Transport Bulletin

Nov./Dec.'01

American Association for Respiratory Care

Notes from the Editor

by Steven E. Sittig, RRT

As I sit down to write this edition of my "Notes from the Editor," it is the last weekend of September. Where did this past year go? It doesn't seem all that long ago that we were all planning for our respective big summer vacations. It has been a busy year and I hope all is getting back to normal for everyone since the tragic events of September 11 in New York City and Washington, DC.

In this issue we have a great article from Aaron Lund on EKG in the transport environment. The critical care transport class he took sounds very thorough and worthwhile. I would be interested in hearing from others in the section who may have taken this course or are looking into it.

I am also starting a new section on pharmacology review. In each *Bulletin* I will highlight two or three different medicines for you to review. My first working title for this section was, "Yes, there are other drugs besides Albuterol," but logic overrode my silly attempt at sarcasm. In the transport environment we need to be aware of all types of medicines that our patients may be taking or that are administered during transport.

This has been an interesting year for the section, as the listserve has seen increasing traffic. This is a great way to pose questions to other transport RTs nationwide. Subjects can range from policy/procedure questions, equipment issues, or interesting issues found in transport, among others. If you don't have access to the Internet, please feel free to call me with your issues/questions or have a friend or coworker forward them to me. I can then post them on the listserve and let you know about any responses that result.

I hope that if you attended the AARC Congress in San Antonio, you had a great time and perhaps we had a chance to meet. I would encourage you to attend the Critical Care Medical Transport Conference (CCMTC) scheduled for the first week in April in Las Vegas. I was unable to attend this year's conference in San Antonio but heard the attendance is growing every year. This a great opportunity to attend an outstanding multidisciplinary conference with other transport professionals. For those of you who have interesting research ideas, etc., there is also an abstract forum. Presenting at conferences such as these can really boost the recognition of RTs in transport.

I look forward to the New Year and hope to hear from you about what you would like to see covered in **your** *Bulletin* next year. In addition, if you have any interesting ideas for presentation at the 2002 AARC Congress in Tampa, please forward them to either Jerry Focht or myself. I keep threatening to do a presentation at another national conference but need to clear the deck, so to speak, of other commitments first.

I have recently completed a project that was forwarded to me by Karen Singleterry from the AARC. A writer in New York was commissioned to write a textbook on people with careers in life science. The book will include an ecologist, dental hygienist, and veterinarian, among others, and they also wanted to include a respiratory therapist. Each career will be comprised of three short paragraphs, including a description of the profession and its educational requirements, and a profile of a person in that profession. The target audience is 5th and 6th grade students. I conducted a phone interview with the author to provide the information on respiratory therapy. I recently heard that the book has been completed and the expected publication date is early spring of 2002. This was a fun project to be involved in and I was happy to help promote the profession and highlight our role in transport.

In closing, I would once again like to encourage the readership to consider submitting articles to this *Bulletin*. I am always available to help budding authors with questions or ideas. My email address and phone number are listed on page 2.

Until next time, may all of your transports end safely for you and your patients. ■

CAMTS Update

by Tom Cahill, RRT

It was a busy summer and fall for all of us. The CAMTS Board met in July in Toronto and September at the AMTC. To date there are 94 services accredited by CAMTS. You

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can see a complete list of these services on the web site at www.camts.com.

A new site surveyor class will be held in Phoenix in January. As the song goes, "The Times They Are A Changing." The new standards are in their final revision and should be ready for publication by the beginning of the year. The Board has been working hard at revising the standards to reflect the evolution of the aeromedical field. We have tangled with the issue of ATLS and advanced physiology and now have some alternatives for teams to choose from.

In the future, CAMTS will be looking closely at your mission statements and evaluating your team based on what you say you do. Clinical competencies, medical direction, and continuing education should reflect the population you are transporting. A big emphasis on safety will be seen in these new standards in all aspects of the service. Pilots, mechanics, dispatchers, and the flight team will be evaluated to see if they meet these new standards. The standards will also take an "all or nothing" direction with a close look at those teams that use ground transport as an alternative to flying. The question you need to ask yourself is, "Are we truly acting as a critical care provider in all aspects of our care?"

