Acute Care for Ischemic Stroke Patients: Nurses Make the Difference

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No relevant financial relationship exist for this lecture

No off label discussion

Objective:

- Formulate a nursing plan of care for the ischemic stroke that impacts patient outcomes across the continuum of care from the hyper-acute through the acute phase

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Overview of Stroke – A major Public Health Problem

- Stroke 3rd leading cause of death in the United States
  - Stroke every 40 seconds.
  - Every three to four minutes, someone dies of stroke.
  - In 2006, 6 out of every 10 deaths due to stroke were in women.
- 795,000 people in the United States have a stroke per year.
  - About 610,000 of these are first or new strokes.
  - About 185,000 people who survive a stroke eventually have another.
- Stroke is an important cause of disability.
  - In 2005, nearly 1.1 million stroke survivors reported difficulty performing basic activities of daily life.
- In 2010, stroke will cost the United States $73.7 billion.

(Source: CDC, 2010)

Stroke Statistics in the USA

- A recent study of Americans found that "25% of people who had a stroke died within a year and 8% had another stroke within a year… 50% died or had another stroke or a heart attack within four years" (Feng, 2010).

Stroke Units: State of the Art

- Early admission of most patients to a unit that has a specialized interest in the treatment of stroke is strongly recommended (Level of Evidence I, Grade A Recommendation).
  - Reduces mortality and morbidity
- Coordinated Multidisciplinary team care can result in:
    - improved outcomes
    - decreased LOS
    - decrease costs
- Stroke is a complex disease requiring the efforts and skills of the multidisciplinary team.
  - Nurses are often responsible for the coordination of that care.

- Cochrane Database Syst Rev. 2007 Oct 17;(4):CD000197. Organized inpatient (stroke unit) care for stroke.

Key Aspect of the Continuum of Care for Stroke

Stroke Center Coordination of Care

- Acute Stroke Treatment and Management
  - •Pre-hospital
  - •Emergency Room
- Prevention of Complications
  - •Hemorrhagic Transformation
  - •Cerebral edema
  - •Pneumonia
  - •PE
  - •DVT
  - •UTI
- Secondary Prevention
- Rehabilitation

Nursing Role: EMS Education

- Assessment includes:
  - Stroke focused: Cincinnati, FAST, LAPSS
  - ABC's
  - Last known well time
  - Oxygenation
  - Blood glucose
- rt-PA only FDA approved drug for AIS
- Emphasize "Load and Go" concept
  - Delivering the patient to a center that can deliver acute stroke care according to evidence based protocols.

- Summers D, et al. (2009). Comprehensive overview of nursing and interdisciplinary care of the acute ischemic stroke patient: A scientific statement from the American Heart Association. *Stroke, 40*, 2911–2944.

Stroke Syndromes: Classic Signs Referable to Different Cerebral Areas

- Left (Dominant Hemisphere)
  - Left gaze preference
  - Right visual field deficit
  - Right hemiparesis
  - Right hemisensory loss
- Right (Nondominant Hemisphere)
  - Right gaze preference
  - Left visual field deficit
  - Left hemiparesis
  - Left hemisensory loss neglect (left hemi-inattention)

Summers D, et al. (2009). *Stroke, 40*, 2911–2944

Stroke Syndromes: Classic Signs Referable to Different Cerebral Areas

- Brainstem
  - Nausea and/or vomiting
  - Diplopia, dysconjugate gaze, gaze palsy
  - Dysarthria, dysphagia
  - Vertigo, tinnitus
  - Hemiparesis or quadriplegia
  - Sensory loss in hemibody or all 4 limbs
  - Decreased consciousness
  - Hiccups, abnormal respirations
- Cerebellum
  - Truncal/gait ataxia
  - Limb ataxia neck stiffness

Summers D, et al. (2009). *Stroke, 40*, 2911–2944

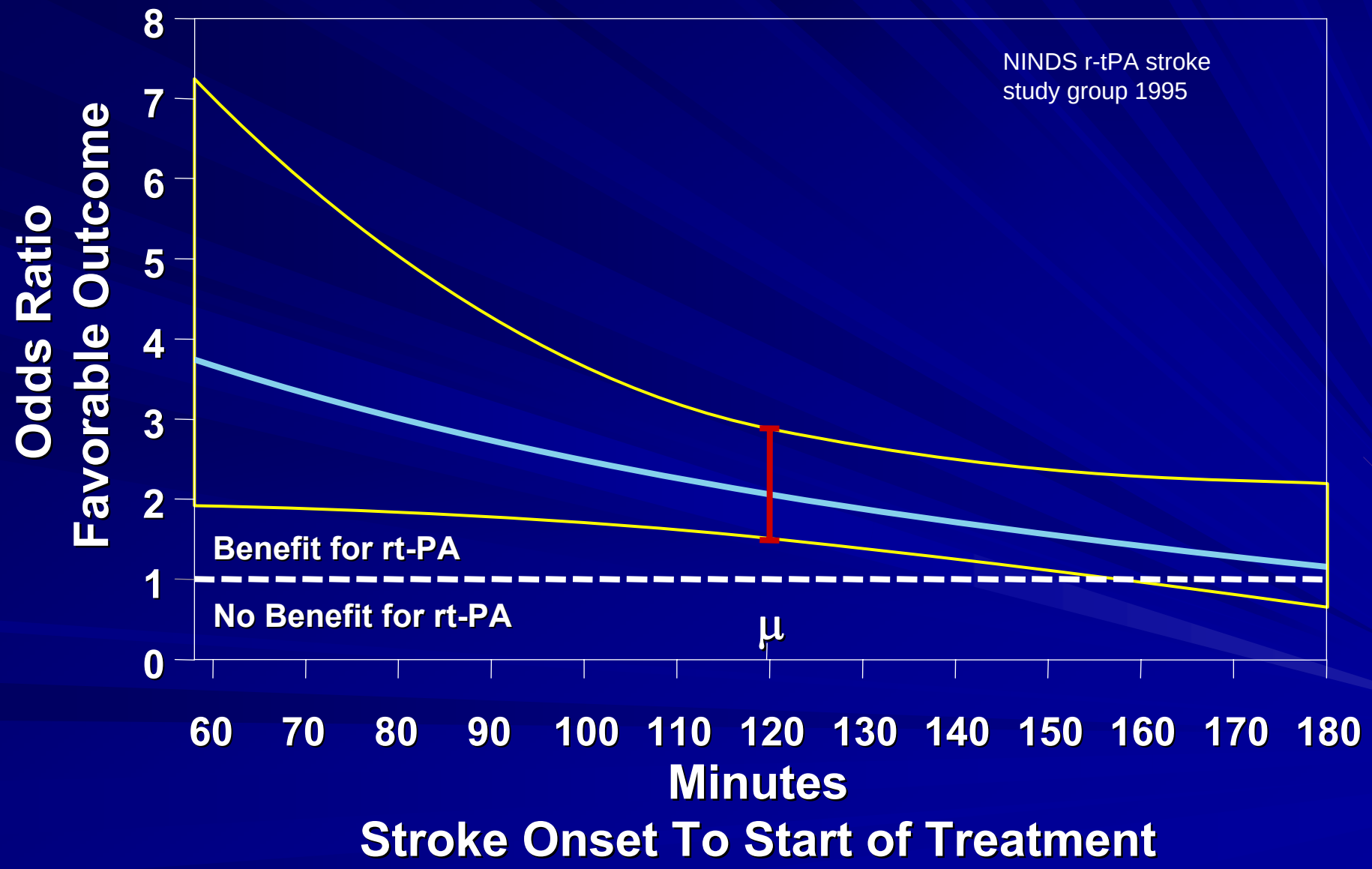
Stroke Syndromes: Classic Signs Referable to Different Cerebral Areas

