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ATRIUM Clinical Update

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New Guidelines for CPR and Emergency Cardiac Care

The American Heart Association published a major update to guidelines for cardiopulmonary resuscitation and emergency cardiovascular care in the December 13, 2005 issue of *Circulation*. All AACN members received a copy of that issue last month, but at over 200 pages, it's a lot to read through. Our goal with this issue of *Clinical Update* is to provide you with a one-page overview of the changes you can distribute to your staff and post in the units until you get new training materials and everyone takes a renewal course under the new guidelines.

Compressions: Push Hard, Push Fast

More than ever before, the latest guidelines emphasize the critical importance of good chest compressions. It makes sense — perfect ventilation doesn't help the patient if the oxygen can't get to the tissues. Appropriate drug therapy won't be effective if circulation isn't adequate.

- **Push hard and push fast: 100 compressions per minute for everyone (but newborns)**
- **Use equal compression and release time (0.3 seconds each)**
- **Allow the chest to return to normal position (full recoil) between compressions**

In order to speed up compressions, most people will shorten the upstroke of the compression and not allow the sternum to return to its normal resting position. However, this approach does not allow the heart to re-expand fully, and limits venous return. Over time, this will compromise cardiac output.

- **Relieve the person doing compressions every 2 minutes**
- **Make the switch in 5 seconds or less**
- **Do not interrupt compressions for more than 10 seconds except for defibrillation and intubation**

Manikin studies show that compression quality declines after two minutes (not enough depth, rate, or recoil) but people doing compressions don't feel tired until five or more minutes have passed. During resuscitation, the recorder should keep track of compression time by the clock, and announce when a rotation is needed.

Throughout the new guidelines, changes are made in BLS and ACLS to limit interruptions of compressions. Studies of CPR performed by health care professionals show that patients receive no compressions for 24% to 49% of total CPR time. When compressions stop, blood flow stops immediately and coronary artery perfusion pressure falls. The first compressions after an interruption do not produce as much perfusion as subsequent compressions. The bottom line? More interruptions decrease the chance of survival from cardiac arrest.

Airway Must Take Priority for Ventilation

While health care providers caring for trauma patients with potential c-spine injuries have always been taught not to use a head tilt-chin lift to open the airway, the new BLS guidelines modify that approach. New recommendations are to start with the jaw thrust maneuver without head extension, but to move to the head tilt immediately if the jaw thrust doesn't work. That's because opening the airway is the priority in an unresponsive trauma patient. The jaw thrust is very difficult to learn and perform adequately, and there is no assurance that this maneuver will keep the spine still. Oxygen must be delivered to the tissues, and a patient airway is essential.

- **Endotracheal tube placement must be confirmed with a CO_2 or esophageal detector device**

The new guidelines call for this additional assessment of tube placement immediately after intubation, during transport and whenever the patient is moved; it's no longer optional.

- **Each rescue breath should last one second**
- **Breath volume must produce a visible rise of the chest**
- **When an airway is in place, do not pause compressions for ventilation**

Since perfusion is reduced during CPR to 25% to 33% of normal, ventilation can also be less to maintain a normal ventilation/perfusion ratio. Positive pressure ventilation — whether mouth-to-shield/mask or with a resuscitation bag — increases intrathoracic pressure, which will decrease venous return. Thus, the new guidelines recommend avoiding breaths that are too large (ideally, approximately 500 mL) or giving too many breaths to minimize the negative effects on venous return and cardiac output.

- **During the first minutes of CPR for ventricular fibrillation, compressions are more important than ventilation**

In the first minutes of a cardiac arrest, a reserve of oxygen is present in the blood. Thus, oxygen delivery to the tissues is determined by the effectiveness of compressions, not rescue breathing.

Defibrillation: Major Changes

New guidelines for defibrillation follow the same theme: minimize interruptions of compressions.

- **Administer a single shock (not stacked shocks)**
- **Do not pause to check pulses after shock**
- **Resume CPR immediately after the shock**
- **Check pulses after 2 minutes of CPR**

Studies showed that a 3-shock sequence can result in delays of 19 to 37 seconds or longer between the first shock and resumption of CPR, which is deemed unacceptable. During this time, coronary artery perfusion drops, and it takes more time to restore perfusion when compressions start up again. A well-perfused heart is more likely to respond favorably to defibrillation.

Harder to Unlearn Than to Learn

For those of us who have been taking and teaching ACLS courses for decades, this update will be challenging to implement. It is far easier to learn new things than to "unlearn" what we already know and then start over. I'll bet I'm not the only nurse who will always think of a rhythm without pulses as "EMD." The good news is that the new guidelines are based on more extensive research than ever before and give us the best chance at successful resuscitation.

