

ED NURSING™

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New cardiovascular guidelines are here: You'll be amazed at the options

Guidelines give you exciting approaches, drugs, and techniques

The next time a patient with a life-threatening cardiovascular condition comes to your ED, you should use new approaches, drugs, and techniques to care for them. New guidelines are going to revamp the way you care for patients in the ED, predicts **Mary Fran Hazinski, RN, MSN, FAAN**, senior science editor for the American Heart Association's (AHA) emergency cardiovascular care programs and clinical specialist in the division of trauma in the departments of surgery and pediatrics at Vanderbilt University Medical Center in Nashville, TN.

For the first time since 1992, the Dallas-based AHA has published a major revision to the guidelines for resuscitative and emergency cardiovascular care that are used throughout the world.¹ (See **resource box for information on how to obtain the guidelines, p. 8.**)

All of the algorithms for advanced cardiovascular life support (ACLS), pediatric advanced life support, and basic life support have been revised, as well as the treatment guidelines for patients with acute coronary syndromes and stroke, Hazinski reports. You'll need to review the guidelines and apply them immediately. "Most EDs will adopt them without much change." (See **story on steps to take now, p. 7.**)

ED Nursing covers new ACLS guidelines

This special issue of *ED Nursing* updates you on the newly revised advanced cardiac life support (ACLS) guidelines from the American Heart Association. Read our cover story for a complete overview of key changes. Inside the issue, see stories on a new ACLS course for experienced providers, biphasic waveforms, steps to take now to change your practice, new approaches for fibrinolytics, new concepts in prehospital care, confirmation of endotracheal tube position, and new cardiovascular drugs. We also include two revised ACLS algorithms and a guide for using them.

We hope you enjoy this special issue of *ED Nursing*.

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EXECUTIVE SUMMARY

The first new guidelines since 1992 have been published for resuscitative and emergency cardiovascular care by the Dallas-based American Heart Association.

- Treatment guidelines and algorithms for advanced cardiovascular life support, pediatric advanced life support, and basic life support have been revised.
- New options are given for treatments, techniques, and interventions.
- There is a new focus on interventions that can prevent an arrest.

These guidelines are particularly noteworthy because they are the first international guidelines, Hazinski underscores.

“As a result, they reflect science from all over the world,” she says. “We are getting a lot more information about resuscitation. The more evidence we get, the better recommendations we can make.”

From this point on, AHA will meet with international resuscitation experts for an evidence evaluator conference every five years, so the guidelines will be updated on a more predictable basis, Hazinski reports. “This will help instructors to better plan courses and renewals.”

The new guidelines address pharmacology of resuscitation, ventilation, defibrillation, public access defibrillation programs, acute coronary syndromes, stroke, post-resuscitation care, and toxicology. (See story on confirmation of endotracheal tube placement, p. 9.)

The guidelines give you many more options, says **Darlene Bradley, RN, MSN, MAOM, CCRN, CEN**, director of emergency/trauma services at UCI Medical Center at University of California-Irvine.

“The age limit has been lifted for use of interosseous access, which were formerly not used for children over 6 years of age,” she notes.

There are more choices for drug therapies, Bradley reports. “There are also more considerations to prevent the arrest condition such as drug overdoses, electrolyte imbalances, and hypothermia,” she says. “We are given a greater variety of interventions to help us care for our patients better,” she says. (See related stories on biphasic waveforms, p. 10; new approaches in fibrinolytics, p. 11; and new cardiovascular drugs, p. 13.)

Here are some of the key changes in the guidelines:

- **Algorithms have been significantly revised.**

The guidelines contain an new international algorithm, significant expansion of tachycardia algorithms, revisions in the acute coronary syndromes algorithms, and the addition of vasopressin to the ventricular fibrillation/pulseless ventricular tachycardia algorithm, says Hazinski. (See **A Guide to the International ACLS Algorithms, p. 3; ILCOR Universal/International ACLS Algorithm, p. 6; and Comprehensive ECC Algorithm, p. 6.**)

The algorithms pertaining to acute coronary syndromes and stroke have expanded even more, says **Rebecca L. Stark-Johnson, CRNA, APNP**, anesthesia manager at Fort Atkinson (WI) Memorial Health Services, and a regional faculty instructor for the AHA’s ACLS Program. “The text discussion pertaining to this is very good, and explores reperfusion to a large extent.”

- **There is a new focus on prevention.**

ACLS still has as a teaching goal the mastery of resuscitation of the patient in witnessed ventricular fibrillation arrest, notes **John M. Field, MD, FACC, FACEP**, associate professor of medicine and surgery at Pennsylvania State University College of Medicine in Hershey, and ACLS science editor at the AHA.

“However, it is now realized that many arrests have prodromal periods when an intervention can prevent an arrest,” he says. “This is emphasized in the areas of acute coronary syndromes and reperfusion, as well as the new ACLS-EP [experienced provider] course.” (For more information on this new course, see p. 11; for new approaches in prehospital care, see p. 12.)

- **There is a new range for tidal volumes.**

The guidelines recommend that a tidal volume for patients receiving supplementary oxygen be approximately one half of the tidal volume previously recommended, says Stark-Johnson. “Now, the tidal volume delivered should approximate 6-7 mL/kg, if you are administering supplementary oxygen.”

Higher volumes tend to increase the risk of gastric inflation, says Stark-Johnson. “Resuscitation professionals can use the ‘chest rise’ as a rough indication of ventilation tidal volumes that are in that range.”

