**Post-Arrest Neuroprognostication: Practices and Opinions of Canadian Physicians**

**Supplement**

**Post Arrest Neuro Prognostication Survey**

This survey is designed to investigate current practices and opinions regarding neuroprognostication in comatose post cardiac arrest patients in Canadian centers. You are invited to participate because you have been identified as a Canadian physician with possible subject matter expertise in post arrest neuroprognostication. We invite you to participate regardless of training, experience, or area of expertise. Collected information will identify areas of variability and guide further research. This survey is approved by the University of Calgary Research Ethics Board (REB21-0561). It will take approximately 20 minutes to complete and is anonymous.

Do you consent to participate and have your responses used for research?

* Yes
* No

1. Which of the following best describes your specialty? Select all that apply.

* Critical care
* Neurology
* Cardiology

Other: *(free text)*

1. How many years have you been practicing as an independent licensed physician?

* 0-5
* 6-10
* 11-15
* 16-20
* > 20

1. In which Canadian province or territory do you mainly practice?

* British Columbia
* Alberta
* Saskatchewan
* Manitoba
* Ontario
* Quebec
* Newfoundland and Labrador
* Nova Scotia
* New Brunswick
* Prince Edward Island
* Northwest Territories
* Yukon

Nunavut

1. In which type of center do you practice primarily?

Consider an academic centre as a university affiliated hospital with associated training programs in critical care, cardiology and/or neurology.

* Academic < 100 beds
* Academic 100-500 beds
* Academic > 500 beds
* Non-academic < 100 beds
* Non-academic 100-500 beds
* Non-academic > 500 beds
* Other: *(free text)*

1. How many cardiac arrest patients (out of hospital and in hospital cardiac arrest) does your center manage per year?

* 0
* 1-25
* 26-50
* 51-75
* 76-100
* 101-150
* 151-200
* 201-250
* 251-300
* > 300
* Unsure

1. Approximately how many post cardiac arrest patients do you personally prognosticate per year?

* 0
* 1-5
* 6-10
* 10-15
* 16-25
* 26-50
* > 50

1. What temperature do you most often target for post arrest patients who do not follow commands?

* 32- 34oC
* 34 - 36oC
* Euthermia (<37.5oC)
* Fever avoidance (<38oC)
* Other: please specify *(free text)*
* I do not target a specific temperature in any post arrest patient.

1. How long are post arrest patients maintained at this temperature?

* < 24 hours
* 24-48 hours
* 48-72 hours
* Other: please specific *(free text)*
* Not applicable – I do not target a specific temperature in any post arrest patient.

1. What guidelines and/or other clinical resources do you use to guide your post arrest management and neuroprognostication practices? Select all that apply.

* American Heart Association
* American Academy of Neurology
* Australian and New Zealand Committee on Resuscitation Council
* European Resuscitation Council / European Society of Intensive Care Medicine
* Other: *(free text)*

1. Do you have an institutional protocol to guide post arrest neuroprognostication?

* Yes
* No
* Unsure

1. Rate your level of confidence with accurately identifying patients with good vs poor outcomes at day 3-5 post arrest based on the results of neuroprognostication.

Good outcome being defined as a Cerebral Performance Category (CPC) of 1-2 and poor outcome CPC 3-5.

|  |  |
| --- | --- |
| **CPC 1** | No/minimal disability. Conscious, alert, able to work, may have mild neurological or psychologic deficits. |
| **CPC 2** | Moderate disability. Conscious, independent in activities of daily living, able to work in sheltered environment. |
| **CPC 3** | Severe disability. Conscious, dependent on others for daily support. |
| **CPC 4** | Coma or vegetative state |
| **CPC 5** | Brain death |

* Not confident at all
* Slightly confident
* Somewhat confident
* Fairly confident
* Very confident

1. Please select in each column which of the following you would consider a major confounder of the neurological examination, electroencephalography (EEG) and somatosensory evoked potentials (SSEP).

