How to Update CPR?

Are There Major & Minor Changes In the Guideline 2008?

Are Nurse anesthetists important for CPR?

Sudta Parakkamodom, RN, CRNA, Sc.M
Department of Anesthesiology
Faculty of Medicine Siriraj Hospital
Mahidol University
Why ???

พยาบาลวิสัญญี ให้การดูแลในเรื่องวิสัญญี หรือเกี่ยวข้องกับวิสัญญี ได้แก่ การเตรียมและประเมินผู้ป่วยเพื่อให้ยาสลบ ทำให้ผู้ป่วยสลบ หรือหมดความรู้สึก โดยการใช้ยาและเทคนิคที่เหมาะสมทั้งเฉพาะที่ และทั่วไป รวมทั้งการสอดใส่เครื่องมือบางอย่าง เพื่อการเฝ้าระวังผู้ป่วย การดูแลหลังได้รับยาสลบหรือระงับความรู้สึก การจัดการกับความปวดเฉียบพลันและเรื้อรัง และหน้าที่อื่น ๆ ที่เกี่ยวข้องกับการช่วยหายใจ และการช่วยฟื้นคืนชีวิต (American Association of Nurse Anesthetist, 1999)

สมจิต หนุเจริญกุล, แนวคิดการปฏิบัติการพยาบาลชั้นสูง ในระบบสุขภาพ ตามนโยบายหลักประกันสุขภาพถ้วนหน้า, สภาการพยาบาล, 2550, หน้า 5
Cardiopulmonary Resuscitation (CPR)

International Liaison Committee on Resuscitation (ILCOR) was formed in 1992 to provide a forum for liaison between principal resuscitation organizations worldwide.

Integrate all evidence following these steps:

1. Perform literature review and record search terms and databases searched.
2. Select studies relevant to hypothesis.
3. Determine level of evidence based on methodology.
4. Perform critical appraisal (poor to excellent).
5. Integrate evidence into a science summary and possible treatment recommendation.
Cardiopulmonary Resuscitation (CPR)

International Liaison Committee on Resuscitation (ILCOR) was formed in 1992 to provide a forum for liaison between principal resuscitation organizations worldwide.

- American Heart Association (AHA)
- European Resuscitation Council (ERC)
- Heart and Stroke Foundation of Canada (HSFC)
- Australian and New Zealand Committee on Resuscitation (ANZCOR)
- Resuscitation Councils of Southern Africa (RCSA)
- Inter American Heart Foundation (IAHF)
- Resuscitation Council of Asia (RCA)
- Thai Resuscitation Council

AHA guideline
Classification of Recommendations & Level of Evidence

Class I

Benefit >>> Risk

Procedure/treatment or diagnostic Test /assessment
Should be performed /administered.

Class IIa

Benefit >> Risk

It is reasonable to perform procedure/administer treatment or perform diagnostic test/assessment.

Class IIb

Benefit > Risk

Procedure/treatment or diagnostic Test /assessment may be considered.

Class III

Risk > Benefit

Procedure/treatment or diagnostic test /assessment should not be performed /administered.

It is not helpful and may be harmful.

Class Indeterminate.

• Research just getting started
• Continuing area of research
• No recommendations until further research (eg, cannot recommend for or against)
Are There Major & Minor Changes In the Guideline 2008?
## Table. Clinical Bystander CPR Studies Comparing Chest Compression-Only CPR With Chest Compression Plus Rescue Breathing CPR

