Welcome to ACLS 😊

We’re excited that you’re taking a class with us! This checklist should help you prepare.

☐ Ensure you have a 2011 or newer addition of the American Heart Association ACLS Provider Manual. The ECC Handbook is also a great reference but isn’t required. It is an AHA requirement that you have a book before class. Contact us if you would like to rent one (please see our website for full details).

☐ Pre-Test: Complete the pretest and print your results. Visit www.heart.org/eccstudent and enter the code from your text book or “advancedlifesupport.”

☐ If you need a review of your heart rhythms, try www.skillstat.com, go under the tools tab and click EKG simulator. Proficient basic arrhythmia recognition is essential to being successful in ACLS. You can find additional choices if you Google, EKG simulator.

☐ Bring a photo ID, current BLS and if re-certifying bring your current ACLS card. If you want to receive CEU’s, the BRN requires you to provide your license number at the time of your class.

We both remember how nervous we were the first time we took ACLS. We intend this class to be fun and relaxed but also want to give you the confidence you need in an emergency. Please leave your jitters at home and prepare to learn and laugh with us.

Course Agenda
The following information will be covered in your ACLS course. **Stroke and ACS modules are included if this is a full provider course or upon advanced request.

• Course Overview
• 2010 AHA Guidelines and ECC Science Update
• BLS and ACLS Surveys
• Adult HCP-BLS with AED skills check
• Managing Respiratory Emergencies
• Airways with skills check
• Mega-code Team Dynamic
• Algorithm and mock code overview
• Acute Coronary Syndrome**
• Stroke**
• Written Exam (84% or greater required to pass)
• Mock Code skills exam

Breaks are taken as needed and do not hesitate to ask questions.

We look forward to seeing you soon!
Kristen and Vilate

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Medical Education Angels Quick Little Medication Review 😊

This isn’t all the ACLS drugs, but these are the most common and you’ll want to know these for sure!!

**Epinephrine**: a potent catecholamine used to increased cardiac output by increasing heart rate resulting in increased blood flow to the heart and brain.
- First line drug in any pulseless rhythm
- 1mg IVP every 3-5 minutes

**Vasopressin**: a potent arterial vasoconstrictor indicated for GI hemorrhage, severe hypotension and ACLS protocol in VF and pulseless VT. Thought to produce less ischemia than Epinephrine, but no improvement in survival shown.
- 40 units IVP

**Adenosine**: first line anti-arrhythmic used to treat SVT and WPW. Has an unusually fast on-set and a half-life of <10 seconds. Acts on the AV node by slowing conduction and inhibiting pathways that lead to re-entry dysrhythmias.
- 6mg IVP over 1-3 seconds. After 1-2 minutes, if no response, may repeat with 12mg IVP over 1-3 seconds.
- Usually will note a few seconds of Asystole after injection, usually resolves in <10 seconds. May also note SB or PVC’s

**Amiodarone**: anti-arrhythmic used for a wide variety of atrial and ventricular dysrhythmias. ACLS dosing is different from stable dosing. May cause hypotension and bradycardia in stable patients.
- For cardiac arrest: 300mg SIVP; may repeat an additional 150mg in 3-5 minutes for persistent VF/VT
- Stable, wide complex tachycardia: 150mg loading dose/10 minutes then 1mg/min gtt x 6 hours, followed by 0.5mg/min gtt for 18 hours. Max dose: 2.2grams IV/24 hours

**Lidocaine**: an anti-arrhythmic used to suppress ventricular irritability, decreases automaticity (rate) and increases the VF threshold
- 1-1.5mg/kg IVP, may repeat in 3-5 minutes up to 3mg/kg total
- Maintenance: standard mix 2gm/500cc D5W and run at 1-4 mg/min

**Atropine**: blocks the vagal effects on the SA and AV nodes thereby increasing the heart rate.
- 0.5mg-1 mg for bradycardia
- Max 0.04mg/kg

This is obviously only a brief over-view as we have not included side effects or nursing considerations. One of the common pitfalls is confusing the “A” drugs in the mega-code (Atropine for Amiodarone, etc.)
**H’s and T’s**

Medical Education Angels quick list of the potentially reversible causes of cardiac arrest.