Provide supplemental oxygen adjusted based on oximetry readings, if the victim has a perfusing rhythm, recommends Stark-Johnson.

(Continued on page 6)

COMING IN FUTURE MONTHS

■ Ways to treat anorexic patients

■ Effective alternatives to restraint

■ How to calm agitated patients

■ Reduce delays in treating MIs

(Continued)

(Continued)

Source: American Heart Association. © *Guidelines 2000 for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care*. Dallas; 2000. Reproduced with permission.

**Figure 1: International Liaison
Committee on Resuscitation (ILCOR)
Universal/International ACLS Algorithm**

Figure 2. Comprehensive ECC Algorithm

Source for both charts: American Heart Association. © Guidelines 2000 for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Dallas; 2000. Reproduced with permission.

(Continued from page 2)

Smaller tidal volumes are recommended only in the presence of oxygen administration, and are not recommended for patients who don't have cardiovascular collapse, Hazinski underscores.

• Post-resuscitation care requires new approaches.

According to the guidelines, you should not actively rewarm patients who are mildly hypothermic following cardiac arrest, advises Stark-Johnson. "Treat febrile patients to achieve normothermia."

Ventilatory values in patients who require mechanical ventilation should be maintained within the normal range after cardiac arrest, the guidelines recommend. "Hyperventilation may be harmful," Stark-Johnson says. "An exception is the use of hyperventilation in patients who have signs of cerebral herniation."

• Ethical issues are addressed.

The new guidelines include more specific information about "do not attempt resuscitation" orders in the

prehospital setting, indications for cessation of ACLS in the field, and family presence during resuscitation in the hospital, says Hazinski. **(See story on family presence, p. 15.)**

The resuscitation scene needs to be surveyed for a living will, advance directive, or no-CPR bracelet, notes Stark-Johnson. "The 911 call may not mean that the patient or family has changed their mind, but rather that they are uncomfortable with death at home."

There are specific criteria now listed in the algorithm for withholding or stopping resuscitation efforts, Stark-Johnson adds. "The criteria direct the team to consider the quality of resuscitation," she says. "There are now protocols for leaving the body at the scene."

• There are new recommendations for treatment of patients with drug overdoses.

Beta blockers can be harmful to patients with cocaine-associated acute coronary syndromes, says Stark-Johnson. "This has caused coronary

vasoconstriction and should be avoided. Nitrates and benzodiazepines should be first-line therapy.”

Alpha blockers might induce tachycardia and hypotension, she notes. “These should be reserved for patients who do not respond to nitrates and benzodiazepines.”

Hypotension and ventricular arrhythmias occur with tricyclic overdoses, says Stark-Johnson. “The induction of systemic alkalosis [pH 7.5-7.55] is therapy of choice.”

Acute respiratory failure (hypoxemia and respiratory alkalosis) may occur with opiate overdoses, says Stark-Johnson. “Reverse these abnormalities with mechanical ventilation before naloxone administration,” she advises. “This will reduce the incidence of pulmonary edema and serious arrhythmias associated with abrupt catecholamine elevation.”

• **The section on tachycardias has been expanded.**

The section on tachycardias now covers narrow-QRS complex tachycardias, wide-QRS complex tachycardias, and pre-excited tachycardias, reports Stark-Johnson.

For tachycardic patients not requiring immediate cardioversion, the guidelines recommend two things, says Stark-Johnson. “You need to make a specific rhythm diagnosis. You also have to recognize tachycardic patients who have significantly impaired cardiac function.” Those patients have ejection fraction < 40% and overt heart failure.

Reference

1. Guidelines 2000 for cardiopulmonary resuscitation and emergency cardiovascular care. *Circulation* 2000; 102:suppl 1. ■

Here are five steps you must take now

Here are five steps you need to take immediately to implement the new guidelines for emergency cardiovascular care from the Dallas-based American Heart Association (AHA):

1. Read the guidelines.

Every ED nurse should obtain a copy of the guidelines immediately, stresses **Mary Fran Hazinski, RN, MSN, FAAN**, senior science editor for the AHA’s emergency cardiovascular care programs and clinical specialist in the division of trauma in the departments of surgery and pediatrics at Vanderbilt University Medical Center in Nashville, TN.

“Nurses should also subscribe to *Currents in Emergency Cardiovascular Care* newsletter to keep up to date on new science or revisions,” she recommends.

SOURCES

For more information on the guidelines, contact:

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(See resources box for ordering information, p. 8.)

The AHA has a manual available for purchase titled the *Guidelines 2000 for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care*. “It includes all changes, the science that precedes the change, and specifics related to each course, including basic, advanced, and pediatric advanced life support,” says **Darlene Bradley, RN, MSN, MAOM, CCRN, CEN**, director of emergency/trauma services at UCI Medical Center at University of California-Irvine. The manual is particularly appropriate for ED nurses, who must be knowledgeable in each of those categories, she adds.

The *2000 Handbook of Emergency Cardiovascular Care* is also available from the AHA, notes Hazinski. It contains all the new neonatal, advanced cardiovascular life support (ACLS), pediatric advanced life support (PALS), and basic life support (BLS) algorithms and drug dosages, she says.

2. Update colleagues.

Physicians, paramedics, and other nurses are dependent on the ED nurse to practice and communicate knowledgeably about the current guidelines and recommendations, Bradley stresses. “It is an opportune time for you to get educated and speak knowledgeably about these changes,” she says.