|  |  |  |  |
| --- | --- | --- | --- |
|  | Neuro Exam | EEG | SSEP |
| Propofol - ongoing infusions or impaired clearance with infusion discontinued within 48hr |  |  |  |
| Benzodiazepines - ongoing infusions or impaired clearance with infusion discontinued within 48hr |  |  |  |
| Opioids – ongoing infusions or impaired clearance with administration discontinued within 48hr |  |  |  |
| Clinically significant drug intoxications within 48hr |  |  |  |
| Temperature < 34oC |  |  |  |
| Temperature > 38oC |  |  |  |
| Glucose < 2.2 mmol/L |  |  |  |
| Glucose > 22 mmol/L |  |  |  |
| Na < 120 mmol/L |  |  |  |
| Na > 160 mmol/L |  |  |  |
| Stage 3 acute kidney injury (Cr > 3x the upper limit of normal) |  |  |  |
| Severe hepatic dysfunction (with evidence of synthetic dysfunction) |  |  |  |
| Convulsive seizure within 24hr |  |  |  |
| Non-convulsive seizures within 24hr |  |  |  |
| Concern for critical illness neuropathy/myopathy |  |  |  |

Please list other confounders you consider not included above: *(free text)*

1. Regarding the neurological exam, in your opinion, please indicate the utility of the various findings IN ISOLATION for determining if a patient has a poor prognosis defined as CPC 3-5 (regardless of timing in relation to arrest/normothermia).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Very Useful | Useful | Somewhat Useful | Not Useful | Unsure |
| Bilaterally absent pupillary light reflexes |  |  |  |  |  |
| Bilaterally absent corneal reflexes |  |  |  |  |  |
| Absent oculocephalic reflex |  |  |  |  |  |
| Bilaterally absent vestibulo-ocular reflex |  |  |  |  |  |
| Bilaterally absent gag reflex |  |  |  |  |  |
| Absent cough reflex |  |  |  |  |  |
| Lack of eye opening to painful stimuli |  |  |  |  |  |
| Lack of purposeful motor response (obeying, localizing, or withdrawing) to painful stimuli |  |  |  |  |  |
| Status myoclonus (>30min sustained diffuse myoclonus) |  |  |  |  |  |
| Myoclonus not meeting criteria for status myoclonus |  |  |  |  |  |

1. In your opinion, what false positive rate (FPR) for a diagnostic test is necessary for it to be a definitive test used for neuroprognostication?

* <1%
* <2.5%
* <5%
* <10%

1. Aside from bedside neurological exams, how accessible are the following ancillary tests to you in your center to assist with neuroprognostication?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Test not available  at center | Test available, but logistical challenges exist  (e.g. only available certain days) | Test is both available and easily accessible. | Unsure |
| Electroencephalography (EEG) - spot |  |  |  |  |
| Electroencephalography (EEG) - continuous |  |  |  |  |
| Somatosensory evoked potentials (SSEP) |  |  |  |  |
| Neuron-specific enolase (NSE) |  |  |  |  |
| Protein S-100B |  |  |  |  |
| Creatinine Kinase BB |  |  |  |  |
| Tau |  |  |  |  |
| Neurofilament light chain |  |  |  |  |
| Glial Fibrillary Acidic Protein (GFAP) |  |  |  |  |
| Ubiquitin C terminal hydrolase -L1 (UCH-L1) |  |  |  |  |
| Computed tomography (CT) |  |  |  |  |
| Magnetic resonance imaging (MRI) |  |  |  |  |

Please list other ancillary tests you utilize that are not included above: *(free text)*

1. Assuming all these ancillary tests are available to you, how useful do you find each of them for determining neuroprognosis post arrest?

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Very Useful | Useful | Somewhat Useful | Not Useful | Unsure |
| Electroencephalography (EEG) - spot |  |  |  |  |  |
| Electroencephalography (EEG) - continuous |  |  |  |  |  |
| Somatosensory evoked potentials (SSEP) |  |  |  |  |  |
| Neuron specific enolase (NSE) |  |  |  |  |  |
| Protein S-100B |  |  |  |  |  |
| Creatinine Kinase BB |  |  |  |  |  |
| Tau |  |  |  |  |  |
| Neurofilament light chain |  |  |  |  |  |
| Glial Fibrillary Acidic Protein (GFAP) |  |  |  |  |  |
| Ubiquitin C terminal hydrolase –L1 (UCH-L1) |  |  |  |  |  |
| Computer Tomography (CT) |  |  |  |  |  |
| Magnetic Resonance Imaging (MRI) |  |  |  |  |  |

1. Indicate the earliest time point post arrest (and return of normothermia) that each finding could reliably predict a poor prognosis (CPC 3-5) in isolation?

