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Inside

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ED is the future of stroke treatment: Are your practices up to par?

Put your stroke protocols in line with current research

Special Report: Stroke Treatment in the ED

Do you consider every stroke patient a potential candidate for thrombolytic therapy? If not, you're not up to date with current approaches for stroke management, according to experts interviewed by *ED Nursing.* **(For more information on new guidelines for "mini-strokes," *see ED Nursing*, January 2000, p. 25.)**

A recent study demonstrated the importance of stroke being treated in the ED, showing that stroke patients can be treated with tissue plasminogen activator (t-PA), the only FDA-approved clot-busting medication, as rapidly by ED physicians as neurologists.[1] **(See story on study, p. 97.)** This study gives added weight to the concept of the ED as the future of stroke treatment, says

EXECUTIVE SUMMARY

A recent study found that stroke patients can be treated with tissue plasminogen activator (t-PA) as rapidly by ED physicians as neurologists, but many EDs still haven't adopted t-PA for stroke as a standard of practice.

- You need to know inclusion criteria for thrombolytic therapy to identify patients who are candidates for treatment.
- t-PA needs to be given within three hours of the onset of symptoms. Research has shown that the earlier a thrombolytic agent is given, the better the outcome.
- Lawsuits have been filed for failing to treat stroke patients with thrombolytic therapy, so carefully document the reasons a patient is not a candidate for treatment.
- Find out when the patient was last normal, instead of asking when symptoms first started.

Christi DeLemos, RN, stroke research coordinator at Mercy General Hospital in Sacramento, CA, and the study's co-author.

Every second counts, says **Patricia Kunz Howard**, RN, MSN, CCRN, CEN, EMS training coordinator for the Lexington (KY) Fayette Urban County Government Division of Fire and Emergency Services and former ED director and stroke team coordinator at Central Baptist Hospital, also in Lexington. "Now that the ED can implement treatment, it has the potential to improve outcomes."

Still, many EDs haven't adopted t-PA for stroke as a standard of practice, and many nurses aren't aggressively identifying patients who are candidates for treatment, DeLemos emphasizes. "It wasn't too long ago that we had nothing to do for stroke, so it's a major change in how we practice medicine," she says. **(See Nursing Guidelines for Thrombolytic therapy and nursing management inserted in this issue.)**

You should make judgments about specific interventions for stroke patients and not wait for a neurologist, Howard emphasizes. "Previously, patients were not evaluated by a specialist quickly enough, or in some cases, the specialists did not want to come in to see an acute stroke at all."

Your ED's stroke protocol is key in reducing delays to treatment, says Howard. "Protocols should allow the triage nurse to initiate the workup, thus facilitating diagnosis and treatment."

Patients who are eligible for thrombolytic therapy must receive treatment within three hours of onset of symptoms, and studies have shown that the earlier the drug is given, the better the outcome, Howard notes.[2,3] **(See related story on ways to reduce door-to-needle times, p. 95.)**

Patients not given t-PA might sue

Despite guidelines and research that stress early treatment in the ED, many EDs are still not prepared to care for acute strokes, Howard reports. "Acute stroke treatment in the ED is where treatment for myocardial infarction was 15 years ago," she says.

Many EDs still are poorly prepared to care for acute stroke patients, reports Howard. "Most EDs have inadequate stroke protocols or none at all, no stroke team in place, and don't assess patients quickly," she says.

You might face liability risks if you aren't up to date with your stroke practice, warns DeLemos. "Multiple lawsuits have been filed for failing to treat patients with t-PA."

To avoid problems, document the reasons for deciding not to treat, DeLemos emphasizes. Your careful documentation is key. "There are patients who have sued over not getting the drug when they were actually not good candidates, but there was no documentation of the reasons why."

Many stroke patients come to the ED on their own instead of calling 911, she notes. "Those patients must be triaged quickly, so you need to be on the lookout for signs and symptoms of stroke," DeLemos says. "Having those patients sitting in the waiting room is a big no-no and huge source of litigation."

Here are ways to utilize current approaches in stroke care in your ED:

• **Be familiar with inclusion criteria.**

Follow specific criteria to determine who should and shouldn't receive thrombolytics, says DeLemos. "If you select poorly, your patients could end up having terrible complications."

t-PA inclusion and exclusion criteria are well-accepted, says Howard. "The current thought is that any patient with a National Institutes of Health [NIH] Stroke Scale score over 6 with a sustained and not improving neurologic deficit, in the absence of exclusion factors, should receive t-PA," she says. "Also, exclusion for hypertension refers to sustained hypertension, not just a reading or two." **(For more information on the NIH Stroke Scale, see *ED Nursing*, March 2000, p. 61.)**

• **Avoid dosing errors.**

The dose of t-PA for stroke is 0.9 mg/kg, which is approximately two-thirds of the cardiac dose. The dose is critical, stresses DeLemos. "The European Cooperative Acute Stroke Study looked at a dosage of 1.1 mg/kg, which is only 0.2 mg more, but the hemorrhage and mortality rates were so high that the study was stopped."[4]

Weighing the patient can be overlooked in the hectic ED, but avoid "guesstimates" about the patient's weight, says DeLemos. Dosage charts are also helpful, she adds.

• **Monitor blood pressure carefully.**

Check blood pressure every 15 minutes for two hours, every 30 minutes for the next six hours, and every hour for the next 16 hours, says DeLemos.

COMING IN FUTURE MONTHS

■ New advanced cardiac life-support drugs

■ Update on new reimbursement system

■ Care for non-English speaking patients

■ How to manage a postmortem C-section

SOURCES

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"Blood pressure management is an essential element of thrombolytic therapy," she says. "We now know if the patient's blood pressure is elevated over 185/110, the likelihood of intracerebral hemorrhage goes up."

If you don't manage blood pressure carefully and take steps to keep it down, the risk of a bad outcome from the treatment is higher, DeLemos adds.

• **Determine when the patient was last normal.**

TPA needs to be given within three hours of onset of symptoms, DeLemos emphasizes. You might be the first person to talk to the EMS provider, so you need to find out as much information as possible, she adds.

"Ask them when the patient was last known to be normal, instead of when they were found," she advises. "That's an important distinction to make."

• **Take a team approach.**

Make sure that all ancillary departments such as lab and radiology are aware the patient is a potential candidate for t-PA, says DeLemos. "If everyone involved in the process understands that we need to move quickly, it can make a big difference in door-to-needle time."

• **Ensure proper management of complications.**

Your ED's protocol should address management of severe hypertension before, during, and after administration of t-PA and bleeding complications, cautions **Nanette H. Hock**, RN, MSN, program coordinator for the Stanford Stroke Center in Palo Alto, CA. "Rapid administration of t-PA is important," she says. "But more important is the clinical acumen of the ED physician in managing severe hypertension and potential complications such as intracranial hemorrhage." **(See story on ED stroke protocol, p. 98.)**

Because there is the possibility of bleeding complications, protocols must include frequent neurological checks, management of vital signs within close parameters and a noncontrast computerized tomography scan if any neurologic changes occur, Howard says.

"The more aggressive the treatment is on the front end, and the more quickly the patient's problem is recognized, the better the functional outcome," she says.

