

Instructor Lesson Plan

Stroke: A Continuing Education Program for New Mexico Paramedics

2.0 CECs: ALS Medical

This program was developed by the University of New Mexico
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Department of Health, EMS Bureau

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Objectives:

At the end of this lesson the participant should be able to:

- Value the role EMS providers play in recognition and management of the stroke patient.
- Outline the contribution of each component of a comprehensive, statewide stroke care system.
- Describe the on-going efforts of the New Mexico Stroke Task Force in the development of a comprehensive, statewide stroke care system.
- Advocate the continuing development of a comprehensive statewide stroke care system.
- Describe the anatomy and physiology of the brain, including cerebral circulation.
- Describe risk factors for stroke.
- Explain the pathophysiology of stroke.
- Recognize signs and symptoms of stroke.
- Obtain the relevant history of a patient with signs and symptoms of stroke.
- Perform a specific stroke assessment, using an approved stroke assessment scale
- Acknowledge the importance of determining the time of onset of stroke signs and symptoms.
- Recognize stroke as a treatable condition requiring expeditious transport to an appropriate medical facility.
- Make appropriate transport decisions for patients with signs and symptoms of stroke, to include limiting scene time and selecting the most appropriate destination and mode of transport.
- Provide proper and complete prehospital care of the patient with signs and symptoms of stroke.
- Describe the capabilities of area medical facilities with regard to stroke care.
- Describe in-hospital treatments available for stroke care.
- Recognize the role that EMS providers can play in educating family, friends, and the public about stroke.

Time Allotted for Lesson:

2.0 hours

Instructor Preparation:

The instructor must be knowledgeable in anatomy and physiology of the nervous system, pathophysiology of stroke, and current standards for prehospital stroke management. The instructor should review a primary paramedic education text as necessary. Determine local protocols and operations procedures for management of patients with suspected stroke and seek current research related to the topic.

Suggested Instructor Resources:

New Mexico Stroke Task Force Report:

http://www.health.state.nm.us/pdf/Report-Stroke_The-Challenge-09-2004.pdf

National Institute of Neurological Disorders and Stroke:

<http://www.ninds.nih.gov/>

National Stroke Association:

<http://www.stroke.org/site/PageServer?pagename=HOME>

American Stroke Association:

<http://www.strokeassociation.org/presenter.jhtml?identifier=1200037>

New Mexico EMS Treatment Guidelines:

http://164.64.80.7/ipems.com/treatguide/TREATMENT_GUIDELINES.pdf

Materials & Training Equipment Needed:

Instructor CD with PowerPoint slides, computer, projection equipment and a microphone for large rooms.

Evaluation

Administer the pre-course quiz prior to the presentation. If possible, have the quizzes graded in order to place focus on areas of participant difficulty.

Administer the post-course quiz at the end of the presentation.

Slide	Content	Instructor Notes
1	Title slide	Make introductions and announcements as necessary. Take care of any administrative tasks such as attendance rosters, etc.
2	<p>Introduction</p> <p>Stroke is a major health issue in the U.S., including NM Many strokes can be treated, but:</p> <p><i>There are numerous missed opportunities for treatment of stroke!</i></p>	This program was developed to address EMS personnel educational needs as a step in developing a comprehensive stroke treatment center in New Mexico.
3	<p>Introduction</p> <p>EMS providers have critical roles to play in public and patient education, recognition of stroke, and appropriate clinical decision-making, including rapid transport to the most appropriate facility.</p>	
4	<p>Program Goal</p> <p>The overall goal of this program is that paramedics recognize stroke as a treatable condition requiring expeditious transport to an appropriate medical facility.</p>	To meet this goal, the program will cover a number of topics.

Slide	Content	Instructor Notes
5	<p>Overview</p> <ul style="list-style-type: none"> ▪ Changed views on time to treatment ▪ Epidemiology of stroke ▪ NM Department of Health report on stroke ▪ The NM Stroke Advisory Committee ▪ Anatomy and physiology Pathophysiology ▪ Responsibilities of the EMS provider ▪ Assessment ▪ Early recognition ▪ Clinical decision-making ▪ Stroke awareness & prevention 	
6	<p>Traditional vs. Emerging View of Time</p> <p><u>Traditional view of time:</u></p> <p>Patient: wait & see if symptoms go away</p> <p>Prehospital providers: low priority for transport</p> <p>Acute care: give it time to resolve</p>	
7	<p>Traditional vs. Emerging View of Time</p> <p><u>Emerging view of time:</u></p> <p>Patient: stroke is a brain attack – call 911</p> <p>Prehospital providers: high priority for transport</p> <p>Acute care: stroke team, acute care protocols</p>	

Slide	Content	Instructor Notes
8	Mean minutes to ED from onset of symptoms by time of day	Class participation: ask, “What trend do you identify?” “What do you think accounts for this trend?”
9	Median minutes to ED arrival by type of 1st medical contact	
10	Barriers to Early Intervention Delay in recognizing symptoms of stroke Delay in seeking medical attention Delay in transport Attitudes of health care professionals Emergency room issues	Class participation: ask, “How do you think each of these sources of delay can be addressed?”
11	Epidemiology of Stroke	Transition to epidemiology of stroke: the study of the patterns, causes, and control of stroke in groups of people.
12	Morbidity and Mortality 700,000 new strokes/year in USA 75% are ischemic One fourth of the 700,000 die Third leading cause of death (~ 20%) Most common cause of disability in adults (60-70% of survivors)	Morbidity is the term used to refer to illness and mortality refers to death. They are often used in describing types of disease rates, eg morbidity rates (rates of illness) and mortality rates (death rates).

