

HeartCode™ ACLS

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Preface

The goal of HeartCode ACLS is to improve the quality of care provided to the adult victim of cardiac arrest or other cardiopulmonary emergencies.

HeartCode ACLS, the official AHA eLearning program, offers an alternative to the traditional ACLS class. In today's fast-paced environment, it is not always easy for healthcare providers to keep their certifications current.

HeartCode ACLS offers a convenient method for obtaining an American Heart Association ACLS card.

Providers can complete the course at their own pace, on their own schedule, saving time and money and improving the utilization of a limited pool of instructor resources.

This specific program is designed to educate clinicians about treatments for cardiovascular emergencies and stroke.

Target Audience

Physicians, pharmacists, registered nurses, emergency medical service technicians and paramedics are the target audience. Other healthcare workers who care directly for patients may also benefit.

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Special features in HeartCode ACLS

Introduction

The HeartCode ACLS CD-ROM includes all of the exams required for successful completion of the didactic portion of the HeartCode ACLS Program:

- ACLS Written Exam
- 10 Core Cases (*realistic patient-simulation cases*)

Also on the CD-ROM:

Team Training Module

A module on team concepts that allows providers to learn the basic team principles and how to integrate these principles in a simulated code.

Electronic versions of AHA textbooks

- HeartCode ACLS Provider Manual
- 2005 American Heart Association Guidelines for Cardiovascular Resuscitation and Emergency Cardiovascular Care

HeartCode ACLS includes microsimulation technology that improves both the educational content and user-friendliness of the program. Providers are presented with realistic patient cases and are required to interact with the program to assess the patient, formulate a treatment plan based on the ACLS algorithms and effect treatment. The advanced technology allows the simulated patient to react accordingly to the treatment provided—good or bad—in order to improve the learning experience.

In addition to standard drop-down menus, the on-screen simulations allow the provider to interact directly with the scene images to increase the realism of the case.

Upon completion of a given case, the provider is presented with a detailed debriefing screen. This debriefing is more than

Special features in HeartCode ACLS

just a list of events ending with a score. Providers are presented with an account of their actions, pointing out both correct and incorrect actions. Suggestions for improvement are offered, and all appropriate AHA reference material is hyperlinked to the debriefing, allowing immediate remediation at the conclusion of the case.

How to get the HeartCode ACLS certificate

The HeartCode Interactive Learning System is a computer-based self-learning program for the American Heart Association ACLS course. All the student needs to do is:

- Review the background material to the extent desired
- Complete the required exams on the CD-ROM and print out the certificate
- Go to a Training Center or international skills center to have his/her skills evaluated

Upon successful completion the student receives an AHA Course Completion Card.

Core Cases (Patients)

Description and Learning Objectives

The 10 ACLS core cases in HeartCode provide you with an opportunity to test your ability to manage a range of important cardiovascular emergencies and stroke in a realistic simulation setting while working toward your ACLS certification. The intelligent debriefing gives you optimal chances to learn from and improve your performance.

Descriptions and learning objectives

Patient: Brad Stephens

A 58-year-old man has collapsed after being brought to the hospital. He complained of some shortness of breath and chest pain before losing consciousness.

In this case, you will be managing an adult cardiac arrest. You will need to assess the patient, obtain and recognize the ECG rhythm and apply the ACLS algorithm.

Diagnosis: VF/Pulseless VT - Unconscious

Difficulty: Beginner

Learning Objectives: Executes BLS Primary and ACLS Secondary ABCD Surveys to assess patient.

Executes relevant cardiorespiratory support.

Executes effective CPR when indicated.

Recognizes VF on ECG.

Recognizes VT on ECG.

Applies the VF/Pulseless VT Algorithm.

Executes proficient defibrillation.

Recalls that CPR and defibrillation is a critical combination for treating VF and pulseless VT.

Recalls recommended shock doses: Monophasic: 360J.

Biphasic: device specific or 200 J if unknown

Recalls that drug administration must NOT delay defibrillation.

Recalls general indications, contraindications and dosages for drugs relevant to treatment of VF/pulseless VT.

Executes relevant postresuscitation care.

Descriptions and learning objectives

Patient: Derrick Gentry

A 72-year-old man is brought into the ED by ambulance complaining of loss of movement in his left arm. He has a history of hypertension and hypercholesterolemia. You will need to perform a rapid, targeted neurological assessment of this patient to determine the next step in his management. Time is critical here.

