

NEWSLETTER

Hong Kong Association of Critical Care Nurses (HKACCN)

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EDITORIAL

THE WORLD FEDERATION OF CRITICAL CARE NURSES (WFCCN) HAS ARRIVED

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G., Kim, D., Baktoft, B., Wong, E.*

It is our pleasure to announce to readers of HKACCN Newsletter that, the World Federation of Critical Care Nursing (WFCCN) was formally established and launched on 30 October 2001. This historically significant and professionally important achievement occurred as part of the proceedings of the 8th World Congress on Intensive Care in Sydney, Australia.

Critical Care emerged as a specialty of nursing in the late 1960's in many western countries and has expanded across all continents and most countries of the world. During the last 30 years or more critical care nurses have worked together, taught each other, established networks and formed organisations to support the growth and refinement of their clinical and professional expertise.

These networks and organisations of critical care nurses have evolved into strong and active professional associations, with a common goal of wanting to improve the quality and effectiveness of care and treatment afforded our most critically ill patients and their families. Constitutionally almost all such networks and associations have been confined in their purposes and activities to states and nations within limited jurisdictional borders.

In 1999 the European Federation of Critical Care Nursing Associations (EfCCNa) formed a formal coalition of Critical Care Nursing Associations which, at present, comprises 20 member associations and represents 18 countries¹.

The establishment of WFCCN in 2001 expands on the work of EfCCNa and a world wide study of critical care nursing associations conducted in 1998-2000². The WFCCN can now work with many individual associations of critical care nursing of the World and provide a world-wide forum for the advancement of critical care nursing practice and fellowship. The WFCCN has made the following statements in relation to their philosophy, purpose and objectives:

PHILOSOPHY

The philosophy of the WFCCN is to assist critical care nursing associations and nurses regardless of age, gender, nation, colour, religious beliefs or social background in the pursuit of the objectives of the WFCCN.

HKACCN LOGO

PURPOSE

The purpose of the WFCCN is to link critical care nursing associations and nurses throughout the world, to strengthen the influence and contribution of critical care nurses to health care globally and to be a collective voice and advocate for critical care nurses and patients at an International level.

OBJECTIVES

The objectives of the WFCCN are:

1. To represent critical care nurses and critical care nursing at an International level.
2. To improve the standard of care provided to critically ill patients and their families throughout the countries of the world.
3. To advance the art and science of critical care nursing in all countries throughout the world.
4. To promote co-operation, collaboration and support for critical care nursing organisations and individuals.
5. To improve the recognition given to critical care nursing throughout the world.
6. To maintain and improve effective co-operation between all health professionals, institutions, agencies and charities who have a professional interest in the care of critically ill patients.
7. To establish standards for education, practice and management of critical care nursing.
8. To foster and support research initiatives that advance critical care nursing and patient/family care.
9. To encourage and enhance education programs in critical care nursing throughout the world.
10. To provide conferences, written information and continuing education for critical care nurses.

The founding country associations for the first Council of Representatives meeting of the WFCCN included:

Australia, Canada, Denmark, United Kingdom, Hong Kong, Korea, New Zealand & Philippines.

The inaugural Core Administration to drive the establishment of WFCCN include:

- A/Prof Ged Williams (Australia) – Chair
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- Isabelita Rogado (Philippines) – Secretary
(bellerogado@yahoo.com)
- Bernice Budz (Canada) – Treasurer
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- John Albarran (UK) – Trade & Industry Sponsorship Coordinator
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Other Council members are:

- Birte Baktoft (Denmark)
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We anticipate a rapid increase in the number of member associations from many more countries and to work with critical care nurses in countries where such associations do not exist to help establish networks and associations in those countries.

Initial activities and pursuits agreed to at the first meeting of the Council of Representatives were:

- To promote the existence of the WFCCN to potential member associations and encourage application and membership
- To identify an official journal of the WFCCN and distribute it to all member associations and their members
- To develop a website of relevant information that is easily accessible to critical care nurses the world over.
- To explore long term legal, financial and constitutional arrangements that will best serve the purposes and objectives of the WFCCN and its member associations.

Persons interested in knowing more about WFCCN and its members may contact the Core Administration as described above. The next meeting of the core administration and available council representatives will occur in Paris, France in association with the EfCCNa Critical Care Nursing Conference 26-27 May 2002.

A second report of the WFCCN and its activities will be provided to all member associations and relevant critical care journal editors following this meeting.

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1. www.efccna.org.
2. Williams G, Chaboyer W, Thornsteindottir R, Fullbrook P, Shelton C, Chan D, Wojner A. 2001. World Wide Overview of Critical Care Nursing Organisations and their Activities. *International Nursing Review* (In print).