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13	Stroke Deaths, 1996	<p>There is often a time lag in the availability of health statistics.</p> <p>Class participation: ask, “How does the reported stroke death rate in New Mexico compare to that of other states?” “What factors may alter the accuracy of these statistics?”</p>
14	<p>Stroke Mortality</p> <p>The mortality for patients who have been stabbed is less than 5% while the mortality due to stroke is 20%</p>	<p>An interesting perspective on the overall importance of causes of death.</p>
15	Annual Incidence of Stroke by Gender & Age per 10,000 Persons	<p>Class participation: ask, “While the incidence of stroke increases with age for both sexes, what accounts for higher incidence of stroke in females from 55 to 74 years?”</p>
16	Stroke: The Challenge A Report About Stroke in New Mexico 2004 Department of Health	<p>Bringing it closer to home: the New Mexico Stroke Task Force Report is available on-line. The link is in the student handout.</p>

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17	<p>Stroke in New Mexico</p> <p>Albuquerque Stroke Knowledge Survey 500 Adults, March 2000</p> <p>62% could <u>not</u> name the most common stroke warning signs</p> <p>27% did <u>not</u> know to call 911</p> <p>36% did <u>not</u> know they can reduce their stroke risk</p> <p>46% did <u>not</u> know there are emergency treatments for stroke</p> <p>52% present at the time of a stroke did <u>not</u> call 911</p> <p>Nationally, only 1% list stroke as a major health concern</p>	<p>Class participation: ask, “What is your reaction to these findings?” “Are you surprised at the findings?” “What role do you think EMS providers have in addressing this issue?”</p>
18	<p>Stroke In New Mexico</p> <p>3rd most common fatal disease in NM</p> <p>Leading cause of long term disability</p> <p>Each day 2 New Mexicans die, 8 become stroke survivors</p> <p><i>1 of 3 people do not know they can reduce risk of stroke!</i></p>	

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19	<p>Stroke in New Mexico</p> <p>Only 0.4% of eligible stroke patients received thrombolytic therapy (NM Medical Review Association 2005)</p> <p>In 2002, an estimated \$65 million was spent on stroke hospital care in New Mexico – <i>excluding</i> MD charges & rehab costs</p>	
20	<p>2002 NM Statewide EMS Provider Stroke Survey</p> <p>45% could <u>not</u> define TIA correctly</p> <p>64% did <u>not</u> know time window for r-tPA</p> <p>55% would treat BP of 180/110 or lower in the pre-hospital setting</p> <p>Only 21% received > 5 hours of initial training on stroke</p> <p>47% think their stroke knowledge is inadequate</p>	<p>Class participation: ask, “What is your reaction to these findings?” “Are you surprised at the findings?”</p>
21	<p>Stroke Education for EMS</p> <p>Traditionally EMS has received minimal training</p> <p>EMS texts only cover superficially, as medical rather than cardiovascular problem</p> <p>Stroke patients given low dispatch priority</p> <p>Not always considered an emergency requiring rapid intervention and transport</p>	<p>The current National Standard Curriculum at the EMT-Basic level does not specifically include stroke.</p>

Slide	Content	Instructor Notes
22	<p>The Hospital Situation</p> <p>68% of NM hospitals surveyed have no standing orders for stroke patients</p>	
23	<p>Stroke Risk Factors & Prevention</p>	<p>Transition to risk factors.</p> <p>Prior to advancing to the next slide, ask participants how many stroke risk factors they can list.</p>
24	<p>Common Risk Factors for Stroke</p> <p>Hypertension Diabetes mellitus Cardiac disease Prior stroke or TIA Hypercholesterolemia Age (>55 yrs) Gender (male)</p>	
25	<p>Risk Factors for Stroke</p> <p>Race (African Americans have >twice the risk) Family history Hypercoagulative states Pregnancy Sickle cell disease Cancer</p>	