<table>
<thead>
<tr>
<th>Study</th>
<th>Population Studied (All Are Out-of-Hospital)</th>
<th>Outcome Measure</th>
<th>No Bystander CPR (%)</th>
<th>CC-Only CPR (%)</th>
<th>CC + RB CPR (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>14-day survival</td>
<td>17/116 (15)</td>
</tr>
<tr>
<td>9.</td>
<td>Van Hoeyweghen et al, 1993</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21.</td>
<td>Hallstrom et al, 2000</td>
<td>Prospective, RCT of dispatcher instructions for all adult cardiac arrests, excluding poisoning/overdoses</td>
<td>Discharged alive from hospital</td>
<td>32/240 (15)</td>
<td>29/278 (10)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22.</td>
<td>Waalewijn et al, 2001</td>
<td>All bystander-witnessed adult cardiac arrests with EMS resuscitation</td>
<td>Discharged alive from hospital</td>
<td>17/116 (15)</td>
<td>29/278 (10)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23.</td>
<td>Nagao et al, 2007</td>
<td>All witnessed adult cardiac arrests—cardiac and noncardiac causes</td>
<td>Neurologically favorable 1-month survival</td>
<td>30/712 (4)*</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>24/124 (19)†</td>
<td></td>
</tr>
<tr>
<td>24.</td>
<td>Iwami et al, 2007</td>
<td>All witnessed adult cardiac arrests of presumed cardiac origin</td>
<td>Neurologically favorable 1-year survival</td>
<td>25/617 (4)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>14/122 (12)</td>
<td></td>
</tr>
<tr>
<td>25.</td>
<td>Bohm et al, 2007</td>
<td>All cardiac arrests with bystander CPR including cardiac and noncardiac causes</td>
<td>1-month survival</td>
<td>77/1145 (7)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Survival after out-of-hospital for witnessed ventricular fibrillation cardiac arrests only</td>
<td></td>
<td></td>
<td>24/124 (19)†</td>
<td></td>
</tr>
</tbody>
</table>
Hands-only CPR in Out Hospital

New recommendations published in the association's journal, Circulation, said a "hands-only" approach, using chest compressions alone, was just as effective as using compressions and mouth-to-mouth together on a collapsed patient.

Ohio State University's Michael Sayre, who lead the team that drafted the new recommendations, told Reuters people not trained in CPR should do two things when they encounter an adult who has suddenly collapsed: call emergency services and then push "hard and fast" in the centre of the person's chest.

CPR Guidelines Change
April 2, 2008 – 12:24 am

The American Heart Association has found hands-only CPR works just as well for adult cardiac arrest as standard CPR, which involves alternating 30 chest presses with two breaths. They found many people are hesitant to perform standard CPR due to the fear of infection and hope the new hands-only guidelines will change this.
Are There Major & Minor Changes In the Guideline 2008?

**Minor Change**

- Hands-only CPR in Out Hospital Cardiac Arrest.
CPR Guideline 2005

A. New ACLS Guidelines Concepts
B. New Medical Devices
C. New ACLS Drugs
D. New ACLS Rhythms
A. New ACLS Guidelines Concepts

The “2005 AHA Guideline for CPR”

• **High-quality chest compressions:** compression of adequate rate and depth with full-chest recoil and minimal interruptions. "push hard and push fast"
• **Compression-to-ventilation ratio of 30:2**
• **Interruptions limited to 10 seconds or less.**
• **After one shock, provide about 2 minutes of CPR before re-analyze the heart rhythm.**
**Hands-off Time**

CPP = Coronary Perfusion Pressure

= Diastolic pressure Gradient

between Aorta & Right Atrium

during the Relaxation phase of CPR
B. New Medical Devices

1. Esophageal-tracheal combitube
2. Laryngeal mask airway (LMA)
3. Confirming Tracheal Tube Placement
   - Esophageal detector devices
   - Pulse oximetry (SpO2)
   - End-tidal Colorimetric CO2 indicators
   - Capnometric devices
   - Capnograph (EtCO2)
   - Tube holders
   - Cervical collars
C. New ACLS Drugs

1: Vasopressin: New adrenergic-like drug that can be used as the first catecholamine for persistent or recurrent VF.
C. New ACLS Drugs

2: **Amiodarone:**
Amiodarone is really a "star" agent for the stable and unstable tachycardias, the drug of choice, specifically for