There is also a new addition to the standards: Medical Escort has been defined and given standards of care. We hope to see our first pilot service accredited in 2002.

2002 is a going to be a great year. Let's all try to make it a safe one as well. ■

Another View of EKGs in the Prehospital/ Transport Setting

by Aaron Lund, RRT, NREMT-I, CCEMTP, Perinatal/Pediatric Respiratory Care Specialist, flight respiratory therapist, StarCare V, Lincoln, NE

Recently, I had the opportunity to take the Critical Care Emergency Medical Transport Program (CCEMTP) course sponsored by the University of Maryland at Baltimore County. The program, lasting 80+ hours, consists of lectures in various modules: Critical Care Transport Environment, Breathing Management, Surgical Airway Management, Hemodynamic Management, Cardiac Management, Pharmacological Management, GI/GU/Renal Management, Transport Considerations, Special Considerations, Burn Management, X-ray Interpretation, and High-Risk OB. Upon completion of the program, each participant undertakes a written examination and is awarded the CCEMTP credential for a period of three years. Many topics were reviewed, but for me, one in particular brought functioning in the critical care transport environment into a new perspective.

Of great interest was the topic of monitoring multiple leads with our traditional transport monitors. Traditionally, many of us monitor solely out of Lead II. But let's say your patient has had a septal wall MI, which would show Q waves and ST elevation in leads V1 and V2. How can you clearly monitor your therapeutic interventions? How can you accurately diagnose a bundle branch block in Leads I, II, and III? How can you accurately state the axis if the chest leads are placed directly onto the chest? How can you discern if the patient has right/left atrial enlargement or right/left ventricular hypertrophy? You need to look past the initial Lead I, Lead II, and Lead III.

First of all, when performing EKG monitoring of a patient in the transport environment, one must take caution in the placement of leads. The black, red, and white cables are clearly marked LA (Left Arm), LL (Left Leg), and RA (Right Arm). So why do we always place these leads on the left chest, right chest, and left abdomen? These electrodes should be placed appropriately into their designated areas to get a clear understanding of the axis. If these leads were meant to be placed on the chest and abdomen they would be labeled as LC (Left Chest), LA (Left Abdomen), and RC (Right Chest).

Receiving an accurate interpretation of your axis will also allow you to determine if there is any sort of hemiblock going on. If the patient has a pathological left axis, he is going to have an anterior hemiblock. If he has a right axis, he is going to have a posterior hemiblock. So why do I need to know about hemiblocks and other heart blocks in the transport environment? These patients are oftentimes at risk of going into complete heart blocks, and drugs such as lidocaine, procainamide, and sometimes even morphine can further slow conduction through the ventricles.

So, how many views can you really see with only three cables? You can actually receive nine views of the heart! We all know when we go to buy something new — let's say a new car — we don't just look at three views it. We want to see the whole thing. The same should be true when transporting the cardiac patient. Initially, we will look at Lead I, Lead II, and Lead III. To receive the remaining six views we will simply continue to monitor our patient in Lead III on the monitor but manipulate the placement of our red cable. To receive V1 we will want to place a new electrode in the same position as V1 (4th intercostal space to the right side of the sternum). This is now considered MCL1. V2 is found by changing the cable. A new electrode is placed on the left side of the sternum in the 4th intercostal space, and this should now be labeled as MCL2. Continue with this process to view all of the V-leads to receive the remaining views of the heart. And watch the amazement of the receiving facility staff when you present them with nine different views of the heart. But please make sure you label each view appropriately.