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Does not reliably predict a poor prognosis | <24hr | 24-48hr | 49-72hr | 73-96hr | 97-120hr | 121-144hr | 145- 168hr | >168hr | Unsure |
| Bilaterally absent pupillary light reflexes |  |  |  |  |  |  |  |  |  |  |
| Bilaterally absent corneal blink reflex |  |  |  |  |  |  |  |  |  |  |
| Status myoclonus  (>30min diffuse myoclonus) |  |  |  |  |  |  |  |  |  |  |
| GCS motor response <2 |  |  |  |  |  |  |  |  |  |  |
| GCS motor response <3 |  |  |  |  |  |  |  |  |  |  |
| CT head - subjective loss of gray-white differentiation |  |  |  |  |  |  |  |  |  |  |
| CT head - quantitative gray-white ratio <1.15 |  |  |  |  |  |  |  |  |  |  |
| MR brain - extensive restricted diffusion of deep grey matter only |  |  |  |  |  |  |  |  |  |  |
| MR brain - restricted diffusion of cerebral cortex only |  |  |  |  |  |  |  |  |  |  |
| MR brain - restricted diffusion of cortex and deep grey matter |  |  |  |  |  |  |  |  |  |  |
| EEG - isoelectric (<2uV) background |  |  |  |  |  |  |  |  |  |  |
| EEG - suppressed (<10uV) background |  |  |  |  |  |  |  |  |  |  |
| EEG - burst suppression with highly epileptiform bursts |  |  |  |  |  |  |  |  |  |  |
| EEG - burst suppression with non-epileptiform bursts |  |  |  |  |  |  |  |  |  |  |
| EEG - generalized periodic discharges on suppressed background |  |  |  |  |  |  |  |  |  |  |
| EEG - electrographic seizures |  |  |  |  |  |  |  |  |  |  |
| EEG – absence of reactivity |  |  |  |  |  |  |  |  |  |  |
| SSEP - bilaterally absent N20 potentials |  |  |  |  |  |  |  |  |  |  |
| Neuron specific enolase >33ug/L |  |  |  |  |  |  |  |  |  |  |
| Neuron specific enolase >60ug/L |  |  |  |  |  |  |  |  |  |  |

Guidelines are now recommending a multimodal approach to neuro prognostication that utilizes findings on neurological exam, electrophysiologic tests, neuro imaging and biomarkers.

1. With regards to a multimodal approach to neuro prognostication please indicate your level of agreement with the following statements:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Strongly agree | Agree | Neutral | Diagree | Strongly disagree |
| If no definitive findings from the neurological exam, electrophysiologic tests, neuroimaging or biomarkers are present the prognosis is unclear |  |  |  |  |  |
| 1 definitive finding on either neurological exam, electrophysiologic tests, neuroimaging, or biomarkers indicates a poor prognosis (CPC 3-5) with adequate certainty (FPR <5%) |  |  |  |  |  |
| >2 definitive findings on either neurological exam, electrophysiologic tests, neuroimaging, and/or biomarkers is required to conclude a patient has a poor prognosis (CPC 3-5) |  |  |  |  |  |
| Ideally, when utilizing >2 definitive findings to predict a poor prognosis (CPC 3-5), these should be from different testing categories (i.e. neuroimaging and exam or neuroimaging and electrophysiologic tests, etc.) |  |  |  |  |  |
| When >2 definitive findings are present, it is not necessary to obtain additional tests |  |  |  |  |  |

1. For the following scenarios, indicate the earliest time point you are comfortable concluding that a patient has a poor neurological prognosis (CPC 3-5).