- Hemorrhage
  - Focal neurological deficits as in AIS
  - Headache (especially in subarachnoid hemorrhage)
  - Neck pain
  - Light intolerance
  - Nausea, vomiting
  - Decreased level of consciousness

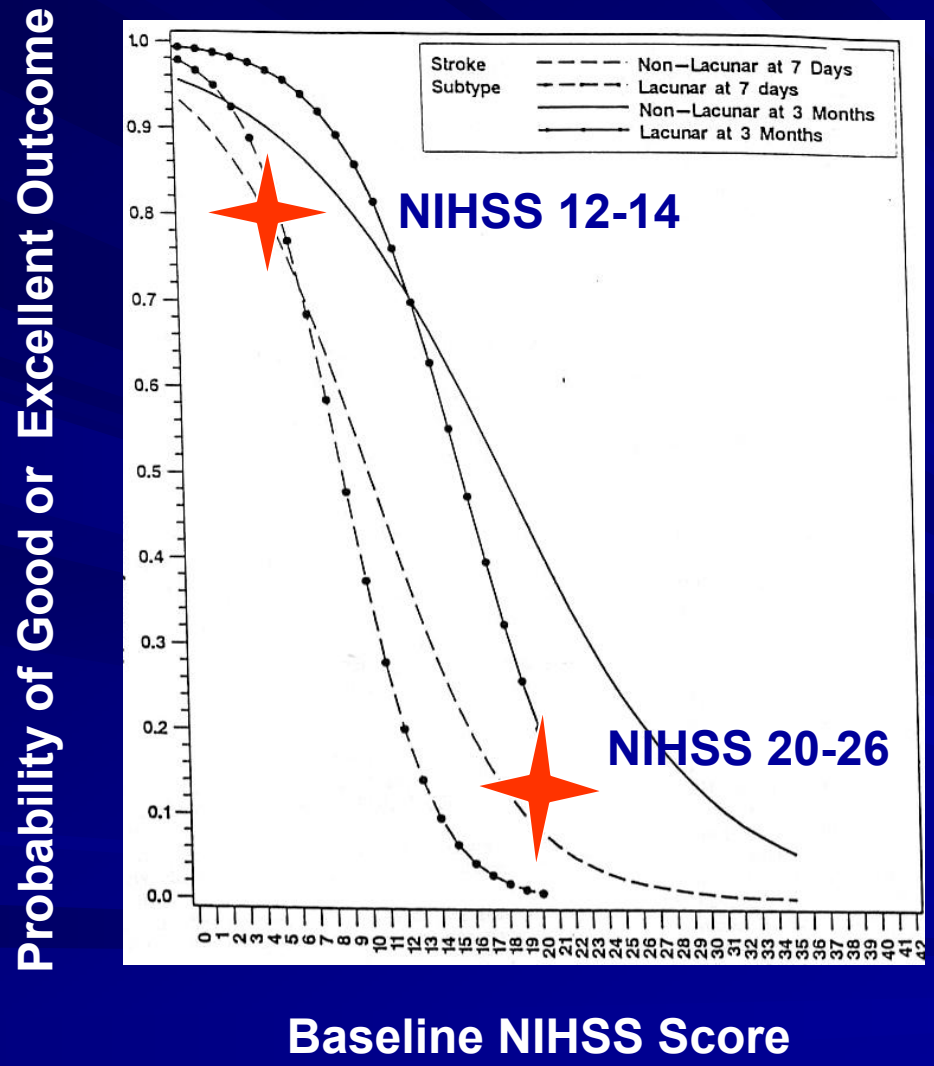
HYPERACUTE PHASE: The First 24 Hours

- Stroke symptoms can evolve over minutes to hours.
- Nurses should be aware of unusual stroke presentations.
- ED assessments include: Stat imaging Neurological assessment (NIHSS), vital signs + temperature, and should be done not less than every 30 minutes.
  - Summers D, et al. (2009). *Stroke, 40*, 2911–2944