References

1. Akins PT, DeLemos C, Wentworth D, et al. Clinical outcomes are similar when stroke neurologists and emergency room physicians prescribe intravenous tissue plasminogen activator for acute ischemic stroke. Abstract presented at the American Stroke Association's 25th International Stroke Conference. New Orleans; February 2000.
2. Carok JJ, Huybrech TS. Stroke treatment economic model: Predicting long-term costs from functional status. *Stroke* 1999; 30:2,574-2,579.
3. Holloway RG, Benesch CG, Rahilly CR. A systematic review of cost-effectiveness research of stroke evaluation and treatment. *Stroke* 1999; 30:1,340-1,349.
4. Hacke W, Kaste M, Fieschi C, et al. Intravenous thrombolysis with recombinant tissue plasminogen activator for acute hemispheric stroke: The European Cooperative Acute Stroke Study (ECASS). *JAMA* 1995; 274;1,017-1,025. ■

How to reduce delays when seconds count

Your door-to-needle time for administration of thrombolytic therapy to stroke patients should be less than 90 minutes, says **Patricia Kunz Howard**, RN, MSN, CCRN, CEN, EMS training coordinator for the Lexington (KY) Fayette Urban County Government Division of Fire and Emergency Services and former ED director and stroke team coordinator at Central Baptist Hospital, also in Lexington.

Special Report: Stroke Treatment in the ED

"The sooner the drug is given, the better," she emphasizes.

ED nurses have a comfort level with thrombolytics for cardiac indications but might be hesitant to use it for stroke, thus causing delays in treatment, says **Janice Fitzgerald**. MS, RN, CEN, clinical practice guidelines coordinator at Baystate Medical Center in Springfield, MA. "Just as we say 'time is muscle' with cardiac conditions, the same rule applies to stroke. Time is also brain."

Every second counts, Fitzgerald emphasizes.

Brain Attack Inservice (EMS)

1. What significance does stroke (brain attack) have to our society?
- Third-leading cause of death.
- 150,000 deaths per year attributable to stroke.
- Leading cause of adult disability.
- Most preventable of all catastrophic conditions.

2. Be stroke smart
- Recognize symptoms: inability to walk, garbled speech, dizziness, loss of balance, weakness numbness or paralysis of the face, arm or leg, mental status change, blurred or decreased vision.
- Respond properly.

3. Initial EMS actions for stroke
- ABCs: Establish airway and administer oxygen by mask or nasal cannula at 2 liters per minute using normal saline (60 ccs per hour).
- Establish IV or saline lock using normal saline (60/hr) on all patients with recent onset of symptoms.
- Frequently monitor vital signs and neurological status (expect high pressures).
- Check blood glucose per protocol.
- Determine and document onset (the last time the patient was seen normal) of stroke symptoms.

4. EMS actions that should NOT be taken:
- Don't delay transport.
- Don't administer large amounts of fluid; it may contribute to brain swelling two to three days later.
- Don't administer dextrose fluids unless the blood glucose is below 80.
- Exceptions to the above guidelines exist in case where symptoms of shock or hypoglycemia exist. Contact the receiving ED for orders.

5. Conditions that mimic stroke or are other potential causes of "stroke-like" symptoms:
- Hypoglycemia: This should be considered in anyone with altered mental status and neurological symptoms.

EMS — Check blood sugar.
- Epidural and subdural hematoma: Collections of blood under the skull.

EMS — Check for evidence of a fall.
- Brain abscess or tumor.

EMS — Check for elevated temperature or history of cancer.
- Post-seizure paralysis.

EMS — Obtain history and evaluate for evidence of a seizure.

Source: Mercy General Hospital, Sacramento, CA.

"Everybody who has contact with moving the patient through the system must do it as quickly as possible, knowing that the clock is ticking."

Here are ways to reduce your door-to-needle times:

• **Take advantage of having first contact with the patient.**

You might be the first provider to do an in-depth assessment that might flag the patient as a potential candidate for treatment, says Fitzgerald. "Any patient who comes in with stroke symptoms should be considered a candidate."

• **Include standing orders for nurses.**

Protocols should give the nurse "standing orders" to initiate diagnostic procedures based on the patient's clinical presentation and specific risk factors, without an examination by a physician, nurse practitioner, or physician's assistant, says Howard. "It should also allow nurses to start other interventions, such as IV access."

• **Investigate delays.**

Delays also can be overcome by frequent quality assurance audits, says **Nanette H. Hock**, RN, MSN, program coordinator for the Stanford Stroke Center in Palo Alto, CA. "Find out what caused the delay, and immediately implement an action plan."

Hold periodic staff meetings to evaluate delays in door-to-needle times, says DeLemos. "Ask, 'What is our door to needle time? What are the hang-ups? How long does it take to get a CT scan interpreted? How long does it take for an ED physician to see the patient?' These are all things that can make a huge difference."

• **Assess whether the patient needs to be transferred.**

Identify the delays that cannot be controlled or overcome, Hock recommends. If the cause of the delay is beyond the institution's capacity to change or overcome, such as the absence of a competent physician who can direct the treatment or the absence of an ICU bed, the institution should transfer the patient to a more competent hospital, she says.

• **Make stroke care a priority.**

A common cause of delay is a disorganized or busy ED with multiple patients and conflicting priorities, says Hock. In this case, the team needs to make a concerted effort to reprioritize stroke or transport the patient immediately to the ICU for thrombolytic therapy, she advises.

"Whatever the cause of the delay may be, the key is to make a concerted and authoritative decision to change and better the system," Hock emphasizes.

• **Educate emergency medical services (EMS) providers about making stroke a priority.**

Inservicing EMS providers is essential so they can alert you of an incoming stroke patient and begin

SOURCE

For more information about reducing door-to-needle times, contact:

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gathering needed information, Howard says. "While many places today assume that everyone knows about rapid recognition and treatment of stroke, it is simply not true."

EMS providers need special training on stroke recognition, says Howard. "Many emergency medical technicians and paramedics were not trained under this framework, so in some cases they are part of the delay to care." For example, paramedics might not transport a patient whose only complaint is numbness or double vision, Howard adds.

"It is a recognized fact that patients brought in by ambulance receive evaluation more quickly than patients walking through the front door," Howard says.

Also, EMS providers should begin the thrombolytic checklist as they do for an acute myocardial infarction, says Howard. "EMS should have their own stroke protocol, so they can do things such as administer an aspirin and manage hypertension." **(See brain attack inservice for EMS, p. 96.)**

• Identify individual staff members to take specific actions.

"You need a 'point' person to take charge and hammer down the cascade of events that are to take place instantly, such as obtaining rapid CT, ultrastat labs, reading the CT, and instantly screening the patient for potential t-PA treatment or other interventions," advises Hock. These events must be a closed loop, she says. "If one or two pathways don't work, the effort and outcome are not as smooth."

• Use protocols.

Stroke protocols in ED provide the guideline for rapid and organized treatment for acute stroke, says Hock. At a minimum, protocols should cover recognition of signs and symptoms of stroke, proposed response time, and specific roles and responsibilities in a stroke code, she says. **(See protocol for thrombolytic therapy and thrombolytic therapy standing orders, inserted in this issue.)**

"The protocols will help minimize delay in triage and treatment by defining the algorithm and pathway for care," Hock says. ■

t-PA should be given in the ED, study says

Special Report: Stroke Treatment in the ED

A new study holds up the ED as the future of stroke care. In the study, neurologists evaluated and treated 20 stroke patients, and ED physicians treated and evaluated 23 stroke patients after a phone consultation with a neurologist and review of brain scans by a radiologist.[1] The door-to-needle times were similar (97 minutes for neurologists and 108 minutes for ED physicians).

"There was a need to evaluate whether emergency physicians could administer tissue plasminogen activator [t-PA, the only FDA-approved clot-busting medication] safely and effectively," says **Paul Akins**, MD, PhD, co-director of the Regional Stroke Intervention Program for Mercy Healthcare in Sacramento, CA. "Our results showed that it could be done." The ED is where the fate of a vast number of stroke patients is largely determined, says Akins. "Those early minutes of arrival are critical in determining whether a patient will regain his or her life, or be left severely disabled," he says.