<table>
<thead>
<tr>
<th>Medical Condition</th>
<th>Causes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypovolemia</td>
<td>Tablets (drug overdose, accidents)</td>
</tr>
<tr>
<td>Hypoxia</td>
<td>Tamponade</td>
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<tr>
<td>Hydrogen ion loss – acidosis</td>
<td>Tension Pneumothorax</td>
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<tr>
<td>Hyperkalemia/Hypokalemia</td>
<td>Thrombosis – coronary or pulmonary</td>
</tr>
<tr>
<td>Hypothermia</td>
<td>Trauma</td>
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<tr>
<td>Hypoglycemia &amp; other metabolic disorders</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>HYPOVOLEMIA</th>
<th>TOXINS (drug OD, accidents)</th>
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<tbody>
<tr>
<td>2. secure IV/IO access</td>
<td></td>
</tr>
<tr>
<td>3. give fluid bolus and reassess</td>
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</tbody>
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<table>
<thead>
<tr>
<th>HYPOXIA</th>
<th>TAMPOANADE (causes: chest trauma, CABG, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. confirm chest rise bilaterally and lung sounds</td>
<td>1. Look for: JVD, narrow pulse pressure</td>
</tr>
<tr>
<td>2. check 02 source</td>
<td>2. Pericardialcentesis, return to OR</td>
</tr>
<tr>
<td>3. sp02, ABG’s, suction</td>
<td></td>
</tr>
</tbody>
</table>

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<thead>
<tr>
<th>HYDROGEN ION LOSS</th>
<th>TENSION PNEUMOTHORAX (s/s: chest asymmetry, tympani, decreased BS, high peak pressures, JVD, tracheal deviation, severe respiratory distress)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. respiratory – ensure adequate ventilation</td>
<td>1. vent tension in chest with angio at 2ICS below clavicle if it is within your scope of practice</td>
</tr>
<tr>
<td>2. metabolic – give NaHCO3 (sodium bicarbonate)</td>
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<tr>
<td>3. draw/evaluate CO2 in serum or pH on ABG</td>
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<thead>
<tr>
<th>HYTHERMIA</th>
<th>THROMBOSIS (coronary or pulmonary)</th>
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</thead>
<tbody>
<tr>
<td>1. consider warm NS infusion</td>
<td>1. consider fibrinolysis</td>
</tr>
<tr>
<td>2. warming measures</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>HYPOGLYCEMIA</th>
<th>TRAUMA</th>
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<tbody>
<tr>
<td>1. accu-check and administer D50 PRN</td>
<td>1. inspect body completely; remove clothing</td>
</tr>
<tr>
<td></td>
<td>2. secure airway</td>
</tr>
<tr>
<td></td>
<td>3. control external bleeding by applying pressure while concurrently giving crystalloids and blood products</td>
</tr>
<tr>
<td></td>
<td>4. look for s/s of internal bleeding: send lab work, do diagnostic tests as long as patient stable enough for exam, tap belly if suspicious for internal bleeding, call OR to be on call</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>HYPOKALEMIA</th>
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<tbody>
<tr>
<td>1. look for flat T waves and U waves</td>
<td></td>
</tr>
<tr>
<td>2. administer potassium and consider checking and infusing Magnesium</td>
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</tbody>
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**HYPERKALEMIS**

1. look for peaked T waves, tall ST or widening QRS
2. To move K intracellular:
   - CaCl 10%, 5-10ml/onset 1-3 min
   - Sod. Bicarb give 1 amp up to 1mEq/kg can repeat in 15 min./onset 5-10 min
   - Insulin & Dextrose: 10u regular insulin/1 amp D50 (25gms) /onset 30 min
   - Nebulized Albuterol 10-20mg/15 minutes, may repeat / onset 15 min
   - Lasix 40-80mg IV / onset with diuresis
   - Kayexalate 15-50gm PO or rectal /onset 1-2 hours

Pg 64, 65 ECC 2005 handbook

***Please remember the H’s and T’s evolve slowly over time as well. Toxins, was tablets years ago and the most recent text book no longer shows trauma or hypoglycemia. Most importantly, please know and follow your facilities policies! ***
The next six pages are from the AHA 2011 pocket card that accompanies the book. We find that often people have lost their card or they borrow a book which no longer has it. It is not meant to replace the text book, it is simple a supplement to your learning.
Bradycardia With a Pulse Algorithm

Assess appropriateness for clinical condition. Heart rate typically <50/min if bradycardia.

