ARC SAC Advisory
Stroke Assessment Tools

Overall Recommendation:

An accurate, concise and rapidly deployable method to evaluate individuals experiencing stroke-like signs and symptoms is desired and has been attempted through the use of various stroke assessment tools since the mid 1980's.

Both the Cincinnati Prehospital Stroke Scale (CPSS) and Los Angeles Prehospital Stroke Screen (LAPSS) stroke tools utilized assessment items which the reliability and validity were previously established. As the F.A.S.T. stroke tool incorporates criteria from both the CPSS and LAPSS, provided near-excellent agreement between healthcare personnel and physicians, required less than two minutes to complete and was easily utilized by laypersons when guided through administration, the tool presents as a reliable and effective triage resource for healthcare and non-healthcare/ laypersons.

Recommendations and Strength

Standard: None

Guideline: Utilizing a stroke scale is effective in identifying stroke.

Option: None

Notation:
- Utilization of F.A.S.T. is appropriate by the first aid provider and general public.
- No evidence that one scale is clearly better than another.

Questions to be addressed:

Is the screening tool F.A.S.T. (face, arms, speech and time) an effective stroke assessment tool for first aid providers and, what is the most effective stroke assessment tool presently available to first aid providers?

Hypothesis: There will be no difference in identification of individuals suspected of experiencing a stroke utilizing F.A.S.T. (face, arms, speech and time) and other assessment instruments.

Introduction/Overview:

The discourse on assessing the functional status following a stroke is lengthy. An accurate, concise and rapidly deployable method to evaluate individuals experiencing stroke-like signs and symptoms is desired and has been attempted through the use of various stroke assessment tools since the mid 1980's. In evaluating the available stroke performance instruments, two specific questions were addressed. This advisory focuses on the development and implementation of stroke assessment tools for use in settings where access to definitive healthcare resources may be limited or delayed.

From the 15 individual functional assessment items of the National Institute of Health Stroke Scale, several abbreviated assessment tools were developed to include the Los Angeles Prehospital Stroke Screen, Cincinnati Prehospital Stroke Scale and the Face, Arms, Speech and Time (F.A.S.T.) exam. Utilizing the stroke items of facial weakness, arm weakness and speech deficits, an abbreviated stroke instrument can effectively and accurately utilized to triage of stroke symptoms by healthcare personnel and untrained laypersons in a timely manner. As the FAST stroke tool incorporates criteria from both the CPSS and LAPSS, provided near-excellent agreement between healthcare personnel and physicians, required less than two minutes to complete and was easily utilized by laypersons when guided through administration, the tool presents as a reliable and effective triage resource for healthcare and non-healthcare/ laypersons.

Summary of Scientific Foundation:

An accurate, concise and rapidly deployable method to evaluate individuals experiencing stroke-like signs and symptoms is desired and has been attempted through the use of various stroke assessment tools since the mid 1980's. In evaluating the available stroke performance instruments, two specific questions were addressed. First, is the screening tool F.A.S.T. (face, arms, speech and time) an effective stroke assessment tool for first aid providers, and second, what is the most effective stroke assessment tool presently available to first aid providers?

The National Institute of Health Stroke Scale identified and provided reliability and validity for 15 individual functional assessment items. An abbreviated three-item Out-of-Hospital NIH Stroke Scale was developed which modified the NIH 15-item for use as a diagnostic tool. The model utilizing facial palsy, arm difference and dysarthria presented as 100% sensitive in predicting stroke with 92% specificity. Due to dysarthria and aphasia being confusing, a single item was created and identified as abnormal speech. The presentation of an abnormality with facial palsy or motor arm and combined with abnormal speech presented a scale with 100% sensitivity and 88% specificity. The scale identified the potential for use by other medical personnel and the general public to assist with recognition of a stroke.