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | <24 hr | 24 - 72hr | 72 - 120hr | 120 - 168hr | 8 - 14 days | 15 - 28 days | 1 - 3 mths | >3mths | Unsure |
| Post ROSC if no TTM was performed & >2 definitive findings suggesting poor prognosis present |  |  |  |  |  |  |  |  |  |
| Post re-warming to normothermia if TTM (32-36oC) was performed & >2 definitive findings suggesting poor prognosis present |  |  |  |  |  |  |  |  |  |
| Post ROSC if no TTM was performed & only 1 definitive finding suggesting poor prognosis present |  |  |  |  |  |  |  |  |  |
| Post re-warming to normothermia if TTM (32-36oC) was performed & only 1 definitive finding suggesting poor prognosis present |  |  |  |  |  |  |  |  |  |
| Post ROSC if no TTM was performed and patient remains comatose (GCS <8) patient with no definitive findings suggesting poor prognosis present and no confounders present. |  |  |  |  |  |  |  |  |  |
| Post re-warming to normothermia if TTM (32-36oC) was performed and patient remains comatose (GCS <8) patient with no definitive findings suggesting poor prognosis present and no confounders present. |  |  |  |  |  |  |  |  |  |

1. What is the earliest time point post arrest you would be comfortable CLINICALLY determining death by neurological criteria (DNC), as defined as the irreversible loss of the capacity for consciousness, combined with the irreversible loss of all brain stem functions including the capacity to breathe (in the absence of confounders)?

* <24 hr
* 24-48hr
* 49-72hr
* 73-96hr
* 97-120hr
* 121-144hr
* 145-168hr
* >168hr
* Unsure

1. How often do you request a second opinion from a colleague / external expert when determining neuroprognosis post arrest AND what specialty of colleague / external expert do you typically consult?

* Never
* Rarely
* Sometimes
* Frequently
* Almost all the time

Please specify the specialty of colleague / external expert you would typically consult for a second opinion: (*free text)*

1. In addition to the medical information obtained through multimodal neuroprognostication are there other important factors (patient, family, or health care system related) that should be taken into consideration when discussing goals of care? (free text)
2. Please rate your level of provider distress on average, when determining neuroprognosis post arrest.

* Not at all distressed
* Mildly distressed
* Moderately distressed
* Very distressed
* Extremely distressed
* Prefer not to answer

Thank you for your participation.

Should you have any questions or concerns please contact:

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**Additional Results**

**Table S1: Expanded demographics of survey respondents**

|  |  |  |
| --- | --- | --- |
|  | | **N (% of total answered)** ‡ |
| **Independent practice (yr)** |  | |
| 0-5 | 29 (22.7) | |
| 6-10 | 24 (18.8) | |
| 11-15 | 13 (10.2) | |
| 16-20 | 19 (14.8) | |
| >20 | 43 (33.6) | |
| **Province of practice** |  | |
| British Columbia | 6 (4.7) | |
| Alberta | 71 (55.5) | |
| Saskatchewan | 2 (1.6) | |
| Manitoba | 12 (9.4) | |
| Ontario | 24 (18.8) | |
| Quebec | 11 (8.6) | |
| Newfoundland and Labrador | 1 (0.8) | |
| Nova Scotia | 1 (0.8) | |
| **Type of medical center** |  | |
| Academic < 100 beds | 2 (1.7) | |
| Academic 100-500 beds | 22 (18.2) | |
| Academic > 500 beds | 85 (70.2) | |
| Non-Academic < 100 beds | 2 (1.7) | |
| Non-Academic 100-500 beds | 9 (7.4) | |
| Non-Academic > 500 beds | 1 (0.8) | |
| **Post cardiac arrests patients** (#/center/yr) |  | |
| 0 | 1 (0.8) | |
| 1-25 | 14 (11.7) | |
| 26-50 | 12 (10.0) | |
| 51-75 | 21 (17.5) | |
| 76-100 | 15 (12.5) | |
| 101-150 | 16 (13.3) | |
| 151-200 | 6 (5.0) | |
| 201-250 | 3 (2.5) | |
| >300 | 11 (9.2) | |
| Unsure | 19 (15.8) | |
| **Post arrest prognostications** (#/physician/yr) |  | |
| 0 | 7 (5.8) | |
| 1-5 | 25 (20.7) | |
| 6-10 | 27 (22.3) | |
| 11-15 | 37 (30.6) | |
| 16-25 | 16 (13.2) | |
| 26-50 | 8 (6.6) | |
| >50 | 1 (0.8) | |