Check Your Knowledge...

Q. What are the 11 factors that contribute to a pulseless rhythm?

Answer on other side

See sources on page two.

Clinical Update is an educational newsletter provided by Atrium Medical Corporation and is edited by Patricia Carroll, RN,BC, CEN, RRT, MS.

In The Literature

Checking Gastric Tube Insertion

The current issue of the *American Journal of Critical Care* contains an interesting article about the use of carbon dioxide detection as a safety measure to identify inadvertent placement of gastric tubes in the airway. The authors describe a system in which they initially used capnography with great success, and then evaluated the CO_2 detectors that change color as an alternative to capnography. Their research showed that these colorimetric detectors were as accurate as capnography in identifying the presence of carbon dioxide and inadvertent airway cannulation.

What's missing from this article, however, is a cost analysis comparing capnography to colorimetric testing. The authors describe using a portable capnograph, and at times it was not available. With the disposable one-use colormetric device averaging $10 each, and capnography now widely available and integrated into traditional bedside monitors, capnography may be less expensive. When two methods have equal accuracy, cost should be a factor to consider.

Source: Burns SM et al: Detection of inadvertent airway intubation during gastric tube insertion: capnography versus a colorimetric carbon dioxide detector. *American Journal of Critical Care* 2006;15(2):188-193.

State of the RN Workforce

Peter Buerhaus and colleagues wrote a six-part series of articles examining the RN workforce for *Nursing Economic$*. The sixth article in the current issue summarizes the findings reported in the previous five articles and provides recommendations for a strategic plan for nursing management. The researchers' recommendations include: fixing problems associated with a negative climate in the workplace, measuring and improving nursing contributions to patient safety, thinking long-term, increasing capacity in nursing education programs, promoting a balanced, professional image for nursing, improving workforce diversity, and recognizing that positive changes in the workplace are possible.

This is a must-read for all nurse managers and educators.

Source: Buerhaus PI et al. State of the registered nurse workforce in the United States. *Nursing Economic$* 2006;24(1):6-12.

What Satisfies Nurses?

Researchers from New York conducted a national survey of 1,538 RNs working in nursing to determine which factors were associated with work satisfaction and reported their findings in the current issue of the *Journal of Nursing Scholarship*. This survey is unique in that it was not limited to nurses working in a hospital. They discovered that work setting was not related to satisfaction except for those nurses working in education — they were more satisfied than the rest of the nurses surveyed.

Not surprising to nurses, salary was not significantly related to satisfaction. Fairness in wages was related, as was paid time off. Paid time off was important as a way to reduce work-to-family conflict. More important to satisfaction than wages are autonomy in practice, a variety of work assignments, supervisory support, and opportunities for promotion. There are great recommendations for nurse managers in this report.

Source: Kovner C, et al. Factors Associated with Work Satisfaction of Registered Nurses. *Journal of Nursing Scholarship* 2006;38(1):71-79.

On the World Wide Web...

Are you and your staff ready for a public health emergency? You can begin to assess readiness with new simulations designed by researchers at the University of Illinois at Chicago. "Mobile Panflu Prep" is available on March 1 as a free download to cell phones from Cingular, Sprint and T-Mobile; users must register to see if their particular phone can handle the simulation. An anthrax simulation is in the works. For more information, visit http://www.publichealthgames.com

How Healthy is Your State?

The Trust for America's Health provides a report card for all 50 states in which the state is compared to the US as a whole. Click on your state and you'll get a list of adult health, child health, and public health indicators; CDC funding for various health programs; bioterrorism preparedness and HRSA non-research funding. The state sites also provide information about health disparities, obesity, birth defects, and cancer. You'd probably have to visit 10 sites and wade through layers of information to get the information pulled together for you here.
Visit http://healthyamericans.org

ACLS and BLS Online

The issue of Circulation containing the new emergency cardiac care guidelines is available free online at http://circ.ahajournals.org/content/vol102/suppl_1/

The American Heart Association provides Webcasts on the new guidelines that can be viewed online or downloaded as podcasts at:
http://tinyurl.com/nvd8p

An AHA online renewal course for health care provider BLS is available at:
http://tinyurl.com/pcqv6

Sources from page one:
American Heart Association: *Currents in Emergency Cardiovascular Care* 2005-06; 16(4).
American Heart Association: Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. *Circulation* 2005;112(24) suppl. IV1-IV211.

Check Your Knowledge...

A. Hypovolemia, hypoxia, hydrogen ions (acidosis), hypo/hyperkalemia, hypoglycemia, hypothermia, toxins, tamponade, tension pneumothorax, thrombosis (coronary/pulmonary), trauma