The Canadian Stroke Strategy

la Stratégie canadienne de l'AVC

Canadian Best Practice Recommendations for Stroke Care

Canadian Stroke Network

Réseau canadien contre les accidents cérébrovasculaires

HEART & STROKE FOUNDATION OF CANADA | FONDATION DES MALADIES DU CŒUR DU CANADA

Finding answers. For life.
À la conquête de solutions.

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Canadian Best Practice Recommendations for Stroke Care

Educational Workshop For Emergency Medical Services Care of Suspected Acute Stroke Patients

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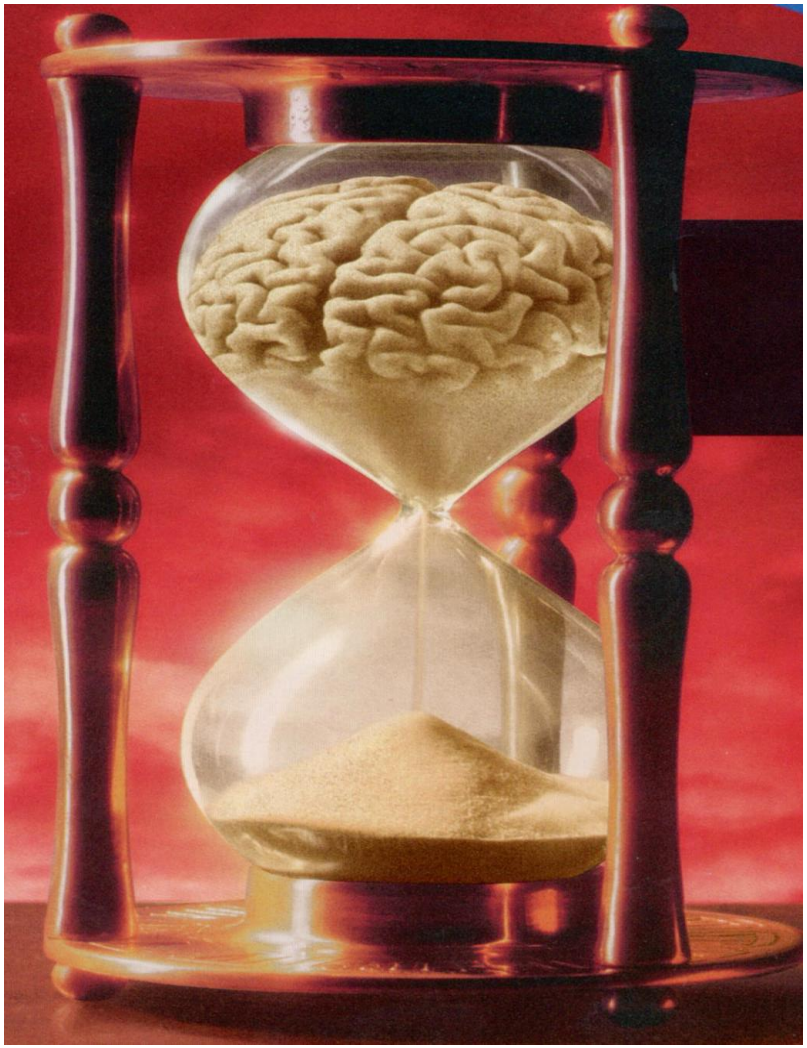


Time is Brain

PRIORITY:
EMS Best Practices Implementation and Uptake

Purpose

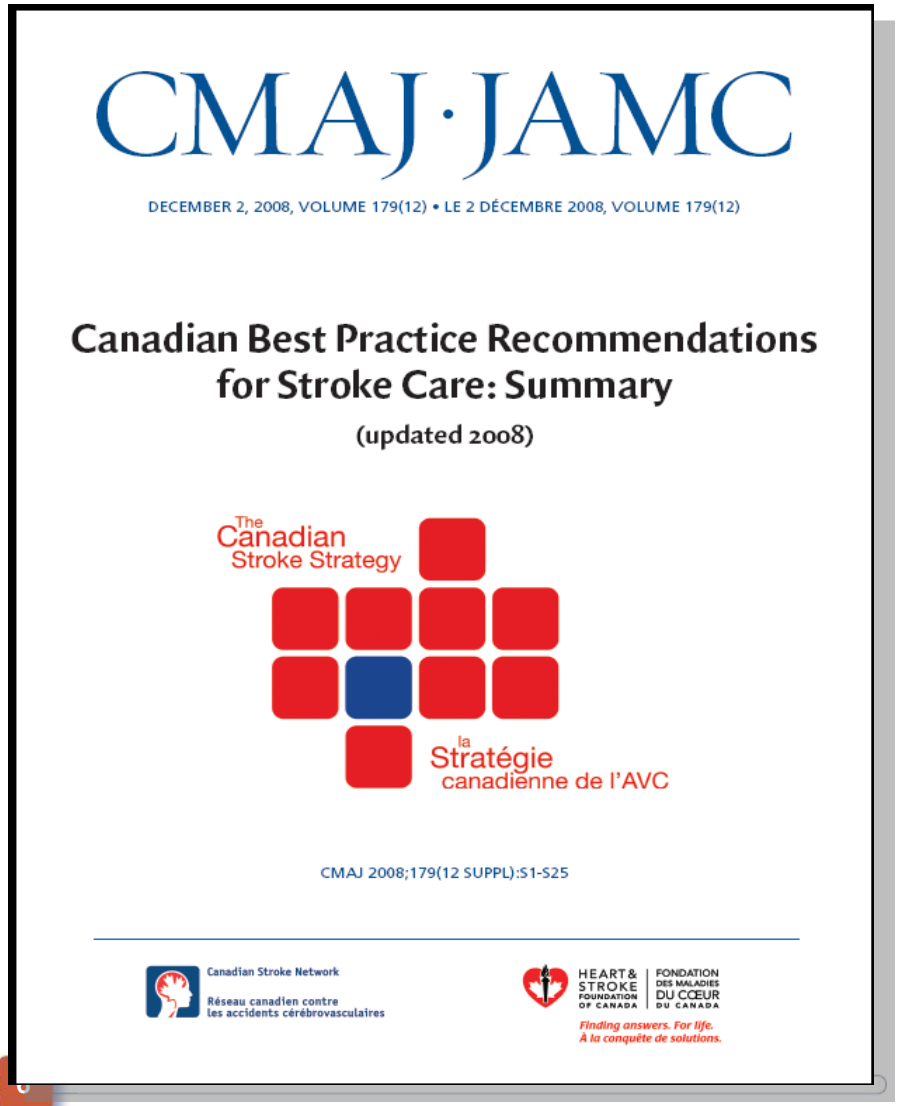
- To facilitate the uptake and implementation of the Canadian Stroke Strategy best practice recommendations for the out-of-hospital care of stroke patients by emergency medical services (EMS).
- The goal of this resource is to create greater consistency and standardization of education and on scene assessments and care of suspected stroke patients.

Learning objectives of workshop

- To understand the components of the Canadian Stroke Strategy best practice recommendation for emergency medical system care of suspected acute stroke patients;
- To recognize signs and symptoms of suspected acute stroke patients on scene and to differentiate mimics of acute stroke (hypoglycemia, postictal phase, etc)
- To understand the components of out-of-hospital management of acute stroke patients
  - To identify the key information and assessments to be done on scene for suspected acute stroke patients (align with stroke pocket resource);
  - To integrate stroke history and assessment information into the decision-making process for transportation of suspected stroke patients to acute care facilities with the appropriate level of stroke care.
- To understand the key information required as part of EMS documentation and communication with emergency department staff.