‡ valid percentages; % - (valid) percentage; yr - year; # - number

**Table S2: Number and percentages‡ of respondents indicating the earliest time point they are comfortable concluding an unconfounded comatose patient has a poor neurological prognosis (CPC 3-5) based on clinical scenarios**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | **Earliest time post ROSC/normothermia physician comfortable concluding poor neurological prognosis** | | | | | | | | |
| **<24 hr** | **24-72hr** | **72- 120hr** | **120-168hr** | **8-14days** | **15-28days** | **1-3mths** | **>3mths** | **Unsure** |
| **Post ROSC if no TTM performed** | **>2** definitive findings suggesting poor prognosis | 4 (4.3) | 32 (34.4) | 51 (54.8) | 4 (4.3) | 0 (0) | 0 (0) | 0 (0) | 1(1.1) | 1 (1.1) |
| **1** definitive finding suggesting poor prognosis | 0 (0) | 4 (4.3) | 34 (36.6) | 24 (25.8) | 11 (11.8) | 1 (1.1) | 3 (3.2) | 1 (1.1) | 15 (16.1) |
| **no** definitive findings suggesting poor prognosis | 0 (0) | 3 (3.2) | 10 (10.8) | 20 (21.5) | 24 (25.8) | 8 (8.6) | 10 (10.8) | 7 (7.5) | 11 (11.8) |
| **Post rewarming to normothermia if TTM**  **(32-36oC) performed** | **>2** definitive findings suggesting poor prognosis | 0 (0) | 21 (22.6) | 51 (61.3) | 13 (14.0) | 0 (0) | 0 (0) | 0 (0) | 1 (1.1) | 1 (1.1) |
| **1** definitive finding suggesting poor prognosis | 0 (0) | 3 (3.2) | 30 (32.2) | 25 (26.9) | 14 (15.1) | 2 (2.2) | 2 (2.2) | 1 (1.1) | 16 (17.2) |
| **no** definitive findings suggesting poor prognosis | 0 (0) | 3 (3.2) | 9 (9.7) | 20 (21.5) | 22 (23.7) | 9 (9.7) | 11 (11.8) | 7 (7.5) | 12 (12.9) |

‡ valid percentages; hr - hours; mths – months; TTM - targeted temperature management

**Table S3: Number and percentages‡ of respondents indicating the earliest time point they are comfortable clinically determining death by neurological criteria assuming no confounders present**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Time post ROSC physician comfortable clinically determining DNC** | | | | | | | | |
| **<24 hr** | **24-24hr** | **49- 72hr** | **73-96hr** | **97-120hr** | **121-144hr** | **145-168hr** | **>168hr** | **Unsure** |
| N (%)**‡** | 6 (6.5) | 53 (57.0) | 18 (19.4) | 15 (16.1) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 1 (1.1) |

‡ valid percentages; DNC - death by neurological criteria; hr – hours; N – number; % - valid percent

**Table S4: Perceived utility of physical exam findings in determining a patient has a poor neurological prognosis (CPC 3-5)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Physical exam findings** | **Utility N (%)‡** | | | | |
| **Very**  **useful** | **Useful** | **Somewhat useful** | **Not**  **useful** | **Unsure** |
| Bilaterally absent PLR | 55 (53.4) | 33 (32.0) | 11 (10.7) | 4 (3.9) | 0 (0) |
| Bilaterally absent CR | 45 (43.7) | 37 (35.9) | 12 (11.7) | 8 (7.8) | 1 (1.0) |
| Absent OCR | 29 (28.2) | 39 (37.9) | 15 (14.6) | 19 (18.4) | 1 (1.0) |
| Bilaterally absent VOR | 34 (33.0) | 40 (38.8) | 13 (12.6) | 14 (13.6) | 2 (1.9) |
| Bilaterally absent gag reflex | 13 (12.6) | 22 (21.4) | 29 (28.2) | 39 (37.9) | 0 (0) |
| Absent cough reflex | 15 (14.6) | 23 (22.3) | 33 (32.0) | 31 (30.1) | 1 (1.0) |
| Lack of eye opening to painful stimuli | 9 (8.7) | 21 (20.4) | 31 (30.1) | 42 (40.8) | 0 (0) |
| Lack of purposeful motor response† | 23 (22.3) | 29 (28.2) | 33 (32.0) | 18 (17.5) | 0 (0) |
| Status myoclonus\* | 32 (31.1) | 45 (43.7) | 14 (13.6) | 10 (9.7) | 2 (1.9) |
| Other myoclonus | 5 (4.9) | 24 (23.3) | 30 (29.1) | 37 (35.9) | 7 (6.8) |