NINDS TPA Stroke Study:
Time to Treatment and Odds Ratio of Favorable Outcome



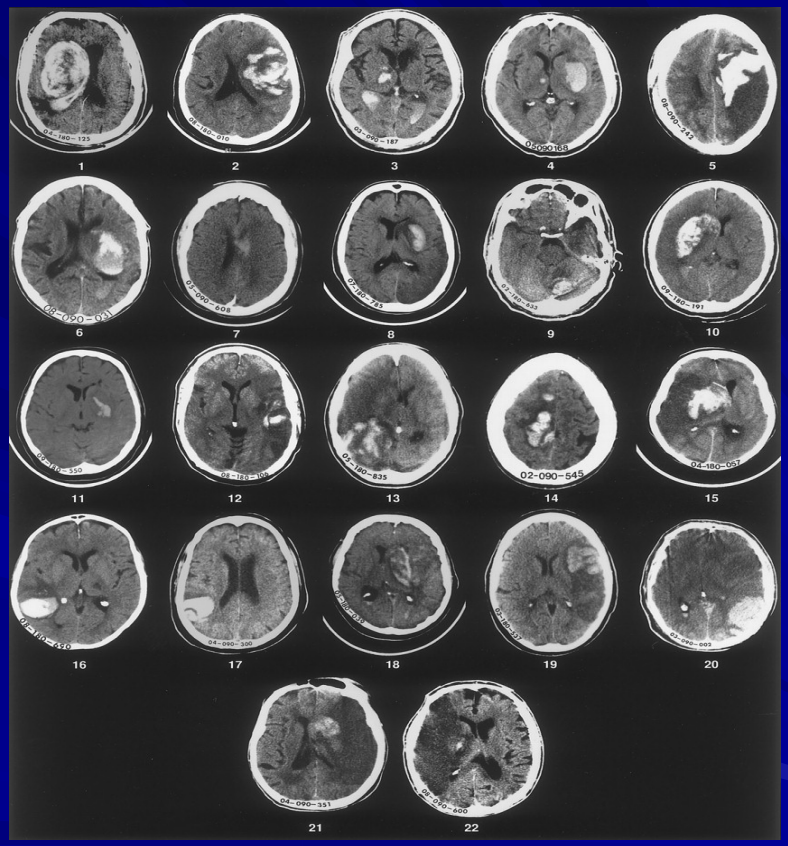
Probability of Excellent Outcome



Adams HP et al
Neurology
1999;53:126-131

Symptomatic Hemorrhages within 36 Hours of Baseline NIHSS

No of Patients % ICH		
NIHSS	no	yes
0-5	42	2
6-10	68	3
11-15	66	5
16-20	72	4
>20	63	17



NINDS Study Group. Intracerebral Hemorrhage After Intravenous t-PA Therapy for Ischemic Stroke. *Stroke*. 1997;28:2109-2118.

Administration of Thrombolytic Treatment

- Rt-PA is packaged as a crystalline powder and is reconstituted with sterile water
- Dosing: calculate rt-PA at 0.9mg/kg
  - Give a 10% bolus over 1 minute
  - Give the rest (90%) over 1 hour
  - Max dose for any patient is 90mg
- To prevent accidental overdose, it is important to waste amount with another nurse before administering to patient
- Prior to administering rt-PA make sure all invasive lines are in place (e.g., endotracheal and indwelling urinary catheter
  - Summers D, et al. (2009). *Stroke, 40*, 2911–2944

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Thrombolysis with Alteplase 3 to 4.5 Hours after Acute Ischemic Stroke

Werner Hacke, M.D., Markku Kaste, M.D., Erich Bluhmki, Ph.D., Miroslav Brozman, M.D., Antoni Dávalos, M.D., Donata Guidetti, M.D., Vincent Larrue, M.D., Kennedy R. Lees, M.D., Zakaria Medeghri, M.D., Thomas Machnig, M.D., Dietmar Schneider, M.D., Rüdiger von Kummer, M.D., Nils Wahlgren, M.D., and Danilo Toni, M.D., for the ECASS Investigators*

AHA/ASA Science Advisory

Expansion of the Time Window for Treatment of Acute Ischemic Stroke With Intravenous Tissue Plasminogen Activator

A Science Advisory From the American Heart Association/American Stroke Association

The American Academy of Neurology affirms the value for this paper as an educational tool for neurologists.

Gregory J. del Zoppo, MD, MS, FAHA, Chair; Jeffrey L. Saver, MD, FAHA; Edward C. Jauch, MD, MS, FAHA; Harold P. Adams, Jr, MD, FAHA; on behalf of the American Heart Association Stroke Council

Expansion of the Time Window for Treatment of Acute Ischemic Stroke With IV Plasminogen Activator