Section One

Development and update process for the Canadian Best Practice Recommendations for Stroke Care



Canadian Best Practice Recommendations for Stroke Care

- Synthesis of best practice recommendations for stroke care across the continuum
- Address critical topic areas
- Commitment to keep current with two-year update cycle
- First edition released in 2006
- EMS recommendations added in 2008 edition
- 2010 edition to be released in the Fall of 2010
  - Further refined development process
  - Increased focus on transitions of care, and rural, remote and northern issues in stroke management

Background: EMS Stroke Recommendations

- First included in 2008 update of best practices
- Developed using systematic process:
  - Review of current research and gray literature
  - Environmental scan of existing EMS practices and protocols for out-of-hospital care of suspected stroke patients
  - Review of international stroke recommendations for EMS
  - Extensive consultation with EMS experts across Canada
  - Development of expert writing group for recommendations
  - Final review by external consensus panel process

Acute Stroke Care: A Shift in the Treatment Paradigm

Time Is Brain

More than half of suspected stroke patients are transported by EMS

- Stroke is treatable
- Short window of opportunity
- Treatment requires stroke expertise and carries a risk
- Organized stroke care improves outcomes

BPR 3.1: Emergency Medical Services Management of Acute Stroke Patients

- Patients who show signs and symptoms of hyper-acute stroke must be treated as a time-sensitive emergency and should be transported without delay to the closest institution that provides emergency stroke care.
- The recommended total time from symptom onset to reperfusion for eligible patients, is usually defined as 4.5 hours. This is broken into 2 phases: pre-hospital and ED

- The pre-hospital phase, which starts with symptom onset, and includes on-scene management and anticipated transport time, should be less than 3.5 hours (Target performance: at least 75% of the time)
- The current evidence shows that emergency department phase should be less than 60 minutes (Target performance: at least 75% of the time)

  * local variations need to be taken into consideration for out-of-hospital time

Best Practice Recommendations cont'd

i. Immediate contact with emergency medical services (e.g., 9-1-1) by patients or other members of the public is strongly recommended because it reduces time to treatment for acute stroke [Evidence Level C]

ii. The Emergency medical services system must be set up to categorize patients exhibiting signs and symptoms of a hyperacute stroke as a high priority Evidence Level C]

iii. A standardized acute stroke out-of-hospital diagnostic screening tool should be used by paramedics (See Table One for CSS core content for EMS stroke reference cards) [Evidence Level B]

iv. Out-of-hospital patient management should be optimized to meet the needs of suspected acute stroke patients [Evidence Level A]

v. Direct transport protocols must be in place to facilitate the transfer of eligible patients to the closest and most appropriate facility providing acute stroke care [Evidence Level C]

Best Practice Recommendations cont'd

vi. Direct transport protocol criteria must be based on (1) the local ED performance which is recommended as being less than 60 minutes; and (2) the out-of-hospital phase, including symptom duration and anticipated transport duration, being less than 3.5 hours and/or (3) other acute care needs of the patient [Evidence Level B]

vii. History of event, including time of onset, signs and symptoms, and previous medical and drug history, must be obtained from the patient if able and/or a reliable informant when available [Evidence Level C]

viii. Paramedics must notify the receiving facility of a suspected acute stroke patient in order for the facility to prepare for patient arrival [Evidence Level C]

ix. Transfer of care from paramedics to receiving facility personnel must occur without delay [Evidence Level C].

x. Patients who are not considered potentially eligible for time-sensitive reperfusion should be transported to the closest appropriate emergency department

CSS System Implications

Structures required to enable providers to meet best practice recommendations

- These recommendations are referring exclusively to patients with hyper-acute stroke who may be eligible for time-sensitive reperfusion interventions within the therapeutic window. Stroke patients not eligible for reperfusion (do not meet criteria for rapid transport based on standardized screening) should still be transported to and among appropriate facilities
- Scope of out-of-hospital care is from first patient contact with emergency medical services to the transfer of care to the receiving facility
- Dispatcher training programs that address stroke
- Paramedic education that includes stroke assessment and management
- Direct transport agreements
- Coordinated, seamless transport and disposition
- Communication systems to support access

CSS Performance Measures

Key indicators for monitoring levels of performance and quality of care in meeting best practice recommendations.

- **Percentage of cases where total out-of-hospital time is less than 3.5 hours – from symptom onset to arrival at an ED (performance target is => 75%) ***
- Percentage of (suspected) stroke patients arriving in the emergency department who were transported by emergency medical services.
- Time from initial call received by emergency dispatch centre to emergency medical services arrival on patient scene.
- Time from emergency medical services arrival on patient scene to arrival at *appropriate* emergency department.
- Percentage of potential stroke patients transported by emergency medical services who received a final diagnosis of stroke or transient ischemic attack during hospital stay (in the emergency department or as an inpatient).

Categories of Stroke Services within Canadian Hospitals (CSS)

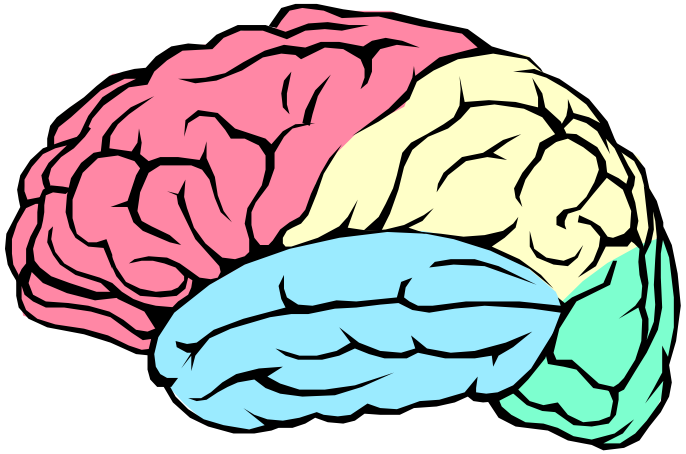
- ***Comprehensive stroke centres***
  - Specialized resources and personnel available at all times (24 hours a day, 365 days a year) to provide assessment and management of stroke patients
  - Established written stroke protocols for emergency services, in-hospital care and rehabilitation
  - Ability to offer thrombolytic therapy to suitable ischemic stroke patients; timely neurovascular imaging and expert interpretation; and coordinated processes for patient transition to ongoing rehabilitation, secondary prevention and community reintegration services
  - Access to rapid neurosurgical consultation and neurosurgical facilities onsite, as well as interventional radiology services
  - Have a leadership role in establishing partnerships and providing education to other local hospitals for supporting stroke care services.

Categories of Stroke Services within Hospitals (CSS)

- ***Hospitals with intermediate stroke services***
  - Centres with clinicians who have stroke expertise;
  - Written stroke protocols for emergency services, acute care and/or rehabilitation;
  - Ability to offer thrombolytic therapy to suitable ischemic stroke patients or protocols to transfer appropriate patients to a comprehensive stroke centre;
  - Timely neurovascular imaging and timely access to expert interpretation (e.g., telemedicine);
  - Coordinated processes for patient transition to ongoing rehabilitation and secondary prevention services.

- ***Hospitals without specialized stroke resources***
  - Centres that do not have in-hospital resources such as clinicians with stroke expertise or neuroimaging
  - These centres should have written agreements in place to facilitate timely transfer of stroke patients to higher levels of care as appropriate.

Section Two



Detailed Review of Stroke Patient Management

EMS Stroke Patient Management

- Signs and symptoms of suspected acute stroke patients on scene
- Acute stroke mimics (hypoglycemia, postictal phase, etc)
- Components of out-of-hospital management of acute stroke patients
  - Key information and assessments to be done on scene for suspected acute stroke patients (align with stroke pocket reference);
  - Stroke history and assessment information into the decision-making process for transportation of suspected stroke patients to acute care facilities with the appropriate level of stroke care.
- Information required as part of EMS documentation and communication with emergency department staff.

Province's Provincial Stroke Strategy

(to be customized for each presentation)

- Overview of provincial stroke strategy
- Organization and coordination of EMS services within province
- Relationship between EMS providers and stroke centres, regions and provincial stroke strategy
- Existing protocols and Memorandums of Understanding (MOU's) for stroke bypass within province.

Out-of-Hospital Stroke Management

Why Is This Important?

- Acute stroke is a medical emergency and optimizing out-of-hospital care improves patient outcomes
- EMS plays a critical role in assessment and management
- Acute interventions such as reperfusion are time sensitive

Redirecting ambulances to stroke centres facilitates earlier assessment, diagnosis and treatment which may result in better outcomes.