‡ valid percentages; PLR - pupillary light reflex; CR - corneal reflex; OCR - oculocephalic reflex; VOR - vestibulocochlear reflex; † defined as Glasgow Coma Scale motor score of <3; \* defined as >30min sustained, diffuse myoclonus

**Table S5: Earliest time post ROSC and return of normothermia physical exam findings can be used to predict a poor neurological prognosis (CPC 3-5)**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Physical exam findings** |  | | **Earliest time post ROSC/normothermia finding can be used to indicate a poor prognosis**  **N (%)‡** | | | | | | | | |
| **<24hr** | **24-48hr** | | **49-72hr** | **73-96hr** | **97-120hr** | **121-144hr** | **145-168hr** | **>168hr** | **Unsure** | **N/A** |
| Bilaterally absent PLR | 6 (6.2) | 34 (35.1) | | 15 (15.5) | 38 (39.2) | 0 (0) | 0 (0) | 1 (1.0) | 1 (1.0) | 0 (0) | 3 (3.1) |
| Bilaterally absent CR | 4 (4.1) | 25 (25.8) | | 20 (20.6) | 31 (35.1) | 2 (2.1) | 0 (0) | 2 (2.1) | 0 (0) | 2 (2.1) | 8 (8.2) |
| GCSm < 2 | 2 (2.1) | 11 (11.3) | | 21 (21.6) | 43 (44.3) | 5 (5.2) | 4 (4.1) | 1 (1.0) | 3 (3.1) | 2 (2.1) | 5 (5.2) |
| GCSm < 3 | 2 (2.1) | 8 (8.2) | | 18 (18.6) | 37 (38.1) | 6 (6.2) | 4 (4.1) | 2 (2.1) | 4 (4.2) | 3 (3.1) | 13 (13.4) |
| Status myoclonus\* | 22 (22.7) | 29 (29.9) | | 12 (12.4) | 20 (20.6) | 1 (1.0) | 0 (0) | 5 (5.2) | 0 (0) | 5 (5.2) | 3 (3.1) |

‡ valid percentages; PLR - pupillary light reflex; CR - corneal reflex; GCSm – Glasgow Coma Scale motor score; \* defined as >30min sustained, diffuse myoclonus, N/A– does not reliably predict a poor prognosis

**Table S6: Accessibility of prognosticating tests**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Ancillary Test & Findings** | **Availability N (%)‡** | | | |
| **Not**  **Available** | **Available**  **but**  **Logistical Challenges** | **Available**  **& Accessible** | **Unsure** |
| EEG - spot | 2 (2.0) | 16 (16.0) | 82 (82.0) | 0 (0) |
| EEG - continuous | 23 (23.0) | 36 (36.0) | 40 (40.0) | 1 (1.0) |
| SSEP | 25 (25.0) | 54 (54.0) | 19 (19.0) | 2 (2.0) |
| CT | 2 (2.0) | 0 (0) | 98 (98.0) | 0 (0) |
| MRI | 2 (2.0) | 11 (11.0) | 87 (87.0) | 0 (0) |
| NSE | 66 (66.0) | 17 (17.0) | 7 (7.0) | 10 (10.0) |
| Protein S-100B | 72 (72.0) | 10 (10.0) | 5 (5.0) | 13 (13.0) |
| Creatinine Kinase BB | 54 (54.0) | 12 (12.0) | 20 (20.0) | 14 (14.0) |
| Tau | 67 (67.0) | 16 (16.0) | 1 (1.0) | 16 (16.0) |
| Neurofilament Light Chain | 66 (66.0) | 18 (18.0) | 0 (0) | 16 (16.0) |
| GFAP | 68 (68.0) | 13 (13.0) | 0 (0) | 19 (19.0) |
| UCH-L1 | 71 (71.0) | 10 (10.0) | 0 (0) | 19 (19.0) |

