation analysis.¹⁰ For example, the impact factor is defined as the average number of citations per paper published in that journal over the preceding 2 years. The *h* index reflects number of publications and citations; a journal with an *h* index of *N* has published *N* papers that have each been cited a minimum of *N* times. Both the impact factor and the *h* index have been applied to individual authors and to journals, although their dominance as metrics of scientific importance has been debated.^{10–13} Citations in neurosurgical literature have been described as following a clear clustering pattern, with a recent analysis identifying the six “core” neurosurgery journals, in order of citations for a given time period, as *Journal of Neurosurgery*, *Neurosurgery*, *Spine*, *Acta Neurochirurgica*, *Stroke*, and *Journal of Neurotrauma*.⁸

In modern neurosurgery publishing, several safeguards are put in place to ensure the quality of research publications and, by consequence, the contribution of literature to the quality of patient care.

REPORTING GUIDELINES AS A TOOL FOR LITERATURE QUALITY

Around the turn of the twenty-first century, there emerged a growing awareness of the poor quality of reporting in medical research literature.^{14–16} Selective reporting of data, incomplete listing of interventions, problematic conclusions, and unclear methodologies plagued many papers. In neurosurgery, these deficiencies were particularly profound. Despite the well-known preeminence of randomized controlled trials (RCTs),¹⁷ these were scarce in the neurosurgery literature even when compared with general surgery or other surgical subspecialties.^{18–20} Moreover, under close examination, neurosurgical RCTs as a group showed many flaws. In a survey of 108 RCTs on neurosurgery procedures during a 36-year span, underpowered trials and inadequate design reporting were widespread.²¹ Another survey of 159 neurosurgical RCTs found, among other pitfalls, that

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