Implementation of EMS Stroke Best Practices

- Standardize pocket reference content for EMS providers
- Builds on existing training
- Focuses on key elements most critical in rapid assessment for suspected acute stroke
- Based on extensive consultation from all key stakeholders involved in out-of-hospital care of acute stroke patients
- Also recognizes that EMS have standard protocols for all calls they respond to

EMS – Stroke Pocket Guide_1

Strongly Recommended Content for Inclusion on all EMS Stroke Reference Guides

1. **Patient condition on EMS arrival to scene**
   - **A**irway, **B**reathing, **C**irculatory status
2. **Initial history and medical information**
   - Symptom onset/Last seen normal (LSN) date and time (i.e., last stroke symptom-free time)
   - Palliative status
3. **Physical assessment specific to stroke**
   - Current stroke signs and symptoms
     - ARM/LEG unilateral motor weakness or drift
     - Speech slurring, loss, inappropriate words, mute, or other changes
     - Facial droop or weakness

EMS – Stroke Pocket Guide_2

Strongly Recommended Content for Inclusion on all EMS Stroke Reference Guides

4. Additional Assessments

- Presence of seizures
- Glasgow Coma Scale score
- Blood glucose level

5. Assessment for Contraindications to tPA *(may impact transport location decisions)*

- CTAS 1 and/or uncorrected ABC
- Blood glucose <= 3.0 mmol/l
- Seizure at onset of symptoms or witnessed by Emergency Medical Service providers
- Glasgow Coma Scale <9
- Terminally ill or palliative care patient

EMS – Stroke Pocket Guide_3

Strongly Recommended Content for Inclusion on all EMS Stroke Reference Guides

6. Transport decisions and considerations

***Time is Brain* – need for efficiency and minimizing time from on-scene arrival to transport to a stroke centre**

- The recommended total time from symptom onset to reperfusion for eligible patients, is usually defined as 4.5 hours. This is broken into 2 phases: pre-hospital and emergency department:
  - The pre-hospital phase, which starts with symptom onset, and includes on-scene management and anticipated transport time, should be less than 3.5 hours
  - The current evidence shows that the emergency department phase should be less than 60 minutes

EMS – Stroke Pocket Guide_4

Strongly Recommended Content for Inclusion on all EMS Stroke Reference Guides

6. Transport decisions and considerations (cont'd)

- Direct transport protocol criteria must be based on (1) the local ED performance which is recommended as being less than 60 minutes; and (2) the out-of-hospital phase, including symptom duration and anticipated transport duration, being less than 3.5 hours and/or (3) other acute care needs of the patient
- Transport to closest designated stroke centre (comprehensive or intermediate)
- Implement normal EMS en-route transport management (for stroke, 18 g needle is preferred for IV access)
- Prenotification to the destination emergency department of a suspected acute stroke in transport

EMS – Stroke Pocket Guide_5

Strongly Recommended Content for Inclusion on all EMS Stroke Reference Guides

7. Additional Transport Information

- These recommendations are referring exclusively to patients with hyper-acute stroke who may be eligible for time-sensitive reperfusion interventions within the therapeutic window. Stroke patients not eligible for reperfusion (do not meet criteria for rapid transport based on standardized screening) should still be transported to and among appropriate facilities
- Patients with symptoms that resolve prior to paramedic arrival on scene may not require medical redirect to an acute stroke centre, but should be assessed emergently.
- Those patients whose symptoms resolve after paramedic assessment or during transport should continue on medical redirect to a stroke centre.

EMS – Stroke Pocket Guide_6

Strongly Recommended Content for Inclusion on all EMS Stroke Reference Guides

- It is important to request that a family member accompany the ambulance to the hospital so that they could provide vital information. In the absence of a person being present, verify the contact number of an informant and/or decision-maker.

Notes:

* local variations need to be taken into consideration for pre-hospital time

^ EMS personnel should identify comprehensive and intermediate stroke centres within the relevant EMS catchment areas

8. Handover to destination emergency department personnel:

- Communication to receiving staff (triage nurse or attending physician)
- EMS documentation completed and a copy left with the receiving ED

1. EMS Arrival on scene and Initial Assessment

52% of suspected stroke patients arrive to hospital by ambulance *(CIHI 2008)*

Currently, time from last seen normal to emergency department arrival ranges from 1.7 hours to 8.0 hours

1. Patient condition on EMS arrival to scene

- **A**irway, **B**reathing, **C**irculatory status

"ABCs" Stable?

If not, transport without delay to closest, most appropriate hospital

2. Initial history and medical information

- Last seen normal (LSN) date and time (i.e., last stroke symptom-free time, symptom onset time)
  - Witnessed
  - Unwitnessed
    - Stroke on wakening? When did patient go to sleep relative to time of call to EMS?
- Palliative status
- **DOCUMENTATION** of these elements is **critical!!!**

Canadian Stroke Audit: LSN Documentation Required

Stroke/TIA onset (last seen normal): **Date: (dd/mmm/yyyy)** **Time: (24hr:min)**	**Patient age at stroke onset (last seen normal) (automatic calculation):** _____ ***If patient age < 16 years of age, trigger hidden SAS variable for exclusion:***	
Is the time of stroke onset (last seen normal) : **O Exact (e.g. 08:45)** **O Estimated (e.g. morning)** **O Not documented in chart (e.g. date but no time)**	**Estimated Times to Use if Exact Time is Not Documented:** **- The middle of the night = 03:00** **- Breakfast=08:00** **- Early morning = 08:00** **- Morning = 09:00** **- Late morning = 10:00** **- Lunch=12:00** **- Midday = 12 Noon = 12:00**	**- Early afternoon = 14:00** **- Afternoon or mid afternoon = 15:00** **- Late afternoon = 16:00** **- Dinner/Supper=18:00** **- Early evening = 19:00** **- Evening = 21:00** **- Late evening = 22:00**
		Symptoms discovered on awakening or unwitnessed stroke onset: **O No** **O Yes** **O UTD**

RCSN 2009

3. Physical assessment specific to stroke

- **Current stroke signs and symptoms**
  - **Patient has new onset of at least *one* of the following:**
    - ARM/LEG unilateral motor weakness or drift
    - Speech slurring, loss, inappropriate words, mute, or other changes
    - Facial droop or weakness

Warning Signs for Stroke

Weakness - Sudden loss of strength or sudden numbness in the face, arm or leg, even if temporary.

Trouble speaking - Sudden difficulty speaking or understanding or sudden confusion, even if temporary.

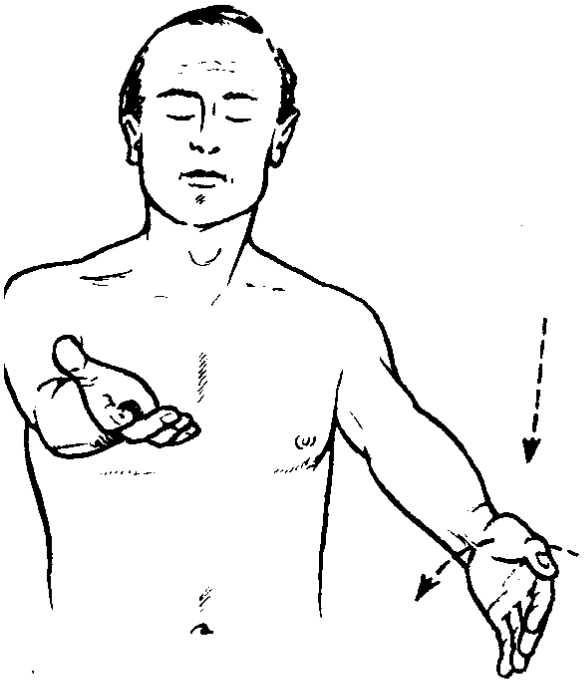
Vision problems - Sudden trouble with vision, even if temporary.

Headache - Sudden severe and unusual headache.

