

# First Responder



JUNE '06 Newsletter

## IN THIS ISSUE:

\* Ambulance services slow to use new guidelines

\* Get the pressure up !!!!!

(Part I in a series looking at how we can achieve better blood flow to the brain and the heart during CPR)

## Some Ambulance services slow to implement international guidelines

It is now been over six months since the 2005 International Guidelines for Resuscitation have been introduced to the world but it seems that many ambulance services throughout Australia have yet to adopt them. One report from NSW suggests that the delay in the roll out of the new CPR/Defibrillation technique is due to lack of funding and bureaucratic bungling. The Daily Telegraph on June 1st states that the NSW Ambulance Service has yet to start training its officers in these new techniques which are already showing a greater success in survival rates around the world.

The new techniques are being used in or being taught to paramedics in Adelaide, Brisbane, Canberra and Perth.

NSW Ambulance union spokesman, Peter Rumball said no staff had been trained or even notified of the impending changes and it is before a Medical review Committee.

Emergency medicine experts such as Ian Jacobs from the Australian Resuscitation Council said "there is good evidence to show that interruptions to compressions during CPR affects survival - it should not have to be reviewed by a medical review committee - simply just introduced".

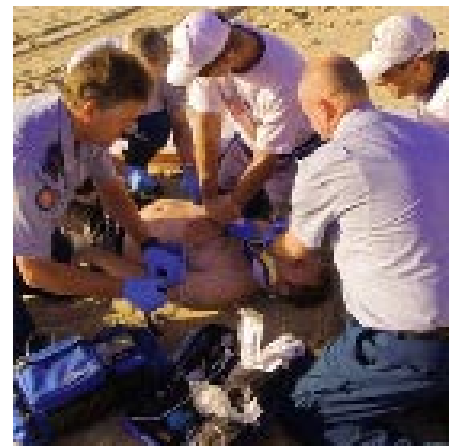
Opposition Health Spokeswoman Jillian Skinner, said lack of funding was holding paramedics back.

"NSW can't keep up with world best practice because there is not enough money for retraining" she said.

In marked contrast to the NSW Ambulance Service, Queensland has already started to train its paramedics in the new guidelines. The Qld Ambulance Service (QAS) Medical Director estimates that the changes will be completed by August/September of this year. The Medical Director also stated that other changes were to occur; such as an entire update of the clinical practice manual, a change from the anti-arrhythmic drug of Lignocaine to Amiodarone, introduction of Adrenaline for Advanced Care Paramedics to use in cardiac arrest and the use of 12 lead ECG in the field across the entire service.

The QAS Medical Director sees these changes saving more lives and improving the outcomes of sudden cardiac arrest. Queensland's current success rate for out-of-hospital survival for cardiac arrest stands well ahead of world averages.

*Queensland paramedics applying Advanced Life Support skills during a cardiac arrest*



## Oxy / Defib Kit



**\$ 4,999.00**  
(GST Free)

### KIT INCLUDES:

- \* Oxy Resus Soft Pack
- \* ZOLL AED PLUS DEFIBRILLATOR
- \* RESQPOD
- \* All brass multiflow regulator
- \* Bag Valve Mask Device- disposable - Adult and Child sizes
- \* LMAs (3 sizes) disposable plus accessories
- \* Therapy Masks (adult / child)
- \* Set of 3 Oropharyngeal Airways
- \* V-Vac Suction Kit with spare cartridge
- \* Stifneck Select Cervical Collar
- \* Instructions for Use

*Postage and Handling not included*

## WOUND CLOSURE PROGRAM CAIRNS

August 26 2006  
1 day full-time  
plus pre course study

## IV FLUID THERAPY PROGRAM CAIRNS

August 22 2006  
1 day full-time plus  
pre course study

Limited spaces conditions  
and prerequisites apply

## EMERGENCY MEDICAL TECHNICIAN PROGRAM

CERTIFICATE LEVEL IV  
CAIRNS

August 17-25 2006  
9 days full-time

PLEASE ENQUIRE ABOUT OUR  
ON-SITE PROGRAMS

## REFRESHER PROGRAM CAIRNS

August 24-25 2006

## Get the pressure up !!!!!!!!!!!

The following article is the first of a 2 part series looking at the impact of manual CPR on increasing coronary perfusion pressure. It may be that we have gone as far as possible in improving survival outcomes of Sudden Cardiac Arrest (SCA) using manual compressions only. We look at two new innovations which increase blood flow dramatically to the heart and brain during resuscitation.

