Less Ventilation, Defibrillation

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and treatment of cardiac arrest, "the last summation returned to the beginning question: How do we get more bystanders and health care providers to perform CPR and to perform it well?" they said.

"Our greatest challenge and highest priority is the training of lay rescuers and health care providers in simple, high-quality CPR skills that can be easily taught, remembered, and implemented to save lives," according to Ms. Hazinski and her associates. Evidence shows that "few victims of cardiac arrest receive CPR, and even fewer receive high-quality CPR."

To address this issue, the authors recommend a simplification of previous instructions on CPR, with a stronger emphasis on continuous chest compression with minimal interruptions for ventilation and rhythm checks.

"The combination of inadequate and interrupted chest compressions and excessive ventilation rates reduces cardiac output and coronary and cerebral blood flow and diminishes the likelihood of a successful resuscitation attempt," they said.

Thus, a universal compression-ventilation ratio of 30:2 for all lone rescuers (lay or trained) of victims of any age (excluding newborns) is recommended. Children can be treated using a 15:2 ratio if there are two rescuers present, since asphyxial arrest is more likely in this population. And a priority for ventilation was reaffirmed in the case of newborn resuscitation.

From an emergency medicine perspective, "this will hopefully mean we get a lot more people with pulses from the prehospital setting," Dr. Robert O'Connor, one of the authors of the guidelines, said in an interview.

The revised compression-ventilation ratio is not so much a deemphasis of ventilation, but rather a refinement, he explained. "Over the past 5 years, we have learned that with a 15:2 ratio, patients were being inadvertently hyperventilated, which is harmful. If you give 30:2, it gives the adequate number of ventilations per minute while maintaining a good consistent period of chest compressions," said Dr. O'Connor, director of the emergency medicine program at Christiana Care Health System in Newark, Del., and professor of emergency medicine at Jefferson Medical College, Philadelphia.

The main change in the guidelines concerning defibrillation is the recommendation for only one shock rather than three, and the emphasis on immediate postshock chest compressions and CPR, rather than rhythm checks. "This change is based on the high first-shock success rate of new defibrillators and the knowledge that if the first shock fails, intervening chest compressions may improve oxygen and substrate delivery to the myocardium, making the subsequent shock more likely to result in defibrillation," said Ms. Hazinski and her associates.

Although lay rescuers are encouraged to use automated external defibrillators as soon as possible, emergency medical service providers "may consider about five cycles (or 2 minutes) of CPR before defibrillation for unwitnessed arrest," they suggested. The first rhythm check should be done about 2 minutes after defibrillation and every subsequent 2 minutes. Vasopressors and antiarrhythmics should be administered as soon as possible after a rhythm check.

For acute ischemic stroke, there was reaffirmation of the previous recommendation to using tissue plasminogen activator (TPA) therapy "when administered by physicians in hospitals with stroke protocols that rigorously adhere to the eligibility criteria and therapeutic regimen of the National Institute of Neurological Disorders and Stroke (NINDS) protocol," Ms. Hazinski and her associates said.

Reaction to the guidelines from various medical specialties appears positive.

"We brain specialists like anything that keeps the blood flowing, and keeps people pumping on the chest," neurologist William M. Coplin said in an interview. "Once you start the heart you can keep the brain perfused and that's what's important," said Dr. Coplin of the department of neurology and neurologic surgery at Wayne State University, Detroit.

"We used to worry so much more about getting the lungs working, but we've certainly known for long enough that you can have lower oxygen in your system and as long as the blood is flowing the brain will survive," he said.

Cardiologist James J. Ferguson III also agrees with the focus on chest compressions as "the cornerstone of effective CPR. … One can infer that too many interruptions, ineffective circulation, and a lack of prioritization may have contributed to less than optimal outcomes in the past," said Dr. Ferguson of Baylor College of Medicine, Houston, and the Texas Heart Institute of St. Luke's Episcopal Hospital there.

Both Dr. Ferguson and Dr. Coplin agreed that the new guidelines may also be useful in overcoming hesitance from bystanders who are worried about disease-exposure with mouth-to-mouth resuscitation. "By stressing the importance of chest compressions, this may sidestep some of those issues, but it raises the concern that later on in the resuscitation efforts, when ventilation becomes more important, that it may be ignored to some extent," Dr. Ferguson said in an interview. However, he said that "the working philosophy of 'keep it simple and maximize your early benefit' would seem to provide the most benefit to the most people. Many more people who are saved are saved early, rather than late."

But he was disappointed with the guidelines' failure to fully endorse therapeutic hypothermia to improve neurologic outcome in comatose survivors of cardiac arrest.