American Heart Association

Advanced Cardiovascular Life Support course

David Chan, PDC chairman
BLS / ACLS instructor (AHA / JIBC)

Recently, the American Heart Association (AHA) and the International liaison committee on Resuscitation (ILCOR) have developed a new guideline on cardiopulmonary resuscitation. That is – the Guideline 2000 on cardiopulmonary resuscitation and emergency cardiovascular care. Understanding the new CPR guideline enable the health professionals to anticipate what will happen and what to do during different phases in cardiac arrest. This will reduce their anxiety, and make them feel more confident to intervene during the whole resuscitation process. However, confidence does not imply competency, because studies show that hospital staff (including nurses and doctors) generally lack competent CPR skills. Therefore, regular training and re-training on CPR are needed in order to help health professionals to retain such skills. In that case, health professionals can be better prepared to manage patients with cardiac arrest.

Despite the fact that similar form of training already exists, however the demands still largely exceed the supply. In view of the such need, our HKACCN has recently invited a team of faculty from the American Heart Association (AHA) to Hong Kong to develop a joint program in Mar-Apr 2002 on Basic Life Support (BLS) and Advanced Cardiovascular Life Support (ACLS) for upkeeping the CPR standards for our nurses and doctors. More regular program on these will be organized in future.

The following is a picture of the faculties from the American Heart Association (the middle 4 on the front row) and the newly qualified ACLS instructors.



NEW BLS and ACLS Guidelines

Dr. Violeta Lopez (Professor, CUHK)

More changes to the basic life support (BLS) and advanced cardiac life support (ACLS) guidelines have been approved, and you will soon be receiving official update training. However, for those members who are unable to attend the

training sessions offered by the AHA and HKACCN, this article will give you a summary of the recommendations (AHA, 2000; AHA 2001a; AHA, 2002b). However, we advise you to get hold of the whole article and familiarize yourselves with the guidelines.

For BLS

Phone first vs. phone fast : If you encounter unresponsive adult, call the emergency medical service (EMS) first before initiating cardiopulmonary resuscitation (CPR). In cases of submersion or near drowning, or cardiac arrest associated with trauma or drug overdoses, provide CPR for one minute before calling EMS.

Rescue breathing : It is recommended that 2 effective mouth-to-mouth ventilation be delivered slowly over 2 full seconds per breath, with the least tidal volume needed to make the chest rise. This method reduces the risk of air entering the stomach instead of the lungs during resuscitation.

Pulse check: In addition to performing the standard pulse check using the carotid artery, rescuers need to assess for signs of circulation, including evidence of normal breathing, coughing, or any movement in response to two rescue breaths.

Chest compressions : Compression-ventilation ratio for one or two rescuers for patients with unprotected airway is 15:2 ratio at a rate of 100 per minute.

Automated external defibrillation

All health care providers who need to perform CPR should be trained, equipped, and authorized to perform defibrillation. Collapse-to-shock interval should be less than 3 minutes.

For ACLS

The new international ACLS algorithm integrates steps of BLS, early defibrillation, and ACLS guidelines. Adrenergic and antiarrhythmic agents and buffer therapy now have secondary roles regardless of whether the patient is in ventricular fibrillation (VF). The key changes are:

Ventilation : The new recommendation emphasizes the need to confirm placement of the endotracheal tube (ET) not only by chest auscultation, but also by using esophageal detector devices and capnographic waveform monitors. These secondary methods of confirmation must be performed immediately after tube placement, during or after moving the patient, and during patient transport. Tracheal intubation should be performed only by personnel who are trained and proficient in this skill (successful 6 to 12 in-field intubations per year). Ventilatory volume for patients not in cardiovascular arrest is 6 to 7 ml/kg over 1.5 to 2 seconds. The “chest rise” is recommended as a sign of adequate ventilation.

Defibrillation : All personnel who are expected to perform CPR should be trained to use the AED. The new recommendations call for a goal of 3 minutes or less from collapse to shock in all hospital areas and ambulatory care facilities.

Drug changes : Only use one antiarrhythmic drug per patient as combining them may have a pro-arrhythmic effect.

- Lidocaine – used to suppress VF and VT associated with AMI. Prophylactic use is contraindicated.
- Amiodorone – used a first-line antiarrhythmic for shock-refractory VT/VF and as an initial treatment for wide-complex tachycardia in haemodynamically stable patients.
- Epinephrine – high-dose epinephrine (0.1 mg/kg) is no longer recommended for treating cardiac arrest because of lack of evidence that improves patient survival. Epinephrine is only used if patients do not respond to Vasopressin.
- Vasopressin – is an important new recommendation for promoting return of spontaneous circulation after cardiac arrest. Vasopressin is administered intravenously as a one-time dose of 40 units.
- Magnesium – a new recommendation only used to treat known patients with hypomagnesemia and torsades de pointes.
- Bretylium – has been removed from ACLS treatment algorithms and guidelines because of the high incidence of adverse reactions.