**Part One:** Forty years after the advent of CPR, survival rates from out-of-hospital cardiac arrest remains between 5-15% in most developed countries. It is estimated that approximately 460,000 (USA), 700,000 (Europe) and 17,000 (Australia) cardiac arrests occur annually. Only about half of these are found in ventricular fibrillation (VF) that would respond to early defibrillation. While defibrillation is the definitive therapy for ventricular fibrillation (VF), its efficacy is severely limited by response time, and its success is also dependent on circulation. Quite literally, it may be impossible to restart a heart after several minutes without first providing adequate coronary blood flow. It has been shown that circulation support by chest compressions prior to defibrillation improves the outcome of many patients with prolonged VF. Circulatory support and tissue perfusion during cardiac arrest are related to the amount of chest displacement and the continuity of compressions during CPR. It is now evident that manual CPR only produces up to 25% of normal blood flow to the brain and only up to 15% normal blood flow to the heart. Automated devices improve CPR outcome by both eliminating the inadequacy and the frequent interruptions of compression. Rescuer fatigue inherent with manual CPR is also overcome with mechanical CPR.

### TIME LIMITATIONS OF DEFIBRILLATION

In a study of cardiac arrests in casinos that had automatic external defibrillators (AEDs) applied, a 74% survival rate was observed in patients receiving a first shock within 3 minutes of arrest. If the first shock was not delivered within 3 minutes, the survival rate dropped to 49%.

Intervals of no more than 3 minutes from collapse to defibrillation are necessary to achieve the highest survival rates.

However, in the EMS setting, a 3-minute interval from arrest to first shock is generally not possible, and EMS agencies rarely achieve the high survival rates seen in the casino and other studies.

Over 70% of cardiac arrests outside the hospital occur at home where no AED is available, and therefore the vast majority of cardiac arrest patients do not receive defibrillation within the crucial first 3 minutes.

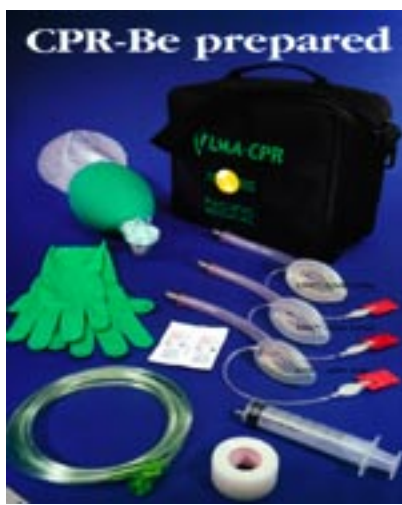
Another limitation is that defibrillation is not indicated in at least half of all cardiac arrest patients. This is because more than 50% of patients in cardiac arrest do not exhibit VF when the rescuer arrives.

So, while defibrillation is the definitive treatment for VF, countershock alone does not ensure survival.

### THE IMPORTANT ROLE CIRCULATION PLAYS IN DEFIBRILLATION

A growing body of evidence suggests that beyond a delay of about 3 minutes, re-establishing blood flow before defibrillation may improve the efficacy of electrical countershock. In one EMS study a revised protocol directed the provision of approximately 90 seconds of CPR before defibrillation for patients in cardiac arrest.