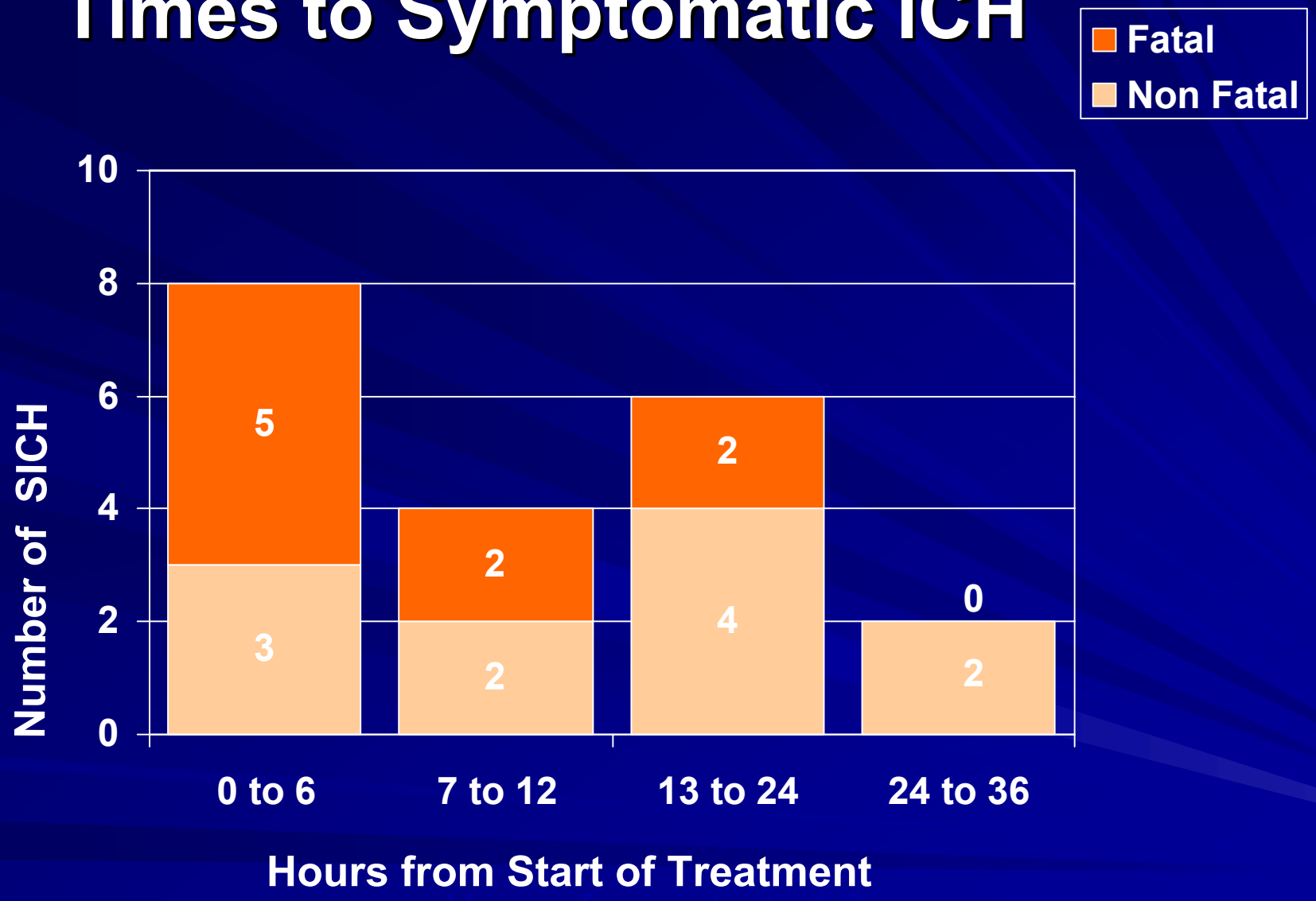
- Exclusions:
  - <80 years
  - NIHSS<25
  - No previous stroke or diabetes
  - not taking anticoagulants, regardless of their current INR value

del Zoppo et al., Stroke. 2009 Aug;40(8):2945-8. Epub 2009 May 28.

Nursing Management Assessment:

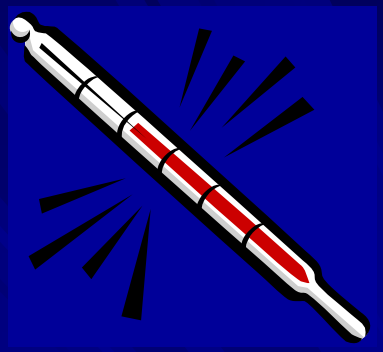
Patients treated with Thrombolytics	Patients not treated with thrombolytics
Neurological assessment and vital signs (except temp) – Every 15 min for 2 hours after start of rtPA infusion – Then every 30 min for 6 hrs – Then q 60 min for 16 hrs (total of 24 hrs) –Temp q 4 hrs or prn *Call Physician if:* ▪Systolic BP >185 or <110 mm Hg ▪Diastolic BP >105 or <60 mm Hg ▪Pulse <50 or >110/min ▪Respirations >24/min ▪Temp >99.6°F ▪Decline in neurological status	In ICU, every hour with neurological checks or more frequently if necessary In non-ICU setting, depending on patient's condition and neurological assessments, at a minimum check neurological and vital signs q 4 hrs Summers D, et al. (2009). *Stroke, 40*, 2911–2944 ▪Treat BP >220 mm Hg systolic pressure or >110–120 mm Hg diastolic pressure ▪A recommended course of action is to reduce hypertension only about 15% during the first 24 hours after an ischemic stroke (Oliveira-Filho & Koroshetz, Up To Date 2009).

Times to Symptomatic ICH



NINDS Study Group. Intracerebral Hemorrhage After Intravenous t-PA Therapy for Ischemic Stroke. *Stroke*. 1997;28:2109-2118.

Fever



- Temperature Control
  - Meta-analysis suggests that fever within first 24 h of hospitalization in patients with ischemic stroke is associated with doubling of odds of mortality within one month of the onset of stroke. (Acta Neurol Scand. 2010 Mar 1)
  - Fever can be directly caused by a stroke, but should search for infections—especially, for pneumonia and urinary tract infection (Oliveira-Filho & Koroshetz, Up To Date 2009).
- > 99.5 F
  - Tylenol 650 mg q 4 hours PRN

Head Position

- Head positioning
  - Heads Down positioning to promote gravity induced increase in arterial flow to ischemic tissue
  - Normally placed at 30 degrees – prior studies have focused on CPP in brain injury studies
    - Increased ICP in stroke with reduced CPP peaks beyond 48 hours
  - Study of 20 patients with MCA occlusion – measured MCA Mean Flow Velocity (MFV) with TCD
    - All patients had increase of MCA MFV flow by 20% when HOB lowered from 30 to 0 degrees

Wojner-Alexander AW, Garami Z, Chernyshev OY, Alexandrov AV. Neurology. 2005 Apr 26;64(8):1354-7.

Nursing Management Assessment:

Patients treated with thrombolytics	Patients not treated with thrombolytics
IV fluids NS at 75-100 mL/hr	IV fluids NS at 75-100 mL/hr
No heparin, warfarin, or antithrombotics for 24 hrs, then start as ordered	Antithrombotics should be ordered within first 24 hrs of hospital admission
Brain CT or MRI after rtPA therapy (at 24 hrs)	Repeat brain CT scan or MRI may be ordered 24-48 hrs after stroke or prn
Perform admit peripheral glucose	Perform admit peripheral glucose

Summers D, et al. (2009). *Stroke, 40*, 2911–2944

Hyperglycemia

- Approximately 1/3 of the patients who present with acute stroke have hyperglycemia (i.e., blood glucose >126 mg/dl) (Oliveira-Filho & Koroshetz, Up To Date 2009).
- Hyperglycemia of >140 mg/dl increases the likelihood of a poor outcome in stroke patients, and carefully administered rapid-acting insulin is recommended to reduce levels of blood glucose when they are >180 mg/dl.
- Hypoglycemia is also deleterious to an injured brain. Thus, the effects of insulin administration are closely monitored, and glucose and potassium must be available to buffer the effect of the insulin. In general, it appears that a safe target goal for blood glucose in critically ill neurological patients is between 120 mg/dl and 180 mg/dl (Mayer & Schwab, 2010).