- Tachycardias in patients with impaired heart function
- Narrow-complex junctional tachycardias that failed to respond to adenosine and vagal stimulation
- Also narrow-complex ectopic or multifocal atrial tachycardia
- Also stable monomorphic VT with poor cardiac function
C. New ACLS Drugs

3: Glycoprotein IIb/IIIa receptor inhibitors have been added as a treatment to consider in the acute coronary syndromes, specifically chest pain patients with ST depression or dynamic T-wave inversions, and for high-risk unstable angina/non-ST-elevation AMI.
C. New ACLS Drugs

4: Tenecteplase is a new fibrinolytic agent
5: Low molecular weight heparin for high-risk unstable angina/non-ST-elevation AMI.

There is a series of antiarrhythmics that are in general second-line agents. Several have not yet been approved for marketing in the United States: dofetilide, flecainide, ibutilide, propafenone, and sotolol.
D. New ACLS Rhythms

1: Respiratory arrest
2: Witnessed VF treated with an AED
3: Shock-resistant VF/pulseless VT
4: Asystole
5: Pulseless electrical activity
6: Acute coronary syndromes
7: Bradycardias
8: Unstable tachycardias
9: Stable tachycardias
10: Acute stroke
# Summary of BLS ABCD Maneuvers for Infants, Children, and Adults

<table>
<thead>
<tr>
<th>Maneuver</th>
<th>Adult</th>
<th>Child</th>
<th>Infant</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lay rescuer: 8 years HCP: Adolescent and older</td>
<td>Lay rescuers: 1 to 8 years HCP: 1 year to adolescent</td>
<td>Under 1 year of age</td>
</tr>
<tr>
<td><strong>Activate</strong>  Emergency Response Number (lone rescuer)</td>
<td>Activate when victim found unresponsive  HCP: if asphyxial arrest likely, call after 5 cycles (2 min.) of CPR</td>
<td>Activate after performing 5 cycles of CPR  For sudden, witnessed collapse, activate after verifying that victim unresponsive</td>
<td></td>
</tr>
<tr>
<td><strong>Airway</strong></td>
<td>Head tilt–chin lift (HCP: suspected trauma, use jaw thrust)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Breaths</strong>  Initial</td>
<td>2 breaths at 1 sec /breath</td>
<td>2 effective breaths at 1 sec / breath</td>
<td></td>
</tr>
<tr>
<td><strong>HCP:</strong> Rescue breathing</td>
<td>10 to 12 breaths/min (approximately 1 breath every 5 to 6 seconds)</td>
<td>12 to 20 breaths/min (approximately 1 breath every 3 to 5 seconds)</td>
<td></td>
</tr>
<tr>
<td>without chest compressions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>HCP:</strong> Rescue breaths for CPR with advanced airway</td>
<td>8 to 10 breaths/min (approximately)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>FBAO</strong>  (Foreign-body airway obstruction)</td>
<td>Abdominal thrusts</td>
<td>Back slaps and chest thrusts</td>
<td></td>
</tr>
<tr>
<td><strong>Circulation</strong></td>
<td>Carotid (HCP can use femoral in child)</td>
<td></td>
<td>Brachial or femoral</td>
</tr>
<tr>
<td>HCP: Pulse check(&lt;10 sec)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compression landmarks</td>
<td>Lower half of sternum, between nipples</td>
<td>Just below nipple line</td>
<td></td>
</tr>
<tr>
<td>-----------------------</td>
<td>---------------------------------------</td>
<td>------------------------</td>
<td></td>
</tr>
<tr>
<td><strong>Compression method</strong></td>
<td>2 Hands: Heel of 1 hand, other hand on top</td>
<td>2 Hands: Heel of 1 hand with second on top or 1 Hand: Heel of 1 hand only</td>
<td>2 or 3 fingers HCP (2 rescuers): 2 thumb–encircling hands</td>
</tr>
<tr>
<td>- Push hard and fast</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Allow complete recoil</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Compression depth</strong></td>
<td>11/2 to 2 inches</td>
<td>Approximately one third to one half the depth of the chest</td>
<td></td>
</tr>
<tr>
<td><strong>Compression rate</strong></td>
<td>Approximately 100/min</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Compression-ventilation ratio</strong></td>
<td>30:2 (1 or 2 rescuers)</td>
<td>30:2 (single rescuer) HCP: 15:2 (2 rescuers)</td>
<td></td>
</tr>
<tr>
<td><strong>Defibrillation</strong></td>
<td>Use adult pads. Do not use child pads/child system. HCP: For out-of-hospital response may provide 5 cycles/2 minutes of CPR before shock if response&gt;4 to 5 minutes and arrest not witnessed.</td>
<td>HCP: Use AED as soon as available for sudden collapse and in-hospital. ALL: After 5 cycle of CPR (out-of-hospital). Use child pads/child for child 1 to 8 years if available. If child pads/system not available, use adult AED and pads.</td>
<td>No recommendation for infants&lt;1 year of age</td>
</tr>
</tbody>
</table>
Adult CPR