Identify and treat underlying cause
- Maintain patent airway; assist breathing as necessary
- Oxygen (if hypoxemic)
- Cardiac monitor to identify rhythm; monitor blood pressure and oximetry
- IV access
- 12-Lead ECG if available; don't delay therapy

Persistent bradyarrhythmia causing:
- Hypotension?
- Acutely altered mental status?
- Signs of shock?
- Ischemic chest discomfort?
- Acute heart failure?

Monitor and observe

No

Yes

Atropine
If atropine ineffective:
- Transcutaneous pacing OR
- Dopamine infusion OR
- Epinephrine infusion

Consider:
- Expert consultation
- Transvenous pacing

Doses/Details
Atropine IV Dose:
First dose: 0.5 mg bolus
Repeat every 3-5 minutes
Maximum: 3 mg

Dopamine IV Infusion:
2-10 mcg/kg per minute

Epinephrine IV Infusion:
2-10 mcg per minute
Tachycardia With a Pulse Algorithm

Assess appropriateness for clinical condition. Heart rate typically ≥150/min if tachyarrhythmia.

Identify and treat underlying cause
- Maintain patent airway; assist breathing as necessary
- Oxygen (if hypoxemic)
- Cardiac monitor to identify rhythm; monitor blood pressure and oximetry

Persistent tachyarrhythmia causing:
- Hypotension?
- Acutely altered mental status?
- Signs of shock?
- Ischemic chest discomfort?
- Acute heart failure?

Yes

Synchronized cardioversion
- Consider sedation
- If regular narrow complex, consider adenosine

No

Wide QRS? ≥0.12 second

Yes

Synchronized cardioversion
- Consider sedation
- If regular narrow complex, consider adenosine

No

IV access and 12-lead ECG if available
- Consider adenosine only if regular and monomorphic
- Consider antiarrhythmic infusion
- Consider expert consultation

Doses/Details

Synchronized Cardioversion
Initial recommended doses:
- Narrow regular: 50-100 J
- Narrow Irregular: 120-200 J biphasic or 200 J monophasic
- Wide regular: 100 J
- Wide irregular: defibrillation dose (NOT synchronized)

Adenosine IV Dose:
First dose: 6 mg rapid IV push; follow with NS flush. Second dose: 12 mg if required.

Antiarhythmic Infusions for Stable Wide-QRS Tachycardia

Procainamide IV Dose:
20-50 mg/min until arrhythmia suppressed, hypotension ensues, QRS duration increases >50%, or maximum dose 17 mg/kg given. Maintenance infusion: 1-4 mg/min. Avoid if prolonged QT or CHF.

Amiodarone IV Dose:
First dose: 150 mg over 10 minutes. Repeat as needed if VT recurs. Follow by maintenance infusion of 1 mg/min for first 6 hours.

Sotalol IV Dose:
100 mg (1.5 mg/kg) over 5 minutes. Avoid if prolonged QT.
Suspected Stroke Algorithm: Goals for Management of Stroke

**Identify signs and symptoms of possible stroke**
- **Activate Emergency Response**

**Critical EMS assessments and actions**
- Support ABCDs, give oxygen if neeeded
- Perform prehospital stroke assessment
- Establish time of symptom onset (last normal)
- Transfer to stroke center
- Alert hospital
- Check glucose if possible

**Immediate general assessment and stabilization**
- Assess ABCDs, vital signs
- Provide oxygen if hypoxic
- Obtain IV access and perform laboratory assessments
- Check glucose; treat if indicated
- Perform neurologic screening assessment
- Activate stroke team
- Order emergent CT or MRI of brain
- Obtain 12-lead ECG

**Immediate neurologic assessment by stroke team or designee**
- Review patient history
- Establish time of symptom onset or last known normal
- Perform neurologic examination (NIH Stroke Scale or Canadian Neurological Scale)

