The Pre-hospital Stroke Scale, Deconstructed

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Presenter Disclosure Information

Å Toby Gropen
- ï The Pre-hospital Stroke Scale, Deconstructed

Å FINANCIAL DISCLOSURE:
- ï No relevant financial relationship exists

Å UNLABELED/UNAPPROVED USES DISCLOSURE:
- ï None

Talk objectives

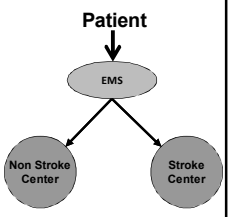
Å -Understand goals of pre-hospital stroke assessment

Å -Distinguish between pre-hospital stroke screens versus severity scales

Å -Appreciate the validity and reliability of individual pre-hospital stroke scale items

Validated Stroke Screens

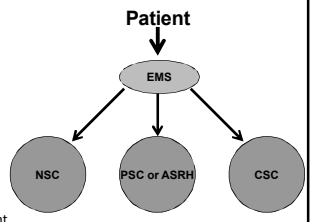
- Cincinnati Prehospital Stroke Scale (CPSS)
- Los Angeles Prehospital Stroke Screen (LAPSS)
- Melbourne Ambulance Stroke Screen (MASS)
- Recognition of Stroke in the Emergency Room (ROSIER) scale
- Ontario prehospital stroke screening tool (OPSST)
- Medic Prehospital Assessment for Code Stroke (Med PACS)



Kothari, 1999; Kidwell, 2000; Bray, 2005; Nor, 2005; Chenkin, 2009; Studnek, 2013

Stroke Severity/LVO Scales

- National Institutes of Health Stroke Scale (NIHSS)
- 3-item stroke scale (3I-SS)
- Los Angeles Motor Scale (LAMS)
- Rapid Arterial oCclusion Evaluation (RACE) scale
- Cincinnati Prehospital Stroke Severity Scale (CPSSS, C-STAT)
- Field Assessment Stroke Triage for Emergency Destination (FAST-ED)
- Emergency Medical Stroke Assessment (EMSA)



Brott, 1989; Singer, 2005; Nazliel, 2008; Perez de la Ossa, 2014; Katz, 2015; Lima, 2016; Gropen, in press

Attributes of Stroke Severity Scales

Assessments	LAMS	3I-SS	CPSSS	RACE	FAST-ED	EMSA
Level of Consciousness (LOC)		X				
LOC Questions			X			
LOC Commands				X		
Best Gaze		X	X	X	X	X
Facial Palsy	X			X	X	X
Motor Arm	X	X	X	X	X	X
Motor Leg				X		X
Motor Grip	X					
Language or Dysarthria					X	X
Extinction and Inattention				X	X	
Published Pre-hospital Validation?	Yes	No	No	Yes	No	No

Emergency Medical Stroke Assessment (EMSA) Check any elements that are abnormal	Abnormal
E: Eye Movement	
Horizontal Gaze Ask patient to keep their head still and follow your finger left to right with their eyes Abnormal: Patient is unable to follow as well in one direction compared to the other	☐
M: Motor – Face, Arm, or Leg Weakness	
Facial Weakness Ask patient to show their teeth or smile Abnormal: One side of the face does not move as well as the other	☐
Arm Weakness Ask patient to hold out both arms, palms up, for 10 seconds with eyes closed Abnormal: One arm does not move or drifts down compared to the other	☐
Leg Weakness Ask patient to lift up one leg and then the other for 5 seconds Abnormal: One leg does not move or drifts down compared to the other	☐
SA: Slurred Speech or Aphasia	
Naming Ask patient to name your watch and pen Abnormal: Patient slurs words, says the wrong words, or is unable to speak	☐
Repetition Ask patient to repeat "They heard him speak on the radio last night" after you Abnormal: Patient slurs words, says the wrong words, or is unable to speak	☐

A New Model of EMS Medical Direction for Stroke

- Initiated September, 2016 as a domain reporting not a scoring process
- BREMSS Trauma Communication Center (TCC) provides real-times guidance of pre-hospital responders
- Simplifies training, allowing the 24 more experienced TCC personnel, in turn, to train EMS responders
- It establishes a platform for real-time paging out of pre-hospital STROKE domains & scale elements and other information
- Since March, 2017 has included review (by a Vascular Neurologist) of audio recordings of all calls made to the ATCC by EMS
- It allows "deconstruction" of the pre-hospital stroke scale
- Provides insight regarding the often challenging conditions in the field

Real-time paging of scale elements

Some Audio Recordings

Å Guided EMSA 

Å Left MCA syndrome 

Inter-rater Reliability of EMSA Elements

Å 146 recordings from EMS in the field were reviewed by the TCC and vascular neurologist and each item was independently scored

	Kappa	95% Confidence Interval		p-value
Gaze	0.71	0.45	0.97	<0.0001
Face	0.54	0.26	0.82	0.002
Arm	0.57	0.29	0.85	0.001
Leg	0.60	0.33	0.86	0.0006
Naming	0.56	0.30	0.81	0.001
Repetition	0.34	0.06	0.61	0.04

Sensitivity and Specificity of EMSA Elements for LVO

Stroke Type	N (%)
Non-LVO	142 (78)
LVO	39 (22)
M1, BA, ICA	31
M2	8
Total	181

EMSA Component	Sensitivity	Specificity	Likelihood Ratio Positive	Likelihood Ratio Negative
Gaze	0.44	0.78	2.00	0.72
Face	0.64	0.51	1.31	0.71
Arm	0.69	0.34	1.05	0.91
Leg	0.64	0.46	1.19	0.78
Naming	0.51	0.53	1.09	0.92
Repetition	0.62	0.57	1.44	0.67

Pre-hospital Stroke Scale, Reconstructed, So Far . . .

Odds Ratio Estimates for M1, BA, ICA

EMSA Component	Odds Ratio	95% Confidence Limits	
Gaze	3.71	1.60	8.62

Odds Ratio Estimates for All LVO

EMSA Component	Odds Ratio	95% Confidence Limits	
Gaze	2.89	1.24	6.73
Naming	0.28	0.08	1.01
Repetition	4.64	1.34	16.08

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