1. Find hand position
2. Position shoulders over hands; compress chest 30 times 1½-2 inches
3. Give 2 slow breaths
Child CPR (1 to 12 years old)

If no pulse:

- Find hand position
- Position shoulders over hands; compress chest 30 times 1½-2 inches
- Give 2 slow breaths
Infant CPR (Newborn to 1 year of age)

If no pulse:

- Find finger position
- Position hand over fingers; compress chest 30 times ½-1 inches
- Give 2 slow breaths
Are Nurse anesthetists important for CPR?

Preliminary & Teamwork
IHCA  In-Hospital Cardiac Arrest

Pathophysiology of Cardiac Arrest

- **OHCA** out of hospital cardiac arrest
  - VF/VT > 40%
    - Ischemia
    - Children
      » Low VF/VT
      » Non-VF/VT
      » Better survival

- **IHCA** In-Hospital Cardiac Arrest
  - VF/VT 20–35%
    - Hypoxia or Hypotension
    - PEA Asystole

### Preliminary

Survival rate from cardiac arrest due to *ventricular fibrillation* as related to promptness of initiation of CPR and ACLS

<table>
<thead>
<tr>
<th>Initiation of CPR (minutes)</th>
<th>Arrival of ACLS (minutes)</th>
<th>Survival Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;4</td>
<td>&lt;8</td>
<td>43</td>
</tr>
<tr>
<td>&lt;4</td>
<td>&gt;16</td>
<td>10</td>
</tr>
<tr>
<td>8-12</td>
<td>8-16</td>
<td>6</td>
</tr>
<tr>
<td>8-12</td>
<td>&gt;16</td>
<td>0</td>
</tr>
<tr>
<td>&gt;12</td>
<td>&gt;12</td>
<td>0</td>
</tr>
</tbody>
</table>

* Data from Seattle Heart Watch, JAMA 1979; 241:1905-7
Chances of success reduced 7% to 10% each minute

# Preliminary

**Influence of Early CPR and Early Defibrillation on Percent of Survival to Hospital Discharge**

<table>
<thead>
<tr>
<th>Collapse to CPR</th>
<th>Collapse to Defibrillation</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 5 min</td>
<td>&lt;10 min: 37% &gt;10 min: 7%</td>
</tr>
<tr>
<td>&gt; 5 min</td>
<td>&lt;10 min: 20% &gt;10 min: 0%</td>
</tr>
</tbody>
</table>
Clinical effects of compression and pre-shock pauses

Association between pre-shock pause and shock success. Cases are grouped by pre-shock pause in 10s intervals. Note that longer pre-shock pauses are significantly associated with a smaller probability of shock success.
Association between chest compression depth and shock success. Cases are grouped by 30s average compression depth in approximately 11 mm (0.5 in.) intervals. Chest compression depth of 38–50 mm (1.5–2 in.) represents current CPR guidelines recommendations. Deeper chest compressions are significantly associated with increased probability of shock success.
Teamwork

Medical record
Thank you for attention