Hyperglycemia

- Persistent hyperglycemia (>155) during the 1st 48 hrs is associated with poor outcomes*
  - IV tPA ineffective with elevated blood glucose
  - Increased risk of hemorrhagic transformation following use of IV tPA
  - Stroke worsened in patients with increased blood glucose
- >180 should be treated with insulin (07 Guidelines)

*Stroke. 2009 Feb;40(2):562-8. The prognostic value of capillary glucose levels in acute stroke: the GLycemia in Acute Stroke (GLIAS) study.

Nursing Management Assessment:

Patients treated with Thrombolytics	Patients not treated with thrombolytics
For O2 sat <92%, give O2 by cannula at 2-3 L/min	For O2 sat <92%, give O2 by cannula at 2-3 L/min
Monitor for major and minor bleeding complications	N/A
Continuous cardiac monitoring up to 72 hrs or more	Continuous cardiac monitoring for 24-48 hrs
Measure intake and output	Measure intake and output

Summers D, et al. (2009). *Stroke, 40*, 2911–2944

Intensive Monitoring

- 30 - 37.5 % of patients will deteriorate in the first 24 hours.
- Intensive monitoring by nurses trained in stroke is very important
  - Trained in neurological assessment (NIHSS)
  - Trained in monitoring of bleeding complications (major and minor)
  - Ongoing management of blood pressure, temperature, oxygenation, and blood glucose

•Castillo J. Cerebrovasc Dis. 1999;9(suppl 3):1– 8.
•A Dávalos, D Toni, F Iweins, E Lesaffre, S Bastianello, and J Castillo *Stroke.* 1999 December; 30(12): 2631–2636.

Acute Care

- Nursing focus on stabilization of the stroke patient through frequent evaluation of neurological status, BP management and prevention of complications
- Clinical pathways and stroke orders that address these issues and include consultations of multidisciplinary team should be developed

Brain Attack Coalition. *JAMA*. 2000;283:3102–3109.

Complications

- During administration and 1st 24 hours signs of intracranial bleeding are
  - acute hypertension
  - severe headache
  - nausea or vomiting
- If any of these arise – STOP the infusion, get a STAT noncontrast head CT and notify neurology ASAP

Hemorrhagic Transformation

- Asymptomatic
  - No change in neurological symptoms
- Symptomatic
  - Change in NIH score by 4 (NIND rt-PA Stroke Study Group 1995)
  - "Deterioration" of neurological functioning defined as an increase of 1 point on the NIHSS (Adams et al., 2007).
  - Predictors
    - Elevated BP after t-PA
    - NIH > 20
    - Large Hemispheric stroke
    - Elevated glucose

Selim M, et al Stroke. 2002 Aug;33(8):2047-52.

NINDS rt-PA Stroke Study Group Hemorrhage Algorithm - Nursing Alert

Care Element	Suspect ICH or Systemic Bleed
STAT diagnostics	■CT head, noncontrast or MRI with GRE sequence ■Labs: Na, Glucose, PT/aPTT/INR, fibrinogen, CBC with platelets, type and cross-match ■Pulse oximetry, consider SVO2, brain oximeter ■Consider ICP monitor ■Consider hemodynamic monitoring ■Check stool for occult blood

Summers D, et al. (2009). *Stroke, 40*, 2911–2944

NINDS rt-PA Stroke Study Group Hemorrhage Algorithm – Nursing Alert

Care Element	Suspect ICH or Systemic Bleed
Consultations	▪Neurosurgery if ICH suspected ▪Hematology if ICH suspected ▪General surgery if systemic bleed suspected
Summers D, et al. (2009). *Stroke, 40*, 2911–2944	▪Vital signs and neuro exam q 15 min initially then hourly ▪Assess for signs of ICP q 15 min ▪Continuous ECG monitoring ▪Look for other bleeding sites ▪GCS/pupil check q 1 hr and prn ▪Intubation ▪ICP monitoring (Smith & Amin-Hanjani, 2009).

Nurses Will Make the Difference

- Unfortunately, the clinical signs of herniation or of increased intracranial pressure are clearest late in the process
- The appearance of **Cushing's triad**—bradycardia, respiratory depression, and hypertension—is an especially ominous sign
  - (Biros & Heegaard, 2009)

NINDS rt-PA Stroke Study Group Hemorrhage Algorithm – Nursing Alert

Care Element	Suspect ICH or Systemic Bleed
Treatments	Consider mannitol 25 g q 4-6 h Consider blood products (cryoprecipitate, FFP, PLTs, PRBCs, other meds such as factor VIIa) Consider surgery. Apply pressure to compressible sites for major or minor systemic bleeds

Summers D, et al. (2009). *Stroke, 40*, 2911–2944

Malignant MCA Syndrome

- Malignant brain edema
  - Mortality up to 80%
  - Starts days 1-3
  - Peaks days 3-5
  - Subsides by 2 weeks
- **Neurologic causes**: edema, hemorrhagic transformation, restroke
- **Systemic causes**: fever, infection, hypotension, hypoxia, hypercarbia

Nursing Alert – Assessing ICP

Signs and symptoms of increasing ICP – a medical emergency
Early signs: decreased level of consciousness, deterioration in neurological function (motor), headache, visual disturbances, changes in blood pressure or heart rate, changes in respiratory pattern Late signs: pupillary abnormalities, more persistent changes in vital signs, changes in respiratory pattern with changes in arterial blood gases

Summers D, et al. (2009). *Stroke, 40*, 2911–2944

Nursing Alert – Assessing ICP

General measures to prevent elevation of ICP

- HOB up 30° or as physician specifies, reverse Trendelenburg position may be used if blood pressure is stable.
  - –Head position may be one of the single most important nursing modalities for controlling increased ICP.
- Good head and body alignment: prevents increased intrathoracic pressure and allows venous drainage.
- Patients should be made comfortable, avoid pain, bladder distention, and agitation
- Keep patient normothermic.