Diagnosis: Acute ischemic stroke

Difficulty: Medium

Learning Objectives: Recognizes signs and symptoms of stroke.
Manages stroke patient according to guidelines.
Applies the algorithm for suspected stroke.
Executes a rapid neurological exam.
Recalls that the clinical condition of patients with stroke may change rapidly.
Recalls the importance of obtaining an urgent non-contrast CT scan of head.
Recalls the importance of determining time of symptom onset.
Inferes rapidly patient's eligibility for fibrinolytic therapy.
Executes administration of fibrinolytics according to the guidelines.
Recalls to avoid central IV lines and arterial punctures if not absolutely necessary.
Recognizes signs and symptoms of increased intracranial pressure.
Recalls complications of stroke.
Summarizes differential diagnoses of stroke.

Descriptions and learning objectives

Patient: Ervin Waters

An 82-year-old man with palpitations has been sent to the Emergency Department by his family doctor. After assessing the patient, management of tachycardia depends on the ECG diagnosis, duration of the problem and the patient's cardiac function.

Diagnosis: Atrial fibrillation

Difficulty: Beginner

Learning Objectives: Executes BLS Primary and ACLS Secondary ABCD Surveys to assess patient.

Distinguishes between stable and unstable tachycardia.

Identifies atrial fibrillation on ECG.

Summarizes the importance of establishing whether a patient is stable or unstable.

Recalls the sequence of treatments for AF.

Recalls that a patient who is hemodynamically unstable due to AF should be electrically cardioverted immediately.

Recalls the importance of determining the duration of atrial fibrillation.

Recalls that anticoagulation measures are mandatory before attempting cardioversion in stable patients with AF ~ >48 h.

Recalls guidelines for urgent cardioversion in unstable patients.

Descriptions and learning objectives

Patient: Ian Denholm

A 74-year-old man is complaining of fatigue on exertion. He has noticed that his heart rate is well over 100 beats per minute. This patient is complaining of fatigue and is tachycardic. Always assess the patient clinically and monitor vital signs before deciding on a course of treatment.

Diagnosis: VT with pulse

Difficulty: Medium

Learning Objectives: Executes BLS Primary and ACLS Secondary ABCD Surveys to assess patient.

Executes relevant cardiorespiratory support.

Executes continuously assessments of the patient.

Recognizes signs and symptoms of tachycardia.

Distinguishes between stable and unstable tachycardia.

Identifies the tachycardic patient who is unstable from tachycardia.

Implements the guideline when manage an unstable tachycardia patient.

Recalls that first-line treatment for the hemodynamically unstable patient is urgent electrical cardioversion, regardless of tachycardic subtype.

Distinguishes between wide- and narrow-complex tachycardias on ECG.

Identifies the specific subtype of tachycardia on ECG.

Implements the guideline in managing stable VT.

Understands that left ventricular function influences choice of therapy.

Understands the importance of establishing the particular subtype of stable VT the patient has before initiating treatment.

Recalls drugs relevant to treatment of tachycardia.

Recalls important properties of antiarrhythmics.

Uses electrical cardioversion when appropriate.

Recalls that VT may quickly deteriorate to VF.

Descriptions and learning objectives

Patient: John Mitchell

A 56-year-old man is complaining of chest pain. He is a smoker who has not seen a doctor for several years. You will need to rapidly assess and treat this patient, using the ACLS Chest Pain Algorithm to guide your management.

Diagnosis: Acute coronary syndrome

Difficulty: Medium

Learning Objectives: Executes BLS Primary and ACLS Secondary ABCD Surveys to assess patient.

Executes relevant cardiorespiratory support.

Recognizes symptoms of MI.

Applies the Acute Coronary Syndromes algorithm.

Judges the ECG for ACS related changes.

Applies the AHA recommended ED plan for immediate assessment and general treatment of the patient with chest pain suggestive of ischemia.

Executes attempts to control chest pain aggressively.

Executes intitial treatment for patients with ACS correctly.

Recalls that ECG subtype influences choice of therapy.

Evaluates patient's eligibility for reperfusion therapy rapidly.

Executes reperfusion therapy when indicated.

Recalls to minimize door-to-drug interval.

Recalls indications, contraindications, dosage and administration of drugs relevant to treatment of ACS.

