Timing of Neuropsychological Outcome Measures in Patients With Subarachnoid Hemorrhage

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See related article, pages 1864–1872.

Aneurysmal subarachnoid hemorrhage (SAH) accounts for up to 5% of all strokes and changes the lives of ≈30,000 people in the United States each year.1 The majority of patients experiencing SAH are young (mean age of presentation 55 years) and their average case fatality is 51%.2,3 About half of survivors are left with significant long-term cognitive dysfunction. Such cognitive impairment can also be seen in patients defined as having good neurological recovery by the Glasgow Outcome Scale. Despite these well-known facts, the available literature in the English language has important limitations. Such limitations include relatively small sample sizes, lack of follow-up beyond a 3-month period in many reports, and variations of timing of neuropsychological assessments within and between studies.

To bridge these gaps, Samra et al present an interesting report on the recovery of cognitive function after surgery for SAH in this issue of Stroke.4 The Cognitive Function After Aneurysm Surgery Trial (CFAAST) was a longitudinal study, designed to provide long-term follow-up for patients enrolled in the Intraoperative Hypothermia for Aneurysm Surgery Trial (IHAST). The latter was a prospective randomized controlled trial investigating the effect of mild intraoperative hypothermia on neurological outcome 3 months after treatment in patients with SAH requiring craniotomy and aneurysmal clipping.5 CFAAST evaluated patients considered as having good neurological outcome defined as a Glasgow Outcome Scale of 1 to 2. The 3 main objectives of the study included the determination of the frequency and severity of cognitive dysfunction, the timing or recovery of cognitive dysfunction, and the effects, if any, of aneurysm location and mild intraoperative hypothermia on long-term cognitive function. The authors studied 185 patients enrolled in IHAST (89 patients treated with hypothermia and 96 patients treated with normothermia), and a matched control group of 45 patients enrolled before beginning CFAAST (matched for age, race, gender, and education). The authors drew 2 major conclusions from the study: (1) neurocognitive improvement continues beyond 3 months with a plateau between 9 to 15 months; and (2) neurocognitive improvement was not affected by the use of intraoperative hypothermia or anatomical location of the clipped aneurysm. CFAAST has several strengths: it was a multicenter, prospective, blinded, and longitudinal study of patients with SAH; neuropsychological, cognitive, and functional assessments were required at 3, 9, and 15 months after enrollment; trained and certified neuropsychologists carried out standardized neuropsychological testing to evaluate key domains of global cognition, memory, language, visuospatial abilities, attention, and executive functioning; qualified personnel independently double-scored all neuropsychological and behavioral data; and the investigators made adjustments for the practice effects associated with repeated testing. CFAAST also has limitations: the results may not necessarily be generalizable to all patients with SAH because the researchers only included a subset of patients; the control group included patients from a limited geographical area as opposed to the IHAST subjects; there was no premorbid assessments of disability; and the authors provided no information on factors that may affect long-term cognition of survivors such as antiepileptic drug use.6

The design and findings of CFAAST will have a major impact on future clinical trials of patients with SAH. Important points to bear in mind when planning such Phase III clinical trials include the following: neuropsychological evaluation has to be performed beyond 3 months and at least up to 9 to 15 months; neuropsychological improvement plateaus between 9 to 15 months, which may affect timing of therapeutic interventions to effect such improvement; neuropsychological outcome measures need to be standardized and used and executed by trained and certified personnel; investigators must correct for practice effects associated with repeated testing; neuropsychological outcome measures will have to be given to all participants regardless of functional physical outcome; and lastly but not least adequate sample size is a must to guarantee adequate power and validity of the results.

Disclosures
None.

References


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**Key Words:** cerebral aneurysm ■ neuropsychology ■ outcome ■ stroke ■ subarachnoid hemorrhage
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