Begin to incorporate skill changes in practice,

including bag-valve mask ventilation, two-thumb compression technique for infants, and insertion of new airway devices such as the Combitube (Kenall/Sheridan Healthcare Products, Argyle, NY) or laryngeal mask airway, advises Bradley. "All of these skills reflect a greater understanding of the guideline changes."

When resuscitation occurs in your ED, begin to offer suggestions on medication or treatment based on current research, urges Bradley. "It's an opportunity for everyone to learn and to acquire greater skill in their practice."

ECG is one key factor

3. Revise protocols to correspond to the new algorithms.

"In our current practice of triage, we already [evaluate] patients based on a primary and secondary assessment," Bradley reports. "The electrocardiogram is only one of the key factors we [evaluate] when searching for causes, continuing assessments, or planning and [evaluating] interventions."

4. Increase knowledge of airway management.

The guidelines address alternative airway devices including the Combitube, laryngeal mask airway, and the pharyngotracheal lumen airway, Bradley says. "Education and training regarding the tube's placements must be provided and practiced," she says.

The use of capnography, or end-tidal CO₂ devices can be used to help confirm placement, adds Bradley.

You'll need to be familiar with these new devices for airway management, says Hazinski. "In some settings, nurses may now be placing these devices," she reports. "You need to know how to confirm proper placement. Some of these devices can be checked for placement using exhaled CO₂, and some cannot."

The guidelines recommend education in alternative techniques, notes **Rebecca L. Stark-Johnson**, CRNA, APNP, anesthesia manager at Fort Atkinson (WI) Memorial Health Services and a regional faculty instructor for the AHA's ACLS Program. However, tracheal intubation should be attempted only by providers experienced in this skill, she cautions.

Previously, airway management techniques were considered only within the realm of an advanced life support provider, but now they are included in training of basic life support providers, says Bradley. These providers must now become proficient in airway management and delivery of ventilation via these devices, she advises.

Advanced airway procedures such as endotracheal intubations still are recommended if the rescuer is skilled in performing the procedure, says Bradley. "They must learn to provide ventilation with barrier devices, as well as ventilations by a bag-valve mask device. This is required for ventilation support for victims of all ages."

RESOURCES

The *Guidelines 2000 for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care* were published in the Aug. 22 issue of *Circulation*, the official journal of the American Heart Association (AHA). Reprints are available for \$20 plus \$7 shipping and handling. The *2000 Handbook of Emergency Cardiovascular Care* is available for \$10 plus \$7 shipping and handling. To order, contact:

- **Channing L. Bete**, 200 State Road, South Deerfield, MA 01373-0200. Telephone: (800) 611-6083 or (413) 665 7611. Fax: (800) 499-6464 or (413) 665 2671. E-mail: service@channing-bete.com. Web site: www.channing-bete.com.

Key changes are outlined on the AHA Web site (www.cpr-ecc.americanheart.org). Click on "What's New" and "Guidelines Released." The fall 2000 issue of *Currents in Emergency Cardiovascular Care* contains a 28-page summary of the new guidelines. Individual copies are available for \$5, including shipping and handling. To order a copy, contact:

- **CurrentsOnLine.com**, 27500 Interstate 45 N., Suite 124, Spring, TX 77386-1357. Telephone: (888) 999-4210 or (281) 419-1992. Fax: (281) 419-8238. E-mail: info@currentsonline.com.

The tidal volume of the ventilations has been decreased to prevent complications such as gastric inflation, Bradley reports.

ACLS providers unable to obtain regular field experience with tracheal intubation (six to 12 times per year) should use alternative, noninvasive techniques, says Stark-Johnson. These include the Combitube, laryngeal mask airway, and the pharyngotracheal lumen airway, she says.

5. Sign up for a BLS, ACLS, or PALS course.

The new guidelines are being rolled out by the AHA, reports Bradley. "National faculty have been updated on the science and practice changes," she says. "Throughout the country, conferences are being organized to update regional faculty and instructors teaching these courses."

As of June 2001, all basic and advanced life support courses are required to use the new books and guidelines, but you should enroll in a course now to obtain the updates, urges Hazinski. Before the end of this year, courses will include the current guidelines and recommendations, she notes. ■

No. 1 recommendation: Confirm tube placement

It could be the single most important point in the American Heart Association's (AHA's) new guidelines for cardiopulmonary resuscitation and emergency care: You *must* confirm endotracheal tube placement, stresses **Mary Fran Hazinski**, RN, MSN, FAAN, senior science editor for the AHA's emergency cardiovascular care programs and clinical specialist in the division of trauma in the departments of surgery and pediatrics at Vanderbilt University Medical Center in Nashville, TN.

"There is growing evidence that tracheal tube dislodgment may be occurring at a much higher rate than previously suspected,"^{1,2} says Hazinski. "There is a need for quality improvement programs for prehospital intubation."

Patients intubated in the prehospital setting may arrive in the ED with a tube that is actually in the esophagus or pharynx, warns Hazinski. "The tube is either misplaced originally or displaced during transport," she says. "Unrecognized tube misplacement is obviously a fatal complication."

Whenever a patient arrives with an endotracheal tube in place, you must immediately evaluate tube placement and confirm that the tube is in the correct place, stresses Hazinski.

'It can be deadly'

Studies should be done by EDs to document the effectiveness and safety of prehospital intubation, Hazinski recommends. "This is a procedure that can be lifesaving, but it can also be deadly. It is critical that everyone involved in the care of these patients know that tube location must immediately be verified."