*Continued next page*



### Advanced Airway Kit

Includes:

Laryngeal Mask Airways -

Size 3,4,& 5

Bag Valve Mask -

Adult & Child

Tape, Gel, Syringe, Gloves,

Carry Case

NOW WITH RESQPOD

**\$ 399.00 (GST Free)**

## ATTENTION EMTs

Are you registered with the  
Australasian Registry of  
Emergency Medical  
Technicians

### AREMT

Gain recognition for your  
hard earned qualifications

Visit the website to see  
what AREMT can do for  
you!!!!

[www.arent.com.au](http://www.arent.com.au)

*Continued from previous page*

Under this protocol, for patients whose initial presenting rhythm was VF, the number of neurologically intact survivors increased to 23% when compared with a historical control of 17% neurologically intact survivors. This result included both witnessed and unwitnessed arrests.

The efficacy of administering defibrillation first appears to diminish over time and, after approximately 3 minutes, better results are achieved by delivering CPR prior to defibrillation.

A recently reported prospective study followed a similar protocol where patients were randomly treated with either 3 minutes of CPR first or with immediate countershock. This prospective study showed that for patients treated after a response interval of 5 or more minutes, a significantly higher number had Return of Spontaneous Circulation (ROSC), survival to discharge and one-year survival when CPR was provided before defibrillation. ***In this patient group, 58% experienced ROSC vs 38% of the control group, and the one-year survival was 20% vs 4% for the control group.***

#### MYOCARDIAL AND CEREBRAL PERFUSION IN CPR

Even when performed by experts, manual CPR produces only about 30% of blood flow to the brain a meagre 10% to 20% of normal blood flow to the heart. Due to its unique physiological characteristics the heart is more difficult to perfuse.

#### THE MECHANISM OF HEART PERFUSION

As the heart contracts (systole), blood is ejected out of the left ventricle, past the aortic valve, and into the aorta. At this stage, though, the blood doesn't flow freely into the coronary arteries or the myocardium. It is only with the return of diastole that blood flows from the aorta into the coronary arteries, perfusing the heart muscle.

Commonly, the effectiveness of manual CPR is assessed by checking for a pulse generated by chest compression. The presence of a pulse is a positive sign, especially when it can be palpated with each compression. It does not necessarily mean that blood flow to the heart is adequate.

***No studies have shown the clinical utility of checking pulses during ongoing CPR. The important pressure for perfusion of the myocardium is coronary perfusion pressure***

#### THE IMPORTANCE OF CORONARY PERFUSION PRESSURE

Coronary perfusion pressure (CPP) is an indicator of coronary flow. When CPP increases, so does blood flow to the myocardium.

#### INCREASED CPP CORRELATES WITH SURVIVAL AND ROSC

The clearest link between CPP and the likelihood of a return of spontaneous circulation (ROSC) is documented by Paradis et al> CPP was measured in 100 Emergency Department (ED) cardiac arrest patients. A definite correlation was noted between peak CPP and ROSC. Eleven (79%) of the 14 patients with CPP greater than 25mm Hg had a return of spontaneous circulation, while no patient with a peak CPP of less than 15mm Hg experienced such a return. Return spontaneous circulation and survival from an arrest have been clearly linked to the ability to achieve a CPP greater than 15mm Hg. The problem is the difficulty in achieving and maintaining CPP above 15mm Hg through conventional CPR. In the 100 patients studied by Paradis, conventional CPR provided a mean CPP of only 12.5mm Hg, indicating that conventional CPR cannot reliably provide that CPP necessary for adequate ROSC and survival.

*Continued next page*

*Continued from previous page*

## RESCUER CPR PERFORMANCE

As discussed before, CPR typically does not perfuse the heart or brain well under the best of circumstances. In addition, there are inconsistencies inherent in manual CPR.

Several facts emerge from the literature evaluating CPR performance. Firstly, rescuers have difficulty accurately determining the correct depth of compression of chest compressions and secondly, rescuers cannot accurately perceive their own fatigue.

## PHYSICAL DEMANDS OF MANUAL CPR

According to the AHA Guidelines 2000, the chest must be compressed at a rate of 100 compressions per minute, to a depth of 4-5 cms, with proper hand placement, and 50% duty cycle should be maintained (50% of time under compression, 50% percent under relaxation) This is simply more than most rescuers can physically achieve and certainly more than anyone can perform beyond a few minutes. New guidelines suggest compression depth up to 1/3 the depth of the chest, increasing greater demands on rescuer performance.