Now onto bundle branch blocks. The simplest way that I found to discern between a right and left bundle branch block is to utilize Taigman's Turn Signal Theory. To do this, you will need to monitor the patient in V1 (two points for you if you remembered this is MCL1) while working with three cables. Now look to see if the QRS complex is greater than 0.12 and find the J-point (the point where the QRS complex meets the isoelectric line and moves into the T wave). Draw a line over to the middle of the QRS complex and a line in the direction of the last portion of the QRS complex. If the arrow goes up, you have a

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right bundle branch block — just like when you turn on the turn signal to make a right hand turn. If the arrow goes down, you have a left bundle branch block.

Finally, to look at hypertrophy of the heart, one must once again look at V1 for most items and include V5 when looking at left ventricular hypertrophy. Right atrial enlargement will be evident by a diphasic P wave in V1, with the initial portion of the P wave larger than the later portion. The opposite holds true for left atrial enlargement; the initial portion of the P wave is smaller than the terminal portion. To diagnose ventricular hypertrophy we are going to again look at V1. Traditionally, in V1, or MCL1 in the transport environment, the R wave is much smaller than the S wave and the R wave progressively gets larger in the subsequent chest leads. So, when looking at V1 or MCL1 in right ventricular hypertrophy we will notice that there is a large R wave and a small S wave. And in the subsequent chest leads the R wave gets smaller. In left ventricular hypertrophy you will notice a large S wave in V1 and a large R wave in V5. If you add the small boxes that these waves occupy totally and it is greater then 35, you have left ventricular hypertrophy.

I challenge each and every one of you working with the adult patient population to utilize these methods. I understand that old habits are hard to break at times and that oftentimes change is met with resistance. At the end of this section in the CCEMTP course I heard one paramedic ask the following question: "Why do I need to know this information if it is just my job to get the patient from Point A to Point B?" Clearly, I was astonished! In the critical care transport environment we are "health care PROFESSIONALS" and the people who entrust us with their patients and loved ones expect us to know how to accurately care for and provide interventions to these patients throughout the transport process. I hope that none of us in the transport environment believe that all we must do is bring Mr./Mrs. Jones from Point A to Point B. If this is your belief I would invite you to apply for the many positions available in the Wheelchair Transport Van environment. In the long run though, if you follow these simple steps you will clearly benefit the administration of therapeutic interventions performed on your patient. ■

Winter Weather Awareness

by Steven E. Sittig, RRT

Anyone who lives in the northern part of the United States or most mountain ranges knows they will have to deal with winter weather. While most people can stay at home safe from the elements, those of us in the field of transport must sometimes brave the elements to serve our patients. No program should risk its transport crew during extreme winter weather, but even normal winter weather can be a serious threat.

Once your body begins to lose heat faster than it produces it you are undergoing exposure. During this phase, two things happen. First, you begin voluntary exercise to keep warm. For example, you might jump up and down. Secondly, your body makes involuntary adjustments to preserve normal temperature in the vital organs and you begin to shiver. Either response depletes your energy reserves. The only way to stop the depletion of energy is to reduce the degree of exposure.

The body loses heat in five ways: respiration, evaporation, conduction, radiation, and convection.

Respiration: Heat escapes when air is exhaled. Covering the mouth and nose area with wool or even a bandana can reduce this heat loss.

Evaporation: Perspiration evaporating from the skin and moisture from the lungs contributes to the heat loss by the body. Control the amount of evaporation by wearing layers of clothing that can be ventilated or taken off. By manipulating these layers of clothes you can help control the cooling effect of evaporation.

Conduction: Sitting on the ground or snow, or touching cold equipment, are examples of how heat can be lost through conduction. You should wear clothing made of materials that do not lose their insulating capabilities when wet, such as wool or newer materials such as Gore-Tex or polypropylene.

Radiation: Radiation is the largest cause of loss of heat from uncovered skin, especially that on the head, neck, and hands. Exposure to the wind, in addition to the cold, adds a significant multiplier to heat loss. Wearing proper headgear and mittens can save an immense loss of heat from the body. In survival situations mittens are better than gloves, as the fingers move freely in contact with one another and your hands remain warmer.

