In the past three decades significant advances in the management of patients with acute neurologic disorders have led to the establishment of neurocritical care (NCC), a relatively novel sub-specialty that exists at the crossroads of specialties such as anesthesiology, critical care medicine, interventional neuroradiology, neurology, neurosurgery, and trauma/surgical critical care. Most of these advances are the result of clinical research on the natural history, clinical presentation, diagnosis and treatment of neurologic disease. Clinical research offers healthcare professionals, and their patients and families in the neurocritical care unit (NCCU) with information that is often incomplete to decide the best way to evaluate and treat acute neurologic disease. Hence, it is not surprising that more than half of the treatments delivered today do not have clear evidence of effectiveness [1]. This incertitude has determined great variability in the management of patients in the NCCU, with expenditures and outcomes differing across diverse clinical practice settings.

In the U.S.A., the Institute of Medicine (IOM) has defined comparative effectiveness research (CER) as “the generation and synthesis of evidence that compares the benefits and harms of alternative methods to prevent, diagnose, treat, and monitor a clinical condition or to improve the delivery of care. The purpose of CER is to assist consumers, clinicians, purchasers, and policy makers to make informed decisions that will improve health care at both the individual and population levels” [1]. The IOM stated that CER addresses the knowledge gap that exists as a consequence of the lack of direct comparisons of the different diagnostic and therapeutic paradigms to help patients and their healthcare providers to make informed decisions [2].

There is limited information about the comparative effectiveness (CE) of medications, devices and treatments currently in use in the NCCU. CER can identify what management paradigms are best for which patients and under what circumstances in the NCCU.

An example of CER in NCC is the South American study of intracranial pressure (ICP) monitoring for severe traumatic brain injury (TBI) [3], a randomized clinical trial (RCT) of guideline ICP monitoring-directed (goal ICP ≤ 20 mm Hg) reduction of ICP compared to clinical exam/imaging-based care in patients after severe TBI. ICP monitoring is considered the standard of care for patients with severe TBI. However, the use of ICP monitoring to achieve treatment effectiveness was never before tested in a RCT. This study demonstrated that treatment of severe TBI focused on lowering ICP to target goal ≤ 20 mm Hg was not superior to care based on a clinical exam/imaging protocol without ICP monitoring. The result of this study has prompted both neurosurgeons and neurointensivists caring for these patients to question whether or not an ICP target of ≤ 20 mm Hg is appropriate. Another more recent example of CER is INTERACT2 [4], an international RCT that compared intensive (target < 140 mm Hg in 1 hour) versus guideline-directed (target < 180 mm Hg) reduction of systolic blood pressure (BP) in patients after acute intracerebral hemorrhage (ICH). The guideline-directed group was based on the current American Heart Association (AHA) management guideline for patients with ICH. The target BP in the guideline was chosen arbitrarily and not based on evidence. In this study, intensive BP lowering did not demonstrate a significant decrease in the rate of the primary end point defined as severe disability or death (modified Rankin scale score = 3-6).

In conclusion, this study has not provided enough evidence to change the standard of care based on the AHA guideline although INTERACT2 has shown that intensive reduction of systolic BP is probably safe. A North American counterpart RCT called ATTACH 2 is ongoing with results anticipated for 2016.

These two illustrative examples of CER in NCC demonstrate the importance of conducting this type of research using a study design to compare different management protocols to identify which works best to monitor treatment on patients with severe TBI, and to treat arterial hypertension in patients after ICH, respectively.

In conclusion, it is paramount for neurointensivists to conduct CER. In this regard, the following suggestions might turn out important [2]:

1. Use of available resources such as the Cochrane Collaboration (meta-analyses), Agency for Healthcare Research and Quality (systematic reviews), and other similar centers.
2. Create registries like the AHA Get with the Guidelines-Stroke Registry.
3. Implement practice networks to standardize data and for data sharing.

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4. Attract clinical scientists with advanced scientific training in epidemiology, biostatistics and/or public health to

5. Identify funding opportunities.

REFERENCES