Be realistic about neurologists

Expecting neurologists to drop everything and come running to the ED for every stroke patient is unrealistic, says Akins. The study showed that patients had identical outcomes whether they were treated by ED physicians or neurologists, says Akins.

"That's very important when you consider that some ED physicians have been leery of taking on this treatment," he says. Using TPA for stroke is relatively new in the ED and carries the possibility of life-threatening complications such as hemorrhage, Akins notes.

The study found that protocol violations for the way in which t-PA is administered were much more frequent in the ED physician group than the neurology group, says **Christi DeLemos**, RN, stroke research coordinator at Mercy General Hospital in Sacramento, CA, and a co-author of the study. "That's primarily because the drug was new and is not administered in same way as for myocardial infarction."

Once the high rate of error became apparent, an education program for the ED physicians was implemented. The hospital's stroke team provided inservicing at staff meetings, and cards for dosages and inclusion/exclusion criteria were given to physicians, says Howard. "The physicians were also encouraged to

SOURCE

For more information about the study, contact:

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page the stroke team to discuss every case."

"The rate of error went down dramatically," says DeLemos. "Our rate of error is none at the ED level now. This shows that giving t-PA in the ED is safe and effective."

Providers must be knowledgeable in the use of t-PA and the nuances of case selection, cautions Akins. "Close, compulsive adherence to published guidelines is critical to avoid bleeding complications and to select patients that will benefit," he says.

Reference

1. Akins PT, DeLemos C, Wentworth D, et al. Clinical outcomes are similar when stroke neurologists and emergency room physicians prescribe intravenous tissue plasminogen activator for acute ischemic stroke. Abstract presented at the American Stroke Association's 25th International Stroke Conference. New Orleans; February 2000. ■

Here's a sample stroke protocol

Assume that paramedics call and report they have a 54-year-old male who collapsed at his desk 15 minutes ago and will arrive at the ED in less than three minutes. At St. Elizabeth Medical Center in Edgewood, KY, the Possible Stroke ED Care Map covers the patient's first two hours of care. **(See protocol, p. 99.)** Here are the steps taken in this hypothetical scenario, according to **Rebeca Tacy**, RN, BSN, CEN, assistant ED nurse manager:

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1. Paramedics alert the ED. The paramedics have been trained in the acute ischemic protocol and have already prepared for the patient to receive tissue plasminogen activator (t-PA), the only clot-busting medication approved by the Food and Drug Administration.

"The paramedics have begun the history-taking process to determine that the patient has no contraindications to thrombolytic therapy," says Tacy.

2. The ED physician on duty prepares the critical care ED room, and the stroke team is called. "The patient has not even arrived, and life-saving measures have already been implemented," Tacy notes.

3. When the patient arrives, the ED team is waiting. The patient's vitals are reassessed, a second IV saline lock is inserted, an electrocardiogram, portable chest X-ray, and standard lab tests are performed.

4. While the ED physician evaluates the patient, a modified National Institutes of Health Stroke Scale assessment is performed, which serves as a quick screen of the patient's deficits.

5. Upon arrival, the patient and family receive a quick orientation of the process. "They are informed that speed is of the essence, because the quicker that the stroke is treated, the greater the benefit to the patient," Tacy explains. "The family is extremely valuable in giving medical information for the stroke patient."

6. CT is ready within five minutes of the patient's arrival. "The registration process is not complete; however, registration must never delay the diagnosis and treatment of the patient," notes Tacy.

An immediate report is received from the radiologist. Copies of the CT films are made for the stroke team neurologist, who consults over the phone to save time. "Twenty minutes have elapsed since the patient arrived in the ED, and 40 minutes have passed since his stroke began," says Tacy.

No delay in giving drug

7. Because the CT is negative, the decision to treat with Activase (altephase, recombinant, manufactured by Genentech in San Francisco) is made by the ED and stroke team physicians. "Because the Activase is available in the ED, there is no delay in getting the drug to the patient," Tacy explains.

8. While the drug is being mixed, the family and patient are informed of the risks and benefits of the medication. The family gives verbal consent. "Since the FDA has approved the treatment of AIS [acute ischemic stroke] with Activase, no formal consent is required," Tacy says. "A written consent would further delay the treatment to the patient."

9. The Activase is hung within 45 minutes of the symptom onset for this patient. The Stroke Team physician arrives as the medication is begun.

10. Admission into a critical care bed is arranged, and the patient's progress is monitored while he is in the ED. Twenty minutes after initiating the Activase, the patient begins to show improvement under the

(Continued on page 100)

S

CASE TYPE

POSS STROKE ED CAREMAP

NAME

ACCT #

DATE

OR PATIENT LABEL ON ALL COPIES

SYMPTOM ONSET TIME	ARRIVAL TIME	TRIAGE TIME	TO TX AREA TIME

CHIEF COMPLAINT: _____

RELATED HX: _____

THROMBOLYTIC PROTOCOL CONTRAINDICATIONS NO YES

LIST _____

STROKE TEAM/NEUROLOGIST CONSULT: _____ PHONE# 844-7686

TIME: _____ NAME _____

CURRENT MEDICATIONS: _____

SEE PROGRESS NOTE _____

ALLERGIES: _____

SEE PROGRESS NOTE _____

DAY 1 0 - 2 HRS.	✓	DAY 1 0 - 2 HRS.	✓	DAY 1 0 - 2 HRS.	✓
ASSESSMENTS 1. ED/Critical Care brief assessement 2. Neuro Assessment 3. Decide eligibility for thrombolytic therapy 4. Cardiac monitoring-as indicated 5. Reassess as indicated 6. Fingerstick blood sugar on arrival 7. I & O 8. Old Chart as needed 9. CT head on arrival INT		**MEDICATIONS/ IV** 1. IV access 2. Consider 02: Antihypertensive Only if Systolic >200 or Diastolic >110 Anticoagulant Antiemetic Thrombolytic Antiarrhythmic Antianxiety Dextrose 50 INT		**NUTRITION** 1. NPO INT	
				ACTIVITY SAFETY 1. Bedrest 2. Siderails up x 2 INT	
				CONSULTS 1. Consider Neurology consult INT	
TESTS 1. Blood sugar finger stick - Stat 2. CBC 3. Chem 7 4. CK 5. Coag Profile 6. EKG 7. CXR - Portable 8. Oximetry 9. CT head - Stat 10. Sed Rate 11. HCG INT		**TREATMENTS** 1. Weight/Height (actual or best estimate) 2. Nasal O2 - titrate to maintain SpO2 at 92% or > 3. Initiate thrombolytic protocol for ischemic CVA as indicated INT		**PSYCHO SOCIAL** 1. Offer reassurance & explanation of condition & treatment plan 2. Pastoral Care 3. Sig. Other Visit INT	
				EDUCATION 1. Orient pt. & family to unit & routine. 2. Explanation of: -current condition /tx plan INT	
				TRANSFER D/C PLAN 1. Admit to unit within 2 hrs. INT	

Complications: _____

#7852 4/97

ASSESSMENT CODES

✓ Negative (normal)
* Positive (needs explanation)
> Needs Description
S Assessment same
△ Change In Assessment

