Update on Resuscitation

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# SUMMARY OF DIFFERENCES IN CARDIOPULMONARY RESUSCITATION

## Adults, Children And Infants

<table>
<thead>
<tr>
<th></th>
<th>ADULTS and OLDER CHILD 9 – 14 years</th>
<th>YOUNG CHILD 1 – 8 years</th>
<th>INFANTS Under 1 year</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AIRWAY</strong></td>
<td>Backward head tilt and Jaw Support</td>
<td>Sniffing Position and Jaw Support</td>
<td>Neutral Head Position and Jaw Support</td>
</tr>
<tr>
<td><strong>BREATHING</strong></td>
<td>1 x every 4 seconds 15 breaths per minute</td>
<td>1 x every 3 seconds 20 breaths per minute</td>
<td>1 x every 3 seconds 20 puffs per minute</td>
</tr>
<tr>
<td><strong>CIRCULATION</strong></td>
<td>Lower half sternum</td>
<td>Lower half sternum</td>
<td>Lower half sternum</td>
</tr>
<tr>
<td><strong>HAND POSITION</strong></td>
<td>2 hands</td>
<td>Heel of hand</td>
<td>2 fingers / 2 thumbs</td>
</tr>
<tr>
<td><strong>DEPTH OF COMPRESSION</strong></td>
<td>1/3 depth of chest</td>
<td>1/3 depth of chest</td>
<td>1/3 depth of chest</td>
</tr>
<tr>
<td><strong>ONE OPERATOR</strong></td>
<td>Ratio: 15 compressions / 2 breaths 4 cycles / minute</td>
<td>Ratio: 5 compressions / 1 breaths 20 cycles / minute</td>
<td>Ratio: 5 compressions / 1 breaths 20 cycles / minute</td>
</tr>
<tr>
<td><strong>TWO OPERATOR</strong></td>
<td>Ratio: **5 compressions / 1 breath 12 cycles / minute or 15 compressions / 2 breaths 4 cycles / minute</td>
<td>Ratio: 5 compressions / 1 breaths 20 cycles / minute</td>
<td>Ratio: 5 compressions / 1 breaths 20 cycles / minute</td>
</tr>
</tbody>
</table>
EARLY ACCESS
to get help

EARLY CPR
to buy time

EARLY DEFIBRILLATION
to restart heart

EARLY ACLS
to stabilize
2005 ILCOR consensus statement

• ARC new guidelines in 2006
• Old practice still accepted until changeover
• Emphasis
  – Any resus better than none
  – Minimise interruption of chest compressions
  – Compressions fast and hard
  – Avoid overventilation
  – Defibrillator ASAP
New development from ILCORÉ and how ARC fares ... getting the Michael Choo stamp of approval
BLS

Basic Life Support Flow Chart

D
Check for Danger

Hazards / Risks / Safety?

R
Responsive? (Unconscious?)

If not, Call for help
Call 000 / Resuscitation Team

A
Open Airway
Look for signs of life
B. Give 2 Initial **Breaths** if not breathing normally

C. Give 30 chest **Compressions** (almost 2 compressions / second) followed by 2 breaths

D. Attach **AED** as soon as available and follow its prompts

**Continue CPR** until qualified personnel arrive or signs of life return

**NO SIGNS OF LIFE** = Unconscious, Unresponsive, Not Breathing Normally, Not Moving

**AED** = Automated External Defibrillator
ILCOR BLS

• Simplification of rescue breaths over 1 sec, visible chest rise, especially asphyxial causes
• Elimination of lay rescuer checking signs of circulation
• Elimination of lay rescuer using only rescue breathing with no chest compressions
• 30:2 for all ages, except newborn
• Push fast (100/m), push hard (1/3 diameter), allow complete recoil, minimise interruptions
Although rescue breathing has been renamed "Expired Air Resuscitation", there are still many ways emphasised and taught by ARC:

1. 30:2 irrespective of number of rescuers
2. Lay rescuer checking of circulation is not part of ARC since 2000. Even medical personnel do not need to check pulse. EMAC ± check pulse
3. Furthermore the ARC does not recommend compression only CPR.
ARC BLS – other new things

• No signs of life called = unconscious unresponsive
• Visualise mid chest as lower sternum
• 2 initial breaths instead of 5 (ERC no rescue breaths and recognition of agonal breaths)
• Ignore number of CPR cycles / min
• Emphasis of defibrillation as part of ALS
• No more abdominal thrusts for choking
Adult ALS

Adult Cardiorespiratory Arrest

BLS Algorithm if appropriate

Precordial Thump for witnessed / monitored arrest

Attach Defib - monitor

Assess rhythm/pulse

Shockable VF / Pulseless VT

Non-Shockable PEA / Asystole
Assess rhythm/pulse

Shockable
VF / Pulseless VT

Attempt Defibrillation¹
1 shock
Manual Biphasic 200J²
Manual Monophasic 360J

Immediate CPR
2 Minutes

Non-Shockable
PEA / Asystole

During CPR
IF NOT ALREADY DONE
- Check electrode/paddle position & contact
- Attempt/verify/secure IV access
- Give adrenaline 1mg & repeat every 3 minutes