Slide	Content	Instructor Notes
26	<p>Modifiable Risk Factors</p> <ul style="list-style-type: none"> Smoking Diabetes Hypertension Obesity/high cholesterol Atrial fibrillation Inactivity Drug abuse (cocaine, IV drug abuse) Excessive alcohol use 	
27	<p>Gender-Specific Risk Factors</p> <p><i>In 2006 over 100,000 women under 65 will have a stroke!</i></p> <ul style="list-style-type: none"> ▪ Migraines with aura ▪ Birth control pills, even low dose ▪ Clotting disorders ▪ Women who have had more than one miscarriage may be at higher risk for blood clots and stroke 	
28	<p>Risk Factors - Hispanics</p> <ul style="list-style-type: none"> ▪ Hispanic population at high risk ▪ Cost of treating ischemic strokes in Hispanics was \$3.1 billion in 2005 ▪ Hispanics are twice as likely to develop ischemic strokes as non-Hispanic Caucasians ▪ Risk factors: inactivity, obesity, diabetes 	

Slide	Content	Instructor Notes
29	<p>Stroke Prevention - Lifestyle</p> <ul style="list-style-type: none"> Diet Exercise Smoking cessation Weight control Control of diabetes Statins Antihypertensives 	<p>Aspirin in Heart Attack and Stroke Prevention</p> <p>AHA Recommendation</p> <p>The American Heart Association recommends aspirin use for patients who've had a myocardial infarction (heart attack), unstable angina, ischemic stroke (caused by blood clot) or transient ischemic attacks (TIAs or "little strokes"), if not contraindicated. This recommendation is based on sound evidence from clinical trials showing that aspirin helps prevent the recurrence of such events as heart attack, hospitalization for recurrent angina, second strokes, etc. (secondary prevention). Studies show aspirin also helps prevent these events from occurring in people at high risk (primary prevention). The risks and benefits of aspirin therapy vary for each person.</p> <p>Source: http://www.americanheart.org/presenter.jhtml?identifier=4456 November 16, 2006</p>
30	<p>Anatomy & Physiology</p>	<p>Transition to anatomy and physiology.</p>

Slide	Content	Instructor Notes
31	<p>The Brain</p> <p>CEREBRUM Higher functions Two hemispheres</p> <p>Dominant side Speech Language Rational thinking</p> <p>Nondominant side Intuition/Insight</p>	General functions of the cerebrum
32	<p>The Brain</p> <p>FRONTAL Reasoning and judgment</p> <p>PARIETAL Motor/sensory for contralateral side</p> <p>CEREBELLUM Balance/posture</p> <p>BRAINSTEM Medulla controls respirations and heart rate</p>	
33	<p>Brain Function</p> <p>Regulatory center Integrates and controls body functions</p> <p>Sensation Interprets sensory perceptions</p> <p>Seat of Consciousness Awareness of self and surroundings</p>	

Slide	Content	Instructor Notes
34	<p>Brain Function</p> <p>Source of voluntary acts Seat of emotions Higher mental processes Thought Reasoning Judgment Memory Learning</p>	
35	<p>Cerebral Circulation</p>	<p>The internal carotid arteries provide circulation to the anterior portion of the brain and the vertebral arteries provide circulation to the posterior portion of the brain. The circle of Willis allows for some collateral circulation via communicating arteries.</p> <p>Obstruction of the anterior and posterior circulation are each associated with particular signs and symptoms of stroke.</p>
36	<p>Cranial Nerves</p> <p>I. Olfactory II. Optic III. Oculomotor IV. Trochlear V. Trigeminal VI. Abducens VII. Facial VIII. Auditory (Vestibulocochlear) IX. Glossopharyngeal X. Vagus XI. Accessory XII. Hypoglossal</p>	
37	<p>Pathophysiology of Stroke</p>	<p>Transition to pathophysiology of stroke.</p>

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38	<p>Stroke</p> <p>Ischemic Thrombotic Embolic</p> <p>Hemorrhagic Intracerebral Subarachnoid</p>	<p>Ischemia: inadequate blood flow.</p> <p>Thrombus: (pl. thrombi), a solid mass formed from the constituents of blood within the blood vessels or the heart. Thrombi that form within the rapidly moving arterial circulation are composed largely of fibrin and platelets with only a few trapped red and white cells.</p> <p>Embolus: (emboli, pl.) - a detached intravascular solid, liquid or gaseous mass that is carried by the blood to a site distant from its point of origin, thus obstructing the flow of blood. Most (99%) arise from thrombi (thromboembolus). embolism - the sudden obstruction or blocking of a vessel by an embolus.</p> <p>Intracerebral: Within the cerebrum</p> <p>Subarachnoid: Beneath the arachnoid layer of the meninges.</p>
39	<p>Comparing Hemorrhage (aneurysm), Thrombus & Embolism</p>	
40	<p>Pathogenesis of Thrombotic Stroke</p>	<p>Source: National Stroke Association</p>
41	<p>Time of Day Ischemic Stroke Occurs</p>	<p>Class participation: ask, “How does this compare with your experience in responding to patients with suspected stroke?”</p>
42	<p>Cerebral Infarction</p>	<p>Infarction: The process of forming an infarct, which is a local area of cell death (necrosis) due to a blockage of normal blood supply.</p> <p>Note edema, injured and necrotic tissue.</p>

