

Cardiac Life Support training for healthcare providers: updated recommendations

CME Center

This article, *Cardiac Life Support training for healthcare providers: updated recommendations* is designated as CME/CPD. Readers who study it, answer the questions related to it on page 20, and send a copy of the Answer Sheet on page 34 to the CME Center of KIMS become eligible for 0.5 CME/CPD credit in Category 1 in the MPC Program of KIMS. To claim credit, the reader has to be registered in the MPC Program, the answer sheet should be received by the CME Center before 31st May 2009, and all questions should have been attempted. Readers would then receive a certificate from the CME Center indicating the credit data.

Among the core skills that can be considered as essential for all health professionals to be competent in are cardiopulmonary resuscitation (CPR) and providing adequate ventilation in emergencies. A number of studies have reported that substantial proportions of newly-qualified doctors were not adequately skilled in common practical procedures or were not confident in performing them.^{1,2} This limitation has also been observed in a study that was recently completed with interns completing their internship training in Kuwait, which showed that there was a deficiency in the knowledge and skills pertaining to the management of emergencies.³ In this investigation, while half the respondents reported that they were confident in performing emergency resuscitative measures, many others indicated that they lacked confidence in doing these skills or some other clinical skills needed in routine situations. Many of the trainees had not performed cardiac defibrillation or endotracheal intubation (50.5%), while a considerable proportion had not performed artificial ventilation (42.9%) or securing airway (30.8%). A fifth of the trainees had responded that they had never performed cardiopulmonary resuscitation.

The most important factor that determines whether a patient survives following sudden cardiac arrest (SCA) is the presence of a rescuer who is trained and equipped to act in

an emergency. It is essential that all health care providers (HCPs), irrespective of their specialties, are competent in Basic Life Support (BLS) and Advanced Life Support (ALS) skills so that they are able to identify and manage life-threatening emergencies effectively.

The 2005 AHA for CPR and ECC that had been published by the American Heart Association Guidelines have recently been updated based on the emerging data of the benefits of high-quality cardiopulmonary resuscitation (CPR) and considering the need for review in view of some of the limitations of the resuscitation scientific evidence. The critical study of the evidence by the team of emergency cardiovascular care (ECC) scientists involved resulted in major changes in some of the guidelines or reaffirmation of some of the other recommendations. The content of this article is based on the updates available under the areas of BLS and ALS as published in the American Heart Association Guidelines for CPR and ECC^{4,5} (Figs. 1, 2, 3, 4).

Compression-Ventilation Ratio

CPR must restore adequate coronary and cerebral blood flow. Interruptions in chest compressions reduce coronary perfusion pressure, and this leads to a decrease in the survival rates from cardiac arrest. Ventilation may not be as important as compressions immediately after ventricular fibrillation (VF) SCA, but may contribute to survival from prolonged and asphyxial arrest.

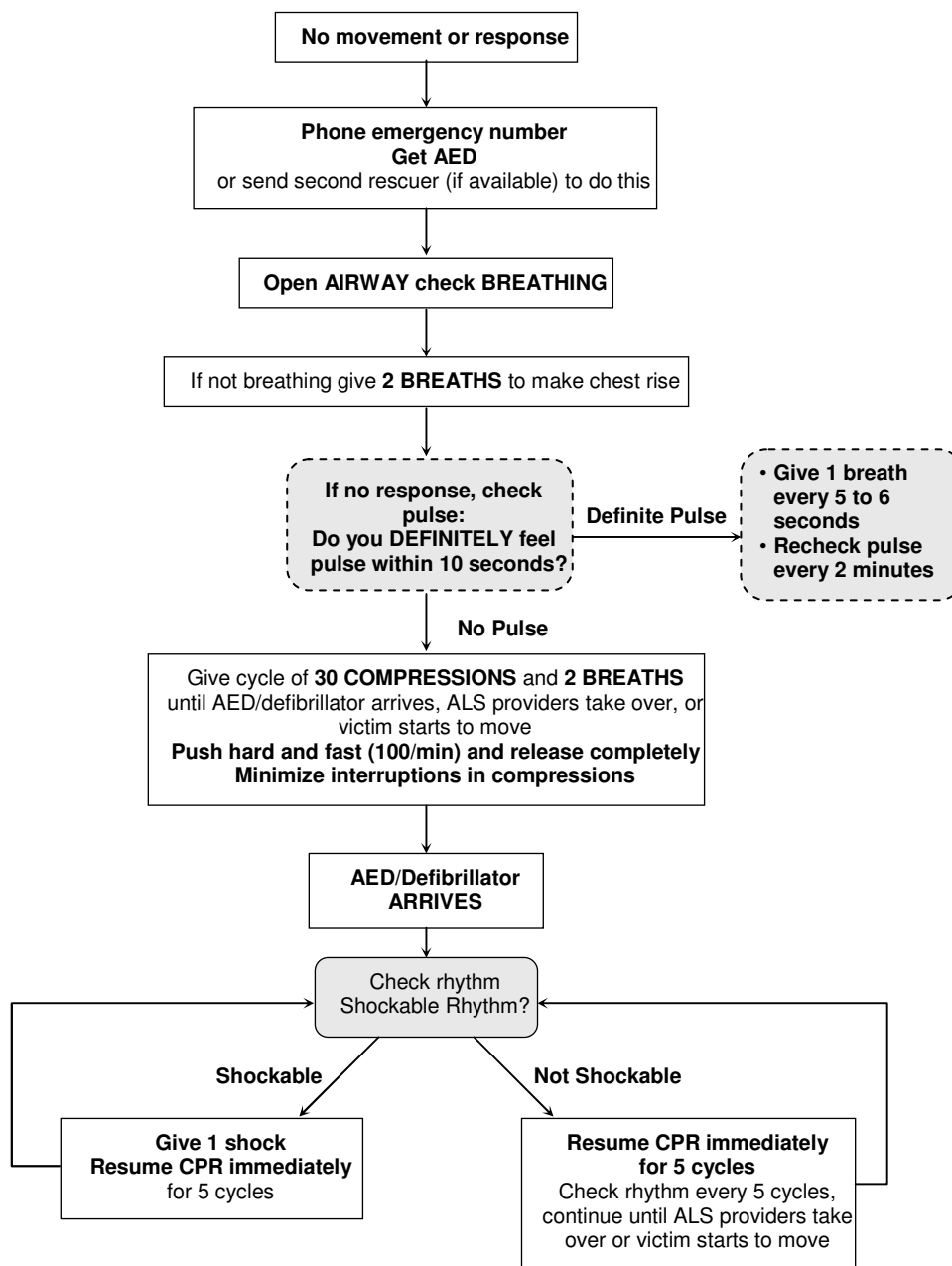
Inadequate chest compressions with interruptions to the procedure combined with excessive ventilation rates reduce cardiac output, and coronary and cardiac blood flow. This lowers the chances of success in resuscitations.