CORRECT REVERSIBLE CAUSES
- Hypoxaemia
- Hypovolaemia
- Hypo/Hyperthermia
- Hypo/Hyperkalaemia & other metabolic disorders
- Tamponade
- Tension pneumothorax
- Toxins / Poisons / Drugs
- Thrombosis
  - pulmonary / coronary

CONSIDER
- Advanced airway
- Antiarrhythmic
  - Amiodarone 300 mg
  - Lignocaine 1-1.5 mg/kg
  - Magnesium 5 mmol
- Electrolytes
  - Potassium 5 mmol
- Buffer
  - NaHCO₃ 1 mmol/kg
- Atropine (1-3 mg) + Pacing
  (for asystole & severe bradycardia)

Note:
1. For witnessed arrest, when using a manual defibrillator, give up to 3 stacked shocks at first defibrillation attempt. If further shocks are required these should be single shocks.
2. Default biphasic energy.
ILCOR ALS

- EMS to provide 5 cycles CPR (2min) before defibrillation for unwitnessed arrest (response time >4-5min)
- 5 cycles CPR (2min) before rhythm check
- Minimise interruptions of chest compressions
- 1 shock instead of 3 stacked shock for VF/pulseless VT
ARC ALS

• Initial 3 stacked shocks can be given in witnessed arrest (recharge time <10sec)
• Monophasic 360J, biphasic 200J unless specified, no change in voltage
• Increased emphasis on considering correctable causes
• No interruptions of CPR even with intubation (<20sec) and pulse check (<10sec)
After advanced airway no guide to number of breaths – 10-12/min may be excessive, 8-10/min no pause (but if calculated from 30:2 then 10/2 min)

Precordial thump can be given in arrest within 15 seconds but not with recent cardiac surgery/trauma

ERC – do not shock fine VF if unsure

Monitoring ETCO2 may be useful for adequacy of CPR, and CPP can only be done with Art and CVP

ABG good to monitor hypoxaemia but not acidosis (need CvO2), PaCO2 may indicate cardiac output performance
Paeds ALS

**Paediatric Cardiorespiratory Arrest**

- Basic CPR
  - Compression - Ventilation Ratio 30:2
- Advanced CPR
  - Compression - Ventilation Ratio 15:2
- Attach Defibrillator – ECG Monitor
- Assess Rhythm
  - Shockable VF / Pulseless VT
  - Non-Shockable PEA / Asystole
During CPR

Check electrode/paddle positions & contact
Attempt/verify/secure IV / IO access
Correct Reversible Causes

- Hypoxaemia
- Hypovolaemia
- Hypo/Hyperkalaemia
- Hypo/Hyperthermia
- Tamponade
- Tension pneumothorax
- Toxins / Poisons / DrugsS
- Thromboembolism

Consider:
Intubation / Advanced Airway
Vasopressor
Adrenaline 10 mcg/kg every 3 min

Antiarrhythmic
- Amiodarone 5 mg/kg OR
- Lignocaine 1 mg/kg for VF/VT.
- Magnesium 0.1 - 0.2 mmol/kg for Torsade de pointes

Buffer
- NaHCO₃ 1 mmol/kg
- Atropine 20mcg/kg + Pacing
  (for asystole & severe bradycardia)

1 For witnessed arrest, give up to 3 stacked shocks (2,4,4 J/Kg) at first defibrillation attempt.
2 If further shocks are needed these should be single shocks 4J/kg.
ILCOR PALS

- Modification of paediatric patients to pre-adolescent (prepuberscent)
- No change in lay recuer to child (1-8 y)
- ERC recommends 5 initial breaths before compressions and perform 1 min CPR before getting help
ARC PALS

• 15:2 in hospital for ALS
• Single shock instead of stacked shocks for VF/pulseless VT unless witnessed
• Monophasic or biphasic, first shock 2J/kg, subsequently 4J/kg
Diagram illustrating the assessment for resuscitation and subsequent management of a newborn baby in the absence of meconium

**Birth**

- Breathing or crying?
  - Yes
    - Routine care:
      - Dry the baby
      - Provide warmth
      - Clear the airway only if needed
      - Assess breathing, colour and heart rate
  - No
    - Dry and stimulate
      - Position the head and neck to open the airway
      - Provide warmth

- Assess breathing and heart rate *
  - If heart rate < 100/min or inadequate breathing

If baby is breathing, heart rate is >100/min and beginning to look pink then give routine care and observations appropriate for gestation
If heart rate < 100/min or inadequate breathing

Give positive pressure ventilation until heart rate > 100 and infant breathing*

Inadequate breathing and heart rate < 60/min*

Assess adequacy of ventilation and improve if possible.
If heart rate does not increase > 60/min
Give chest compressions with positive pressure ventilation at 3:1

If heart rate still does not increase > 60/min reassess ventilation technique*
Give adrenaline
May also need to give IV fluids

* endotracheal intubation may be considered at several stages
ILCOR Neonatal resus

• Increased emphasis on ventilation and de-emphasis of using high concentration oxygen
• This is a new section on ARC
Other ILCOR new developments

• Reaffirming of IV tPA for acute ischaemic stroke eligible according to NINDS criteria
• New first aid recommendations