Summers D, et al. (2009). *Stroke, 40*, 2911–2944

Intracranial Pressure Management

- Osmotic diuresis – mainstay of the therapy
  - Mannitol is not only facilitates movement of extracellular water, but also might be increasing CSF absorption
    - The effect is apparent within 15 minutes and failure to respond to mannitol is usually a bad prognostic sign
    - 100 grams IV over 30 minutes
    - 50 grams IV q6h with osmolality monitoring.
  - Hypertonic Saline
    - 3% NaCl - continuous infusion
    - 7.5% NaCl - mostly used in trauma centers
    - 23.4% saline

Reversal of Transtentorial Herniation (TTH) with Hypertonic Saline

- Sixty-eight patients met criteria for TTH and received 23.4% saline, and there were a total of 76 TTH events in these patients.
- The 23.4% saline was administered as a bolus of 30 mL in 65 events (85.5%) and 60 mL in 11 events (14.5%).
- Clinical reversal of TTH occurred in 57/76 events **(75.0%).**
- Median (IQR) GCS increased from 4(3-5) at the time of herniation to 6(4-7) ($p<0.01$) 1 hour and 7(5-9) 24 hours following TTH ($p<0.001$).

  - Zubkov AY et al, Neurology. 2008 Mar 25;70(13): 1023-9

Neurology. Mar 2008; 70: 1023 - 1029

Intracranial Pressure Management

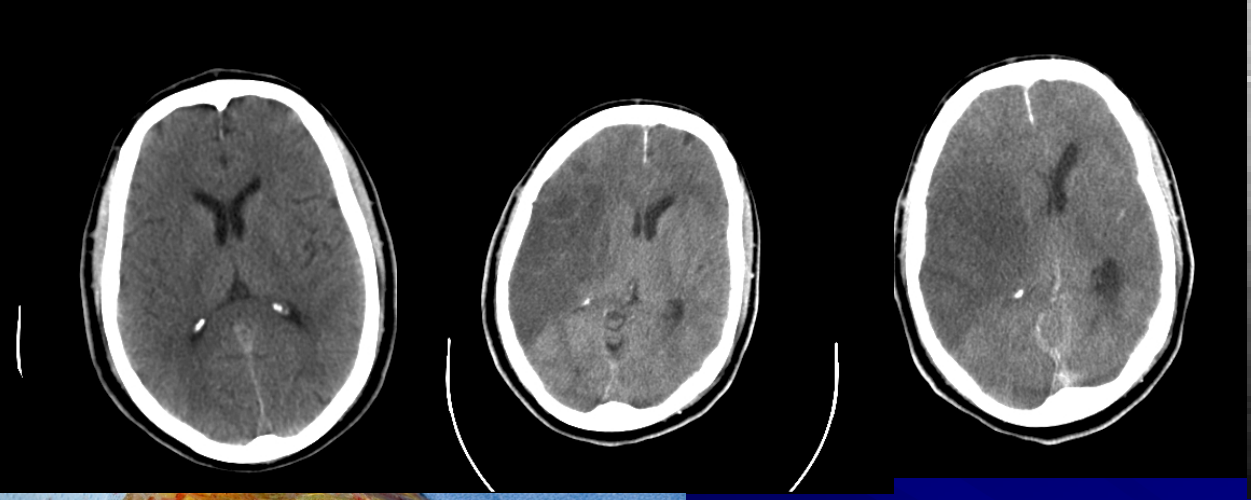
- Hypothermia
  - 33°–34° C) is sometimes tried. Nonetheless, even with timely therapy, significant brain swelling has a greater than 50% mortality rate (Adams et al., 2007)
  - Need to continue the study of safety and effectiveness in the Neuro ICU
  - Guidelines needed for best practice temperature thresholds and rates of rewarming

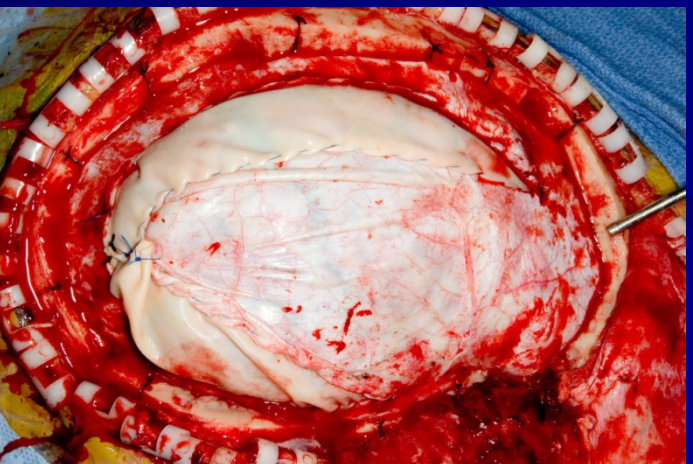
Decompressive Hemicraniectomy

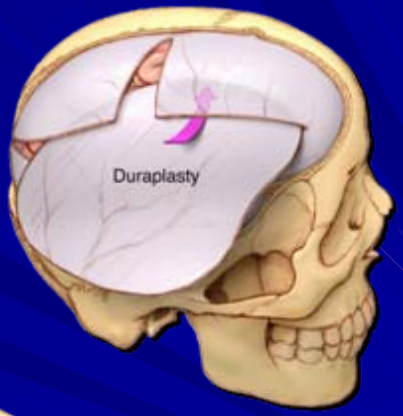
- Decreases mortality and disability
  - Mortality rates after 12 months as high as 50% and a favorable outcome in only 20% of survivors
    - Eric Jüttler et al, *Stroke.* 2007;38:2518 – DESTINY Clinical Trial
- Issues
  - Stephan A. Mayer (*Stroke.* 2007;38:2410.) Theaudin M et al, Stroke. 2010 Apr;41(4):727-31. Epub 2010 Feb 25