Be prepared to prove at any moment that the tube is in place, Hazinski advises. "That's a much safer approach than simply assuming the tube is in place."

When the patient has a profusing rhythm, end-tidal capnography can be very accurate, notes Hazinski. "But when the patient is in cardiac arrest, the capnography may indicate a low CO₂ that is consistent with a tube that is *not* in the trachea, when the tube actually is in place," she adds.

Esophageal detector devices should be used as secondary confirmation devices if the patient is in cardiac arrest, says Hazinski.

Begin with clinical assessment, then add CO₂ detection or end-tidal CO₂ monitoring, advises **Marianne Gausche-Hill**, MD, FACEP, FAAP, director of

emergency medical services at Harbor-University of California at Los Angeles Medical Center in Torrance.

"If it is unclear whether the endotracheal tube is in place after using clinical assessment and CO₂ detection, use an esophageal detector device for patients 5 years of age or greater [20-kg body weight]," Gausche-Hill recommends.

A recent study showed that many endotracheal tubes become dislodged in transport in children 12 years or younger, reports Gausche-Hill, the study's principal investigator.³

Of 186 patients believed to be successfully intubated, 27 patients (14.5%) had the endotracheal tube dislodged, says Gausche-Hill. "Of these, 15 [8%] of patients had the endotracheal tube dislodged and the paramedic recognized the problem. In 12 patients [6.5%], the tube was dislodged and was unrecognized by paramedics."

Any time the patient is moved, tube position should be confirmed, Hazinski recommends. "Continuous exhaled CO₂ is the best method of [evaluating] or detecting tube dislodgment," she says. "Proper head and tube immobilization is necessary during transport."

Endotracheal tubes can be easily dislodged with any movement or transfer of the patient, says Gausche-Hill. "Movement is the rule in the out-of-hospital setting. Because of a child's short tracheal length, these tubes can be easily dislodged," she warns.

DOPE can go wrong

Deterioration of an intubated patient can indicate that the tube has become dislodged, Gausche-Hill notes. Use the mnemonic "DOPE" to remember what can go wrong, she recommends, as follows:

D = dislodgment;

O = obstruction of the tube from secretions or kinking;

P = pneumothorax may result from positive pressure ventilation;

E = equipment may be faulty. (If on a ventilator, remove and begin ventilation using the endotracheal tube and bag-valve device, recommends Gausche-Hill).

In the Gausche-Hill study, the transport interval averaged only five minutes, and paramedics were inexperienced, says Hazinski. "Only 5% of 3,000 paramedics who were trained in pediatric intubation at the beginning of the study had the opportunity to intubate a single pediatric patient in three years," she notes. "If you have a combination of a short transport interval and paramedics inexperienced in intubation, it may be better to use bag-mask ventilation, rather than have patients be intubated in inexperienced hands."

The endotracheal tube is still viewed as the "gold-standard" airway, but only when placed in experienced

SOURCE

For more information about confirmation of tube placement, contact:

- **Marianne Gausche-Hill**, MD, FACEP, FAAP, Harbor-UCLA Medical Center, 1000 W. Carson St., Box 21, Torrance, CA 90509. Telephone: (310) 222-3501. Fax: (310) 782-1763. E-mail: mgausche@emedharbor.edu.

hands, says Hazinski. "But it's difficult to maintain skill and experience when ill children are infrequently encountered."

It might be necessary to limit the number of people performing the intubation, Hazinski suggests. "That way, you have a smaller group of people getting a greater amount of experience, instead of a large number of people getting inadequate experience," she says.

Quality improvement will require good record keeping, says Hazinski. "If prehospital personnel are not able to perform intubation, they should have the opportunity to go back into training," she stresses. "Medical centers need to be willing to support the needs of an emergency medical services system, because that will help with the care of patients in the prehospital setting."

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2. Brennan TA, Leape LL, Laird NM, et al. Incidence of adverse events and negligence in hospitalized patients: Results of the Harvard Medical Practice Study I. *N Engl J Med* 1991; 324:370-376.
3. Gausche M, Lewis RJ, Stratton SJ, et al. Effect of out-of-hospital pediatric endotracheal intubation on survival and neurological outcome: A controlled clinical trial. *JAMA* 2000; 283:783-790. ■

Biphasic waveforms spawn excitement, controversy

Biphasic waveforms have generated a great deal of enthusiasm in the resuscitation community, reports **Rebecca L. Stark-Johnson**, CRNA, APNP, anesthesia manager at Fort Atkinson (WI) Memorial Health Services and a regional faculty instructor for the Dallas-based American Heart Association (AHA)'s Advanced Cardiac Life Support Program. "There is a tremendous amount of controversy about this tool, much of it driven by competitive market forces," she says.

Modern defibrillators, including automated external defibrillators, deliver energy or current in waveforms, says Stark-Johnson. "Biphasic waveforms have recently been developed and approved for marketing and clinical use," she adds.

The body of evidence about the efficacy and safety of devices using biphasic waveforms has increased dramatically in the four years since the first such devices were marketed, says Stark-Johnson.

"The first biphasic automated external defibrillators approved for use in the U.S. used a waveform set at a lower energy [150 to 175 J] than that recommended by the AHA [200 J] for the first monophasic shock," she explains.

No recommendation for energies

It was also a fixed, nonescalating device, which means the energy level of the shock could not be increased, says Stark-Johnson. "The AHA has taken the stance that the optimal energies for biphasic defibrillation have not been determined," she notes. "Nor do they state the biphasic first-shock energy level yielding the highest termination rate for ventricular fibrillation."