Algorithm changes : The algorithms for PEA, asystole, and bradycardia have been changed to use the primary and secondary survey format but the management remains the same. The tachycardia algorithms have been changed dramatically. You need to get hold of these algorithms and study them yourselves.

Acute Coronary Syndrome

- 12-lead ECG
- aspirin (100 to 325 mg)
- Prehospital fibrinolytic therapy is acceptable
- Angioplasty and intra-aortic balloon placement is used as an alternative to fibrinolytic therapy for patients with high risk of intracranial bleeding, large anterior infarct, systolic BP less than 100 mm Hg, tachycardia greater than 100 beats/minute, or crackles one-third from the lung bases.

Stroke Management

Patients with symptoms of stroke should be transported and treated rapidly as patients with an acute MI. Treatment with recombinant tissue plasminogen activator within 3 hours of onset of stroke symptoms is recommended.

Reference

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- American Heart Association (2001b). [ACLS for healthcare providers](#), AHA, Texas, USA.
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RESEARCH BRIEFS

Temperature control in preterm infants with NCPAP

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Background Nasal continuous positive airway pressure (NCPAP) has been used for weaning preterm infants from mechanical ventilation (Bancalari & Sinclair, 1993) by circulating a continuous flow of heated, humidified gas past the infant's airway at a set pressure of 3 to 6 cm H₂O and an oxygen flow rate of 4 to 10L/min. using nasal prongs. As the delivery of dry medical gas involves bypassing the upper airway, it is necessary to maintain the inspired gas warm and moist to prevent complications of NCPAP (Davis and Henderson-Smart, 2001). In general, humidifiers provide gas in a form of vapor by setting the NCPAP ventilator circuit temperature at 35-37 degrees centigrade. However, no reports were found relating to the effect of high or low temperature of inspired gas on the physiological responses of preterm infants. No standard temperature setting of the NCPAP circuit was also found internationally and nationally.

Aim of the study

The specific aim of this pilot study was to examine the effects of two temperature settings of inspired gas on the physiological responses of infants on NCPAP.

Method

Pre and post-test cross over experimental repeated measure design was employed. The infants were randomized into two groups according to their hospital numbers. They were exposed to two temperature settings 33-34 °C (T1) and 36-37 °C (T2) of inspired gas over 24-hour period. The infants' physiological responses (skin temperature, heart rate, respiratory rate, mean blood pressure, and oxygen saturation) were recorded at baseline and over six-time points every four hours for 24 hours.

Results

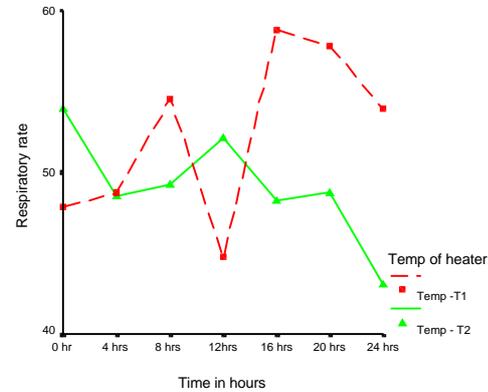
Post-test physiological responses between groups using paired t-test showed no statistically significant differences were found in relations to skin temperature, heart rate, blood pressure and oxygen saturation (Table 1). However, significant interaction was found between intervention types and time in relation to the respiratory rate (Figure 1) using ANOVA.

Table 1. Posttest physiological responses between groups using paired t-test

Variables	Group	Mean (S.D.)	df	t	P
Skin temp	T1	36.71 (0.23)	10	-1.96	.079
	T2	36.85 (0.24)	10		
Heart rate	T1	159.73 (13.09)	10	-1.575	.146
	T2	165.55 (13.19)	10		
Resp rate	T1	53.91 (14.17)	10	2.042	.068
	T2	45.72 (12.57)	10		

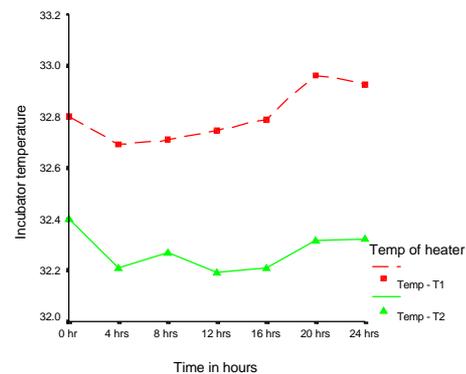
Mean BP	T1	49.00 (8.19)	2	.977	.431
	T2	46.33 (11.02)	2		
O ₂ Sat	T1	98.91 (1.22)	10	.858	.411
	T2	98.27 (2.33)	10		