Understands that time is critical in the management of AMI.

Descriptions and learning objectives

Patient: Kevin King

A 22-year-old man has come to the Emergency Department after experiencing palpitations for 30 minutes. He had a similar episode a few years ago. He is otherwise well. This patient is tachycardic. Remember to assess his vital signs to determine if he has a stable or unstable tachycardia.

Diagnosis: Paroxysmal SVT / Reentry SVT

Difficulty: Beginner

Learning Objectives: Executes BLS Primary and ACLS Secondary ABCD Surveys to assess patient.

Executes relevant cardiorespiratory support.

Recognizes signs and symptoms of tachycardia.

Distinguishes between stable and unstable tachycardia.

Recognizes signs and symptoms that suggest a tachycardia is unstable.

Recalls that unstable tachycardia requires immediate treatment.

Implements correct management of an unstable tachycardia patient according to guidelines.

Recalls that first-line treatment for the hemodynamically unstable patient is urgent electrical cardioversion, regardless of tachycardic subtype.

Distinguishes between patients with preserved and impaired cardiac function.

Distinguishes between wide- and narrow-complex tachycardias on ECG.

Identifies the specific subtype of tachycardia on ECG.

Applies the Stable Narrow-Complex Tachycardia Algorithm.

Recalls the sequence of treatments for PSVT.

Uses vagal maneuvers when appropriate.

Recalls drugs relevant to treatment of tachycardia.

Uses electrical cardioversion when appropriate.

Descriptions and learning objectives

Patient: Lou Weston

A 72-year-old man has fallen twice in the last 24 hours. He is taking medication for hypertension, but is otherwise well. Try to determine the cause of this man's fainting spells. Once you have formulated a diagnosis, you can select options for management of his problem.

Diagnosis: Bradycardia

Difficulty: Medium

Learning Objectives: Executes BLS Primary and ACLS Secondary ABCD Surveys to assess patient.

Executes relevant cardiorespiratory support.

Recognizes signs and symptoms of symptomatic bradycardia.

Understands that only symptomatic bradycardia should be treated.

Applies the Bradycardia Algorithm.

Recalls that transvenous pacing is indicated when second-degree type II or third-degree AV block is identified.

Detects the type of AV block on ECG.

Summarizes that different types of AV blocks carry different prognoses and require different treatment.

Summarizes for time to start catecholamines to maintain heart rate and blood pressure.

Executes transcutaneous pacing when relevant.

Recalls indications for transcutaneous pacing.

Administers atropine when appropriate.

Descriptions and learning objectives

Patient: Nathan Meagher

A 73-year-old orthopedic patient has been found with no pulse. He had hip replacement surgery this morning without any major problems.

You will need to rapidly assess this case and look for reversible causes of the patient's pulseless electrical activity.

Diagnosis: Pulseless electrical activity (PEA)

Difficulty: Beginner

Learning Objectives: Executes BLS Primary and ACLS Secondary ABCD Surveys to assess patient.

Executes relevant cardiorespiratory support.

Executes effective CPR when indicated.

Identifies reversible causes in all arrests.

Identifies PEA and its variations on ECG.

Applies the PEA branch of the pulseless arrest Algorithm.

Identifies why this patient is in cardiac arrest with PEA at this time.

Summarizes that PEA is often associated with reversible causes.

Recalls that the cause of PEA—not the cardiac rhythm of the patient—is the target of treatment.

Recalls that PEA is not a shockable rhythm.

Summarizes that rhythm degeneration usually follows PEA quickly if reversible causes are not identified and treated.

Identify and treat reversible causes of all cardiac arrests.

Summarizes that hypovolemia can cause pulselessness.

Executes management of the airway aggressively.

Administers atropine and epinephrine when indicated.

Executes relevant post resuscitation care.

Descriptions and learning objectives

Patient: Stan Loftus

A man is brought into the ED from his home, where his wife found him unrousable on the couch. Basic life support was not started until the ambulance arrived.

In an out-of-hospital cardiac arrest, focus on the ABCs, identify the ECG rhythm early and follow the appropriate ACLS protocol.

Diagnosis: Asystole

Difficulty: Beginner

Learning Objectives: Executes BLS Primary and ACLS Secondary ABCD Surveys to assess patient.

Executes effective CPR when indicated.

Applies the pulseless arrest algorithm.

Executes management of the airway aggressively.

