Adult Acute Care Bulletin

Nov./Dec.'98

American Association for Respiratory Care

Specialty Practitioner of the Year: *Lynn Smyrk, RRT*

As the adult critical care supervisor at Gundersen Lutheran Hospital in La Crosse, WI, Lynn Smyrk's responsibilities revolve around the day-to-day operations of respiratory care in the adult ICU/CCU. Her primary duties include physician rounds and recommendations for ventilator management, development of protocol and practice guidelines, equipment evaluation and purchasing, CQI, scheduling, supervision, training, and the professional development of all the respiratory therapists assigned to the adult critical care units.

However, Lynn regularly goes above and beyond the call of duty in her critical care involvement. She has published articles in AARC Times, participated in a research fellowship (IV Sedation Study in the ICU, 1994), helped to develop a respiratory care consult service, and participated in the development of a number of the AARC's Clinical Practice Guidelines. She is also active in both her state society and the AARC, having served as president of the Wisconsin Society for Respiratory Care in 1994 and currently as Wisconsin's delegate to the AARC House of Delegates, where she is co-chair of the Publications Committee.

Her involvement extends to her community as well. Lynn has represented the profession in the La Crosse Area Health Initiative-Tobacco Coalition and is currently serving as chair of Western Wisconsin Technical College's Advisory Committee. Congratulations Lynn! ■

AARC Adopts ECMO Position Statement

The AARC recently adopted the following position statement regarding the qualification of respiratory therapists to serve as extracorporeal membrane oxygenation (ECMO) specialists. The position statement reflects evidence of the RT's unique multi-skilling capabilities, and the AARC encourages respiratory therapists to expand their skills by pursuing the additional education required to become an ECMO Specialist.

Respiratory Therapists as Extracorporeal Membrane Oxygenation (ECMO) Specialists

The American Association for Respiratory Care endorses the use of qualified and appropriately educated Respiratory Therapists as Extracorporeal Membrane Oxygenation (ECMO) Specialists. ECMO is a modified cardiopulmonary bypass technique used for the treatment of life threatening cardiac or respiratory failure applied for periods of greater than eight hours outside the operating room environment. An ECMO Specialist is the technical specialist educated to manage the ECMO system (blood pump, tubing, artificial oxygenator, and related equipment) and the clinical needs of the patient on ECMO (such as maintenance of normal acid-base balance, oxygenation, ventilation, and anticoagulation) under the direction and supervision of a licensed physician.

The Respiratory Therapist's education provides extensive training in maintenance of normal acid-base balance; oxygenation and oxygen delivery; ventilation; and cardiorespiratory anatomy, physiology, and pathophysiology. These fundamentals of Respiratory Care education make the Respiratory Therapist uniquely qualified to undertake further education as an ECMO Specialist. Additionally the Respiratory Therapist's ability to function in multiple clinical settings enhances his/her value as an ECMO Specialist, allowing for care of all patient populations in a variety of crit-

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ical care environments. The requisite qualifications for educating a Respiratory Therapist to be an ECMO Specialist should include: (1) the successful completion of an accredited respiratory care educational program, (2) an earned Registered Respiratory Therapist (RRT) credential from the National Board for Respiratory Care (NBRC), and (3) clinical experience in critical care. Education as an ECMO Specialist should be in accordance with the Extracorporeal Life Support Organization's (ELSO) document entitled "Guidelines for Training and Continuing Education of ECMO Specialists." ■

Researchers Develop "Smart" ICU System Using Advanced Computer Intelligence

Researchers at the University of Pennsylvania Medical Center have developed a "smart" intensive care unit (ICU) system that improves vital-sign monitoring of critically-ill patients. By collecting and analyzing several vital signs simultaneously, the smart ICU system could be used to assist health care professionals in monitoring patients' physiological parameters.

Collecting data such as heart rate, blood pressure, and blood flow measurements is critical to patient care but requires a great deal of time and analysis by an experienced clinician. To enhance productivity, advanced computer intelligence can be used to convert a patient's vital-sign measurements into easy-to-follow visual models.

The system utilizes two artificial computer intelligence tools: neural networks and fuzzy logic. The neural network works much like the human brain – it learns how to behave as it interacts with data and is reinforced for positive performance while being "punished" for poor performance. The smart ICU system's neural network can quickly learn the ideal vital signs for a given patient. Fuzzy logic is a mathematical representation of the way humans think and behave, and is more advanced than traditional computer logic because of its ability to manipulate "fuzzier" concepts such as "almost," "near," and "very far." These two relatively new artificial intelligence tools have successfully been used to enhance performance in a broad range of areas, including air conditioning, elevators, and subway systems. The integration of the two tools allows for the optimal "smart" system with the ability to learn and adapt to varying situations.