**‡** valid percentages; EEG - electroencephalography; SSEP - somatosensory evoked potentials; CT - computer tomography; MRI – magnetic resonance imaging; NSE - neuron specific enolase; GFAP – glial fibrillary acidic protein; UCH-L1 - ubiquitin C terminal hydrolase-L1

**Table S7: Perceived utility of prognosticating tests in determining a patient has a poor neurological prognosis (CPC 3-5)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Physical exam findings** | **Utility N (%)‡** | | | | |
| **Very**  **useful** | **Useful** | **Somewhat useful** | **Not**  **useful** | **Unsure** |
| EEG - spot | 20 (20.0) | 41 (41.0) | 33 (33.0) | 6 (6.0) | 0 (0) |
| EEG - continuous | 20 (20.0) | 35 (35.0) | 31 (31.0) | 9 (9.0) | 5 (5.0) |
| CT | 20 (20.0) | 42 (42.0) | 31 (31.0) | 6 (6.0) | 1 (1.0) |
| SSEP | 36 (36.0) | 40 (40.0) | 14 (14.0) | 3 (3.0) | 7 (7.0) |
| MRI | 40 (40.0) | 35 (35.0) | 20 (20.0) | 4 (4.0) | 1 (1.0) |
| NSE | 0 (0) | 21 (21.0) | 15 (15.0) | 8 (8.0) | 56 (56.0) |
| Protein S-100B | 0 (0) | 8 (8.0) | 14 (14.0) | 13 (13.0) | 65 (65.0) |
| Creatinine Kinase BB | 0 (0) | 2 (2.0) | 10 (10.0) | 20 (20.0) | 68 (68.0) |
| Tau | 0 (0) | 2 (2.0) | 7 (7.0) | 17 (17.0) | 74 (74.0) |
| Neurofilament Light Chain | 2 (2.0) | 5 (5.0) | 8 (8.0) | 12 (12.0) | 73 (73.0) |
| GFAP | 0 (0) | 3 (3.0) | 6 (6.0) | 13 (13.0) | 78 (78.0) |
| UCH-L1 | 0 (0) | 3 (3.0) | 4 (4.0) | 15 (15.0) | 78 (78.0) |

**‡** valid percentages;EEG - electroencephalography; SSEP - somatosensory evoked potentials; CT - computer tomography; MRI – magnetic resonance imaging; NSE - neuron specific enolase; GFAP – glial fibrillary acidic protein; UCH-L1 - ubiquitin C terminal hydrolase-L1