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43	<p data-bbox="370 237 737 268">Intracerebral Hemorrhage</p> <ul data-bbox="370 310 857 661" style="list-style-type: none"> <li data-bbox="370 310 857 373">▪ Primary ICH accounts for 16% of stroke presentations <li data-bbox="370 380 857 443">▪ May be difficult to distinguish clinically <li data-bbox="370 449 857 596">▪ Early decreased level of consciousness, severe hypertension, bradycardia suggest mass effect with elevated ICP <li data-bbox="370 602 857 661">▪ Higher early mortality than ischemic stroke 	
44	<p data-bbox="370 678 737 709">Transient Ischemic Attack</p> <p data-bbox="370 751 857 814">By definition, symptoms resolve in < 24 hours</p> <p data-bbox="370 856 857 919">Transient monocular blindness may be an indicator of TIA</p> <p data-bbox="370 961 857 1024">Significant predictor of future stroke risk</p> <p data-bbox="370 1066 857 1108">4-10x increased risk after hemiparesis</p> <p data-bbox="370 1150 857 1182">Risk greatest in first months after TIA</p> <p data-bbox="370 1224 857 1287">Most strokes are NOT preceded by TIAs</p>	<p data-bbox="896 678 1279 709">Monocular: affecting one eye</p>

Slide	Content	Instructor Notes
45	<p>Patent Foramen Ovale</p> <p>Defect in atrial septum Affects high percentage of population Cryptogenic strokes Recent advances - invasive endovascular closure devices (inconsistent findings)</p>	<p>Foramen ovale: An oval hole in the septum of the fetal heart between the right and left atrium, which normally closes shortly after birth.</p> <p>Patent foramen ovale (PFO) is associated with stroke of <i>unknown etiology or cryptogenic stroke</i>.</p> <p>For more on PFP and cryptogenic stroke see (available free on-line via ahajournals):</p> <p>S. Homma and R. L. Sacco Patent Foramen Ovale and Stroke Circulation, August 16, 2005; 112(7): 1063 - 1072.</p> <p>R. L. Sacco et al. Guidelines for Prevention of Stroke in Patients With Ischemic Stroke or Transient Ischemic Attack: A Statement for Healthcare Professionals From the American Heart Association/American Stroke Association Council on Stroke: Co-Sponsored by the Council on Cardiovascular Radiology and Intervention: The American Academy of Neurology affirms the value of this guideline. Circulation, March 14, 2006; 113(10): e409 - e449.</p>
46	<p>Patent Foramen Ovale</p>	

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47	<p>“Economy Class Syndrome”</p> <p>Association between long distance flying and stroke</p> <p>Significantly more cardioembolic and cryptogenic strokes</p> <p>More frequently had patent foramen ovale</p> <p>Less frequently had typical stroke risk factors</p>	Heckman, JG et al. Heart 2006 Jan 31
48	<p>Other Causes of Stroke-like Syndromes</p> <ul style="list-style-type: none"> ▪ Focal seizure (post-ictal Todd’s palsy) ▪ Tumor (hemorrhage or seizure) ▪ Brain abscess or encephalitis ▪ Subdural or epidural hematoma ▪ Hypoglycemia or hyperglycemia ▪ Metabolic encephalopathy ▪ Multiple sclerosis ▪ Hypoxia ▪ Migraine 	<p>Todd's palsy, also known as Todd's paralysis is a neurological condition characterized by a brief period of transient (temporary) paralysis following a seizure. The paralysis - which may be partial or complete - generally occurs on one side of the body and usually subsides completely within 48 hours. Todd's paralysis may also affect speech or vision. (Wikipedia)</p>
49	<p>10-minute break</p>	
50	<p>The Chain of Survival</p>	Transition to the Chain of Survival
51	<p>Elements of the Chain of Survival</p> <p>Detection – early recognition</p> <p>Dispatch – early EMS activation, prompt response</p> <p>Delivery – rapidly and to appropriate facility</p> <p>Door – ED triage</p> <p>Data – ED evaluation</p> <p>Decision – about potential therapies</p> <p>Drug therapy if appropriate</p>	

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52	<p>Time is Brain</p> <p>According to Dr. Jeffrey Saver, director of the UCLA Stroke Center: ONE MINUTE = 1.9 billion neurons 14 billion synapses 7.5 miles of myelinated fibers</p>	<p>Myelin sheath: The fatty coating that surrounds the core of a nerve fiber or axon and facilitates the transmission of nerve impulses.</p>
53	<p>Time is Brain</p> <p>Each minute you wait, you lose close to 2 million brain cells</p> <p>A pea sized piece of brain dies for every 12 minutes that treatment is delayed</p>	
54	<p>Time is Brain</p> <p>MRI: progression of infarct over time.</p>	
55	<p>Common Presenting Symptoms of Stroke</p> <p>Unilateral motor weakness (hemiparesis) Unilateral sensory loss Abnormal speech Vision loss or visual field deficit</p>	
56	<p>Stroke Signs & Symptoms</p> <p>Sudden change in LOC Confusion Loss of consciousness, syncope Seizure Coma Inappropriate affect – laughing, crying Dysphasia, aphasia</p>	<p>Dysphasia: an impairment of speech and/or of comprehension of speech.</p> <p>Aphasia: any of a large group of speech disorders involving defect or loss of the power of expression by speech, writing, or signs, or of comprehending spoken or written language, due to injury or disease of the brain or to psychogenic causes. Less severe forms are known as dysphasia. (Merck)</p>