Temp _____
Wt. _____ Actual / Estimate

	TIME								
CARDIO	Radial/apical heart rhythm regular								
	Capillary refill < 3 seconds								
	Absence of edema								
RESPIRATORY	Abdomen soft, nontender								
	Respirations regular & unlabored								
	Breath sounds clear								
	Absence of cough								
INTEGU-MENTARY	Secretions clear								
	Skin color within patient norm								
	Skin warm & dry								
	Skin turgor good								

NEURO ASSESSMENT										
Level of consciousness	Alert Drowsy Stuporous Coma	0 1 2 3								
LOC Commands	Obeys correctly Obeys one correctly Incorrectly	0 1 2								
Facial Palsy	Normal Minor Partial Complete	0 1 2 3								
Motor Arm-Left Arm	No drift Drift Lifts and falls back Moves on bed only No movement	0 1 2 3 4								
Motor Arm - Right Arm	No drift Drift Lifts and falls back Moves on bed only No movement	0 1 2 3 4								
Motor Leg-Left Leg	No drift Drift Lifts and falls back Moves on bed only No movement	0 1 2 3 4								
Motor Leg-Right Leg	No drift Drift Lifts and falls back Moves on bed only No movement	0 1 2 3 4								
Sensory	Normal Partial Loss Dense Loss	0 1 2								
Best Language	No aphasia Mild to moderate Severe aphasia Mute	0 1 2 3								
Initials										

Alteration in cerebral perfusion	**Resolution of or stopped progression of deficits**	
Risk of airway dysfunction/aspiration	**Patent airway and effective breathing pattern**	
Alteration in BP	**BP will be treated ONLY if it is >200 Systolic or >110 Diastolic**	
Knowledge deficit	**Patient/sig other states & identifies with current condition & treatment plan**	

EMERGENCY DEPARTMENT RECORD

PROGRESS NOTES:

✓ & INITIAL DENOTES COMPLETION IN ED

SOURCE

For more information about the ED's stroke protocol, contact:

- **Rebeca Tacy**, RN, BSN, CEN, St. Elizabeth Medical Center, South Emergency Department, 1 Medical Village Drive, Edgewood, KY 41017. Telephone: (859) 344-2644. Fax: (859) 344-2022.

modified stroke scale assessment, says Tacy.

"Twenty-four hours later, in the ICU, the patient is able to move all extremities and shows minor dysarthria," she says. "Three months later, the patient is back to work."

A National Institute of Neurologic Disorders and Stroke study showed that patients treated with Activase during an acute ischemic stroke were 30% more likely to have minimal or no disability at three months.[1]

Reference

1. National Institute of Neurologic Disorders and Stroke rt-PA Stroke Study Group. Tissue Plasminogen Activator for Acute Ischemic Stroke. *N Eng J Med* 1995; 333:1,581-1,587. ■

Do you know how to safely treat obese patients?

Is your ED providing safe and dignified care to morbidly obese patients? These patients present both physiologic and logistical challenges, according to **Rebecca A. Steinmann**, RN, MS, CEN, CCRN, CCNS, a clinical nurse specialist for trauma/critical care at MetroHealth Medical Center in Cleveland.

Mortality increases with body mass indexes over 25, and five out of the 10 leading causes of death in the United States are linked to obesity, so it's key to assess for medical complications when treating those patients, says Steinmann. **(See related stories on clinical presentations of obese patients, p. 101; cardiac conditions, p. 101; and risk factors of obese patients, p. 102.)** Here are several ways to improve care of obese patients:

• **Use appropriate-size cuffs for accurate measurement of hypertension**. You should have normal, large, and extra-large adult cuffs, says Steinmann. "But it's not reasonable to expect that any ED is equipped with a cuff to check a brachial blood pressure on a 900-lb. patient," she says. "It doesn't work; we tried it."

Instead, ask the patient where they measure his/her blood pressure, suggests Steinmann. "You will need to be creative, and place the most appropriate-size cuff on an extremity where it will fit."

Realize that the measurement may not be as accurate, but an inaccurate measurement that you can trend over time is better than no measurement at all, says Steinmann. "Remember that cuffs applied to obtain radial and/or pedal pressures will be higher than brachial blood pressures. Also remember to convey to the inpatient units how the blood pressure is being measured."

• **Check for skin infections.** Obese patients may have bacterial and fungal infections from skin folds that were abrased or open from continued touching of skin surfaces, and/or inability to clean those areas of their body, says Schutz.

• **Position patient sitting upright or lying on side.** Position patients upright or on their side so the weight of the abdomen does not impinge on the ability to move the chest wall, says Steinmann. Laying the patient flat on the back can precipitate or exacerbate respiratory distress. "There is increased work of breathing because moving the chest wall expends considerable energy."

Rapid and shallow respirations are the norm, says Steinmann. "ABGs frequently demonstrate respiratory acidosis, hypoxemia, and hypercapnia."

If the patient is a trauma case, or needs to be supine for any reason for any length of time, you'll need to consider compression issues, says Schutz. "Use the logic of the OR — that anything subjected to pressure needs to be padded."

The obese patient may have difficulty being supine, especially if he/she is a smoker, says Schutz. "They may have an inability to breathe, due to abdominal contents filling the subdiaphragmatic space and shortening their lung volumes," she says. "Also, it is extremely hard to move that much weight with each breath."

• **Assess whether crutches are a safe option for**

EXECUTIVE SUMMARY

Morbidly obese patients present physiologic and logistical challenges, so you'll need to take steps to assess and treat appropriately.

- Crutch walking may not be a safe option for lower extremity injuries, so consider walkers or wheelchairs instead.
- If you don't have an appropriate-sized cuff, instead of taking a brachial blood pressure, place the cuff on an extremity where it will fit.
- Instead of flat on the back, position patients upright or on their side so the weight of the abdomen does not impinge on the ability to move the chest wall.

Morbidly obese patients: Here's what to expect

There are several differences in clinical presentations of morbidly obese patients that will impact your assessment and intervention, says **Rebecca A. Steinmann**, RN, MS, CEN, CCRN, CCNS, a clinical nurse specialist for trauma/critical care at MetroHealth Medical Center in Cleveland. Here's what to expect:

• **Vital signs.** Expect increased heart rate, increased respiratory rate, and increased blood pressure.

• **Skin assessment.** Look for pressure ulcers in unusual places (such as the sides of the feet). Deep skin folds (axilla, breasts, inguinal, and perineal) might harbor fungal growths. Hyperkeratosis and venous stasis of lower extremities is common.

• **Airway management.** Patents are technically difficult to intubate because of a short and thick neck.

• **Circulation.** When the patient is lying flat, the weight of the abdominal pannus might impede circulation to lower extremities.

• **Medication administration.** Due to poor blood flow to adipose tissue, there might be a delayed response. Transdermal patches might have poor absorption through the skin, due to poor vascular supply to adipose tissues. Some drugs are widely distributed to adipose tissue (for example, Fentanyl and hydromorphine), so drug effects might last longer.

• **Wound care.** There might be impaired healing, increased risk of infection, and poor vascular supply to adipose tissue.

• **Imaging studies.** Patients might exceed weight limit for CT scans, MRIs, and angiography.

• **Stroke.** There is a 24% increased risk of ischemic stroke with a body mass index over 30.[1]

• **Endocrine problems.** Prevalence of Type 2 noninsulin-dependent diabetes mellitus increases with body mass index over 22.

• **Increased volume and acidity of gastric secretions**. There is an increased incidence of gastroesophageal reflux. There is also delayed gastric emptying, so assume the stomach is almost full. As a result of this, the absorption and onset of action of any oral medications might be affected.