One medical application of artificial computer intelligence is hemodynamic analysis. In a study conducted at the medical center, hemodynamic data was collected non-invasively from ten patients'electronic bedside instruments to measure cardiac performance. This data consisted of pulmonary artery occlusion, pressure (PAOP), heart rate (HR), and cardiac output (CO). The artificial computer intelligence system produced three-dimensional maps, or graphs, on a computer screen which illustrated each patient's hemodynamic status over designated periods of time ranging from one hour to one week.

Says C. William Hanson, III, MD, associate professor of anesthesia and section chief of anesthesia/critical care medicine at Penn, "We've identified a new way to streamline the information analysis process, thereby improving the efficiency of patient care. The smart ICU is designed to support clinicians, not replace them; these tools can perform complicated tasks and help to recognize important trends in a patient's health status." (Source: University of Pennsylvania Medical Center) ■

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New Short-Acting Anesthetics Cut Recovery Time

New anesthetic agents, combined with less-invasive surgical techniques, are allowing more and more patients to safely bypass the recovery room and even go home within minutes after surgery, say researchers from University of Chicago Medical Center. At their institution, more than 50% of patients having outpatient surgery with these anesthetics recover quickly enough to leave the operating room in a chair, completely bypassing the recovery room. Moreover, they are "awake, alert, comfortable, clear-headed, and have minimal, if any, pain or nausea."

These researchers believe the trend will now be to shift this approach from academic medical centers to community hospitals and clinics, and from clinics to private doctors offices. In a study involving five community hospitals or surgi-centers that were trained to imple-

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ment the newer short-acting, fast-emergence general anesthetics, they found that 15% to 40% of patients who underwent outpatient surgery with new anesthetics were safely able to bypass the recovery room altogether, up from two percent or less before the study. Speeding recovery time not only increased patient satisfaction, but also produced annual savings ranging from $50,000 to $158,000 per site. (Source: University of Chicago) ■

Rethinking Resuscitation: *Is Room Air Better Than Pure Oxygen?*

Researchers from the University of Maryland School of Medicine and George Washington University School of Medicine and Health Sciences report that resuscitating patients with room air may be better than 100% oxygen because the 21% oxygen concentration in room air can help prevent the neurological damage that can occur after the brain is deprived of oxygen. The study is the first to look at chemical changes in the brain during restoration of blood flow after cardiac arrest and the neurological damage that can follow.

Doctors know that much of the brain damage that occurs after the heart stops pumping takes place while the blood flow is being restored to the brain and is caused by the toxic effects of free radicals, which are byproducts of the process of oxidation. Researchers compared levels of oxidation of brain lipids – fatty acids and fat-like substances that maintain vital metabolic functions – in animal models resuscitated after ten minutes of cardiac arrest. In those given 100% oxygen, free-radical levels were significantly higher than in those resuscitated using the oxygen ratio found in room air.

When neurological deficits were measured, the animals resuscitated with 21% percent oxygen showed less brain damage than those resuscitated with 100% oxygen. "It was reasonable to expect that pure oxygen would be good for a brain that has been deprived of oxygen," says study author Gary Fiskum, PhD. "But we found that was not necessarily the case. After oxygen levels reached normal levels in the blood, continuing to administer pure oxygen actually was damaging the metabolic mechanism in the brain."

Researchers say further studies are needed to understand the precise mechanisms of oxidative injury to the brain. That understanding could help medical science develop more effective therapies to improve neurological outcomes after heart attacks, strokes, and head injuries.

Meanwhile, the researchers say the neurological and neurochemical results of their study raise questions about the appropriateness of current resuscitation guidelines that call for pure oxygen for undefined lengths of time during and after cardiac arrest.

"We are not saying to stop using 100% oxygen and to start using only room air," Fiskum stresses. "We are saying to monitor oxygen levels in the blood more closely and not to use pure oxygen if the oxygen level already is at or above normal."

The study was supported by a grant from the National Institute of Neurological Diseases and Stroke, part of the National Institutes of Health, and was published in the August issue of *Stroke.* ■

Researcher Urges Improved Participation, Methodology in Clinical Trials

Medical researchers studying new therapies should focus on well-designed clinical trials with large numbers of patients and adequate time for testing, according to the director of a leading research institute.

"My view is that clinical trials are like pieces of a puzzle. You can't look at one piece and get the whole picture; you need the whole puzzle," says Robert Califf, MD, director of the Duke Clinical Research Institute in Durham, NC.

According to Dr. Califf, investigators often treat the results of a single trial as definitive and meriting a major change in health policy, which can add to confusion over appropriate health policy. He adds that often the public perception is that therapies prescribed by doctors have been shown to be superior in clinical trials. In fact, most medical practice is currently based on opinion and not definitive evidence.

Dr. Califf points to several prominent examples of problems surfacing only after drugs were in wide use:

- The diet drugs fenfluramine and dexfenfluramine were recalled by the FDA in 1997 after new evidence indicated they can cause heart valve damage.
- A group of anti-arrhythmic drugs were prescribed for about ten years before a clinical trial found they actually increased the risk of sudden death.
- The hypertension drug mibefradil was pulled from the market earlier this year because of potentially fatal interactions with more than two dozen other medications.