The guidelines indicate that they cannot make a definitive recommendation for the energy for first and subsequent nonescalating biphasic defibrillation attempts, says Stark-Johnson. "Current research confirms that biphasic shocks energies of less than or equal to 200 J are safe and effective."

While both type of defibrillators are commercially available, the guidelines state that there is insufficient data to recommend one approach over another, Stark-Johnson says. "However, it is reiterated numerous times that the most important determinant of survival in adult ventricular fibrillation is rapid defibrillation," she notes.

The guidelines recommend new training requirements for automated external defibrillators. Health care providers with a duty to perform cardiopulmonary resuscitation (CPR) need to be trained, equipped, and authorized to use automated external defibrillators, says Stark-Johnson.

"Hospitals need to establish a comprehensive program for in-hospital early CPR and defibrillation," she recommends. "Those staff members trained in CPR need to be capable of providing early defibrillation."

It is now recommended that public access defibrillation be available, particularly when there might be an emergency medical services delay of five minutes or more, says Bradley. "Additionally, defibrillation in the inpatient setting should occur within three minutes." ■

Course covers ACLS for experienced providers

The Advanced Cardiac Life Support-Experienced Provider (ACLS-EP) course is especially designed for providers whose jobs require the regular use of ACLS skills, says **Rebecca L. Stark-Johnson**, CRNA, APNP, anesthesia manager at Fort Atkinson (WI) Memorial Health Services, and a regional faculty instructor for the Dallas-based American Heart Association's ACLS program.

"To take the course, you should be very familiar with the basic algorithms, and have taken multiple re-recognition programs," she explains. "Also, your work situation should have the availability of medications not routinely used in ACLS, but indicated in the ACLS-EP scenarios, such as magnesium and glucagon."

Candidates with those qualifications include ED nurses and physicians, critical care nurses, and some paramedics who practice in very busy situations, says Stark-Johnson. The course focuses on the current ACLS text with emphasis on the chapters involving acute

coronary syndromes, acute stroke, and special situations, she adds. It begins with a period of testing on the Heartsaver automated external defibrillator and ACLS core content, says Stark-Johnson. "Each participant then rotates through the four skills/discussion stations."

The course is designed to challenge and educate experienced providers in more advanced concepts, says **Darlene Bradley**, RN, MSN, MAOM, CCRN, CEN, director of emergency/trauma services at UCI Medical Center at University of California-Irvine. "In order to enroll in the course, a candidate must already have an ACLS provider card," she adds. Course contents include metabolic or electrolyte imbalances, drug overdoses, and hypothermia, notes Bradley.

Current goals in ACLS are to provide a standardized approach to care based on a primary and secondary assessment, says Bradley. "The trend is to move away from the rhythm-based approach."

The ACLS-EP course highlights this concept by focusing on prearrest conditions and their corresponding interventions, says Bradley. "Many times, if an appropriate intervention is given, a full arrest could be prevented," she stresses. ■

Update on goals for fibrinolytic therapy

You'll need to become accustomed to some new terminology: The term "fibrinolytic" is now used instead of "thrombolytic," according to new guidelines published by the Dallas-based American Heart Association (AHA).

Fibrinolytic therapy has been adopted as a standard of care, and has shown a reduction in mortality for eligible patients with acute coronary syndromes or ischemic stroke, notes **Darlene Bradley**, RN, MSN, MAOM, CCRN, CEN, director of emergency/trauma services at UCI Medical Center at University of California-Irvine.

"If the thrombus occludes the coronary vessels for a prolonged period of time, the result may be a Q-wave myocardial infarction," she explains. "The clot formation is made of thrombin and fibrin. In this case, fibrinolytic therapy is beneficial."

Fibrinolytics are a key part of management for patients with acute coronary syndromes, says **Mary Fran Hazinski**, RN, MSN, FAAN, senior science editor for the AHA's emergency cardiovascular care programs and clinical specialist in the division of trauma in the departments of surgery and pediatrics at Vanderbilt University Medical Center in Nashville, TN. "We now realize that acute coronary ischemia actually

starts when there is rupture of a lipid laden plaque. There is an inflammatory component in the vessel and plaque ruptures, and that attracts additional platelets."

Fibrinogen cross-links the platelets, and a partially occluding thrombus can form and cause ischemia, says Hazinski. "At that point, the thrombus is sensitive to antiplatelet agents or new glycoprotein IIb/IIIa receptor inhibitors or aspirin," she explains. "The thrombus may enlarge and throw off microemboli to distal vessels, causing myocardial infarction [MI]."

If the thrombus occludes a coronary vessel for a long period, an MI can occur, Hazinski explains.

The guidelines also recommend use of fibrinolytics in patients with acute ischemic stroke, notes Hazinski. "If patients receive this therapy within three hours of the onset of stroke symptoms, their recovery can be much better," she says.

Fibrinolytics can minimize neurologic damage in patients with stroke and myocardial damage in patients with MI, but the key is that this therapy must be given within a few hours of onset of symptoms, Hazinski stresses. "That's why it's imperative that the lay public recognize symptoms and get to a medical center capable of providing advanced therapy as soon as possible," she says.

ED nurses play a critical role in increasing the likelihood that these patients will be eligible for this therapy by identifying patients at triage and facilitating rapid evaluation with appropriate diagnostics, adds

Hazinski. Patients with MIs are triaged according to their 12-lead electrocardiogram results, she says. “The ED nurse needs to ensure that it’s obtained and interpreted to help classify the patient for therapy,” Hazinski explains.