Reference

1. National Heart, Blood, and Lung Institute. *Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults: The Evidence Report*. Bethesda, MD; 1998. ■

fractures and sprains. Assess whether crutch walking is a realistic option for lower-extremity injuries, says Steinmann. "I would not give out crutches without assurance [from the manufacturer] that the crutches can support that much weight," she advises. Walkers or wheelchairs, specially ordered from bariatric equipment suppliers, might be a much safer option.

• **Consider logistical issues in advance.** Make sure you have the appropriate size cart, bed, and wheelchairs, says Steinmann. There are safety issues to consider for both for the patient and the staff, so make sure you have enough personnel to move the patient from point A to point B, she advises. "We were so proud of ourselves for ordering a specialty bed for one of our patients," she recalls. The prehospital, ED, and security staff assisted in transferring the patient over to the bed. "It then took 14 people to transport the patient on the bed to the elevators up to the inpatient floor, only to find that the bed did not fit through the doorway of the room."

To avoid such scenarios, draft a plan in advance, for how to logistically manage a morbidly obese patient from arrival to admission, she advises.

• **Realize that patients are at high risk for diabetes.**

The obese patient is at high risk of Type 2 diabetes, which is frequently undiagnosed, says **Sandra L. Schutz**, RN, MSN, CCRN, an ED clinical nurse specialist at Swedish Medical Center in Seattle. "If in fact they have diabetes, they may have a hypoglycemic threshold that is much higher than a normal patient and thus will become symptomatic at much higher blood sugars than you would expect."

An example is the patient who is confused, shaky, and diaphoretic at a blood sugar level of 120, says Schutz. "This may simply be from a protracted time of having high sugars, and thus when they get to 120, they are truly hypoglycemic." ■

Assess obese patients for cardiac conditions

There probably will be some degree of cardiac involvement in any morbidly obese patient, stresses **Sandra L. Schutz**, RN, MSN, CCRN, an ED clinical nurse specialist at Swedish Medical Center in Seattle.

"Obesity often causes related and/or aggravated hypertension," she says. "This in turn may cause left ventricular hypertrophy." Here are some cardiac-related items to consider with morbidly obese patients:

• **Order an ECG if there is any question of chest pain.** Risk of coronary heart disease death and nonfatal acute myocardial infarction increases with increased

SOURCES

For more information on management of obese patients, contact:

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body mass index, says **Rebecca A. Steinmann**, RN, MS, CEN, CCRN, CCNS, a clinical nurse specialist for trauma/critical care at MetroHealth Medical Center in Cleveland.

Obesity is associated with prolonged QT interval (electrocardiographic interval from the beginning of QRS complex to end of the T wave), which is associated with sudden cardiac death, says Steinmann.

Obesity is also associated with dyslipidemia, hypertension, and Type II diabetes, so these patients are at increased risk of coronary events, says Steinmann. It's obvious that an ECG should be obtained with chest pain, but it also should be obtained with some of the more atypical coronary presentations, such as increased dyspnea, fatigue, and weakness, she says. "Remember that diabetics do not often present with the classic coronary syndrome presentations."

• **Realize you might not be able to auscultate crackles/rales because of decreased transmission of breath sounds through the increased tissue of the chest wall.** When assessing for congestive heart failure, looking for peripheral edema might not be helpful, as these patients characteristically have edematous lower extremities, says Steinmann. "Just be cognizant that this may be occurring."

• **Assume patients are hypertensive, have some form of ventricular failure, and are diabetic until proven otherwise.** If the morbidly obese patient smokes and/or has pulmonary problems, anticipate that they have some degree also of right ventricular failure, Schutz advises. "I usually seek to disprove those issues, all the while realizing that one of them may become a comorbid issue."

Anticipate comorbid issues with these patients, Schutz advises. "Don't assume the young are OK and just obese," she says. "It doesn't work that way." ■

Examine obese patients for these risk factors

Examine morbidly obese patients for the presence of the following risk factors, according to the Bethesda, MD-based National Heart, Blood, and Lung Institute:[1]

• **Cardiovascular risk factors.** Cigarette smoking, hypertension (systolic blood pressure ≥ 140 mm Hg or diastolic blood pressure ≥ 90 mm Hg, or the patient is taking antihypertensive agents), high-risk LDL-cholesterol (≥ 160 mg/dL), low HDL-cholesterol (< 35 mg/dL), impaired fasting glucose (fasting plasma glucose of 110 to 125 mg/dL), family history of premature coronary heart disease (CHD) (definite myocardial infarction or sudden death at or before 55 years of age in father or other male first-degree relative, or at or before 65 years of age in mother or other female first-degree relative), and age (men ≥ 45 years and women ≥ 55 years or post-menopausal).

Patients can be classified as being at high absolute risk if they have three of the aforementioned risk factors. Patients at high absolute risk usually require clinical management of risk factors to reduce risk.

Patients who are overweight or obese often have other cardiovascular risk factors. The intensity of intervention for cholesterol disorders or hypertension is adjusted according to the absolute risk status estimated from multiple risk correlates. These include both the risk factors listed above and evidence of end-organ damage present in hypertensive patients. Approaches to therapy for cholesterol disorders and hypertension are described in the *Second Report of the Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults* and the *Sixth Report of the Joint National Committee on Prevention, Detection, and Evaluation of High Blood Pressure*, respectively. In overweight patients, control of cardiovascular risk factors deserves equal emphasis as weight reduction therapy. Reduction of risk factors will reduce the risk for cardiovascular disease whether or not efforts at weight loss are successful.

• **Disease conditions.** Established CHD, other atherosclerotic diseases, Type 2 diabetes, and sleep apnea. Patients with those conditions are classified as being at very high risk for disease complications and mortality.

• **Other obesity-associated diseases.** Gynecological abnormalities, osteoarthritis, gallstones and their complications, and stress incontinence.

• **Other risk factors.** Physical inactivity and high serum triglycerides (> 200 mg/dL). When those factors are present, patients can be considered to have incremental absolute risk above that estimated from the preceding

RESOURCE

A complete copy of the National Heart, Lung, and Blood Institute (NHLBI) guidelines is available for $8 plus $2 shipping and handling charge. Ask for NIH Publication No. 98-4083. To order a copy, contact:

- **NHLBI Information Center**, P.O. Box 30105, Bethesda, MD 20824-0105. Telephone: (301) 592-8573. Fax: (301) 592-8563. E-mail: NHLBIInfo@rover.nhlbi.nih.gov.

risk factors. Quantitative risk contribution is not available for those risk factors, but their presence heightens the need for weight reduction in obese persons. **(To order the guidelines, see resource box, above.)**

Reference

1. National Heart, Blood, and Lung Institute. *Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults: The Evidence Report.* Bethesda, MD; 1998. ■

JOURNAL REVIEWS

Gulla J, Singer AJ. Use of alternative therapies among emergency department patients. Ann Emerg Med *2000; 25:226-228.*

This study from the State University of New York at Stony Brook says most ED patients sampled had tried alternative therapies, but most did not inform their physicians, says. Here are the study's key findings:

• Of 139 patients surveyed, 56% had tried alternative therapies.

• The most frequently tried alternative therapies were massage therapy (31%), chiropractic (30%), herbs (24%), medication (19%), and acupuncture (15%).

• Most patients (70%) who tried alternative therapies did not inform their physicians.

The numbers are slightly higher than others reported by previous studies, note the researchers. This change might reflect the continually increasing use of alternative therapies, or the fact that symptomatic patients in the ED are more likely to use alternative therapies than asymptomatic individuals surveyed by telephone, they suggest.