## EFFECTS OF PAUSING MANUAL CPR

Frequent rotation of rescuers may improve performance, but it introduces a new concern. When compressions are stopped, even for a few seconds, CPP drops significantly and ROSC becomes less likely.

Earlier CPR guidelines called for a ratio of 5 compressions to 1 ventilation, then guidelines specified a 15:2 ratio. One reason for this change is that CPP is higher after 15 uninterrupted chest compressions than after 5 compressions. Any benefit gained from ventilating every fifth compression outweighed by the subsequent loss of CPP. Additional evidence shows that pauses in compressions decrease both CPP and the probability of ROSC. Now current guidelines specify a 30:2 ratio in a further effort to increase CPP and decrease pauses in compressions

## THE IDEAL CPR DEVICES

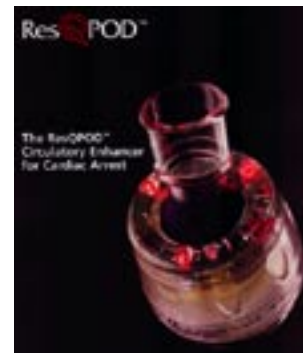
The goal must be to provide equipment (mechanical or otherwise) that is easy to apply and use on the patient as early as possible. The device must also produce a haemodynamic profile better or at least as good as optimally performed manual ECC.

### RESQPOD - IMPEDANCE THRESHOLD DEVICE

A small device that simply fits onto a pocket mask, LMA or ET tube and by enhancing the vacuum in the chest during cardiac compressions the device is able to more than double blood flow and systolic blood pressures to the brain and coronary arteries.

### THE AUTOPULSE™ - NON-INVASIVE CARDIAC SUPPORT PUMP

A Non-invasive Cardiac Support Pump is a new device that deploys in seconds to provide automated chest compressions at a consistent rate and depth and standard duty cycle during CPR and is able to produce blood flows equivalent to pre cardiac arrest.



## The Last Word

*As we said earlier; the face of resuscitation as we have known it is changing rapidly. We know that early defibrillation is the definitive treatment for VF but statistics now show that almost half the victims of sudden cardiac arrest do not present in VF so CPR is the treatment. We are now finding that manual CPR as we know it simply does not create enough pressure to allow for spontaneous circulation.*

*In our next issue we continue to look at the two devices that are having amazing results. The small compact RESQPOD which doubles blood flow to the heart and brain and then the AUTOPULSE which produces normal blood flow during CPR.*



*Charles Makray  
Managing Director*

## ZOLL AED Plus

The most innovative, user friendly and best valued AED on the market today



# \$2999.00 \*

**\* Price GST Exempt**

**The Features:**

- \* LCD Display showing voice prompt messages, device advisory messages, elapsed time, shock count, chest compression graph display.
- \* ECG Screen at no extra cost
- \* Unique one piece electrodes giving compression rate and depth feed back
- \* Choice of standard 2 piece electrodes
- \* 5 year lithium batteries - up to 300 shocks when new and more than 40 shocks when up to 3 years old.
- \* Replacement cost for batteries under \$ 80.00
- \* Passive Airway Support System cover to support the patient's airway in an open position.
- \* Carry Case
- \* Razors, wipes, resuscitation barrier device and shears
- \* 5 year limited warranty

*This price valid until stocks last.*

Visit us at [www.FirstResponseAustralia.com.au](http://www.FirstResponseAustralia.com.au)

**SPECIALISTS IN EMERGENCY  
CARE TRAINING  
AND  
EQUIPMENT**

PO Box 81 N, North Cairns, QLD 4870, Australia.

Phone: (07) 4032-2444 Fax: (07) 4032-4722

email: [admin@FirstResponseAustralia.com.au](mailto:admin@FirstResponseAustralia.com.au)