Figure 1. Mean respiratory rate over time between humidifier temperature settings



Although incubator temperature was not a physiological parameter, a phenomenon of change in incubator temperature was noted. Using paired t-test in the posttest between groups, a statistically significant result in the incubator temperature ($p = 0.045$) was found. The temperature of the incubator used in infants on T1 was significantly different from those infants on T2 temperature setting. The results of the within and between groups at posttest showed statistically significant difference ($df = 10, t = -2.291, p = .045$). Repeated measures ANOVA also showed the trend of change of the incubator temperature across time and there was an interaction effect between intervention types (T1 and T2) and time in relation to the incubator temperature in which the preterm babies were nursed (Figure 2). It was observed that when the preterm infant's skin temperature is low, the nurse increases the incubator temperature accordingly and vice versa.

Figure 2. Mean incubator temperature over time between humidifier temperature settings



Conclusion

From this pilot study, it was found that a change in the temperature setting of the heated humidifier in a NCPAP circuit might affect the respiratory rate and the skin temperature of preterm infants. However, there were numerous limitations in this study and the desirable

temperature setting of the heated humidifier in the NCPAP was still not defined. Future studies should consider a bigger sample size so as to increase the power of the study. In order to avoid the carry-over effect, a longer transitional period in between the control and experimental conditions should be considered before collecting the first physiological data. As the analysis across time appeared to have more obvious differences in the physiological responses at eight to twelve hours after the change in the temperature of the heated humidifier, the time span of future study may consider twelve hours' period in each temperature condition. This undoubtedly can save more time for the researcher and it can minimize some uncontrolled condition like termination of NCPAP during the study. In addition, the researcher should consider some controls on the observations like identifying the location of skin temperature probe placement, limiting the adjustment of incubator temperature and counting the respiratory rate by one full minute.

However, this study demonstrated that neonatal nurses need to be sensitive to the effects of and observe whether the choice of the temperature of the heated humidifier will cause any adverse effects to the physiological status of the preterm infant as well as adjust the temperature setting of the humidifier accordingly.

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CLINICAL UPDATE

Buffering Solutions Used During Continuous Renal Replacement Therapy (CRRT) in Patients with Acute Renal Failure

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Acute renal failure

Acute renal failure often complicates the course of recovery in critically-ill patients. The disorder is defined as a sudden sustained decrease in glomerular filtration rate with associated azotaemia and a fall in urine output (Nissenson, 1998). Critically ill patients, particularly those with multiple organ failure, often present with a large buffer deficit due to a severe catabolic state. If renal function is impaired, severe metabolic acidosis could develop. In haemodynamically unstable or severely catabolic patients, renal replacement therapy is often the management of choice. The goal of CRRT is to maintain normal or near-normal acid-base balance in patients with acute renal failure, thereby, preventing the detrimental effects of acidemia on the patients' cardiovascular performance, hepatic and hormonal responses. Jones et al. (1998) demonstrated that the advantages of continuous treatments include steady biochemical correction, slow continuous fluid removal, and excellent cardiovascular stability.

Continuous renal replacement therapy

CRRT is a technique where continuous production of ultrafiltrate from plasma water is achieved by means of a

hydrostatic pressure gradient across a semi permeable membrane. CRRT, first published in 1977 by Kramer et al. as continuous arteriovenous hemofiltration, quickly gained ground because of its simplicity. However, blood pressure dependent filtration could not adequately control azotemia in hemodynamically unstable patients with acute renal failure. The ability of CRRT to remove solutes is determined by numerous treatment parameters such as, porosity or hydrophobicity of the filter membranes, extracorporeal flow rates and the choice of haemofiltration replacement fluid in maintaining acid-base values.