"All this can be befuddling to the public," Dr. Califf says, "because it would seem like doctors should know what they're doing. But the problem is, no individual doctor sees enough cases to really know the impact of the therapies that they're prescribing." Adding to the problem is a conflict that often occurs in applied research: how to make new therapies available as quickly as possible, while still doing everything possible to ensure safety.

Dr. Califf points to the growing need for more people to volunteer for clinical trials. "The biomedical pipeline is turning out more potentially beneficial products than we have the capacity to test," he says. "We need a national spirit of cooperation and an investment in infrastructure and methodology for clinical trials if we are to realize the benefits of better medical science. Only if patients are responsive to participation in clinical trials will we be able to make needed progress."

Greater attention to the way clinical trials are conducted is also required. A pragmatic clinical trial is intended to answer a question that will directly help doctors know how to treat patients. Dr. Califf says a good clinical trial starts with a good question, and should include these elements:

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- Adequate numbers of patients must be enrolled to be sure the questions are answered.
- Energy and resources should be directed toward answering the questions, rather than to extraneous things. Government regulations are currently detracting from efficient studies.
- There must be careful measurement and good quality control.

Dr. Califf points out that the results of some clinical trials are not made public, particularly if the study findings are not favorable to the company funding the research. He suggests a number of ethical questions also be considered, including:

- When is it reasonable to do a clinical trial and ask a patient to volunteer?
- How do you really get informed consent? Does the patient understand what he or she is getting involved in when randomized to one treatment or another?
- Once the result becomes evident in an ongoing clinical trial, when do you stop it?

Dr. Califf cites the Heart and Estrogen/Progestin Replacement Study (HERS) as an example of a good clinical trial that produced a result contrary to what was expected based on expert opinion. As reported in the August 19 issue of *The Journal of the American Medical Association*, the four-year study came up with the surprising result that postmenopausal women with pre-existing heart disease who took hormone replacement therapy had no more protection against a future heart attack than women who took a placebo. The women taking hormone therapy had more coronary heart disease events and other thrombotic events during the first year of observation than women in the placebo group .

Dr. Califf says: "I think HERS is a really good example. It really demonstrates the complexity of dealing with human illness, and how careful things have to be looked at, and how wrong we can be based on our impressions."

According to Dr. Califf, based on observational studies, it was expected that the risk of cardiac events would be reduced by 30% to 50%. Unfortunately, it appears that women taking hormone replacement therapy were healthier in other ways, and the previous studies mistakenly attributed the better outcomes to the hormone replacement therapy itself. Dr. Califf adds that only a randomized trial could sort out these complex issues. (AMA's 17th Annual Science Reporters Conference) ■

AARC Supports Efforts to Raise Lung Cancer Awareness

The American Association for Respiratory Care has recently joined forces with other health organizations to endorse and help promote a national lung cancer awareness campaign sponsored by Cancer Care, Inc., the Alliance for Lung Cancer Advocacy, the Cancer Research Foundation of America, and the National Coalition for Cancer Survivorship.

As respiratory therapists, our membership often encounter lung cancer patients and see firsthand the ravages of this disease which claims more than 150,000 lives each year. The AARC encourages RTs to be ever cognizant of the warning signs of lung cancer and to continue your efforts to educate the people you work with. Following are some easy-to-recognize signs and symptoms of lung cancer that would be ideal to share with patients and other health professionals alike.

Chest Signs and Symptoms

- smoker's cough that persists or becomes intense
- increase in volume of sputum
- non-smoker's cough that persists for more than 2 weeks
- change of color of sputum
- persistent chest, shoulder, or back pain unrelated to pain from coughing
- wheezing
- blood in sputum
- repeated episodes of pneumonia or bronchitis

Other Signs and Symptoms

- fatigue
- loss of appetite
- headache, bone pain, aching joints
- bone fractures not related to accidental injury
- neurologic symptoms, such as unsteady gait and/or episodic memory loss
- neck and facial swelling
- unexplained weight loss ■

New Product Suggestions

As you know, new product development is an important component of the services that any association provides its members. But where do these new products originate?

Quite often they originate with you. You and your staff encounter problems and needs everyday. Perhaps you require an educational product on a procedure or disease. Or maybe you need a manual to help you manage certain components of your department.

Tell us what products or services the AARC can develop that will help you perform your job. We will research your suggestion, and if it is viable, produce it and make it available to the profession.

Please provide the following information when submitting your product or service suggestion:

- Brief description of the product
- Describe who will use this product
- Tell why you believe potential users will buy this product
- List your name, member number, and specialty section/committee

Send this information to: New Products, AARC, 11030 Ables Lane, Dallas, TX 75229; email: info@aarc.org; FAX: (972) 484-2720. ■

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