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57	<p>Stroke Signs & Symptoms</p> <p>Hemiparesis or hemiplegia of the contralateral side Ataxia, falls Irregular pulse Arrhythmias are present in >50% of stroke patients Hypertension Hypertension + bradycardia = Increased ICP</p>	Ataxia: loss of coordination
58	<p>Stroke Signs & Symptoms: Intracranial Hemorrhage</p> <p>New onset seizure may indicate intracranial hemorrhage Sudden, severe headache with no known cause “Worst headache I’ve ever had”</p>	
59	<p>Cortical Stroke Symptoms</p> <p>Hemiparesis with sensory deficit Aphasia (dominant hemisphere) Fluent (Wernicke’s) may occur in isolation Non-fluent (Broca’s) with hemiparesis Neglect/agnosia (non-dominant hemisphere) Quadrant visual field defect (or hemianopsia)</p>	<p>Aphasia: Inability to verbally express oneself either because of inability to coordinate speech (Broca's aphasia) or to select the proper words (Wernicke's aphasia). This is usually a result of injury to parts of the speech and auditory processing center in the cerebral cortex of the brain.</p> <p>Agnosia: Agnosia (a-gnosis, "non-knowledge") is a loss of ability to recognize objects, persons, sounds, shapes or smells while the specific sense is not defective nor is there any significant memory loss. It is usually associated with brain injury or neurological illness, particularly after damage to the temporal lobe. (Wikipedia)</p> <p>Hemianopsia: Blindness for half the field of vision in one or both eyes</p>

Slide	Content	Instructor Notes
60	<p>Posterior Circulation Symptoms</p> <p>Hemianopsia (occipital lobe) Ataxia/incoordination/nystagmus (cerebellum) Crossed findings (brainstem) Ipsilateral face, contralateral body Multiple cranial nerve nuclei (brainstem) Diplopia Dysarthria Dysphagia Vertigo</p>	<p>Nystagmus: rapid involuntary oscillation of the eyes</p> <p>Ipsilateral: same side</p> <p>Contralateral: opposite side</p> <p>Diplopia: double vision</p> <p>Dysarthria: speech that is slurred and labored due to impairment of the tongue musculature and other muscles essential to speech and articulation</p> <p>Dysphagia: difficulty swallowing (often confused with dysphasia)</p>
61	<p>Findings Occasionally Due to Stroke</p> <p>Clumsiness/incoordination Sudden fall, especially if to one side Patient “found down” Acute ataxia Vertigo Diplopia Dysphagia</p>	
62	<p>Symptoms Less Likely to be Due to Stroke</p> <p>Dizziness Generalized weakness Unsteady gait Unconsciousness Incontinence Isolated facial palsy Acute confusion Psychosis</p>	

Slide	Content	Instructor Notes
63	<p>Differential Diagnosis</p> <p>Use the altered mental status tool, AEIOU TIPS: A: Alcohol/acidosis/altitude E: Epilepsy/environment I: Infection O: Overdose U: Uremia (renal toxicity)</p>	<p>Class participation: ask, “How can you attempt to rule in/rule out some of these causes of altered mental status?” “Why would it be important to do so?”</p>
64	<p>Differential Diagnosis</p> <p>T: Trauma I: Insulin P: Psychosis/poisoning S: Seizure</p>	<p>Class participation: ask, “How can you attempt to rule in/rule out some of these causes of altered mental status?” “Why would it be important to do so?”</p>
65	<p>Rapid Assessment of the Stroke Patient</p>	<p>Transition to focus on assessment</p>
66	<p>What is the “Standard of Care”?</p> <p>Patients & EMS providers have the right to expect that acute care hospitals will offer rapid, appropriate treatment for acute stroke</p> <p>Hospitals not able or choosing not to do so should make this policy clear to allow bypass to other institutions</p>	<p>The New Mexico Stroke Advisory Committee exists to promote a comprehensive stroke care system.</p>
67	<p>What is the “Standard of Care”?</p> <p>Discussion of thrombolytic therapy should be undertaken with all patients who approach meeting criteria for treatment</p> <p>tPA should be given under informed consent</p>	<p>Paramedics may participate in initial screening for tPA eligibility. Informed consent for tPA administration is obtained by hospital personnel.</p>

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68	How Strokes are Dispatched	After recognition of signs and symptoms by patient, family, or bystanders, it is critical that dispatchers be able to obtain as specific as possible information regarding potential for stroke. Possible stroke must become a priority call.
69	<p>Critical Issues to Determine on Scene</p> <p><u>Time of first symptom onset</u> When was patient last known to be normal? How does patient or witness know? Were symptoms present upon awakening?</p> <p><u>Written informed consent</u> If patient cannot give consent, encourage family member or legal guardian to accompany patient to ER</p>	Class participation: ask, “Why are these issues important?”
70	<p>Rapid Assessment</p> <p>ABC’s Pertinent history Vital signs SaO2 Blood glucose level</p>	Class participation: ask, “What does “pertinent history” mean?”