Convection: The primary function of clothing in cold weather is to keep a layer of warm air next to the skin but allow perspiration to pass away from the body. The body continually warms this area just above the skin. You can see this when you shiver; you note the fine hairs on your arm rise up and help trap the air just above the skin's surface. By wearing clothing with good wind protection and insulating value, you can help reduce your body's heat loss in cold weather to a safe level.

You should also review the signs and symptoms of hypothermia. The symptoms become very apparent and include:

- Uncontrollable shivering
- Vague, slow, slurred speech
- Memory lapses: incoherence
- Drowsiness
- Immobile or fumbling hands

So, remember: every time you go out on transport or travel during winter weather, be prepared for potential exposure to the elements. Dressing appropriately, along with carrying winter survival kits including extra-warm clothes, food, and water, can significantly improve your chances of survival if you are in a situation where you are exposed to the elements. ■

Drug Capsule

by Steven E. Sittig, RRT

Milrinone (Primacor): Milrinone is a newer cyclic AMP specific phosphodiesterase (PDE) inhibitor that can produce both positive inotropic effects and vasodilation independent of beta-1 andrenergic receptor stimulation in the cardiovascular system. Milrinone improves hemodynamics and biventricular function in patients with ventricular dysfunction by increasing stroke volume index, increasing left ventricular contractility, and producing pulmonary vasodilation. Milrinone also produces vasodilation in the arteriolar and venous vascular smooth muscle. These clinical properties are advantageous in congestive heart failure, allowing maximal improvements in hemodynamic performance without excessively increasing myocardial oxygen demand. Milrinone is rapidly and almost completely absorbed from the gastrointestinal tract, but is only given intravenously because of an increased mortality rate associated with prolonged administration via the oral route. It is about 70% bound to plasma proteins. Elimination occurs mainly via the urine; about 83% of a dose is excreted as unchanged drug. The elimination half-life is about 2.3 hours. Compared to Amrinone, another bipyridine derivative, milrinone is a more potent drug with a much shorter duration of action and fewer side effects.

Indications: Congestive heart failure; cardiac surgery/low output states.

Dosage: Milrinone comes prepared in a 1 mg/ml solution. Doses of milrinone lactate are expressed in terms of the base. The initial loading dose is 50 micrograms per kg bodyweight given over 10 minutes, followed by a continuous maintenance infusion. The maintenance infusion may be titrated between 0.375 and 0.75 micrograms per kg per minute, but a total daily dose of 1.13 mg per kg should not be exceeded. Dosage should be reduced in patients with renal impairment.

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Administration in children: Pharmacokinetic studies have suggested that steady-state plasma concentrations of milrinone are lower in children than in adults given similar doses, and that milrinone clearance is faster in children. It has been suggested that in children an initial loading dose of 75 micrograms per kg body-weight should be administered, followed by maintenance infusions of 0.75 micrograms per kg per minute, increased to 1.0 micrograms per kg per minute if required. An additional bolus dose of 25 micrograms per kg is recommended before each increase of 0.25 micrograms per kg per minute in infusion rate.

Adverse effects and precautions: Prolonged oral treatment with milrinone has increased the mortality rate, and milrinone is now only employed intravenously for short-term use. Supraventricular and ventricular arrhythmias, hypotension, angina-like chest pain, and headache have been reported. Hypokalaemia, tremor, and thrombocytopenia may occur. Milrinone should be used with caution in patients with severe obstructive aortic or pulmonary valvular disease or with hypertrophic cardiomyopathy. Since milrinone may facilitate conduction through the atrioventricular node it can increase the ventricular response rate in patients with atrial flutter or fibrillation. Digitalisation should be considered in these patients before milrinone therapy is started. Blood pressure, heart rate, ECG, and fluid and electrolyte balance should be monitored during milrinone therapy. Milrinone lactate injection is reported to be incompatible with frusemide and bumetanide, and it should not be diluted with sodium bicarbonate injection. ■

WVU Program Centers on Medical Preparedness for Terrorist Attacks

A new program at West Virginia University (WVU) is designed to prepare doctors and emergency personnel to respond to terrorist attacks on American soil. The Virtual Medical Campus is a computer network and information system that will link doctors and emergency personnel responding to a terrorist attack with specialists who can immediately identify what steps should be taken to protect people living and working nearby.