Currently, only about 7% of stroke patients are evaluated in a time period that would enable them to receive thrombolytic therapy, says Hazinski. “This concern also applies to patients with MIs,” she adds. “We have a lot of work to do to reduce the time to arrival in the ED and triage and [evaluation] with therapy.”

Fibrinolytic therapy for ST elevation MI is the standard of care, notes **John M. Field, MD, FACC, FACEP**, associate professor of medicine and surgery at Pennsylvania State University College of Medicine in Hershey, and ACLS science editor at AHA. “Percutaneous coronary intervention-angioplasty/stent is an acceptable alternative,” he says. “There is a 30-minute goal for door-to-drug, and a two-hour goal for door-to-balloon.”

In patients younger than age 75 who are in shock or in heart failure with large MI, triaging to a facility capable of performing percutaneous coronary intervention is Class I (highest recommendation) when available, says Field.

Prehospital electrocardiograms are recommended (Class I) when the receiving hospital is notified and acute MI is identified, says Field. “Fibrinolytic therapy for stroke candidates who qualify has been moved from Class IIA recommendation to Class I, when a computerized tomography scan and drug can be administered within three hours of symptom onset.”

The guidelines state that intravenous recombinant tissue plasminogen activator (rTPA) improves neurological outcome when administered within three hours of stroke onset in patients who meet fibrinolytic therapy criteria, says **Rebecca L. Stark-Johnson, CRNA, APNP**, anesthesia manager at Fort Atkinson (WI) Memorial Health Services, and a regional faculty instructor for the AHA’s ACLS Program. “The urgency should equal that of an acute MI with ST segment elevation,” she stresses.

The use of rTPA in patients with symptoms of three to six hours is under investigation, notes Stark-Johnson. “Prourokinase has been found to improve neurologic outcome in patients treated within three to six hours in one study,” she reports.¹

Emergency medical services systems should implement a prehospital stroke protocol to rapidly identify patients who may benefit from fibrinolytic treatment, she recommends.

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Cerebral Thromboembolism (PROACT) Investigators. PROACT: A phase II randomized trial of recombinant Prourokinase by direct arterial delivery in acute middle cerebral artery stroke. *Stroke* 1998; 29:4-11. ■

Ways to improve prehospital care

Next time a myocardial infarction patient arrives in your ED, you may find that the 12-lead electrocardiogram (ECG) has already been done in the field. This is only one example of a wide array of new approaches for prehospital care outlined in new guidelines for emergency cardiovascular care, says **Rebecca L. Stark-Johnson, CRNA, APNP**, anesthesia manager at Fort Atkinson (WI) Memorial Health Services and a regional faculty instructor for the Dallas-based American Heart Association’s (AHA’s) Advanced Cardiac Life Support (ACLS) Program.

“The guidelines emphasize that ACLS issues do indeed start in the field and not just at the ED entrance,” she says.

3 minutes to defibrillation

Here are ways to improve prehospital care, according to the guidelines:

- **Set a goal for rapid defibrillation.**

The guidelines emphasize early defibrillation using first responders and automated external defibrillators (AEDs), says **John M. Field, MD, FACC, FACEP**, associate professor of medicine and surgery at Pennsylvania State University College of Medicine in Hershey, and ACLS science editor at AHA. “The goal is three minutes to defibrillation in unmonitored areas of the hospital and campus sites.”

For patients in cardiac arrest, rapid defibrillation is a high-priority goal, says Stark-Johnson. “Community and in-hospital ACLS must be supported by a well-established basic life support program that can provide immediate emergency CPR.”

The guidelines recommend that health care providers with a duty to respond to cardiac arrest should be educated, equipped, and authorized to perform automated external defibrillation, she says.

The AHA offers a training program, the *Heartsaver AED Course*, which is only four hours in length, says Bradley. “It is excellent training for all levels of people from layperson without any experience or knowledge, to even health care workers.”

The program offers hands-on training with AEDs, says Bradley. “There are scenarios built into the program

that allow participants to be very comfortable with the equipment and their skill level," she adds. "I highly recommend this program as a trainer for people new to the concept of AEDs."

• **Rapidly triage patients to an appropriate intervention site.**

Many rural areas do not have the ability to provide ACLS skills in the field, notes Stark-Johnson. "But they may have the ability to send a 12-lead ECG for the ED physician to [evaluate]," she says. "This is a timesaving factor."

The more rapid entry into the ACLS mode, the greater the opportunity to minimize the extent of damage or maximize the ability to convert an arrhythmia, explains Stark-Johnson.

• **Know benefits of a prehospital 12-lead ECG.**

There has been a continued shift to the prehospital arena for early identification of myocardial infarction, reports **Darlene Bradley**, RN, MSN, MAOM, CCRN, CEN, director of emergency/trauma services at UCI Medical Center at University of California-Irvine.

"Recommendations are now provided for paramedics to complete a 12-lead ECG in the field and transmit the information to an ED that is immediately equipped to provide fibrinolytic therapy," she explains.

For patients with acute coronary syndromes, the guidelines recommend a prehospital 12-lead ECG, notes Stark-Johnson. "This improves diagnosis, reduces time to treatment, identifies patients requiring reperfusion, contributes to mortality reduction, and facilitates triage to cardiac centers."

• **Consider prehospital fibrinolytic therapy.**

If there is a prolonged transfer time to a receiving facility, EMS agencies may want to consider administration of this drug prior to arrival in the ED, says Bradley.