Dizziness - Sudden loss of balance, especially with any of the above signs.

www.heartandstroke.com

Physical Assessment: Arm and Leg



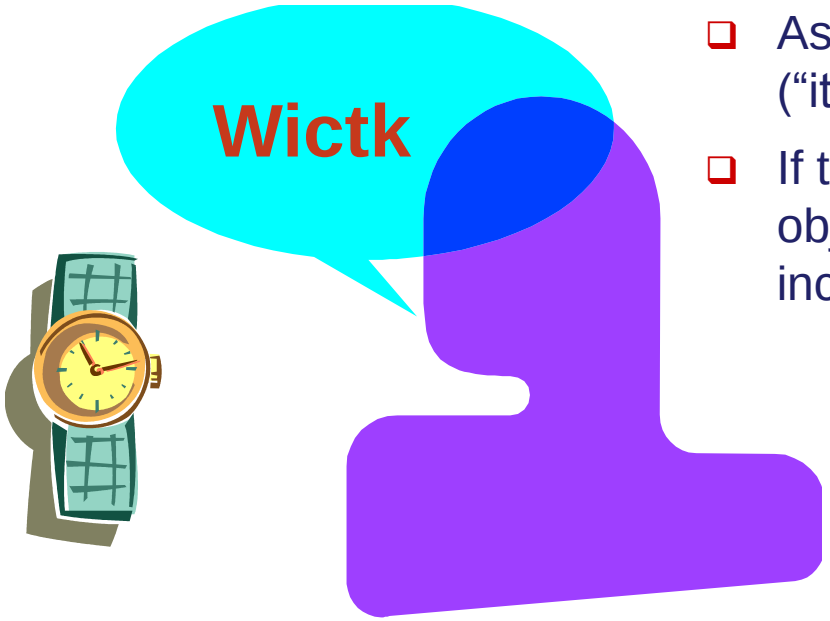
Assessment for arm drift:

- Have the patient hold both arms out in front for 5 seconds. If one arm drifts or falls before the 5 sec. count, or the pt. is unable to move one arm, they fit the inclusion criteria.

Assessment for Leg Weakness:

- Have the patient lift leg at 30 degrees and hold for 5 seconds. Repeat with other leg.
- Compare the two sides. If one leg drifts or falls before the count, or the pt. is unable to move one leg, they fit the inclusion criteria.

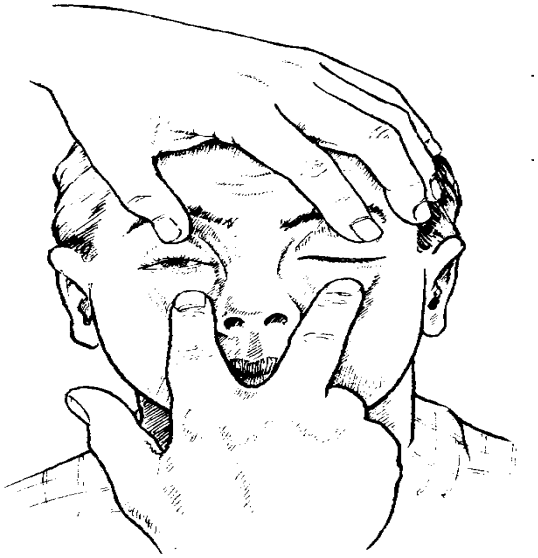
Physical Assessment: Speech



Assessment for Speech Difficulties

- Ask the patient to name 3 objects you show them (i.e. pen, watch, ring).
- Ask the patient to repeat a simple sentence ("it is sunny today.")
- If the patient is unable to repeat all the objects, or repeat the sentence they fit the inclusion criteria.

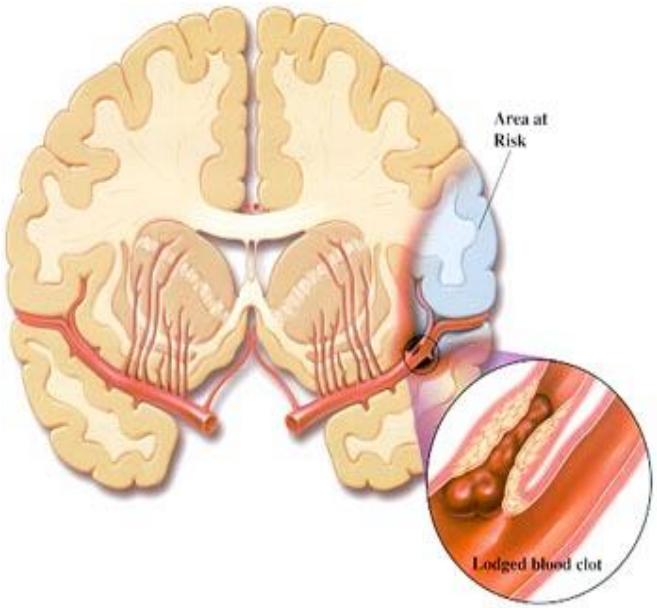
Physical Assessment: Facial Droop



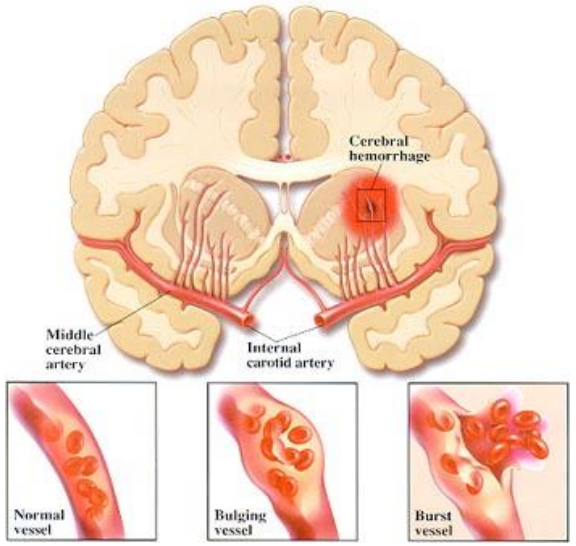
- Ask the patient to
  - Smile
  - Show his/her teeth
  - Grimace
  - Stick out tongue

The Anatomy and Physiology of a Stroke

Ischemic (80%)

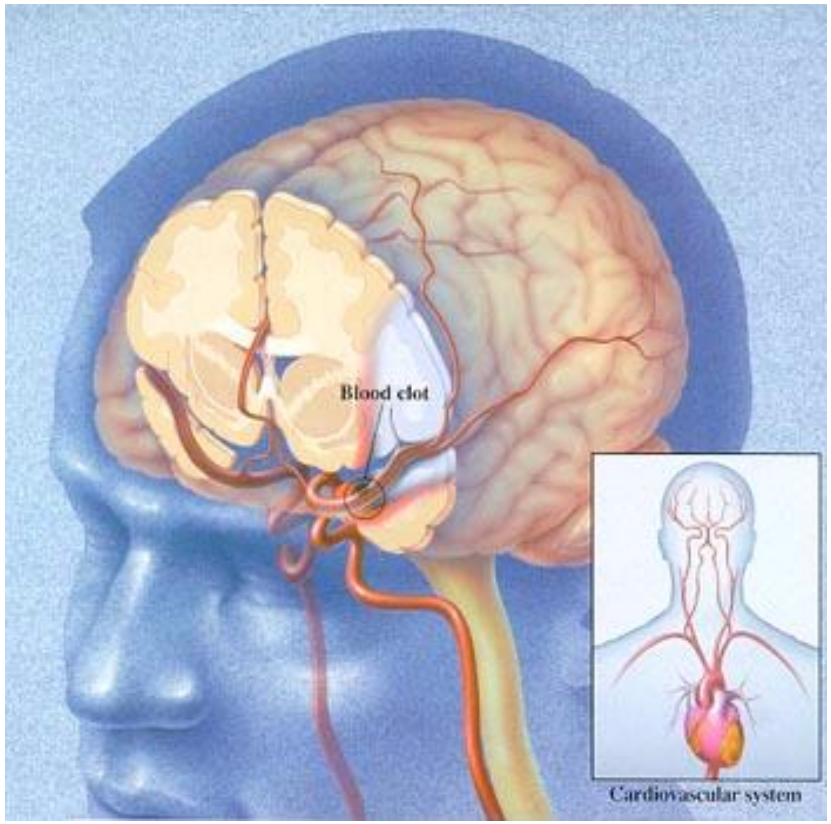


Hemorrhagic (20%)