Recognizes asystole on ECG.

Checks that a flat line on the ECG is indeed asystole.

Administers vasopressin and atropine if and when appropriate.

Identify and treat reversible causes of all cardiac arrests.

Recalls that asystole is not a shockable rhythm.

Recalls that asystole usually represents a confirmation of death rather than a rhythm to be treated.

Recalls the AHA criteria for when to stop resuscitative efforts.

Recalls to look for and honor a valid Do Not Resuscitate Order (DNAR)

Descriptions and learning objectives

Patient: Warren Clark

A patient in the Emergency Department complains of feeling very ill. He has chest pain and low blood pressure. He has driven himself to the hospital after experiencing pain for several hours.

In this case, you must recognize the pre-arrest patient and subsequently follow the appropriate algorithms of management. An AED is available.

Diagnosis: VF/Pulseless VT - Conscious at Start

Difficulty: Beginner

Learning Objectives: Executes Primary and Secondary ABCD Surveys to assess patient.

Executes relevant cardiorespiratory support.

Recognizes VF on ECG.

Recognizes VT on ECG.

Applies the VF/Pulseless VT branch of the pulseless arrest Algorithm.

Executes proficient defibrillation.

Recalls that CPR and defibrillation is a critical combination for treating VF and pulseless VT.

Recalls recommended shock doses: Monophasic: 360J.

Biphasic: device specific or 200 J if unknown

Recalls that drug administration must NOT delay defibrillation.

Summarizes general indications, contraindications and dosages for drugs relevant to treatment of VF/pulseless VT.

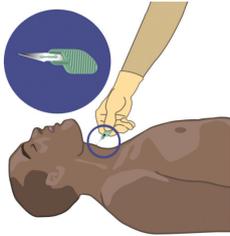
Executes relevant postresuscitation care.

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Special Features

Special features in HeartCode ACLS

Special features in HeartCode ACLS



Cricothyrotomy, surgical

Cricothyrotomy refers to the procedure of creating an opening in the cricothyroid membrane and inserting an airway tube directly into the trachea. A surgical cricothyrotomy makes use of a scalpel incision to create the opening.



Cricothyrotomy, needle

Cricothyrotomy refers to the procedure of creating an opening in the cricothyroid membrane and inserting an airway tube directly into the trachea. In a needle cricothyrotomy a needle is used to gain access to the trachea.



Chest tube

A chest tube can be inserted through an intercostal space directly into the pleural cavity. This is indicated when treating a suspected pneumothorax.



Needle decompression

A needle decompression relieves a suspected pneumothorax by allowing any air trapped inside the thorax to escape through the cannula.

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Ventilate with bag mask, two-rescuer

To achieve optimal airway ventilation of the patient, two well-trained and experienced rescuers should work together. The two-rescuer method allows more efficient ventilation than one-rescuer ventilation.



Peak flow meter

This device measures the patient's peak flow when he blows into the meter. Measuring peak flow is essential when evaluating a patient with asthmatic symptoms.



Carotid sinus massage (carotid sinus pressure)

The carotid sinus contains baroreceptors that respond to pressure changes in the carotid artery. Carotid massage can be used in conjunction with the Valsalva maneuver to terminate spontaneous Reentry SVT.



Valsalva maneuver

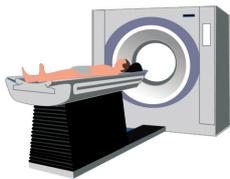
The Valsalva maneuver produces an abrupt increase in intra-abdominal and intrathoracic pressure when the patient strains against a closed glottis while holding his breath. It is often used in conjunction with carotid sinus massage to terminate spontaneous Reentry SVT.

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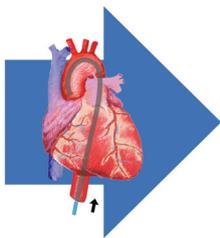
Continuous temperature monitoring

This tool allows you to continuously monitor the patient's core temperature.



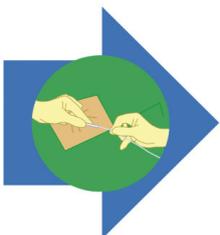
Transfer patient to CT scanning

A CT scan of the cerebrum is primarily used to identify intracerebral or subarachnoid hemorrhage in suspected stroke patients. A noncontrast CT scan is the single most important test when ruling out hemorrhagic stroke.