"The goal of care is to reduce the door-to-drug time," she stresses. "Nurses should be in a state of readiness with emergency equipment, 12-lead ECG, and medications immediately available."

"This is beneficial when the transport of patients with acute infarction from home to the hospital is prolonged," says Stark-Johnson.

Stark-Johnson recommends that if the total of the following exceeds 60 minutes, you should consider prehospital fibrinolytics: Onset of chest pain to contact of ACLS personnel with patient, and arrival of ACLS at the patient's side to arrival at the hospital.

Angioplasty is an alternative to fibrinolytic therapy in centers with high volume and experienced operators, says Stark-Johnson. "Patients in cardiogenic shock who are less than [age] 75 need transport to cardiac interventional centers," she says. ■

Become familiar with these new cardiac drugs

There are many changes in pharmacology of resuscitation outlined in new guidelines from the Dallas-based American Heart Association (AHA), says **Rebecca L. Stark-Johnson**, CRNA, APNP, anesthesia manager at Fort Atkinson (WI) Memorial Health Services, and a regional faculty instructor for the AHA's Advanced Cardiac Life Support (ACLS) program.

Here are several drugs and the changes in recommended indications and dosages, according to the guidelines:

• **Intravenous amiodarone.**

The guidelines add amiodarone as an alternative to lidocaine for persistent ventricular fibrillation, says **John M. Field**, MD, FACC, FACEP, associate professor of medicine and surgery at Pennsylvania State University College of Medicine in Hershey, and ACLS science editor at the AHA.

Amiodarone has been added to the list of recommendations for the initial treatment of stable wide-complex tachycardia, reports **Darlene Bradley**, RN, MSN, MAOM, CCRN, CEN, director of emergency/trauma services at UCI Medical Center at University of California-Irvine.

Use caution in selection the correct drug, says Bradley. "Amrinone or adenosine might be mistakenly selected."

Here are the uses and dosages of the three drugs:

— Adenosine is used to terminate rapid supraventricular rhythms, and the dose is in 6-mg increments and doubled in two minutes if the rhythm persists.

— Amrinone is given for congestive heart failure, and the dosage is 0.75 mg/kg over 10-15 minutes.

— Amiodarone is used to treat rapid atrial and ventricular arrhythmias. The drug is used for rate control. It is given in 300 mg doses for arrest, and smaller doses for arrhythmias.

All three drugs are given intravenously, but they will *not* be given together, Bradley notes. "Because they all begin with the letter 'A,' you should be careful in selecting the correct drug," she urges. "Taking the written order to the medication room may prevent errors in drug selection from occurring."

Amiodarone and procainamide are recommended as alternatives to lidocaine for the initial treatment of hemodynamically stable wide-complex tachycardia, especially in patients with compromised cardiac function, notes Stark-Johnson.

Practitioners are urged to try *one* drug, stresses **Mary Fran Hazinski**, RN, MSN, FAAN, senior

ED nurses need to know these 2 drug categories

The pharmacologic agents are divided into two categories: agents for arrhythmias, and agents to optimize cardiac output and blood pressure. They are as follows:

- **Anti-arrhythmic agents:** adenosine, amiodarone, atropine, beta blockers, bretylium, calcium channel blockers, disopyramide, dopamine, flecainide, ibutilide, isoproterenol, lidocaine, magnesium, procainamide, propafenone, and sotalol.

- **Agents to optimize cardiac output and blood pressure:** epinephrine, vasopressin, norepinephrine, dopamine, dobutamine, amrinone and milrinone, calcium, digitalis, nitroglycerin, sodium nitroprusside, sodium bicarb, and diuretics. ■

science editor for the American Heart Association's (AHA's) emergency cardiovascular care programs and clinical specialist in the division of trauma in the departments of surgery and pediatrics at Vanderbilt University Medical Center in Nashville, TN.

"Use of a combination of several antiarrhythmics would be pro-arrhythmic in the presence of decreased myocardial infarction," she warns.

- **Lidocaine.**

This drug has undergone a change in view, says Stark-Johnson. "Lidocaine remains acceptable as an antiarrhythmic for use in the treatment of shock refractory ventricular fibrillation and pulseless ventricular tachycardia, but the evidence supporting its efficacy is poor," she explains.

Lidocaine remains in the guidelines as an indeterminate recommendation, says Bradley. "This indicates that there is evidence to support the practice, but that current research is insufficient to support a class recommendation."

- **High-dose epinephrine.**

The recommendations have changed for the vasoconstrictor epinephrine. High-dose epinephrine has not been shown to be effective as previously thought, says Bradley. "Post-resuscitation complications have been found to be present when escalating doses of the drug have been given," she adds.

High-dose epinephrine has not been beneficial, Field notes. "When incremental [1-3-5 mg] doses or cumulative high doses are given, neurologic outcome may be worse," he warns.

A single high dose of epinephrine has not been

shown to be either beneficial or harmful, says Field. "There is no change in the recommendation of the standard 1-mg dose," he says. "A high single dose can be given at the discretion of the provider when the standard dose fails. However, incremental or cumulative high doses are not recommended."

The research has not yet shown that routine use of initial and repeated or escalating doses of epinephrine can improve survival in cardiac arrest, says Stark-Johnson. "There is some troublesome evidence that patients that receive high dose epinephrine have more post-resuscitation complications than survivors that received the standard dose," she notes.