A Guide to Understanding Stroke, Heart and Stroke Foundation of Canada, 1996

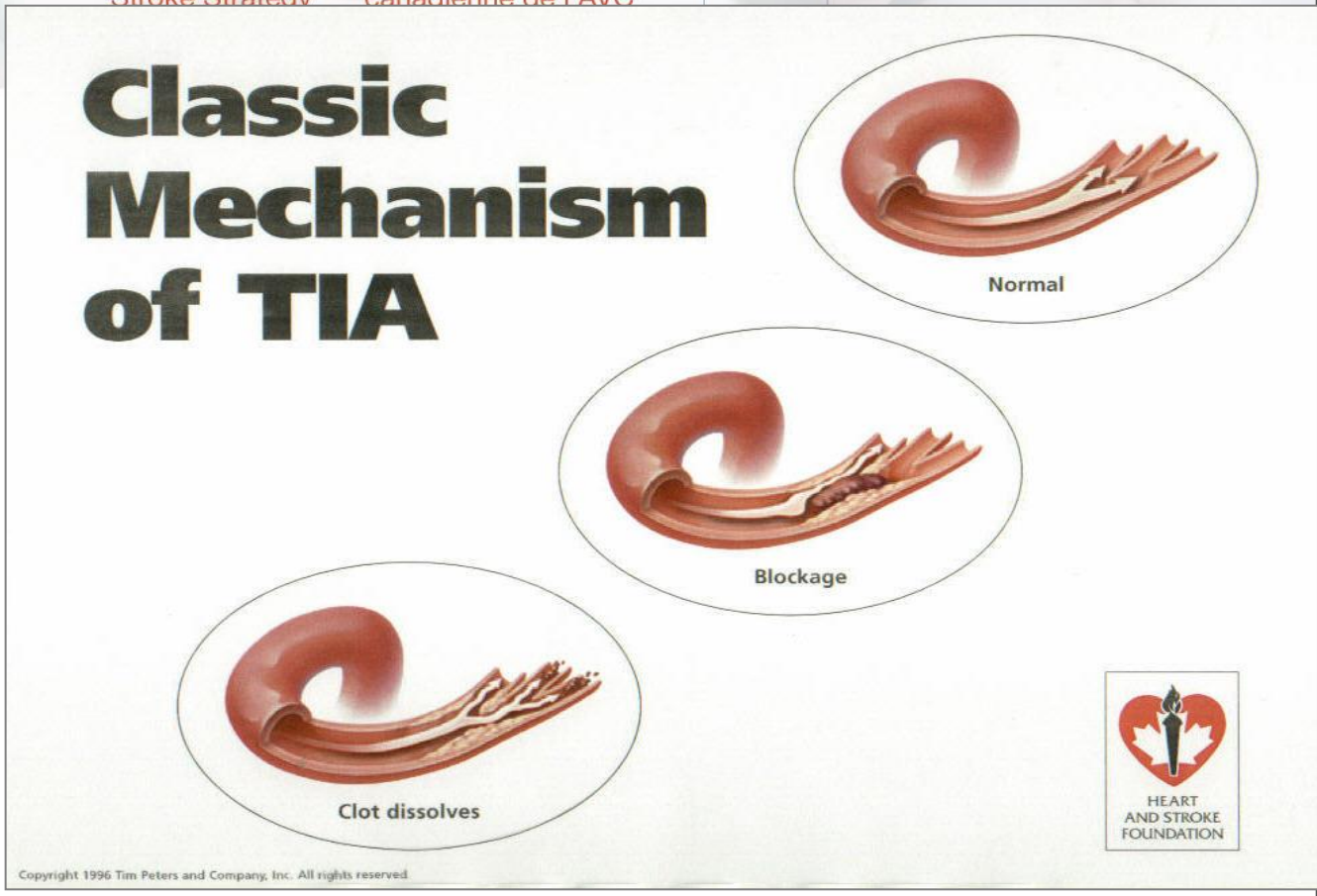
Acute Cerebral Infarction



Approximately 70 - 80% of strokes are caused by cerebral thrombosis or cerebral embolism

Occlusion of cerebral blood vessels leads to brain cell ischemia and infarction

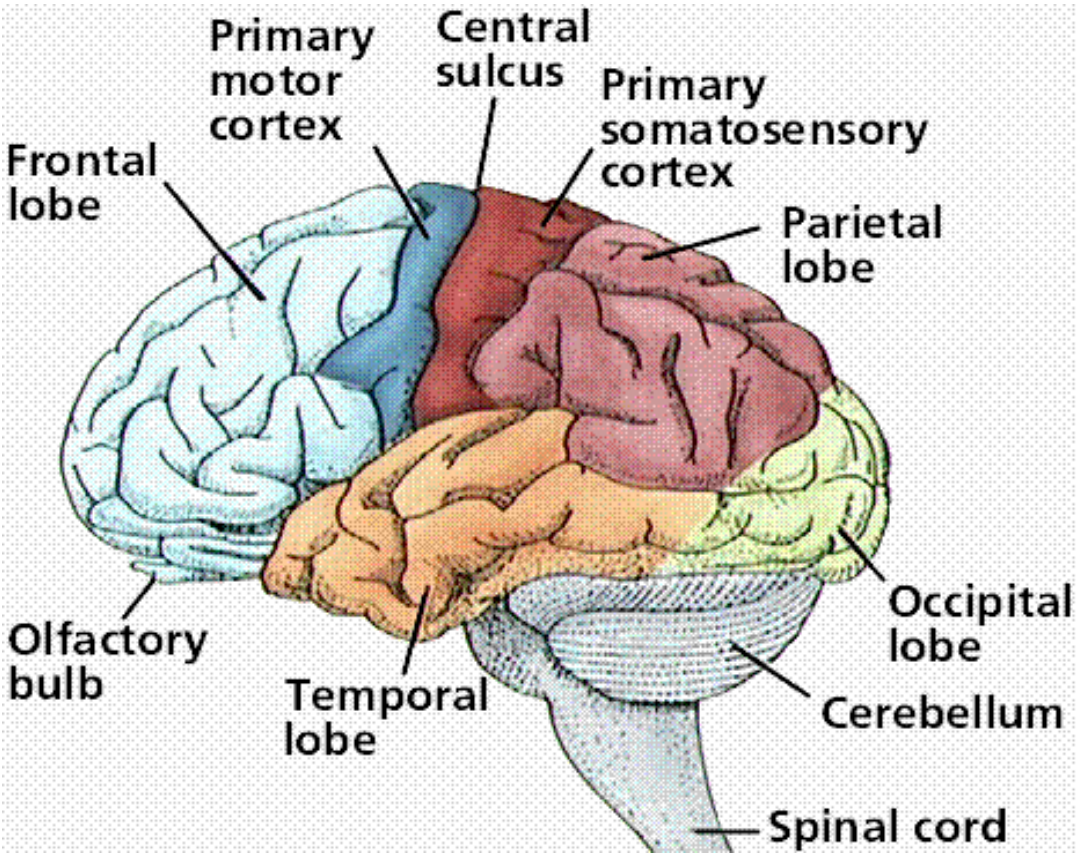
Transient Ischemic Attack



TIA is defined as a focal (or at times global) neurological impairment of sudden onset, and lasting less than 24 hours, and of presumed vascular origin, and with full recovery. (WHO)