Slide	Content	Instructor Notes
71	<p>Brief Neurological Assessment</p> <p>Level of consciousness: alert, drowsy, stupor, coma</p> <p>Speech abnormalities: repeat a sentence</p> <p>Facial asymmetry: smile</p> <p>Motor weakness Arm drift Grip Leg drift</p>	<p>Class participation: ask, “What are some tools available to help guide and document the brief neuro assessment?”</p>
72	<p>Assessment</p> <p>Glasgow coma scale</p>	
73	<p>Cincinnati Prehospital Stroke Scale (CPSS)</p> <p>88% sensitivity for anterior circulation stroke</p> <p>Facial droop Asymmetry</p> <p>Arm drift One arm does not move or drifts down</p> <p>Speech Slurs words, says wrong words, doesn’t speak</p>	<p>Sensitivity: the ability of a test to detect all cases</p> <p>Specificity: the ability of a test to detect cases without false positives.</p> <p>A test may be very sensitive, but not very specific, or vice versa.</p> <p>Class participation: ask, “What are consequences of having a test that is sensitive, but not specific” “What are the consequences of having a test that is specific, but not highly sensitive?”</p>
74	<p>Los Angeles Prehospital Stroke Screen (LAPSS)</p> <p>Completed on all calls on non-comatose, non-traumatic patients with neurologic complaints, age \geq 18</p> <p>Overall accuracy 96 - 98% with high sensitivity and specificity</p>	

Slide	Content	Instructor Notes
75	Los Angeles Prehospital Stroke Scale	
76	NM Stroke Assessment Tool	Combines elements of CPSS and LAPSS
77	Things to Avoid in Pre-Hospital Stroke Care <ul style="list-style-type: none"> ▪ Glucose administration, except to patients with confirmed hypoglycemia ▪ Large volumes of IV fluids ▪ Hypotension ▪ Delays in transport 	<p>Class participation: ask, “Why is it important that hypertension is not treated aggressively in the prehospital setting?”</p> <p>Relate to traumatic brain injury and the need to maintain cerebral perfusion pressure, and the inability to avoid precipitous drops in blood pressure with medications commonly carried in the prehospital setting.</p>
78	Transport <p>Do not delay transport of suspected stroke patients</p> <p>No more than 10 minutes on-scene</p>	
79	Further Assessment & Treatment En-route <p>History</p> <ul style="list-style-type: none"> Med Hx – diabetes, hypertension Family Hx Prior TIA or CVA Meds <p>Reassurance</p> <p>Continue oxygen, maintain SaO₂</p> <p>IV if not established previously</p> <p>Cardiac monitor</p> <p>Assume patient can hear, even if they cannot speak</p> <p>Manage seizures</p>	

Slide	Content	Instructor Notes
80	<p>Advance Notification During Transport</p> <p>Update on patient status allows receiving facility to: Assemble stroke team Clear CT scanner</p>	
81	<p>Transport by EMS</p> <p>Only half of stroke patients arrive at ED by ambulance Ambulance patients more likely to be evaluated by ED MD sooner 30 minutes for ambulance patients 34 minutes for walk in 55 minutes for public transportation</p>	<p>Stroke Journal Report Feb. 16, 2006 2006 American Stroke Assn Meeting Report Abstracts P45, P27</p>
82	<p>Features of a “Stroke Center”</p> <ul style="list-style-type: none"> ▪ On call Stroke Team ▪ Neurologists (or other physicians) with special interest, training, and expertise in stroke care ▪ CT scans available at all times ▪ MRI capability ▪ Emergency access to cerebral angiography ▪ Neurosurgeon available on call ▪ Vascular neurosurgery or surgery expertise ▪ Clinical research program 	