"I wish they hadn't been so soft about it. It is a very soft endorsement, and I don't understand why," said Dr. Coplin, who is also chief of neurology and medical director of neurotrauma and critical care at Detroit Receiving Hospital.

Citing three studies showing improvement in patients treated with hypothermia, the guidelines state that both permissive hypothermia and active induction of hypothermia play a role in postresuscitation care. However, although mild spontaneous hypothermia "may be beneficial to neurologic outcome and is likely to be well tolerated," active induction of hypothermia may only be beneficial to a subset of unconscious, hemodynamically stable adults with a return of spontaneous circulation after an out-of-hospital ventricular fibrillation cardiac arrest, according to the guidelines.

Although the guidelines' recommendation for therapeutic hypothermia is a class IIa rather than a class I recommendation, this should still be interpreted as a strong endorsement—especially because the issue was not even addressed in the previous 2000 guidelines, Dr. O'Connor said.

But there have been practical problems with implementing a hypothermia protocol, Dr. O'Connor added, including issues such as temperature overshoot and inadvertent rewarming. "It's also not clear from current evidence whether this protocol applies to arrest conditions other than ventricular fibrillation," he explained. "So we still recommend it, but with a word of caution." ■

ACE Inhibitor Post CABG May Do More Harm Than Good

BY BRUCE JANCIN
Denver Bureau

STOCKHOLM — The initiation of ACE inhibitor therapy within 7 days of coronary artery bypass graft surgery does not improve clinical outcomes in low-risk patients without a conventional indication for it, Dr. Wiek H. van Gilst, said at the annual congress of the European Society of Cardiology.

In fact, just the opposite was observed in the 2,553-patient Ischemia Management With Accupril Post Bypass Graft via Inhibition of Angiotensin-Converting Enzyme (IMAGINE) trial, conducted in Europe and Canada. The incidence of ischemic events was 52% greater in the quinapril (Accupril) group than with placebo during the first 3 months of follow-up, although at the end of the full 43 months, there was no significant difference between the two treatment groups, noted Dr. van Gilst, professor of cardiovascular and clinical pharmacology at University Medical Center, in Groningen, the Netherlands.

The rationale behind the IMAGINE trial was that the post–coronary artery bypass graft (CABG) period is known to be a time of increased local and systemic inflammation, thrombotic activity, and endothelial dysfunction, and ACE inhibitors have been shown to curb endothelial dysfunction and exert an anti-inflammatory effect. The hypothesis of the study was that quinapril, at a target dose of 40 mg once daily, would slow atherosclerotic progression and reduce ischemic events.

This specific issue had not been examined before. The earlier Heart Outcomes Prevention Evaluation (HOPE), European Trial on Reduction of Cardiac Events With Perindopril in Stable CAD (EUROPA), and Prevention of Events With Angiotensin-Converting Enzyme Inhibition (PEACE) trials included collectively more than 9,200 patients who had undergone CABG, and those patients experienced a significant reduction in ischemic events. In those trials, however, recent CABG was an exclusion criterion.

The primary end point in IMAGINE was a composite of cardiovascular death, resuscitated cardiac arrest, nonfatal MI, coronary revascularization, hospitalization for unstable angina, documented angina not requiring hospitalization, stroke, and congestive heart failure requiring hospitalization. The relative risk of this combined end point was 15% greater in the quinapril group, a rate not significantly higher than with placebo.

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Ischemic event rates were up 52% in the treatment group, Dr. van Gilst said.

IMAGINE participants had higher rates of β-blocker, statin, and antiplatelet therapy usage than did patients in any previous clinical trial. Moreover, none of the participants had a low ejection fraction or other indication for an ACE inhibitor, which made this a very low-risk group. In fact, they were at lower risk of ischemic events than was the age-matched general population, according to Dr. van Gilst.

Discussant Dr. Michel E. Bertrand, called the IMAGINE results "somewhat surprising." He noted that every component of the composite end point save one—nonfatal MI—trended in favor of placebo.

Dr. Bertrand, professor of cardiology at the University of Lille (France), proposed that the quinapril target dose may have been too high. The mean daily dose was 28 mg. The 12% incidence of hypotension and 21% rate of cough in the quinapril group were also relatively high. It may be that the substantial quinapril dose led to an increase in the release of bradykinin, further promoting inflammation in a postsurgical population that had an ongoing highly active inflammatory process, with a resultant increase in ischemic events.

He also said that the negative results could have been due to a molecule-specific effect of quinapril. IMAGINE was not the first negative trial involving quinapril in patients undergoing coronary intervention.

Yet another possibility is that starting an ACE inhibitor within 1 week of CABG is just too soon, Dr. Bertrand said.

IMAGINE was sponsored by Pfizer Inc., which markets Accupril. ■