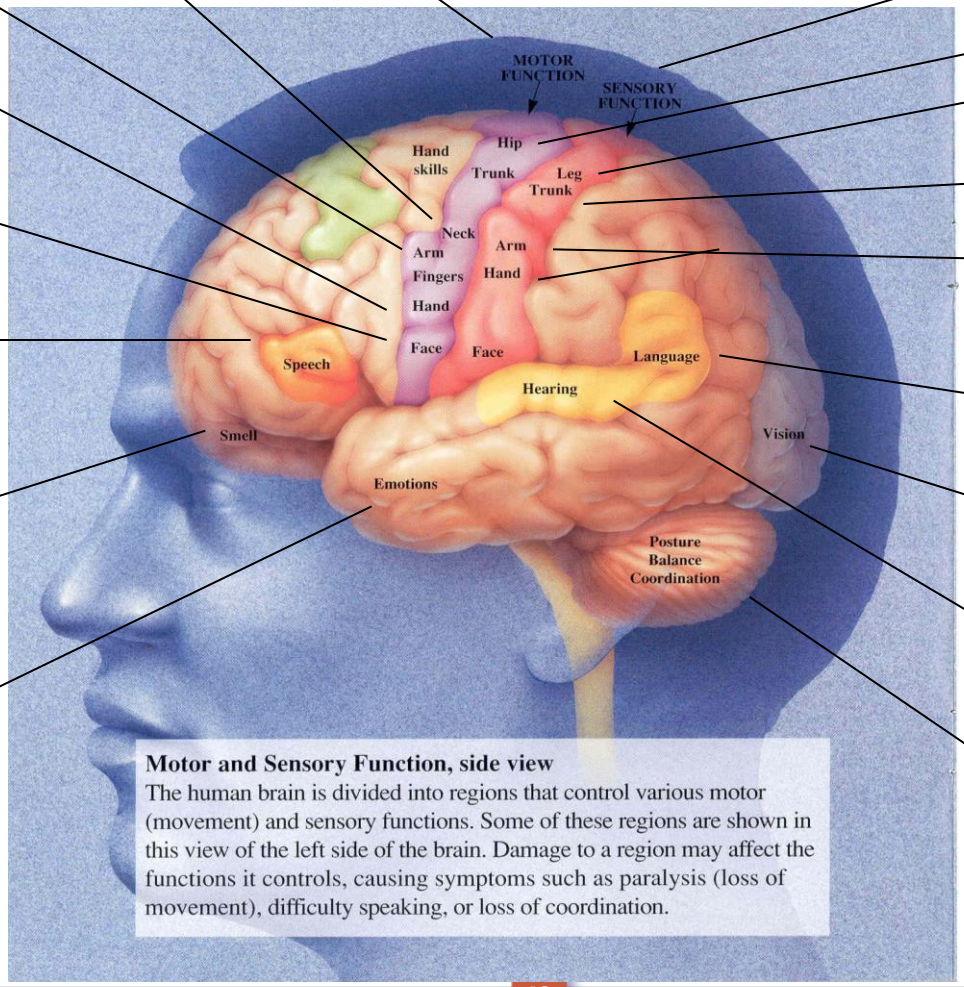
Cerebral Cortex

- Divided in to 4 lobes
  - Frontal
  - Parietal
  - Temporal
  - Occipital



www.emc.maricopa.edu/faculty/farabee/biobk/cerebrum_1.gif

Motor & Sensory Function

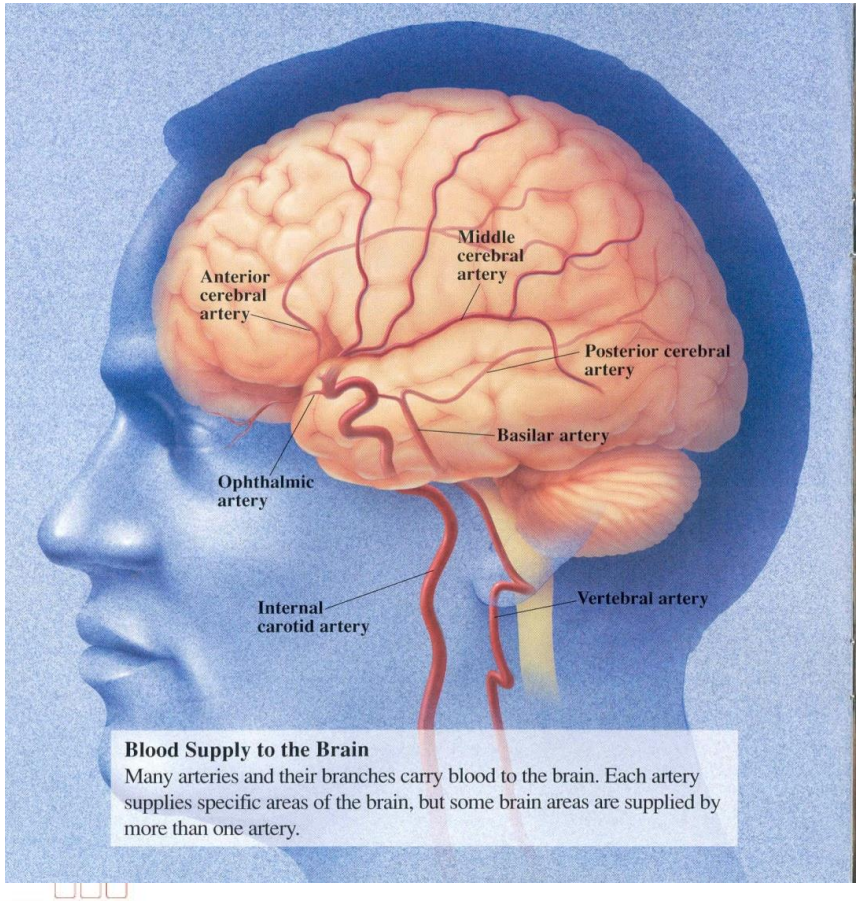


Motor and Sensory Function, side view
The human brain is divided into regions that control various motor (movement) and sensory functions. Some of these regions are shown in this view of the left side of the brain. Damage to a region may affect the functions it controls, causing symptoms such as paralysis (loss of movement), difficulty speaking, or loss of coordination.

Arm
Fingers
Neck
Motor
Sensory
Hip
Hand
Leg
Face
Trunk
Arm
Hand
Speech
Language
Smell
Vision
Emotions
Hearing
Posture
Balance
Coordination

Blood Supply to the Brain

- Brain derives its arterial supply from carotid and vertebral arteries which begin extracranially
- Internal carotid arteries and branches supply anterior 2/3 of cerebral hemispheres
- Vertebral and basilar arteries supply posterior and medial regions of hemispheres, brainstem, diencephalon, cerebellum and cervical spinal cord



Blood Supply to the Brain
Many arteries and their branches carry blood to the brain. Each artery supplies specific areas of the brain, but some brain areas are supplied by more than one artery.

Left and Right Hemisphere

Left Hemisphere

- Expressive aphasia
- Receptive aphasia
- Global aphasia
- Right sided weakness/sensory loss
- Intellectual impairment-reading, writing, math
- Slow and cautious behavior
- Defects in right visual field-homonymous hemianopsia

Right Hemisphere

- Spatial-perceptual deficits
- Left sided weakness/sensory loss
- Neglect of the affected side
- Distractible
- Impulsive behavior
- Poor judgment
- Loss of flow of speech
- Defects in left visual field-homonymous hemianopsia

Stroke Mimics

- The following four conditions represent 62% of stroke mimics
  - Postictal deficit (unrecognized seizure)
  - Systemic infection
  - Tumour/abscess
  - Toxic-metabolic disturbance
- Other mimics
  - Bell's palsy
  - Peripheral nerve palsies
  - Old stroke
  - Confusion
  - Head trauma
  - Hemiplegic migraine

4. Additional Assessments

- Presence of seizures
- Glasgow Coma Scale

Eye Opening (E)	Verbal Response (V)	Motor Response (M)
4 = Spontaneous 3 = To voice 2 = To pain 1 = None	5 = Normal conversation 4 = Disoriented conversation 3 = Words, but not coherent 2 = No words, only sounds 1 = None	6 = Normal 5 = Localized to pain 4 – Withdraws to pain 3 = Decorticate posture 2 = Decerebrate 1 = None

- Blood glucose levels: <= 3 mmol/l

Paediatric Considerations

- Stroke occurs at ALL ages
- Paediatric stroke rate is 4-6 per 100,000. In neonates it may be as high as 1 per 4000
- Types of stroke in children:
  - There are two types of ischemic stroke:
    - A stroke caused by a blood clot in an artery is called arterial ischemic stroke (AIS);
    - A stroke or brain swelling caused by a blood clot in a vein is called cerebral sinovenous thrombosis (CSVT).