ED patients should be routinely questioned about the use of alternative therapies, particularly herbal preparations, which may cause adverse effects, the researchers advise. "Most important to emergency practice is herbal use because of the propensity for adverse effects that may be relevant to the patient's presenting condition," they say. For example, severe bleeding has been reported in patients using extracts of gingko biloba in combination with anticoagulants: "In our ED, we are adding use of alternative therapies to our structured histories." ▼

Watson WT, Marshall ES, Fosbinder D. Elderly patients' perceptions of care in the emergency department. J Emerg Nurs *1999; 25:88-92.*

A need for more information about their care was expressed by elderly patients visiting the ED at Utah Valley Regional Medical Center in Provo, UT, says this study. Elderly patients visit the ED more than the general population, so pay attention to their perceptions and satisfaction, the researchers advise. Twelve elderly patients were interviewed about their experience in the ED, and five themes became apparent, including the following two concerns:

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• **Need for information.** Patients expressed a need to understand specific care and treatment processes, what they could expect, and whether their condition was serious or might worsen.

• **Personal tolerance.** Elderly patients were understanding about the needs of patients in the ED.

The researchers recommend the following practice changes to improve care of the elderly in the ED:

— A comprehensive geriatric triage program by geriatric nurses, where triage includes both assignment for acute treatment and discharge planning with home care agencies and other community services.

— A geriatric consultation team in the ED that assesses needs of elderly patients regarding hospital admission, community services, or both.

— Improvement of training of nurses and physicians in the care of geriatric patients in the ED. ▼

Hsieh M, Gutman M, Haliscak, D. Clinical clearance of cervical spinal injuries by emergency nurses. Acad Emerg Med *2000; 7:342-347.*

Nurses unsafely clinically cleared 5% of cervical spinal injuries, according to this study from the University of Connecticut in Farmington, Bristol (CT) Hospital, and St. Francis Hospital in Hartford, CT.

"These data suggest that the potential of an increased number of missed injuries using nursing clearance without physician supervision would have offset the potential benefits of more prompt removal of cervical spinal precaution in a third of the study patients," they say.

A large number of asymptomatic patients are subjected to the cost and discomfort of cervical spinal immobilization and radiography because physicians are afraid of missing occult cervical injuries, say the researchers. This is the first study that has looked at ED nurses' ability to clinically clear cervical spinal injuries. Patients may be immobilized for a long time before physician evaluation, and waits could be decreased if ED nurses could clear these injuries, say the researchers.

Blunt trauma patients arriving with cervical spine precautions were included in the study. Each member of a ED physician-nurse pair completed a questionnaire about five criteria for clinically clearing the cervical spine for each patient. Physicians and nurses agreed on the presence or absence of the combined criteria in 175 of 211 patients (82.9%). If the nurses assessed the patients before physicians, they would have cleared 35% of the patients before the physicians. These patients could have had their cervical spinal immobilization removed prior to physician evaluation, since they lacked all of the risk criteria as judged by both the nurse and physician, say the researchers. ■

CE objectives

After reading this issue of *ED Nursing*, the CE participant should be able to:

1. Identify clinical, regulatory, or social issues relating to ED nursing (See *ED is future of stroke treatment: Are your practices up to par? t-PA should be given in the ED, study says; Assess obese patients for cardiac conditions*; and *Journal Reviews* in this issue).

2. Describe how those issues affect nursing service delivery.

3. Cite practical solutions to problems and integrate information into the ED nurse's daily practices, according to advice from nationally recognized experts. ■

General Guidelines for Nursing Management

Critical Dimension	Nursing Interventions and Clinical Reasoning	Outcome Measure
pulmonary function and prevention of respiratory complications	1. administer 0_2 for optimal oxygenation; decreased $PaCo_2$ to lower ICP, prepare for intubation in brain stem and large MCA stroke due to danger of respiratory arrest. 2. administer broad-spectrum antibiotic to treat respiratory tract infection. 3. place NGT or G-tube (for enteral feeding) to prevent aspiration pneumonia. 4. implement DVT prophylasis; antiembolic stockings/compression device, administer anticoagulants. DVT is a common complication of stroke from a lack of mobility.	1. ABGs to gauge proper O_2 and CO_2 mix, pulse oximeter readings. 2. sputum culture results 3. chest radiograph findings 4. CXR, ABGs, and VP scans, chest MR image, response to coagulation (aPTT, INR)
cardiovascular management	1. treat atrial arrythmias to reduce the incidence of sudden cardiac death. 2. report repolarization abnormalities, which are consequence of coronary disease with increased stress produced by marked sympathetic hyperactivity after acute brain injury. 3. cautiously treat hypertension; avoid sharp BP drops; severe hypertension (BP systolic >185 mm Hg and diastolic >110 mm Hg) precipitates intracranial hemorrhage; hypotension predisposes the brain to an ischemic event because cerebral perfusion is directly related to systolic arterial BP and ICP.	1. ECG/telemetry findings 2. ECG and cardiac enzymes findings 3. BP readings; hemodynamic response.
elevated ICP and brain edema	1. position head of bed 30 degrees to promote venous return and optimal airway positioning. 2. maintain $PaCO_2$ around 25 to 35 mm Hg to prevent vasodilation. 3. treat with hyperosmolar agents to reduce cerebral edema and prevent lethal herniation syndromes. 4. aggressive control of fever to reduce O_2 demand in already compromised brain. 5. administer high-dose barbiturate therapy to decrease ICP; barbiturates are free radical scavengers and may have neuroprotective effect.	1. ICP readings, clinical S/S 2. ICP readings, ABGs report, clinical S/S 3. serum osmo, ICP readings, clinical S/S 4. ICP readings, temperature readings. 5. ICP readings, clinical S/S, barbiturate levels
metabolic disorders	1. monitor and treat hyperglycemia resulting from elevations in serum cortisol, catecholamines, growth hormone, and glucagon secondary to stress.	1. glucose readings
water and ion balance	1. avoid dehydration or overhydration; overhydration may worsen ICP due to volume overload; dehydration can cause hypotension. 2. treat UTI because they are a frequent cause of morbidity and even mortality in stroke patients; frequently comes from indwelling catheters; use straight catheter when necessary; meticulous Foley catheter care.	1. intake/output, urine and serum osmo, renal panel 2. temperature readings, urine cultures

MCA = middle cerebral artery; ABC = arterial blood gas; NGT = nasogastric tube; G-tube = gastrostomy tube; DVT = deep venous thrombosis; VP scan = ventilation/perfusion scan; aPTT = activated partial thromboplastin time; INR = international normalized ratio; ICP = intracranial pressure; TCD = transcranial Doppler; S/S = signs and symptoms; UTI = urinary tract infection; HUI = health utilities index.

