

Longitudinal examination of neuropsychological and functional cognition outcomes in patients following a cardiac arrest with therapeutic hypothermia

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BACKGROUND

- Therapeutic hypothermia post cardiac arrest has been demonstrated to increase survival to discharge and neurologic recovery
- Neurologic recovery is usually measured by Cerebral Performance Category (CPC) that discriminates poorly between mild neuropsychological and adaptive function deficits
- There are significant gaps in clinical knowledge about neuropsychological and functional recovery course that need to be filled in order to help clinicians educate patients and families and facilitate safe and timely transition back to independence in higher level activities of daily living (e.g., return to work, driving, etc.)

METHODS

- Longitudinal, descriptive cohort study
- Before hospital discharge and 3-6 weeks post discharge:
 - The Repeatable Battery for the Assessment of Neuropsychological Status (RBANS) and Controlled Oral Word Association (COWA) measured cognitive-linguistic function
 - The Executive Function Performance Test (EFPT) measured functional cognition (medication management subtest)
- Inclusion criteria:
 - Patients who have undergone therapeutic hypothermia post cardiac arrest
 - >18 years of age
 - English as a primary language
- Exclusion criteria:
 - Patients who are comatose or vegetative state before arrest
 - Do not resuscitate or do not intubate order
 - Active bleeding
 - Systolic blood pressure <90 for greater than 30 minutes after ROSC despite the use of vasopressors
 - Physical, neurological or cognitive impairment that would limit ability to participate in the study
 - Pregnancy



RESULTS

- From 4/15/14 to 04/07/16, 13 patients were enrolled in the study
- Demographics revealed an average age 59 years; 77% (10/13) being male; 77% married or in a marriage-like relationship; and 46% working full- or part-time
- Prior to discharge the sample showed impaired performance on the RBANS Attention Index (4th percentile) and the COWA test (a measure of verbal fluency which is also associated with executive functioning, 5th percentile), as well as mild memory inefficiency (RBANS Immediate and Delayed Memory Indices = 14th percentile)
- 3-6 week follow up: Improvement was seen in all cognitive domains; low average phonemic fluency remained the only score below average (14th percentile)
- Anxiety and depression screeners showed trends toward reduced symptom level over time but were subclinical at both exams
- 5 patients completed the functional cognition medication management subtest and median scores were 4 during hospitalization (range 0-9) and 0 at follow-up (range 0-1), with higher scores reflecting more need for assistance.

CONCLUSIONS

- Prior to hospital discharge, patients undergoing therapeutic hypothermia post cardiac arrest demonstrated clinically significant cognitive deficits, with attention and executive functioning deficits being prominent. Deficits may not be grossly evident at bedside and neuropsychological testing can be helpful in determining need for initial support or supervision upon returning home. Such support, if needed, can likely be weaned within days to weeks for most patients.
- Functional cognitive testing revealed that during hospitalization, most of the patients required at least verbal guidance with some dimension of a simple medication management task but that most were independent by the time 3 to 6 week follow up occurred.

LIMITATIONS

- Small sample size

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