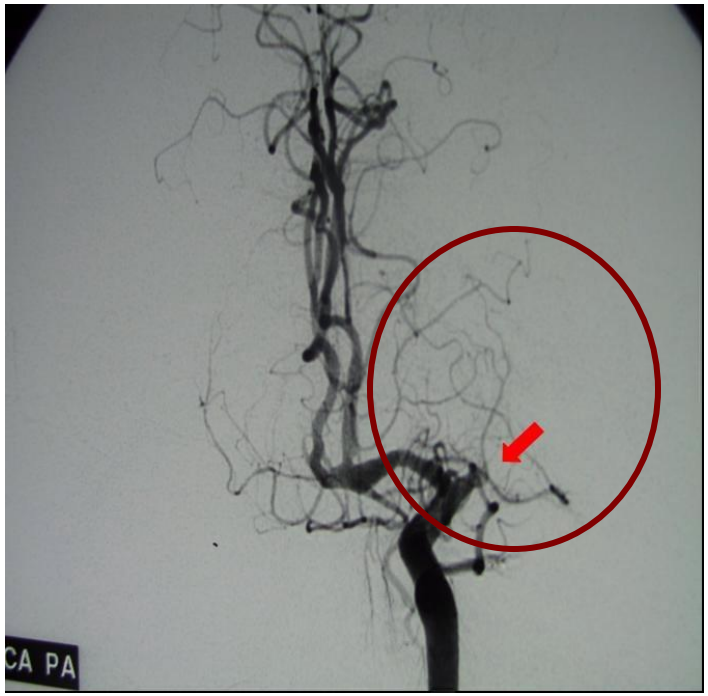
Paediatric Stroke Presentation

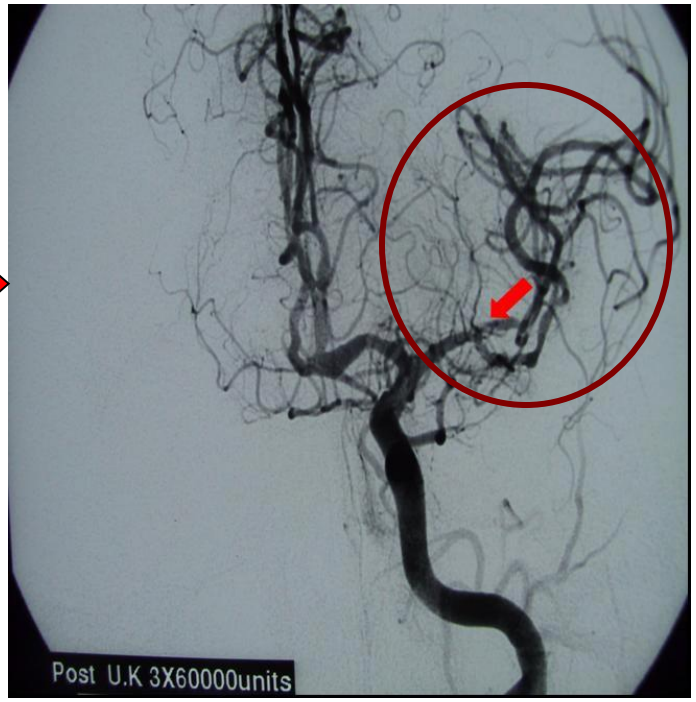
- The most common effect of stroke is weakness of one side of the body (hemiplegia).
- However, may also present with:
  - Unilateral facial droop
  - speech may be affected.
  - Visual disturbances
  - Abnormal balance and/or coordination
  - Headache with or without vomiting
  - Dizziness (room is spinning)
- Stroke due to CSVT may:
  - Show signs of distress.
  - Seizures (twitching of the face, arms or legs, or starring spells).
  - extreme trouble staying awake and alert during the day outside of normal sleeping time.
- *Signs of a stroke may be difficult to recognize in a young child, depending on the child's age and stage of development*

5. Thrombolytic Therapy

- tPA (tissue plasminogen activator)
- Dissolves blood clots
- In patients with stroke
  - 30% benefit significantly from treatment
  - 60% do not show major changes with treatment
  - 10% may have a complication associated with treatment (usually bleeding)
- Time window for receiving tPA has been increased to 4.5 hours from symptom onset (ECASS III)

Acute Stroke Thrombolysis





As with Heart Attacks, "Brain Attacks" can be treated with tPA to dissolve blood clots and restore blood flow.

5. Assessments for Contraindications to tPA

- CTAS 1 and/or uncorrected ABC
- Blood glucose <= 3.0 mmol/l
- Seizure at onset of symptoms or witnessed by Emergency Medical Service providers
- Glasgow Coma Scale <9
- Terminally ill or palliative care patient

Goal of "Stroke Alert Protocols" For EMS Providers

Patients who show signs and symptoms of hyper-acute stroke must be treated as a time-sensitive emergency and should be transported without delay to the closest acute care facility that provides emergency stroke care.

6. Transportation Decisions

- ***Time is Brain*** – need for efficiency and minimizing time from on-scene arrival to transport to a stroke centre
- The recommended total time from symptom onset to reperfusion for eligible patients, is usually defined as 4.5 hours. This is broken into 2 phases: pre-hospital and ED
  - The pre-hospital phase, which starts with symptom onset, and includes on-scene management and anticipated transport time, should be less than 3.5 hours
  - The current evidence shows that emergency department phase should be less than 60 minutes

* *local variations need to be taken into consideration for pre-hospital time*

6. Transportation Decisions (2)

- Direct transport protocol criteria must be based on (1) the local ED performance which is recommended as being less than 60 minutes; and (2) the out-of-hospital phase, including symptom duration and anticipated transport duration, being less than 3.5 hours and/or (3) other acute care needs of the patient
- Transport to closest/designated stroke centre (comprehensive or intermediate)
- Implement normal EMS en-route transport management (for stroke, 18 g needle is preferred for IV access)
- Prenotification to the destination emergency department of a suspected acute stroke in transport

7. Additional Transportation Considerations

- Patients who are not considered potentially eligible for time-sensitive reperfusion should be transported to the closest appropriate emergency department
- Patients with symptoms that resolve prior to paramedic arrival on scene may not require medical redirect to an acute stroke centre, but should be assessed emergently.
- Those patients whose symptoms resolve after paramedic assessment or during transport should continue on medical redirect to a stroke centre.
- It is important to request that a family member accompany the ambulance to the hospital so that they could provide vital information. In the absence of a person being present, verify the contact number of an informant and/or decision-maker.

Transport of Suspected Stroke Patients: Local Information

- Is there a stroke protocol in place for EMS?
- Designated stroke centres – where are they?
  - Ct scan access
  - Telestroke considerations
- Have bypass protocols been established and communicated to EMS dispatchers and responders?
- Who makes the decision to bypass a smaller, closer hospital to get to a stroke centre – dispatch or the receiving centre??
- What are the local prenotification practices?
- Other local issues – do you know what they are??
  - Ambulance availability and maximum allowable transport times
  - Cross-boundary issues

Paramedic Stroke Reference Guide

"Yes" to all = meets criteria = transport

- ✓ "ABCs" stable?
- ✓ Time lapse from symptom onset <= 3.5 hours
- ✓ Patient is conscious? (GCS >9)
- ✓ Is blood sugar > 3mmol/L?
- ✓ Stroke symptoms are not rapidly improving/resolved?
- ✓ Patient did not have a seizure at onset?
- ✓ Patient is not terminally ill or palliative?

Paramedic Transport Decisions

If "yes" to all listed criteria, patient may be eligible for acute tPA. An acute stroke transport protocol should be initiated.