Critical Dimension	Nursing Interventions and Clinical Reasoning	Outcome Measure
prevention of seizures	1. administer anticonvulsant agents; seizures are common in AVMs or intracranial hemorrhage	1. serum levels of anticonvulsant, clinical S/S
bedsore prevention	1. institute meticulous skin care regimen; reposition every two hours, keep skin dry and clean, use protective barriers; bedsores are common in disabled and bedridden patients and can be responsible for marked increase in mortality and morbidity due to sepsis. 2. closely monitor patient's nutrition; hypoprotenemia is commonly associated with bedsores.	1. skin condition analysis 2. serum protein levels; patient's weight
control of fever	1. use medications and cooling blanket to aggressively treat fever; hyperthermia greatly facilitates edema formation and primary neuronal injury due to excitotoxic mechanisms; modest reduction in core body temperature can have pronounced cytoprotective effects.	1. temperature and ICP readings
anticoagulation and antiaggregant therapy	1. administer medication; anticoagulation impairs thrombogenesis resulting from the clotting cascade and prevents thrombus extension, as well as early recurrence of embolism; antiplatelets deter platelet adherence; ticlopidine requires CBC every two weeks for three months to assess for neutropenia. 2. monitor anticoagulant effect; subtherapeutic levels may cause a recurrent event, whereas overcoagulation may precipitate bleeding.	1. clinical S/S of a recurrent event; CBC reports 2. for heparin, aPTT levels; for warfarin INR values; clinical S/S.
psychiatric and psychological support	1. provide coordinated care; obtain psychiatric consultation; administer tricyclic antidepressants to treat depression; psychiatric and behavioral complications are the result of patient's reaction to disabling neurologic deficits and of brain damage affecting brain areas and provoking behavioral changes.	1. clinical S/S, HUI scores
management of neurologic deficits	1. begin early rehabilitation; provide coordinated care; provide assistive and adaptive devices; stroke can cause significant functional impairment and result in a complicated recovery process.	1. HUI, Barthel Index, and Modified Rankin scores, other rehabilitation tools to track and measure functional outcome.
patient and family education	1. discuss stroke etiology and effects of stroke, rationale for treatment, possible complications, and expected outcomes. 2. demonstrate techniques necessary to render care. 3. engage in discussions that promote patient/caregiver questions and problem-solving discussions; this process facilitates clarification of issues, alleviates concerns and anxieties, and helps to identify need for additional counseling or supervision.	1. response to treatment: nature of questions asked or issues raised by patient/caregiver. 2. patient/caregiver compliance 3. compliance and level of independence displayed by patient/caregiver; degree of supervision or counseling required.

Source: Adapted from *American Association of Neuroscience Nurses: Clinical Guideline Series: Recommendation for the Nursing Management of the Hyperacute Ischemic Stroke Patient.* Chicago: AANN; 1998. Used with permission. Contact: AANN, 4700 W. Lake Ave., Glenview, IL 60025-1485. Web: www.aann.org.

Thrombolytic Therapy in Acute Ischemic Stroke Protocol

AREA: Emergency Department, ICU, MGH NeuroCare Unit

PURPOSE: To outline the nursing management of the acute stroke patient entered in the Thrombolytic Therapy in Acute Ischemic Stroke Trial.

LEVEL: Interdependent (* items require an MD order).

SUPPORTIVE DATA: Recombinant human tissue-type plasminogen activator (Activase or rt-PA) is a thrombolytic agent with properties that make it relatively clot-specific. This clot specificity should theoretically minimize the risk of hemorrhage. The drug can be given intravenously with rapid achievement of therapeutic levels and clot lysis can be effected within minutes. A recent study, sponsored by the National Institutes of Health and published in the Dec. 14, 1995, *New England Journal of Medicine*, clearly demonstrated that treatment of selected patients within three hours of onset with t-PA improved patient outcome. Overall, patients treated with t-PA had a 30% greater chance of having minimal or no disability three months after the stroke, when compared with patients who received a placebo. These benefits were seen despite the fact that 6% of the patients treated with t-PA had a serious brain hemorrhage caused by the medication. About half of those patients who had a hemorrhage went on to die. This study was pivotal in the ultimate approval of t-PA for acute stroke by the Food and Drug Administration in June 1996.

CONTENT:

EMERGENCY DEPARTMENT

1. Upon arrival in ED and suspected diagnosis is that of an acute stroke:
   — ascertain symptom onset time;
   — age is > 18 years.
2. Page the stroke pager STAT.
3. STAT CT of the brain without contrast.
4. Start one IV with normal saline at 60 cc/hour and one saline loc (18-gauge needles).
5. Initiate t-PA for Acute Stroke Standing Orders.
6. Obtain actual or estimated patient weight.
7. Notify pharmacy of possibility of giving t-PA, and inform them of the weight of the patient.
8. Obtain portable chest X-ray after CT done.
9. Monitor blood pressure very closely. Inform MD of any BP > 185 systolic and/or >105 diastolic.
10. Call bed placement coordinator for possible admission to designated unit (ICU, neuro unit).
11. When transfer of care from one caregiver to another occurs, neuro assessment of patient will be done together.

CONSENT

1. Physician to explain procedure and obtain consent from either the patient or closest relative.
2. Original consent to be placed in the patient medical record.

DRUG ADMINISTRATION

1. Total t-PA dose to be calculated by the pharmacy based on 0.9 mg/kg body weight (maximum dose 90 mg).
2. 10% of total dose to be given IV BOLUS in the ED.
3. Remaining drug to be given over one hour IV regulated by an IVAC pump; this to be completed in the ED prior to transfer of patient to ICU/MGH NeuroCare Unit.

ASSESSMENT

1. Blood pressure assessed every 15 minutes x 2 hours, every 30 minutes x 6 hours, every 1 hour x 16 hours after initiation of the drug, then every 2-4 hours based on unit protocol.
2. Neuro checks every 15 minutes x 2 hours, every 30 minutes x 6 hours, every 1 hour x 16 hours after initiation of the drug, then every 2-4 hours based on unit protocol.
3. Assess for bleeding:
   - Monitor peripheral IV sites and gums for oozing.
   - Monitor for hematuria.
   - Hemooccult test suspected emesis and stool.
   - Monitor for hallmark signs and symptoms of intracerebral hemorrhage (ICH); neurological deterioration, new onset of headache, acute hypertension, and/or nausea and vomiting.

SAFETY

1. No automatic blood pressure machines to be used.
2. When DCing an IV or saline loc, or after venipuncture, hold site for 30 minutes.
3. No arterial punctures during the first three days of this admission.
4. Place thrombolytic therapy alert card above head of bed.

EMERGENCY MEASURES:

If change in level of consciousness or neurological signs to include suspected ICH:

1. Call radiology for possible STAT CT brain scan, and notify MD immediately.

If severe bleeding occurs and the effects of the study drug need to be reversed:

1. STAT PT, PTT, fibrinogen, type, and crossmatch.
2. Prepare for administration of 6-8 units of cryoprecipitate or 6-8 units of platelets.
3. Obtain fibrinogen level and bleeding time one hour post-infusion of cryoprecipitate or platelets.
4. Titrate further administration of cryoprecipitate/platelets based on fibrinogen level.

REPORTABLE CONDITIONS:

Notify MD if any of the following occur:

1. Altered level of consciousness or change in neurological signs to include signs and symptoms of intracerebral hemorrhage (neurological deterioration, new onset of headache, acute hypertension, and/or nausea and vomiting).
2. Any evidence of other bleeding (i.e., hematuria, oozing gums, etc.).
3. Any other sign and symptom that is unexpected based on present diagnosis.

DOCUMENTATION:

1. Document on appropriate nursing/medication record forms the t-PA bolus and initiation of the t-PA infusion.
2. Document any adverse events or notifications to MD.
3. Document any teaching related to this protocol.
4. Document implementation and discontinuation of this protocol.

Source: Mercy Healthcare Sacramento (CA).

EMERGENCY DEPARTMENT THROMBOLYTIC (t-PA) THERAPY FOR ACUTE STROKE STANDING ORDERS

DATE _____ TIME _____

1. Obtain estimated/actual body weight in kg.

2. Establish IV access (18- to 20-gauge catheters)
   Saline lock for blood draws
   V 0.9% NaCL @ 60 ml/hr.

3. STAT CT scan of the brain without contrast (to be read prior to treatment).

4. Neuro consult with _____.

5. Lab work:
   The following lab results must be obtained prior to treatment:
   - CBC
   - PT, PTT (if on anticoagulation)

   The following must be drawn prior to treatment:
   - Renal panel/Chem 20
   - Type and screen, Fibrinogen
   - ESR

6. Total t-PA dose to be given: _____ (0.9 mg/kg of body weight — max dose 90 mg)
   10% bolus: _____mg over 2-3 mins. followed by infusion remainder of dose over one hour.