Transfer patient to PCI

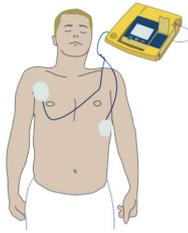
Patients with acute chest pain should be evaluated as potential candidates for percutaneous coronary intervention (PCI) – either angioplasty or intracoronary stenting. PCI is superior to fibrinolytic therapy when treating ACS and is reasonable in patients with cardiogenic shock or heart failure complicating MI.



Transfer patient to transvenous pacing

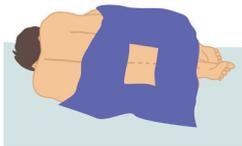
Transvenous pacing is an invasive procedure stimulating the heart to contract, thereby supporting cardiac output. In contrast to transcutaneous pacing, which can be started quickly and conveniently at the bedside, transvenous pacing requires involvement of an invasive cardiology team.

Special features in HeartCode ACLS



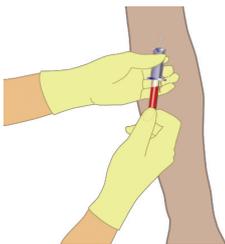
Pacing (transcutaneous)

Transcutaneous cardiac pacing (TCP) supports cardiac output by stimulating the heart through large pacing electrodes placed on the patient's chest and back, thereby causing the heart to contract. TCP can be used in early treatment of asystole and symptomatic bradycardias.



Lumbar puncture

This procedure allows you to draw cerebrospinal fluid for analysis. Acute lumbar puncture may be indicated when there is clinical suspicion of subarachnoid hemorrhage or meningitis. LP eliminates any potential use of fibrinolytic therapy.



Troponin test

Troponin is a serum cardiac marker that can be used to detect myocardial damage when ACS is suspected. The result is given as a positive or negative result, positive representing myocardial damage.



Fibrinolytic drugs

Fibrinolytic agents hydrolyze fibrin clots. Patients with acute chest pain or suspicion of acute ischemic stroke should be evaluated as potential candidates for fibrinolytic therapy.

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Glycoprotein IIb/IIIa inhibitors

These drugs inhibit the integrin glycoprotein IIb/IIIa receptor complexes in the membrane of platelets, inhibiting platelet aggregation. Glycoprotein inhibitors are indicated for acute coronary syndromes without ST-segment elevation.



Pericardiocentesis

This procedure allows you to drain the patient's pericardial cavity by inserting a needle into the pericardial sac. Pericardiocentesis may relieve a suspected pericardial tamponade.

Special features in HeartCode ACLS

Continuing Medical Education Accreditation - Physicians

The American Heart Association is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians.

The American Heart Association designates this educational activity for a maximum of 12.00 AMA PRA Category 1 Credit(s)[™]. Physicians should only claim credit commensurate with the extent of their participation in the activity.

All faculty participating in CME/CE activities sponsored by The American Heart Association will disclose (1) significant financial relationships with the manufacturer(s) of products from the commercial supporter(s) and /or the manufacturer(s) of products or devices discussed in their presentation, and (2) unlabeled/unapproved uses of drugs or devices discussed in their presentation. Such disclosures will be made in writing in course presentation materials and/or online prior to viewing the course.

Continuing Education Accreditation - Nurses

This program (06-NC-992) has been approved by an AACN-approved provider (13531) under established AACN guidelines for 14.00 contact hours, CERP Category A.

Continuing Education Accreditation – Pharmacists



The American Heart Association is accredited by the Accreditation Council for Pharmacy Education as a provider of continuing pharmacy education. ACPE Credit: 12.00 Contact Hours or 1.200 CEUs. Universal Program Number: 256-000-06-434-H01.

Continuing Education Accreditation – Emergency Medical Services

This continuing education activity is approved by the American Heart Association, an organization accredited by the Continuing Education Coordinating Board for Emergency Medical Services (CECBEMS), for 12.00 Advanced CEHs, activity number 06-AMHA-F3-0025.

I. Instructions for Independent Study

Successful completion of this CE activity includes the following:

- (1) Complete 10 cases with a debriefing grade of 70% or above.
- (2) Click on CME/CE/CEH credit request button on CD-ROM and go to Internet* site.
- (3) Complete the appropriate CE request application and activity evaluation form.
- (4) Print Certificate/Statement of Credit.