Buffer replacement fluids

Sodium lactate had traditionally been used as the source of buffer replacement with titration of one proton per molecule of lactate used as substrate during gluconeogenesis or by oxidation in liver or muscle, allowing the general assumption that lactate was 'metabolized to bicarbonate' on an equimolar basis (Nimmo et al., 1993). Lactate-based physiological solutions had the advantage of being commercially available. Lactate is converted to bicarbonate in the liver, each type of anion is capable of providing an alkali load sufficient to correct the acidemia of acute renal failure. Unfortunately, critically ill patients always present with impaired liver function and failure of skeletal muscle lactate metabolism caused by regional hypoperfusion, the capacity to metabolize the lactate delivered during renal replacement might become saturated, with consequent lactate accumulation (Davenport et al., 1993). In addition, when metabolic conversion is impaired, the increase blood concentration of the anions could lead to increased loss of this anion across the dialytic membrane, thus reducing the buffer gain. Furthermore, the administration of lactate in patients with severe hypoxia, liver impairment, or pre-existing lactic acidemia could result in a worsening of lactate acidemia. In critically ill patients with shock and liver failure, the use of lactate-based fluids requires close monitoring of the patient's catabolic rate, acid-base status, and arterial lactate levels.

Bicarbonate buffering solution

There was some theoretical evidence that metabolic and hemodynamic disadvantages of lactate buffering could be avoided by the use of bicarbonate-buffered solutions (Macias, 1996). The use of bicarbonate buffer during hemofiltration is superior in normalizing acidosis when compared with lactate buffer solution. There is a decrease in the incidence of hypotensive crisis and reduced creatinine concentration in the first 72 hours of filtration together with urea clearance (Barenbrock et al., 2000). However, bicarbonate-buffer solution packing has a poor shelf life of an equivalent mixture containing bicarbonate when stored in plastic containers. Over time, the bicarbonate ions are partially converted to carbonate, with loss of carbon dioxide through the walls of the replacement fluid bags. Feriani et al. (1998) found that recent technological advanced could overcome this problem. A double chamber bag with two separate compartments, one containing bicarbonate and the other calcium and magnesium, allowed the bicarbonate solution to be sterilized and stored. A breakable valve between the two compartments permitted the two fluids to be mixed immediately before use, thus avoiding the calcium and magnesium carbonate precipitation.

Kierdorf et al. (1999) suggested that there are three major recommendations in using of bicarbonate-buffered solutions. Firstly, the solution has to be mixed immediately before use. Secondly, the readily mixed bicarbonate-buffered solution has to be prepared in bags made of special plastic sheeting to prevent evaporation of carbon dioxide. Lastly, to avoid precipitation of calcium carbonate and magnesium carbonate, the concentration of these electrolytes are reduced.

Nursing care of patients on CRRTs with bicarbonate-buffered solution

The advantages of CRRT include steady biochemical correction, slow continuous fluid removal, and excellent cardiovascular stability. Research evidence shows that the correction of metabolic acidosis is mandatory to the survival of acute uremia patients and that this correction could be adequately accomplished by means of CRRT. Varying the dialytic prescription and buffer concentration in replacement solution could modulate the optimal correction of metabolic acidosis. Critically ill patients who failed to use lactate as a buffer substrate due to lactate accumulation or slow correction of acidosis should be considered for using the bicarbonate-buffered systems instead. In patients with a multiple organ failure, physiological buffer bicarbonate is preferable because of its lack of metabolic interference. However, it must be realized that the bicarbonate solution had to be mixed immediately before use.

In nursing patient with CRRT, nurses should be fully trained to solve technical complications quickly and effectively were the basis nursing care, watch out the complications of CRRT with bicarbonate-buffered replacement, such as, hypervolaemia, hypernatraemia; hypercapnia and tissue hypoxia were needed. There is a lack of information as to best component of bicarbonate-buffered replacement among the critically ill patient who is treated with CRRTs and when should the treatment stopped. Further research to answer these questions is needed.

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CONFERENCE ANNOUNCEMENTS

- 25 - 27 May 2002 <http://www.efcna.org>
European Federation of Critical Care Nursing Associations 1st Conference, Paris, France
- 2-3 August 2000 <http://www.swsahs.nsw.gov.au/livtrauma>
10th SAWN Trauma Conference, Liverpool, Australia
- October 2002
Resuscitation, 6th Scientific Congress of the European Resuscitation Council, Italy
- 17-20 October 2002 <http://www.icuasm.com.au>
27th Australian and New Zealand Scientific Meeting on Intensive Care, Perth, Western Australia
- 31 October – 2 November, 2002 <http://www.rcna.org.au>
2nd ICN International Nurse Practitioner Advanced Practice Nursing Network Conference
Adelaide, South Australia
- March 2003
4th World Congress of Pediatric Intensive Care, Argentina

CONTRIBUTIONS TO THE NEWSLETTER

The HKACCN Newsletter is published quarterly. The editor welcomes articles reporting news and views relevant to critical care nursing.

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Article preparation

Individual submissions should be double-spaced and can be sent through the email. Accompanying photographs must be of good quality. The editor reserves the right to accept, modify, reject and/or check material to corroborate information.

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