7. Vital signs/neuro assessments every 15 minutes x 2 hours, every 30 minutes x 6 hours, then every 1 hour x 16 hours. (No automatic blood pressure machines.)

8. For minor bleeding, apply pressure over the site.

9. Diagnostics — to be completed after CT:
   EKG
   Chest X-ray
   Urinalysis

10. Notify MD for ANY change in neurological status or major bleeding.

11. For Systolic B/P > _____ or diastolic B/P > _____ give _____.

12. Transfer to ICU/neuro concentrated care when bed is available.

_____
MD Signature

Source: Mercy Healthcare Sacramento (CA).

Nursing Guidelines for Thrombolytic Therapy

ELIGIBILITY CRITERIA

• Inclusion Criteria

1. Symptom onset of less than three hours.
2. Clinical diagnosis of ischemic stroke with measurable deficit on the National Institutes of Health's Stroke Scale
3. Older than 18 years.
4. CT Criteria: Absence of high-density lesion consistent with intracerebral hemorrhage; absence of significant mass effect or midline shift; absence of parenchymal hypodensity, and/or effacement of cerebral sulci more than 33% of the middle cerebral artery territory.

• Exclusion Criteria

1. Stroke or serious head trauma within past three months.
2. Systolic blood pressure (BP) more than 185 mm Hg or diastolic BP more than 110 mm Hg, or BP readings that require aggressive treatment.
3. Conditions that could precipitate or suggest parenchymal bleeding (subarachnoid and ICH, recent onset myocardial infarction, seizures at onset, major surgery within past 14 days, gastrointestinal or urinary tract hemorrhage within previous 21 days, and arterial puncture of a noncompressible site or lumbar puncture within previous seven days).
4. Glucose less than 50 mg/dL or more than 400 mg/dL; INR more than 1.7; platelet count less than 100,000/mm.
5. Rapidly improving or deteriorating neurologic signs or minor symptoms.
6. Recent myocardial infarction.
7. Recent treatment with IV or subcutaneous heparin within past 48 hours and has an elevated partial thromboplastin time.
8. Woman of child-bearing age who has a positive pregnancy test.

DOSING INFORMATION

1. Alteplase Activase 0.9 mg/kg body weight total or maximum 90 mg.
2. Administer 10% of total dose as bolus for 1-2 minutes.
3. Infuse remaining dose over 60 minutes.
4. Immediately follow completed infusion with 50 mL normal saline.
5. No intervening saline or other intravenous solution during the infusion.

PRETREATMENT GUIDELINES

1. Confirm stroke onset — must be less than three hours before drug administration.
2. Confirm patient eligibility (see previous inclusion and exclusion criteria).
3. Obtain urgent laboratory tests: CBC, head CT, electrolytes and chemistry profile, PT/INR and aPTT, glucose (may do a fingerstick), ECG, and pregnancy test (if applicable).
4. BP with neurologic checks every 15 minutes; keep SBP at or less than 185 mm Hg or DBP at or less than 110 mm Hg; use medications that do not cause a precipitous drop in BP (see guidelines for blood pressure management).
5. Establish total of 2-3 IV lines.
6. Obtain patient actual or estimated weight.
7. Continuous cardiac monitoring.
8. Re-evaluate symptoms for clinical worsening or improvement; reverify dose calculation (see dosing guidelines).

POST-TREATMENT GUIDELINES

1. Admit to intensive care unit for 24 hours.
2. Vital signs every 15 minutes for two hours; every 30 minutes for six hours; every one hour for 16 hours.
3. Serial neurologic checks; notify physician for any changes in neurologic status. Decrease in level of consciousness or deterioration in any neurologic signs and symptoms that occurs within 36 hours of t-PA administration may be attributed to intracerebral hemorrhage.
4. Assess for signs of internal bleeding: tachycardia, hypotension, pallor, restlessness, complaints of low back pain, muscle weakness, or numbness in lower extremities.
5. Assess for signs of external bleeding: IV sites, gums, urine.

6. Check all gastric secretions, urine, and stool for occult blood.
7. Maintain SBP at or less than 185 mm Hg or DBP at or less than 110 mm Hg (see guidelines for blood pressure management).
8. Accurate intake and output.
9. Monitor serial laboratory tests: hemoglobin, hematocrit, and coagulation values.
10. No heparin, coumadin, or antiplatelet agent for 24 hours after thrombolytic infusion.
11. Avoid invasive catheters: bladder catheter for 30 minutes, nasogastric tube and venipuncture for 24 hours.
12. Maintain adequate oxygenation.

GUIDELINES IF BLEEDING IS SUSPECTED

1. Discontinue thrombolytic agent.
2. Prepare for emergency noncontrast head CT; obtain coagulation panel.
3. Type and crossmatch four units of packed cells and four to six units of cryoprecipitate or fresh frozen plasma.
4. Obtain neurosurgical consultation.

GUIDELINES FOR BLOOD PRESSURE MANAGEMENT

• Treatment of hypotension

Hypotension is often related to hypovolemia and requires immediate intervention to prevent decreased cerebral blood flow.

1. Administer IV fluid such as normal saline; fluids that contain dextrose may contribute to the development of cerebral edema and increased lactate levels.
2. Evaluate current medications that may contribute to lowering the BP; adjust or discontinue dose as applicable.

• Treatment of Hypertension

1. Before treatment with thrombolytic agent, use agents that gently lower the BP; preferred agents are topical nitroglycerin (Nitropaste) because this can be wiped off easily, oral angiotensin-converting enzyme (ACE) inhibitors, and IV beta-adrenergic blocking agents such as labetalol, a short-acting drug. Give labetalol 10 to 20 mg IVP repeated one to two times; if BP is not decreased to SBP at or less than 185 mm Hg or DBP at or less than 110 mm Hg, the patient is not eligible for thrombolytic therapy. A patient with unremitting hypertension is at high risk for developing ICH.
2. During and after thrombolytic therapy:

a. For SBP more than 185 mm Hg or DBP more than 110 mm Hg on two or more readings, give labetalol 10 to 20 mg IV over 1-2 minutes; may repeat every 10 to 20 minutes (not to exceed 150 mg), or hydralazine 10 to 20 mg IV; may repeat every 30 minutes.
b. For SBP more than 230 mm Hg or DBP more than 120 mm Hg (despite above treatment) or DBP more than 140 mm Hg on two or more readings 5 to 10 minutes apart, give sodium nitroprusside infusion (start at 0.25 mg/kg/min, titrate as needed, not to exceed 10 mg/kg/min) to keep SBP less than 185 mm HG, but more than 140 mm Hg and DBP less than 110 mm Hg but more than 75 mm Gh.
c. Give esmolol 500 mg/kg IV bolus over one minute, follow with esmolol drip at 25 mg/kg/min; increase by 25 mg/kg/min every 5 minutes as needed. Titrate to keep SBP less than 185 mm Hg but more than 140 mm Hg, and DBP less than 110 mm Hg but more than 75 mm Hg.

Source: American Association of Neuroscience Nurses: Clinical Guideline Series: Recommendation for the Nursing Management of the Hyperacute Ischemic Stroke Patient. Chicago: AANN; 1998. Used with permission. Contact: AANN, 4700 W. Lake Ave., Glenview, IL 60025-1485. Web site: www.aann.org.