In 1998 the LAPSS stroke evaluation tool was designed for use by emergency medical personnel. This screening instrument incorporated four historical questions, three motor function assessments and the evaluation of blood glucose. Historical questions included age, history of seizure or epilepsy, symptoms less than 12 hours and not bedridden or wheelchair bound. Motor function assessment included facial grimace, hand grip and arm strength, and blood glucose

level. A total of 83 patients were enrolled over a period of three years, with 50 arriving by ambulance, 27 by private vehicle and six were already hospitalized. Those arriving by ambulance 44 of 48 were correctly identified by LAPSS (92% sensitivity) and 38 of 41 (93% sensitivity) were identified as ischemic strokes. Four patients were missed utilizing the LAPSS criterion. The LAPSS was sensitive at 77% for patients arriving by private vehicle. While the authors identify this scale is appropriate for use by non-healthcare individuals, the exclusion criteria may present as cumbersome, an inability to screen blood glucose and the variance in sensitivity between EMS and private vehicle arrivals indicates the screening instrument is more reliable when utilized healthcare personnel.

Reproducibility and validity of the Out-of-Hospital NIH Stroke Scale (CPSS), occurred in 1999 through a prospective study within a hospital environment. The presence of abnormality in any one of the three stroke scale items resulted in a sensitivity of 66% and specificity of 87% for physician assessment and 59% and 89% respectively for prehospital providers. The ease of education, less than one minute to perform and presenting as reproducible and valid supports use as a rapid assessment stroke tool.

A rapid stroke identification instrument which combined the CPSS and LAPSS into the Face Arm Speech Test (F.A.S.T.) was created in 2003 by replacing the sentence repeat with an assessment of language and deleted the blood glucose level assessment. The primary assessment designed for administration to seated individuals to detect unilateral motor weakness and included facial weakness, arm weakness and speech disturbances. The sensitivity presented as 79% with ambulance personnel and a positive predictive value of 78% and physician predictive values of 71%. As subsequent study in 2005 demonstrated complete agreement between paramedic and physician existed for facial weakness (78%), arm weakness (98%) and speech disturbance (89%). Arm weakness was present in 95% of patients and demonstrated near-excellent agreement, suggesting this item may be the most appropriate clinical finding. Approximately two-thirds of patients presenting with posterior circulation events were positive for the F.A.S.T. criteria.

The recognition of stroke symptoms by the general public remains less than optimal as documented through numerous studies. In 2004 a study utilizing laypersons to interpret stroke symptoms displayed by a mock stroke patient was conducted. An investigator simulating a 9-1-1 operator guided participants through the administration of facial droop, arm drift and speech impairment. The accuracy in administration of the stroke items were 100% for facial droop and speech impairment and 98.6% for arm drift. Interpretation of results for facial droop and arm droop 92.9% and speech impairment of 97.1%. Sensitivity and specificity for facial droop 90%, 94%; speech impairment 100%, 96% and arm drift 95%, 92%. Overall sensitivity and specificity of detection for CPSS items was 94.3% and 82.9% respectively. A post study questionnaire indicated 95.7% of the participants reported extreme or very easy in response to the CPSS questions.

Another study in 2005 sought to determine the ability of individuals to identify deficits and accurately report their findings to an investigator. Utilizing the stroke items of facial weakness, arm weakness and speech deficits portrayed by stroke survivors possessing unresolved symptoms, participants correctly administered the CPSS directions in an average of 94 seconds

96%, 99% and 98% respectively with an overall ability of adults to correctly administer the CPSS being 98%. Facial weakness specificity was 74% with a sensitivity of 94%, arm weakness sensitivity was 92% and specificity 72% and speech deficit specificity and sensitivity were 96%. Findings concluded the ability to expedite prehospital triage of stroke symptoms by untrained laypersons in a timely manner.

While one study utilizing the F.A.S.T. instrument detected 66% of posterior circulation events, the current abbreviated instruments are absent of visual field assessment which decreases the likelihood of detecting an occipital infarction.