- Transport CTAS level 2 to nearest acute stroke centre
- Initiate verbal link to receiving ED department and provide prenotification, including last seen normal time.
- Consider blood glucose and IV but **do not** delay transport to achieve
- Provide supplemental O_2, monitor SPO_2, ECG

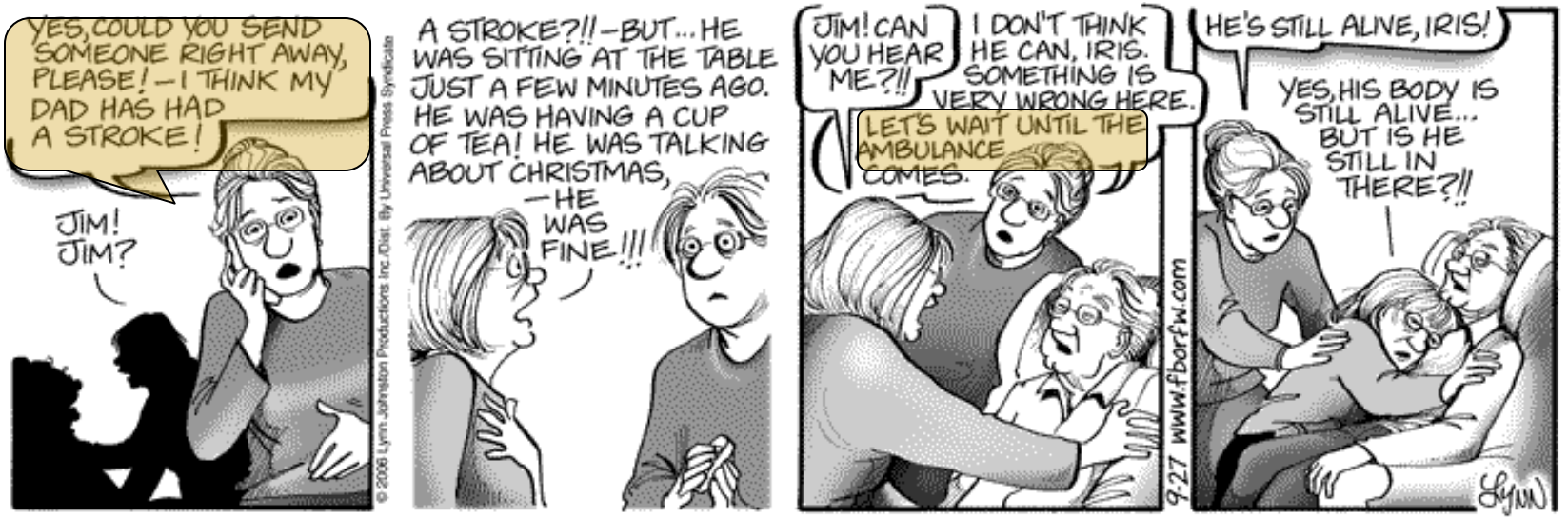
8. Handover to the Emergency Department

- Handover to the ED staff should be done without delay
- Communication to receiving staff (triage nurse and/or attending physician)
  - LSN time
  - Symptoms on arrival to scene
  - Changes in symptoms on scene or during transport
  - Informant or family member present or available
- **Documentation** should be completed and a copy of ambulance call record (ACR) left with the ED
  - Include: LSN time, indicate whether another hospital was bypassed, note whether stroke protocol initiated

9. Provincial/Regional Variations

- Each EMS provider service may have additional components to be included on prompt cards or stroke reference guides
- *Examples of other "non-essential" information that has been previously included on some existing provincial stroke pocket guides and is considered routine care by emergency medical services*
  - Previous stroke history
  - Other vital signs (blood pressure, heart rate, respirations, temperature)
  - Presence of sensory deficits
  - Other medical history and comorbidities
    - Medications (especially antithrombotics)
    - Cardiac conditions
    - Recent surgery
- Add other local variations and additions (not deletions) to core content

Case Studies



What would you do when you arrived on scene?

Case Study #1

- You respond to a private residence for a reported unconscious male.
- On arrival you are met by a male who identifies himself as a co-worker of the patient. He had stopped by to pick up his friend to drive him to work at 0800 hr, but when his friend did not answer the door he became concerned and peered through the window.
- He could see the patient lying motionless on the kitchen floor still in his pyjamas and proceeded to call 911 immediately. He then broke a window to enter the home and found his 58 year old friend unconscious.
- The friend reports that one week ago the patient had complained of a brief period of right sided weakness that lasted less than an hour while he was at work, and the patient did not seek medical attention at that time.

Case Study #1: Stroke Assessment

- ABC: the patient's airway is clear, he is breathing, RR 14, radial pulse present at 64 bpm
- Neuro – patient responds to loud voice and painful stimulus by moving left arm and leg; no movement observed from right arm or leg; speech consists of low moans to stimuli; pupils equal and reactive; no seizures observed
- GCS: 10
- Blood Glucose: 4.5 mmol/L

Case Study #1: EMS Actions

- EMS actions:
  - *Participants to discuss and complete*

- Transport considerations:
  - *Participants to discuss and complete*

Case Study #2

- You respond to a private residence for an unknown problem. On arrival, you are met by a woman who identifies herself as the daughter of the patient.
- The woman explains that she stopped by on her way home from work to check on her father, who lives alone. When she spoke to him by telephone before she left work he said that he was not feeling well. His speech was clear at that time. She also states he is a very healthy 76 year old with just some high blood pressure.
- When she arrived 30 minutes after the call, she found him sitting in his favourite chair, awake but unable to speak clearly, unable to move his left arm, or get out of the chair. You reassure her and proceed to the patient.
- Total time lapse from her phone call to her father (when he was able to speak) until your arrival on scene is 53 minutes.

Case Study #2 : Stroke Assessment

- ABC: airway clear; breathing spontaneously, RR 24; radial pulse present at 96 bpm; BP 184/100
- You examine the patient following the criteria on the stroke reference guide you carry with you, and observe the left side of his face is drooping, he is trying to make sounds that are not interpretable, he is able to move his right arm and leg spontaneously, but not able to move his left arm or leg to command or in response to painful stimuli.
- Blood Glucose: 5.0 mmol/L
- GCS 12

Case Study #2: EMS Actions

- EMS actions:
  - *Participants to discuss and complete*

- Transport considerations:
  - *Participants to discuss and complete*

Case Study #3

- You respond to a call for a 38 year old woman who was previously well then suddenly collapsed and is unable to move her left side. Her husband recognized the signs and symptoms of stroke from a TV ad and called 911.
- You arrive in scene and find the woman conscious, lying on the floor, with left sided facial droop, and unable to move her left arm or leg. Her speech is slurred and partially understandable.
- Her husband reports that she was on a 20 hour flight from Europe the week before, and earlier in the day she reported feeling "funny" and having what seemed like a momentary loss of concentration with dizziness and disorientation.
- In the ambulance she starts to move her left hand and arm, but cannot lift her arm off of the stretcher or make a fist.

Case Study #3: Stroke Assessment

- ABC's: airway open, breathing spontaneously, RR 24; radial pulse 96
- Neuro: on arrival unable to move left arm or leg, right arm and leg moving spontaneously; facial droop noted on left side; able to attempt to follow commands; speech slurred and difficult to understand; pupils equal and reactive; GCS: 13
- Blood Glucose: 4.0 mmolL
- No seizure activity observed or reported by husband
- LSN time to EMS arrival on scene 28 minutes

Case Study #3: Assessment and Actions

- EMS actions:
  - *Participants to discuss and complete*

- Transport considerations:
  - *Participants to discuss and complete*

Case Study #4

- You respond to a call from a grocery store manager that an older woman has collapsed in the store.
- When you arrive on scene a witness reports that the patient was in the produce section when she suddenly collapsed. The witness went over to help her and the patient complained of a sudden onset very severe headache that was getting worse.
- The patient reported that she never gets headaches and this was really bad and very unusual.

Case Study #4: Assessment and Actions

- ABC's: airway open, breathing spontaneously, RR 16; radial pulse 68
- Neuro: on arrival unable to move left arm or leg; right arm and leg moving spontaneously; facial droop noted on left side; able to attempt to follow commands; speech slurred and difficult to understand; patient agitated; pupils equal and reactive; GCS: 13
- Blood Glucose: 5.5 mmol/L
- LSN time to EMS arrival on scene 38 minutes

Case Study #4: Stroke Assessment

- EMS actions:
  - *Participants to discuss and complete*
- Transport considerations:
  - *Participants to discuss and complete*

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It's QUESTION TIME!!

Contact Us

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