The Virtual Medical Campus is the computer network and national information delivery arm of the National Training Center for Homeland Security (NTC-HLS) being developed collaboratively by WVU and the West Virginia National Guard. "The work we are doing is in the public health/public safety area of medical preparedness for the consequences of disasters," says Virtual Medical Campus Director Dr. Rusty Russell. "We are focusing primarily on the medical aspects of response and the knowledge and training that these responders need to have to be able to respond and work together effectively."

Sen. Robert C. Byrd, D-WV, noted that police, fire, and rescue workers rapidly responded to the World Trade Center and the Pentagon after the September 11 attacks. "They are trained and equipped for the type of damage that resulted. But they don't have the expertise on hand for chemical or biological weapon attacks. They would need the expertise of doctors and scientists who can analyze the weapon and suggest the best possible response. This is the goal of the Virtual Medical Campus."

Once operational, perhaps within the next six to 12 months, the Virtual Medical Campus will focus on several national capabilities, Russell says. In addition to improving emergency preparedness among the medical community, the Virtual Medical Campus will also facilitate "medical community participation in federal, state, and local planning and decision making, as related to terrorist or similar events."

In November 1999, the WVU Medical Campus proposed to the Office of Justice Programs the development of this type of national information delivery system. The Office of Justice Programs subsequently funded a study to define key components of the proposed program. Says Russell, "In the course of the study, WVU formed a partnership with the West Virginia National Guard to develop the National Training Center for Homeland Security Destruction."

Two factors led to the agreement, he continues. "There was a recognition of the need for online training and knowledge management systems for first responders, as well as training and support requiring a complementary physical facility." As a result, the Virtual Medical Campus will provide the "information infrastructure and knowledge management systems," Russell says. The state National Guard will be in charge of physical training facilities in the form of specialized training ranges, advanced classrooms, and housing for training exercises.

The chain of events on September 11 point out the need for a nationally coordinated response system, he says. "I think one of the big lessons that we've learned is that we do need to be better prepared, especially since there's always the risk that something like this will happen again." ■

Just For Laughs: *Top 10 Odd Medical Record Statements (supposedly found on patients' charts)*

10. "The skin was moist and dry."
9. "The patient lives at home with his mother, father, and pet turtle, who is presently enrolled in day care three times a week."
8. "The patient was in his usual state of good health until his airplane ran out of gas and crashed."
7. "The patient was to have a bowel resection. However, he took a job as stockbroker instead."
6. "I saw your patient today, who is still under our car for physical therapy."
5. "While in the emergency room, she was examined, X-rated, and sent home."
4. "She stated that she had been constipated for most of her life until 1989 when she got a divorce."
3. "When she fainted, her eyes rolled around the room."
2. "She is numb from her toes down."
1. "The baby was delivered, the cord clamped and cut, and handed to the pediatrician, who breathed and cried immediately. ■

Get it on the Web

Want the latest news from the section in the quickest manner possible? Then access the *Bulletin* on the Internet! If you are a section member and an Internet user, you can get your section newsletter a week and a half to two weeks earlier than you would get it in the mail by going to your section homepage at: http://www.aarc.org/sections/section_index.html. You can either read the *Bulletin* online or print out a copy for later.

The AARC is encouraging all section members who use the Internet to opt for the electronic version of the *Bulletin* over the mailed version. Not only will you get the newsletter faster, you will be helping to save the AARC money through reduced printing and mailing costs. These funds can then be applied to other important programs and projects, such as ensuring effective representation for RTs on Capitol Hill.

To change your option to the electronic section *Bulletin*, send an email to: mendoza@aarc.org. ■