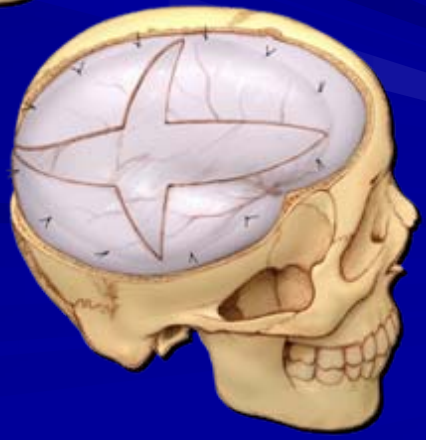
Decompressive Hemicraniectomy

- Patient Selection
  - **Age ≤ 65 yrs**
  - **CT findings large hypodensity in >50% of the MCA territory**
  - **GCS ≤14 (nondominant hemisphere) or ≤9 (dominant hemisphere)**
  - **Operative risk acceptable**
    - **Ashok Pillai** et al, J Neurosurg. 2007 Jan;106(1):59-65.
- Timing of surgery
  - 20% reduction in mortality if done earlier
    - Eric Jüttler et al, *Stroke.* 2007;38:2518 – DESTINY Clinical Trial
- Dominant vs. non-dominant hemisphere strokes
  - Dominant avoided – cognition
    - M. Schneck, T. Origitano *Neurosurgery Clinics of North America*, Volume 19, Issue 3, 459-468
    - Brazilian article 2010
- Age of patient
  - Worse in patients > 60
    - Arac A, et al, Neurosurgery Focus 2009 Jun;26(6):E3






Duraplasty



Nursing Care of Decompressive Hemicraniectomy Patient

- Airway management adequate O2 saturation
- Preventing increased ICP and providing supportive care.
- Hourly vitals/neuros including ICP, CPP, CVP.
- Maintaining BP to ensure adequate CPP
- Seizure precautions
- Antibiotic prophylaxis
- Place a sign on bed to alerting care providers which side of the skull is missing the bone flap
- Do not turn patients onto side of missing flap
- Monitor hemicraniectomy site for changes in appearance- bulging, inflammation, CSF leakage
- Fit with head gear to protect surgical site when up

General Supportive Care of Stroke – Focus on prevention of complications

- Dysphagia Screening to prevent risk of aspiration pneumonia and determine feeding mobility
- Early mobility to prevent DVT, pulmonary emboli
- Bowel and bladder care – best to avoid urinary catheter insertion but if necessary remove as soon as possible
- Other interventions include:
  - Falls prevention
  - Skin Care

Stroke Associated Pneumonia

- Pneumonia – 2nd leading cause of death within first month after stroke
  - >20% die in the 1st year
  - 13% develop pneumonia
  - 35% of acute stroke deaths are from pneumonia
- Higher mortality, poorer long-term functional, and increased cost.
  - Estimated to add $10,0000 and extends LOS by 7 days
- Nursing management –
  - Report fever, listen to breath sounds
  - Consult speech therapy for feeding plan, techniques to prevent aspiration
    - High Fowlers, no straws, mouth care, observe for pocketing, chin tuck, minimal distractions, aware of neglect

Hilker R, et al *Stroke*. 2003;34:975–981; Hinchey JA, *Stroke*. 2005;36:1972–1976; Upadya A, *J Crit Care*. 2004;19:16 –22; Chamorro A, *Stroke*. 2005; 36:1495–1500

Acute Phase - Pneumonia

- Highest risk patients
  - Patients admitted to ICU
  - Vertobrobasilar higher than hemispheric lesions – Brain Stem
  - > 1 infarcted territory
  - Mechanical ventilation
  - Dysphagia – independent factors included facial palsy and decreased LOC
  - Nosocomial highest in failed swallow-gram
  - Immobility
    - Pneumonia complicated 47% of critically ill (Upadya – 2004)

Dysphagia

- Six Screening Tools identified by Perry in 2001
  - 3 oz water
    - DePippo, Holas, Reding. Arch Neurol; 1992
  - Burke Dysphagia Screening Test
    - DePippo, Holas, Reding. Arch Phys Med Rehabil; 1994
  - Any Two
    - Daniels, McAdam, Brailey, Foundas. Am J Speech Lang Pathol. 1997
  - Bedside Swallowing Assessment
    - Smithard, O'neill, England et al. Dysphagia; 1997
  - The Timed Test-
    - Hinds, Wiles. QJ Med 1998
  - Standardized Swallowing Assessment
    - Perry. J Clin Nurse; 2001
  - The Gugging Swallow – 2007
    - Trapl, Enderle, Nowotny. Stroke; 2007
- None meet high sensitivity, high reliability, quick administration, and minimal training for reliable administration

Acute-Stroke Dysphagia Screen (ASDS)

- Goal to develop simple dysphgia screening
- Quick administration with minimal training
- Detect swallowing difficulty quickly and accurately
- Needed to have:
  - Sensitivity to dysphagia and aspiration
  - High interrater and test-retest reliability
  - Concurrent validity established
    - Edmiaston, Conor, Loehr, Nassief. AJCC; 2010

Components

- LOC – Smithard et al showed that LOC correlated with aspiration
  - Glasgow Coma Scale
- Items that indicated whether patient had dysarthria. Logemann et al (1999) did a retrospective analysis of 28 items and found that the best single predictor of oral dysphagia was the presence of dysarthria
  - Facial, lingual, and palatal symmetry selected since they are easy to evaluate visually and can independently or in combination, contribute to dysarthria.
  - When these items are assessed 4 out of 5 cranial nerves that play a rolel in swallowing can be assessed
- 3 oz water swallow test

Nutrition

- Clinically, undernourishment IN 16% of stroke patients
  - Neeraj Badjatia, *Arch Neurol.* 2008;65(1):15-16.
- Feed or Ordinary Diet (FOOD) Trial a large multicenter study of approximately 3000 patients, indicate that a undernourished state at the time of stroke is an independent predictor of poor functional
  - Results showed no reduction in death or poor outcome with routine oral protein-energy supplementation of stroke patients who were primarily well nourished upon admission to the hospital.
  - Nasogastric tube feeding was favored over percutaneous endoscopic gastrostomy as the early route of feeding in dysphagic stroke patients.
- Independent predictors for PEG placement included bulbar symptoms at onset, higher NIHSS score, stroke in the middle cerebral artery distribution, and aspiration pneumonia.
  - Alshekhlee A, J Stroke Cerebrovasc Dis. 2010 May 27

Mobilization

- Early mobilization and measures to prevent the subacute complications of stroke
  - Aspiration Pneumonia
  - DVT and PE
  - Decubitus ulcers, contractures, joint abnormalities
- NO RESEARCH EVIDENCE
  - Arias M, J Clin Nurs. 2007 Feb;16(2):282-8.