II. Cost

This learning activity may be used at no charge for the first 2 hours. After this introductory time expires, participants will be instructed to go to an Internet* site to pay for additional access time. The cost for the activity is 120 US dollars. There is no additional fee for CME/CE/CEH credits for this activity.

*If Internet is not available, participants will be provided with a telephone number to order and pay for additional time and also to request Certificate/Statement of Credit.

Accreditation / Disclosure Statements

Disclosure Statement

As a sponsor accredited by the Accreditation Council for Continuing Medical Education (ACCME), the American Association of Critical-Care Nurses (AACN) and the Council for Pharmacy Education (ACPE), the American Heart Association must ensure fair balance, independence, objectivity, and scientific rigor in all of its individually sponsored or jointly sponsored educational activities.

Accreditation / Disclosure Statements

Therefore, all faculty and authors participating in continuing education activities sponsored by the American Heart Association must disclose to the audience: (1) any significant financial relationships with the manufacturer(s) of products from the commercial supporter(s) and/or the manufacturer(s) of products or devices discussed in the activity, and (2) unlabeled/unapproved uses of drugs or devices discussed in the activity. The intent of this disclosure is not to prevent an author with a significant financial or other relationship from contributing but rather to provide participants with information with which they can make their own judgments. It remains for the participants to determine whether the author's interests or relationships may influence the content.

I. The following authors have declared financial interest(s) and / or affiliations:

Name	Relationship/ Financial Interest	Name of Firm
Richard O. Cummins, MD, MPH, MSc	Research Grants	Laerdal Foundation for Acute Medicine Medtronic Physio-Control Corporation

II. The following faculty have declared NO financial interest(s) and or affiliations:

Name

Mary Fran Hazinski, RN, MSN

Unlabeled/unapproved uses of drugs or devices is included in this activity

This continuing education computer-based instruction contains recommendations from the American Heart Association Emergency Cardiovascular Care Committee, Subcommittee on Advanced Cardiovascular Life Support, as published in the American Heart Association ACLS—The Reference Textbook and the ACLS Provider Manual. Most of these recommendations are based on guidelines developed in an evidence evaluation consensus process for the International Guidelines 2000 Conference and the Guidelines 2005 Conference. The evidence evaluation consists of expert review, an analysis, and discussion of relevant scientific studies published in peer-reviewed journals. The drug treatments recommended in this text are consistent with the indications, contraindications, and doses approved by the Food and Drug Administration (FDA) with the exceptions listed here.

Alteplase, recombinant (tPA)

For patients with acute ischemic stroke who are not candidates for IV fibrinolysis, administration of intra-arterial fibrinolysis in centers that have the resource and expertise available may be considered within the first few hours after onset of symptoms (Class IIb). Intra-arterial administration of tPA has not yet been approved by the US Food and Drug administration (FDA).

Accreditation / Disclosure Statements

Amiodarone

This drug is FDA approved for life-threatening ventricular arrhythmias, including recurrent VF and hemodynamically unstable VT. All other use constitutes an “off-label” indication, including hemodynamically stable VT, wide-complex tachycardia of uncertain origin, AF, atrial flutter, pre-excited arrhythmias and arrhythmias in context of CHF. Similarly, the use of IV amiodarone for “shock refractory VF/VT” would not be an off-label use if given as a 150 mg dose, but giving it as a 300 mg bolus for this approved indication could be construed as “off label.”

Vasopressin

This drug is approved for diabetes insipidus, abdominal distention, and abdominal roentgenography.

Vasopressin has not been shown to differ from Epinephrine (Class Indeterminate) in cardiac arrest. One dose of vasopressin may replace either the first or second dose of epinephrine.

Note on Medication Doses

Emergency cardiovascular care is a dynamic science. Advances in treatment and drug therapies occur rapidly. Readers are advised to check for changes in recommended dose, indications, and contraindications in the following sources: Currents in Emergency Cardiovascular Care, future editions of this handbook, and the AHA textbooks as well as the package insert product information sheet for each drug.

Clinical condition and pharmacokinetics may require drug dose or interval dosing adjustments. Specific parameters may require monitoring, for example, creatinine clearance or QT interval.

Some medications listed in this handbook were scientifically reviewed by the Guidelines evidence-based evaluation process. They may not be available in all countries and may not be specifically approved by the FDA for a particular treatment or application.

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