**Does CT scan show hemorrhage?**
- **No Hemorrhage**
  - **Patient remains candidate for fibrinolytic therapy?**
    - **Yes**
      - Review risks/benefits with patient and family, if acceptable:
        - Give tPA
        - No anticoagulants or antiplatelet treatment for 24 hours
    - **No**
      - Begin post-tPA stroke pathway
      - Aggressively monitor:
        - SP per protocol
        - For neurologic deterioration
      - Emergency admission to stroke unit or intensive care unit
- **Hemorrhage**
  - Consult neurologist or neurosurgeon; consider transfer if not available
  - Begin stroke or hemorrhage pathway
  - Admit to stroke unit or intensive care unit

**Stroke Assessment**

**The Cincinnati Prehospital Stroke Scale**

**Facial Droop** (have patient show teeth or smile):
- Normal—both sides of face move equally
- Abnormal—one side of face does not move as well as the other side

Left: Normal, Right: Stroke patient with facial droop (right side of face).

**Arm Drift** (patient closes eyes and extends both arms straight out, with palms up, for 10 seconds):
- Normal—both arms move the same or both arms do not move at all (other findings, such as pronator drift, may be helpful)
- Abnormal—one arm does not move or one arm drifts down compared with the other

Left: Normal, Right: One-sided motor weakness (right arm).

**Abnormal Speech** (have the patient say “you can’t teach an old dog new tricks”):
- Normal—patient uses correct words with no slurring
- Abnormal—patient slurs words, uses the wrong words, or is unable to speak

**Interpretation:** If any 1 of these 3 signs is abnormal, the probability of a stroke is 72%.

Acute Coronary Syndromes Algorithm

Symptoms suggestive of ischemia or infarction

EMS assessment and care and hospital preparation
- Monitor, support ABCs; be prepared to provide CPR and defibrillation
- Administer aspirin and consider oxygen, nitroglycerin, and morphine if needed
- Obtain 12-lead ECG if ST elevation
  - Notify receiving hospital with transmission or interpretation; note time of onset and first medical contact
  - Notify hospital should mobilize hospital resources to respond to STEMI
  - If considering prehospital fibrinolysis, use fibrinolytic checklist

Concurrent ED assessment (<10 mins)
- Check vital signs; evaluate oxygen saturation
- Establish IV access
- Perform brief, targeted history, physical exam
- Review/complete fibrinolytic checklist; check contraindications
- Obtain initial cardiac marker levels, initial electrolyte and coagulation studies
- Obtain portable chest x-ray (<30 min)

Immediate ED general treatment
- If C.O. sat <94%, start oxygen at 4 L/min, titrate
- Aspirin 160 to 325 mg (if not given by EMS)
- Nitroglycerin sublingual or spray
- Morphine IV if discomfort not relieved by nitroglycerin

ECG interpretation

Reperfusion goals:
- Therapy defined by patient and center criteria
- Door-to-balloon inflation (POCI) goal of 90 minutes
- Door-to-needle (fibrinolysis) goal of 30 minutes

ST elevation or new or
presumably new LBBB;
strongly suspicious
for injury
ST-elevation MI (STEMI)

- Start adjunctive
  therapies as indicated
- Do not delay
  reperfusion

Troponin elevated or
high-risk patient
Consider early invasive
strategy if:
- Refractory ischemic
  chest discomfort
- Recurrent/persistent
  ST deviation
- Ventricular
  tachycardia
- Hemodynamic
  instability
- Signs of heart failure

Consider admission
to ED chest pain unit
or to appropriate bed and follow:
- Serial cardiac markers
  (including troponin)
- Repeat ECG/continuous
  ST-segment monitoring
- Consider noninvasive
  diagnostic test

ST depression or dynamic
T-wave inversion; strongly
suspicous for ischemia
High-risk unstable angina/
non-ST-elevation MI
(UA/NSTEMI)

Develops 1 or more:
- Clinical high-risk features
- Dynamic ECG changes
  consistent with ischemia
- Troponin elevated

No

Admit to monitored bed
Assess risk status
Continue ASA, heparin,
and other therapies as indicated
- ACE inhibitors/ARB
- HMG CoA reductase
  inhibitor (statin therapy)
  Not at high risk:
cardiology to risk stratify

If no evidence
of ischemia or infarction by testing,
can discharge with follow-up

No

Yes

Abnormal
diagnostic
noninvasive
imaging or
physiologic
testing?