- **Vasopressin.**

The new guidelines add vasopressin as an alternative to the first dose of epinephrine in the pulseless ventricular tachycardia/ventricular fibrillation algorithm, says Field. "Vasopressin appears promising."

You may now consider vasopressin for promoting spontaneous circulation in full arrest victims, says Bradley. "It can now be substituted for epinephrine," she says.

Vasopressin, the natural substance antidiuretic hormone, becomes a powerful vasoconstrictor when used at much higher doses than normally present in the body, says Stark-Johnson. "It possesses positive effects that duplicate the positive effects of epinephrine, but does not duplicate the adverse effects," she says.

Vasopressin may be an equivalent agent to epinephrine for promoting return of spontaneous circulation in cardiac arrest, notes Stark-Johnson. "Vasopressin 40 U IV *not* repeated may be substituted for epinephrine as an alternative class IIB agent [which indicates that it is acceptable to use and has fair-to-good evidence supporting its usage]," she says. "The lower adverse side effects profile may be the major reindication for vasopressin."

- **Bretylium.**

This drug is no longer included the treatment plan, says Bradley. "Bretylium was used as a third-line drug in the treatment of ventricular fibrillation or pulseless ventricular tachycardia," she notes.

Bretylium became problematic when the supplier was unable to produce the quantities needed, reports Bradley. "There was concern that if the drug was kept within the guidelines, the manufacturer could not meet the demands," she says.

Bretylium remains a class IIB recommendation, but it is no longer recommended in the guidelines, Bradley explains. "Additionally, bretylium has a very high incidence of side effects," she cautions. "Hypotension caused by this drug in the post-resuscitation phase of care is a major concern." ■

AHA supports family presence

Are you trying to convince your colleagues to allow family members in the resuscitation room? If so, you'll be pleased to learn that this practice is recommended in the new guidelines from the Dallas-based American Heart Association (AHA).

"We were very excited to see the American Heart Association make a statement about the practice of family presence," says **Theresa Meyers**, RN, BSN, CEN, CCRN, director of the ED at Presbyterian Hospital in Dallas, one of the first facilities to implement a family presence policy. "It will be very helpful for health care providers at institutions that are resistant to this practice to have the recommendation from the AHA."

Meyers is hopeful that the recommendation will encourage further research into the practice of having family members at the bedside during resuscitations and invasive procedures. "This is especially important in the area of prehospital care where the practice occurs frequently," she notes.

Family presence is gaining momentum and recognition every day, according to **Laurie Cook**, RN, the ED nurse manager at Presbyterian. "Some indications of this include people calling us weekly who are initiating their own research regarding family presence, medical groups wanting presentations, and ongoing discussions in the break room of the ED by nursing staff," she says.

You can encourage this practice in many ways, urges Cook. "Set up protocols in your ED, have ongoing education about this at staff meetings, give presentations to other departments, such as social services and the medical staff, and initiate discussion by word of mouth." ■

SOURCES

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Improve pain assessment for elderly patients

When you assess pain in elderly patients, you might have to deal with multiple drug interactions, poor hearing, and confusion, says **Alexis M. Newton**, RN, CNS, MSN, clinical nurse specialist/educator for the ED at University of Colorado Hospital in Denver.

Here are six ways to improve pain assessment in elderly patients, recommended by Newton:

1. Ask about medications, and assess use of multiple drugs and possible drug interactions.
2. Identify any barriers to communication such as

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poor hearing, visual impairment, or impaired speech and thought processes.

3. Consider psychosocial barriers, such as the presence of abusive caregivers, which will impede your assessment of pain or possible injuries.

4. Communicate clearly and slowly with the use of open-ended questions to prompt responses.

5. Paraphrase to confirm that you understood the patient's responses.

6. When using a numeric pain scale, explain what you mean by 1 vs. 10. ■



JOURNAL REVIEW

Brown SL, Peck KR, Watts, DD. **Routine pharyngeal cultures may not be useful in pediatric victims of sexual assault.** *J Emerg Nurs* 2000; 26:306-311.

Routine oral cultures in pediatric victims of sexual assault is time-consuming, invasive, and costly, and there is no significant benefit to this practice, suggests this study from Inova Fairfax Hospital in Falls Church, VA. Records of 451 pediatric sexual assault examinations were reviewed, all of which had oral, vaginal or penile, and anal culture results. There were zero positive oral culture results in the sample.

Because of these findings, the policies of the ED's sexual assault nurse examiner program have been changed. Any patient who alleges oral copulation will still have an oral culture done, but the routine collection of specimens for oral cultures has been discontinued. They note the following exceptions:

- Children in whom an inadequate history or a history of questionable value has been received.
- Cases in which the history is unknown because of mental incapacitation, age, or developmental level of the child.
- Possible drug use, either voluntary or involuntary, related to altered mental status and an inability to recall details of the event.

"Not only are oral cultures time-consuming, they represent one more 'probing' the child may be required to undergo," wrote the researchers. "They also are less likely to provide definitive findings, even in a best-case scenario, given the fact that time may have elapsed, the child may have eaten, had something to drink, or have brushed his or her teeth."

Although the monetary savings (estimated at approximately \$40 per patient) might seem insignificant, it will help to contain costs, the researchers say. ■

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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 *New cardiovascular guidelines are here: You'll be amazed at the options*, p. 1; *Update on goals for fibrinolytic therapy*, p. 11; *Become familiar with these new cardiac drugs*, p. 13; and *Journal Reviews*, p. 16 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. ■