DVT Occurrence

- Neurological patients has a higher incidence of DVT due to lack of mobility in the affected limbs, associated with neurological injury.
- Clinically apparent DVT was reported in 1.7% to 5% of patients with ischemic stroke
- Subclinical DVT occurred in 28 to 73%, mostly in the paralyzed extremity
- 5% of the patient with ICH died of pulmonary embolism (PE) within the first 30 days.

DVT Prevention

- Only mechanical methods (intermittent pneumatic compression with or without elastic stockings).
  - Lancet. 2009 Jun 6;373(9679):1958-65. Epub 2009 May 26. Effectiveness of thigh-length graduated compression stockings to reduce the risk of deep vein thrombosis after stroke (CLOTS trial 1): a multicentre, randomised controlled trial.
- Enoxaparin sq once daily was as safe and effective as sq UFH given three daily in the prevention
  - Acta Neurol Scand. 2002 Aug;106(2):84-92. Enoxaparin vs heparin for prevention of deep-vein thrombosis in acute ischaemic stroke: a randomized, double-blind study.

Bladder and Bowel

- **Affects approximately 25 to 50% of stroke survivors.**
- **Persistent difficulties leads to social isolation and restrictions in subsequent employment and leisure activities.**
- **Urinary retention is common during initial stages of stroke recovery but it occurs in only 15% of patients within one year**
- **Post-stroke urinary incontinence it is a strong predictor of survival and recovery at 3 months.**
- **Nursing traditionally assumes primary responsibility for activating this approach.**
  - **assessing urinary retention through the use of a bladder scanner or an in and out catheterization, and measuring urinary frequency, volume, control, and presence of dysuria.**

Doshi V, *Sing Med J*. 2003; 44:643-652; Barrett J. *Rev Clin Gerontol*. 2002; 12:253-267; Britanin K, *J Am Gerontol Soc*. 2006; 54:1915-1919; Peterson R, *J Am Geriatr Soc*. 2006; 54:1878-1884; Booth J. *J Clin Nurs*. 2009; 18:1049-1058

Bladder and Bowel

- Fecal incontinence ranges between 30-40% while in the hospital, 18% at discharge, and between 7-9% at 6 months post-stroke. Harari D, Stroke. 2003; 34:144-150.
- The strongest independent risk factor for fecal incontinence at 3 months post-stroke is needing help getting to the toilet.
- Intervention involves medications and assuring appropriate fiber and fluid intake, and bowel habits. Bulk-forming laxatives, bisacodyl suppositories, stool softeners, osmotic agents, and/or stimulant laxatives may be indicated or contraindicated depending on the individual patient. In some cases of fecal impaction, treatment with enemas, or digital evacuation may be required. Winge K, J Neurol Neurosurg Psychiatry. 2003; 74:13-19.

Acute Phase Bladder Management

- Urinary incontinence – indicator of whether a patient will be discharged to the community or be placed in NF
- Urinary infection - 15-25% of patients
  - average nosocomial UTI estimated at $680 in 1992 and increased LOS by 1 day
  - septicemia increased cost to $3517 and increased LOS by 7.4 days.

Falls

- Higher risk for falls than the general population, with fall rates as high as 50% in community dwelling stroke survivors.
- One study suggested that near-falls in the hospital and poor UE function at the time of hospital discharge were the two best predictors of repeated falls in the first 12 months of community living.
- During stroke recovery, additional factors that increase falling risk are older age, greater trunk sway, inability to walk, visuospatial deficits, apraxia, and use of sedatives.
- Accordingly, the interdisciplinary rehabilitation team should consider all people post-stroke as having an increased risk of falls.
  - Nursing Management: Bed low position, items within reach, timed voiding, extra lightening
  - Right hemisphere fall higher than left hemisphere

Kerse N, *Stroke*. 2008; 39:1890-1893; Ashburn A, Age Aging. 2008; 37:270-276.

Acute Phase

- Skin breakdown –
  - 15% of stroke patients
  - Nursing management – pressure assessment scales and skin rounds

The Basics of Stroke Prevention

- It has been estimated that 80% of all strokes can be prevented (NSA, 2009). The main controllable interventions are:
  - Stop smoking
  - Treat dyslipidemia
  - Treat hypertension
  - Manage diabetes
  - Reduce abdominal obesity
  - Eat a low-fat/high-fiber diet
  - Exercise regularly

Secondary Prevention – TIA, Ischemic, ICH, SAH

- When we discharge our patients, we must make sure they understand their risk factors and what they need to correct or control them.
  - Discharge Planning – Nurses Make the Difference
- If we don't do this, they will be back with another stroke.
- Goal is to ensure a safe transition between the acute care facility, rehabilitation and outpatient settings.

Role of Rehab in Acute Care

- Early Mobilization
- Education
- Assessment for D/C needs

Acute Care for Ischemic Stroke Patients: Nurses Make the Difference

"The thing about neurological patient care is that it is highly dependent upon nurse assessment. We do not have any other "monitor" that can substitute. There is no electrode we can hook up, and no wave we can interpret. There is no equivalent to the PA catheter or ECG. By the time telemetry or SpO2 numbers are abnormal, much too much neurological deterioration may have occurred. Neuro care = Nursing care, might be a good mantra for you to adopt in your negotiations."

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Thank You

Questions