Slide	Content	Instructor Notes
83	<p>Benchmarks for Primary Stroke Center Care</p> <ul style="list-style-type: none"> ▪ Acute Stroke Team member at bedside \leq 15 min of call* ▪ CT or MRI performed \leq 25 min of order ▪ Interpretation of image \leq 20 min of completion* ▪ Lab results completed \leq 45 min of order ▪ Door to needle time for IV tPA \leq 60 min ▪ All services available 24/7/365 	<p>*May use telemedicine/teleradiology</p> <p>Alberts MJ et al. JAMA 2000;283:3102-3109 NINDS Symposium Proceedings, 1997</p>
84	<p>Additional Recommendations</p> <ul style="list-style-type: none"> ▪ Acute stroke teams ▪ Written care protocols ▪ Integration with the EMS system ▪ Emergency Department participation ▪ Stroke unit ▪ Neurosurgical consultation within 2 hours ▪ Medical Director with stroke expertise ▪ Outcomes tracking and Quality Improvement ▪ Educational Programs (CME and public) 	<p>Alberts MJ et al. JAMA 2000;283:3102-3109</p>
85	<p>Stroke Response Team Members</p> <ul style="list-style-type: none"> ▪ On-Call faculty from neurology or neurosurgery ▪ Stroke Fellow ▪ Clinical Coordinator ▪ Residents from each service: ER, neurology, neurosurgery ▪ ER Attending ▪ Clinical Nurse 	

Slide	Content	Instructor Notes
86	<p>Hospital Management</p> <ul style="list-style-type: none"> ▪ TIME GOALS ▪ Door to doctor - 10 minutes ▪ Door to CT completion – 25 minutes ▪ Door to CT read – 45 minutes ▪ Door to treatment – 60 minutes ▪ Neurology consult – 15 minutes ▪ Neurosurgery – 2 hours ▪ Admit to monitored bed – 3 hours 	
87	<p>Initial ER Assessment</p> <ul style="list-style-type: none"> ▪ History ▪ Neurological examination ▪ Physical examination ▪ Laboratory studies ▪ EKG ▪ CT scan of brain 	
88	<p>ER Stroke Evaluation Targets</p> <ul style="list-style-type: none"> ▪ Rapid assessment of all symptomatic patients with onset < 24 hours ▪ CT scan started within 20 - 30 minutes of arrival ▪ Treatment initiated (if appropriate) within 45 - 60 minutes of arrival 	
89	<p>Goals of Neuroimaging in Acute Stroke</p> <ul style="list-style-type: none"> ▪ <u>R/O hemorrhage</u> ▪ R/O other causes of symptoms ▪ Identify old strokes ▪ Occasionally see early signs of edema in large lesions 	

Slide	Content	Instructor Notes
90	<p data-bbox="370 237 675 268">Hospital Management</p> <ul style="list-style-type: none"> <li data-bbox="370 310 841 342">▪ Intravenous thrombolytics - TPA <li data-bbox="370 346 846 636">▪ Patients treated within 3 hours of symptom onset were 30% more likely to have minimal or no disability at 3 months compared with placebo BUT: Increases risk of intracranial hemorrhage <ul style="list-style-type: none"> <li data-bbox="467 562 760 594">○ Must have CT first <li data-bbox="467 598 824 636">○ NOT for prehospital use 	<p data-bbox="896 237 1341 342">Source: National Institute of Neurological Disorders and Stroke Trial</p> <p data-bbox="896 384 1373 447">Class participation: ask, “Why is tPA inappropriate for prehospital use?”</p>
91	<p data-bbox="370 678 626 709">Case: Patient J. H.</p> <ul style="list-style-type: none"> <li data-bbox="418 751 724 856">▪ 60 F with history of hypertension and hypothyroidism <li data-bbox="418 861 865 924">▪ Developed acute L hemiparesis at home after morning bath <li data-bbox="418 928 862 1033">▪ Tried to reach daughter (lawyer) and son-in-law (MD), then called 911 <li data-bbox="418 1037 849 1100">▪ No spontaneous improvement in ER <li data-bbox="418 1104 699 1136">▪ Treated at 3 hours 	<p data-bbox="896 678 1328 741">Illustration of importance of early recognition and treatment.</p>
92	<p data-bbox="370 1192 626 1224">Case: Patient J. H.</p> <ul style="list-style-type: none"> <li data-bbox="418 1266 837 1371">▪ Return of L side strength began about 50 minutes after starting r-tPA infusion <li data-bbox="418 1375 805 1438">▪ All deficits resolved by 24 hours <li data-bbox="418 1442 821 1474">▪ F/U CT negative for infarct 	

Slide	Content	Instructor Notes
93	<p>r-tPA Indications in Acute Stroke</p> <ul style="list-style-type: none"> ▪ First FDA approved acute stroke treatment ▪ CT negative for hemorrhage ▪ Treat within 3 hours of symptom onset ▪ Not used for patients with isolated, mild or rapidly improving deficits ▪ Contraindicated in patients with increased bleeding risks or uncontrolled hypertension 	
94	<p>tPA Critical Pathway</p>	Algorithm for treatment of stroke with tPA
95	<p>IV r-tPA Trial Results</p> <ul style="list-style-type: none"> ▪ Measurable deficit on NIH Stroke Scale ▪ No bleeding, coagulopathy, current anticoagulation, recent prior stroke ▪ CT negative for hemorrhage ▪ IV infusion, <u>3 hour</u> window ▪ 11 - 13% absolute, 32 - 55% relative increase in patients with good outcomes ▪ Significant increase in symptomatic ICH ▪ 8 vs. 0 in Part I, 12 vs. 2 in Part II 	
96	<p>UNM / VA r-tPA Experience First 10 Patients - Clinical Outcome</p> <p>Resolution/Major Improvement 3</p> <p>Minor Improvement/No Change 6</p> <p>Deterioration/Death† 1</p>	†Death from internal bleeding