**Table S8: Earliest time post ROSC and return of normothermia investigation findings can be used to predict a poor neurological prognosis (CPC 3-5)**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Physical exam findings** | **Earliest time post ROSC/normothermia finding can be used to indicate a poor prognosis**  **N (%)‡** | | | | | | | | | |  |
| **<24hr** | **24-48hr** | **49-72hr** | **73-96hr** | **97-120hr** | **121-144hr** | **145-168hr** | **>168hr** | **Unsure** | **N/A** | |
| EEG |  |  |  |  |  |  |  |  |  |  | |
| Isoelectric background (<2uV) | 13 (13.4) | 22 (22.7) | 10 (10.3) | 21 (21.6) | 5 (5.2) | 1 (1.0) | 13 (13.4) | 0 (0) | 5 (5.2) | 7 (7.2) | |
| Suppressed background (<10uV) | 5 (5.2) | 15 (15.5) | 8 (8.2) | 16 (16.5) | 4 (4.1) | 1 (1.0) | 15 (15.5) | 1 (1.0) | 17 (17.5) | 15 (15.5) | |
| Highly epileptiform BS | 12 (12.4) | 16 (16.5) | 11 (11.3) | 15 (15.5) | 1 (1.0) | 2 (2.1) | 10 (10.3) | 1 (1.0) | 13 (13.4) | 16 (16.5) | |
| Non-epileptiform BS | 8 (8.2) | 15 (15.5) | 13 (13.4) | 14 (14.4) | 2 (2.1) | 1 (1.0) | 11 (11.3) | 1 (1.0) | 15 (15.5) | 17 (17.5) | |
| GPDs on suppressed  background | 8 (8.2) | 11 (11.3) | 9 (9.3) | 11 (11.3) | 2 (2.1) | 2 (2.1) | 12 (12.4) | 1 (1.0) | 18 (18.6) | 23 (23.7) | |
| Electrographic seizures | 8 (8.2) | 5 (5.2) | 9 (9.3) | 7 (7.2) | 2 (2.1) | 1 (1.0) | 11 (11.3) | 2 (2.1) | 13 (13.4) | 39 (40.2) | |
| Absent reactivity | 10 (10.3) | 8 (8.2) | 18 (18.6) | 14 (14.4) | 3 (3.1) | 1 (1.0) | 10 (10.3) | 1 (1.0) | 12 (12.4) | 20 (20.6) | |
| SSEP |  |  |  |  |  |  |  |  |  |  | |
| Bilaterally absent N20 | 8 (8.2) | 22 (22.7) | 20 (20.6) | 27 (27.8) | 0 (0) | 2 (2.1) | 7 (7.2) | 0 (0) | 9 (9.3) | 2 (2.1) | |
| CT |  |  |  |  |  |  |  |  |  |  | |
| Subjective loss of grey-  white differentiation | 10 (10.3) | 28 (28.9) | 6 (6.2) | 11 (11.3) | 0 (0) | 1 (1.0) | 4 (4.1) | 1 (1.0) | 6 (6.2) | 30 (30.9) | |
| GM/WM < 1.15 | 10 (10.3) | 14 (14.4) | 5 (5.2) | 13 (13.4) | 0 (0) | 0 (0) | 17 (17.5) | 0 (0) | 23 (23.7) | 15.5(15.5) | |
| MRI |  |  |  |  |  |  |  |  |  |  | |
| Extensive restricted diffusion of  deep grey matter | 4 (4.1) | 17 (17.5) | 11 (11.3) | 20 (20.6) | 1 (1.0) | 0 (0) | 10 (10.3) | 1 (1.0) | 15 (15.5) | 18 (18.6) | |
| Extensive restricted diffusion of  cerebral cortex | 2 (2.1) | 12 (12.4) | 8 (8.2) | 20 (20.6) | 3 (3.1) | 0 (0) | 10 (10.3) | 0 (0) | 20 (20.6) | 22 (22.7) | |
| Extensive restricted diffusion of  cortex & deep grey matter | 11 (11.3) | 16 (16.5) | 12 (12.4) | 17 (17.5) | 3 (3.1) | 0 (0) | 8 (8.2) | 0 (0) | 15 (15.5) | 15 (15.5) | |
| NSE |  |  |  |  |  |  |  |  |  |  | |
| >33ug/L | 1 (1.0) | 3 (3.1) | 4 (4.1) | 8 (8.2) | 0 (0) | 0 (0) | 28 (28.9) | 0 (0) | 48 (49.5) | 5 (5.2) | |
| >60ug/L | 0 (0) | 5 (5.2) | 5 (5.2) | 10 (10.3) | 0 (0) | 0 (0) | 27 (27.8) | 0 (0) | 46 (47.4) | 4 (4.1) | |

**‡** valid percentages - missing percentages are those who either indicated the finding was “not reliably predictive of a poor prognosis”; hr - hours; EEG - electroencephalography; uV - microvolts; BS - burst suppression; GPD – generalized periodic discharge; SSEP - somatosensory evoked potentials; CT - computer tomography; GM - grey matter; WM - white matter; MRI – magnetic resonance imaging; NSE - neuron specific enolase; ug/L - micrograms per litre; GFAP – glial fibrillary acidic protein; UCH-L1 - ubiquitin C terminal hydrolase-L1; N/A – does not reliably predict a poor prognosis

**Figure S1: Provider confidence (a) and distress (b) with neuroprognostication:**

S1(a): Provider confidence with accurately identifying patients with good vs. poor outcomes at day 3-5 post arrest based on the results of neuroprognostication

S1(b): Level of provider distress on average, when determining neuroprognosis post arrest