Slide	Content	Instructor Notes
97	<p>Stroke Treatments Under Development at UNM Hospital / Albuquerque VAMC</p> <ul style="list-style-type: none"> ▪ Neuroprotective agents ▪ Antiplatelet agents ▪ Secondary prophylactic agents <ul style="list-style-type: none"> ○ Atorvastatin 	Atorvastatin (Lipitor®)
98	<p>Other Acute Stroke Interventions</p> <ul style="list-style-type: none"> ▪ Early initiation of antiplatelet or anticoagulant therapy ▪ Blood pressure management ▪ Treatment of hyperthermia ▪ Treatment of hyperglycemia ▪ Swallowing assessment/aspiration prevention ▪ DVT prophylaxis ▪ Early rehab assessment and initiation of therapies ▪ Enrollment in clinical research protocols 	DVT: deep vein thrombosis
99	<p>Groups Supporting tPA use Following NINDS Criteria</p> <ul style="list-style-type: none"> ▪ FDA (tPA approved 6/96) ▪ AHA / ASA ▪ AAN ▪ ACCP ▪ NSA ▪ NIH / NINDS 	<p>NINDS: National Institute of Neurological Disorders & Stroke</p> <p>Food and Drug Administration American Heart Association/American Stroke Association American Academy of Neurology American College of Clinical Pharmacy National Stroke Association National Institutes of Health/National Institute of Neurological Disorders & Stroke</p>

Slide	Content	Instructor Notes
100	<p>Issues for Community Hospitals</p> <ul style="list-style-type: none"> ▪ Availability of CT scanning and interpretation at all times ▪ Availability of ICU or monitored bed ▪ Access to neurology / stroke expertise ▪ Availability of neurosurgery support to manage intracranial hemorrhage complications ▪ Availability of transport to stroke centers 	
101	<p>Stroke Rehabilitation</p>	<p>Transition to Stroke Rehabilitation: Importance of returning to as high a level of functioning as possible.</p>
102	<p>Permanent disability may occur without prompt intervention:</p> <ul style="list-style-type: none"> ▪ Cognitive impairment ▪ Physical disability ▪ Aphasia <ul style="list-style-type: none"> ○ Expressive (speech, writing) ○ Receptive (auditory comprehension, reading) 	<p>Importance of physical, occupational, speech therapy in the community.</p> <p>Need for support: local stroke support groups.</p>
103	<p>Patient Preferences for Stroke Outcomes</p> <ul style="list-style-type: none"> ▪ Survey of 28 recently discharged stroke patients with hemiplegia ▪ 28 age & sex matched controls recently hospitalized with other diagnoses ▪ Rank 11 scenarios in order of preference ▪ Cognitively impaired patients excluded 	<p>Source: Hanger HC et al. Clin Rehab 2000;14:417-424</p> <p>Study of preferred outcomes for stroke and non-stroke patients – disability vs. death</p>

Slide	Content	Instructor Notes
104	Patient Preferences for Stroke Outcomes Results	Class participation: ask, “How could these results be interpreted?”
105	Rehabilitation <ul style="list-style-type: none"> ▪ Speech therapy ▪ Physical therapy ▪ Occupational therapy ▪ May have permanent disability 	Rural issues not only with prehospital, emergency, and acute care, but with rehabilitation services, as well.
106	New Mexico Stroke Advisory Committee	Transition: NM Stroke Advisory Committee
107	The NM Stroke Advisory Committee Exists to advise the EMS Bureau and NM Department of Health on the development and implementation of a comprehensive formal system for stroke care.	Importance of coordinating efforts and different aspects of the stroke care continuum.
108	Conclusion <ul style="list-style-type: none"> ▪ Stroke can be prevented with lifestyle changes ▪ Time = Brain ▪ Know how to recognize ischemic and hemorrhagic stroke ▪ Stroke is a high priority for transport: no more than 10 minutes on scene ▪ ED notification ▪ Promote the Stroke Chain of Survival and Recovery in your community 	Challenge: “What can you do to make a difference?”

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109	<p data-bbox="483 237 753 268" style="text-align: center;">Acknowledgements</p> <p data-bbox="375 310 862 485" style="text-align: center;">This program was developed by the University of New Mexico EMS Academy with grant funding from the New Mexico Department of Health, EMS Bureau</p> <p data-bbox="418 491 818 558" style="text-align: center;">Special thanks to the following contributors:</p> <p data-bbox="483 564 756 705" style="text-align: center;">Sheran Dodd, EMT-I Glenn Graham, MD Dave Johnson, MD Winnie Maggore, JD</p>	