In the first few minutes following the onset of VF SCA, continuous chest compression alone may be appropriate. However, ventilations with chest compressions are more important

CME Center, Kuwait Institute for Medical Specialization.

Correspondence: CME Center, Kuwait Institute for Medical Specialization, P.O. Box 1793, Kuwait 13018. Tel: (965) 2410027 Ext. 107; Fax: (965) 2410028; email: cmecenter@kims.org.kw

Fig 1. BLS HCP* Adult Algorithm



* Healthcare Provider

Fig 2. Pulseless Arrest Algorithm

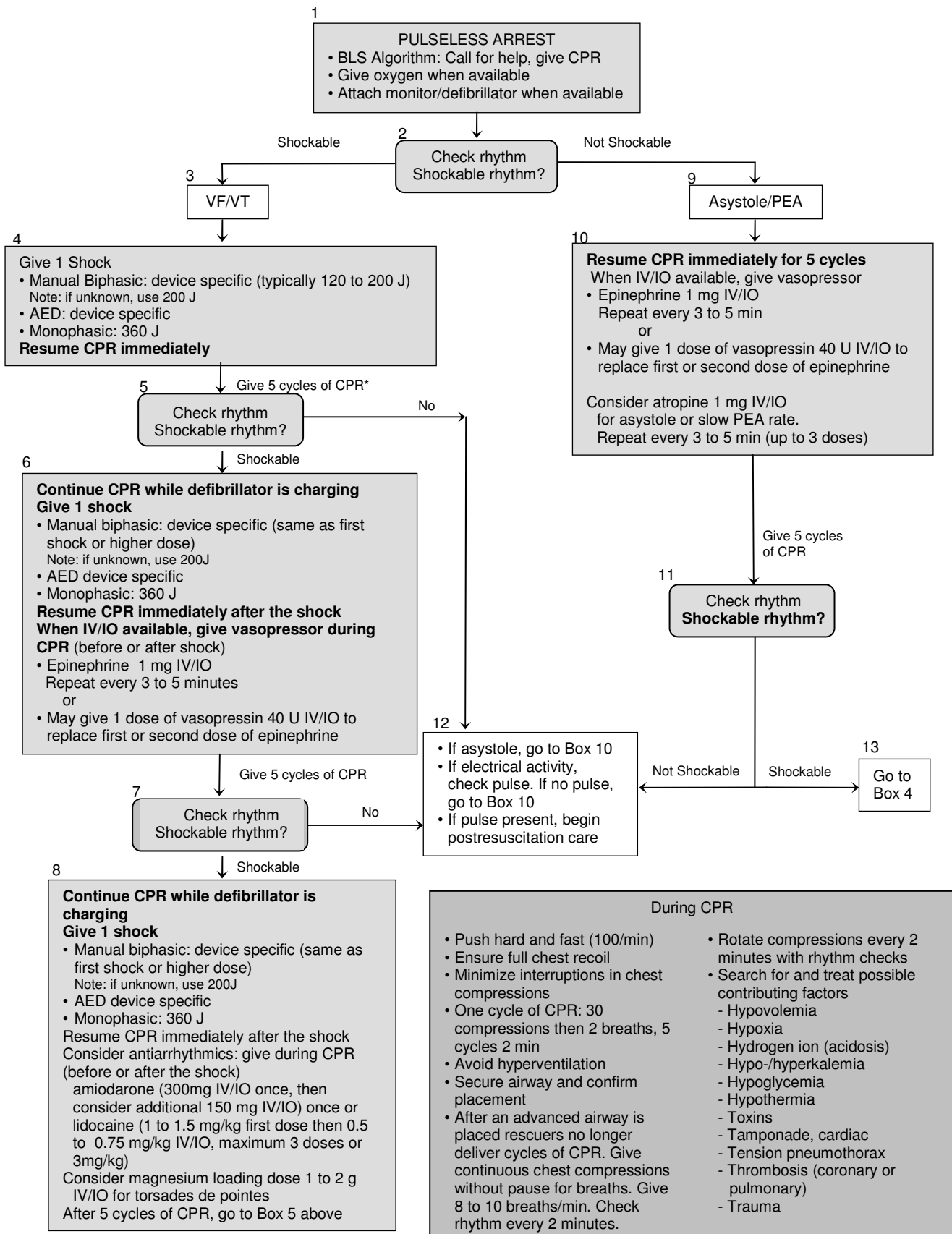


Fig 3. Bradycardia Algorithm

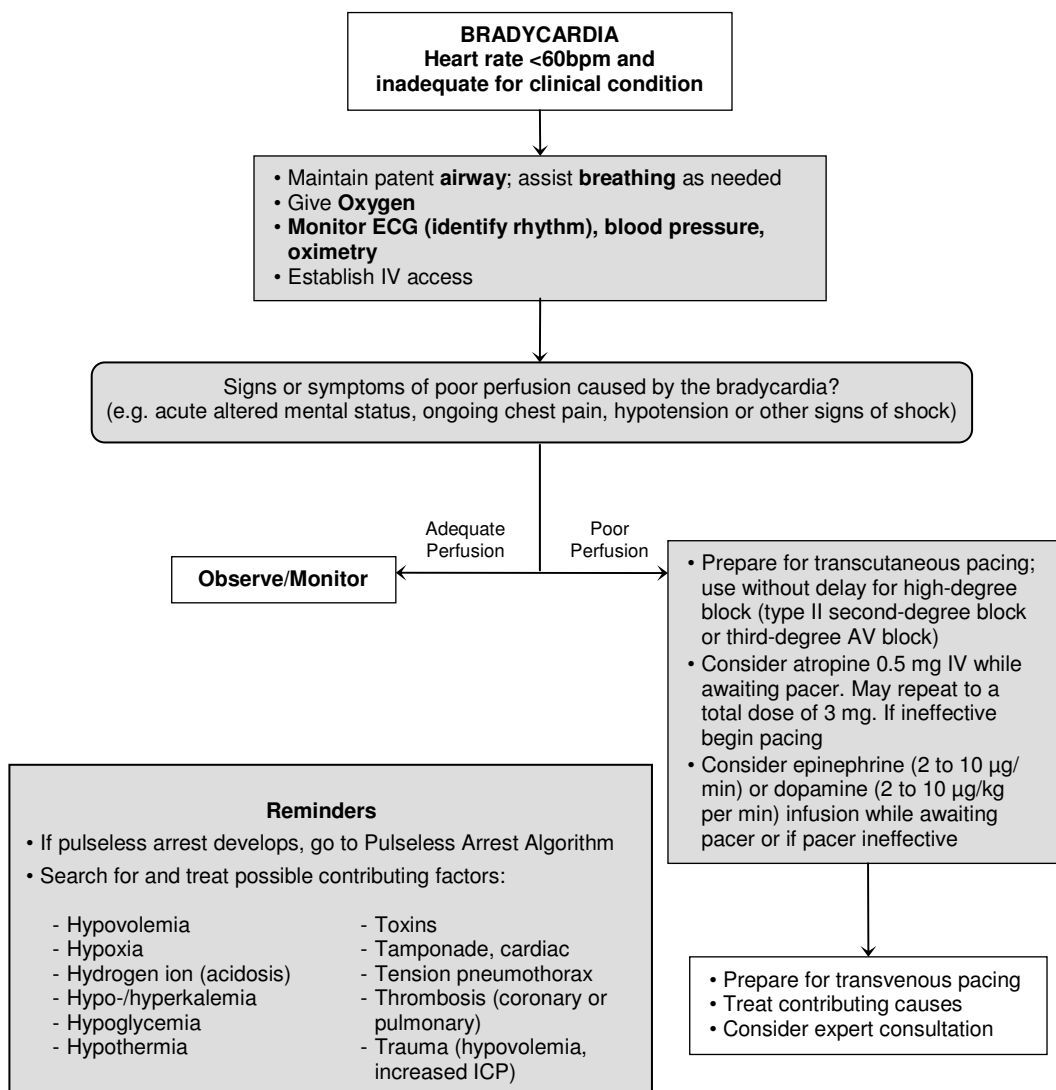
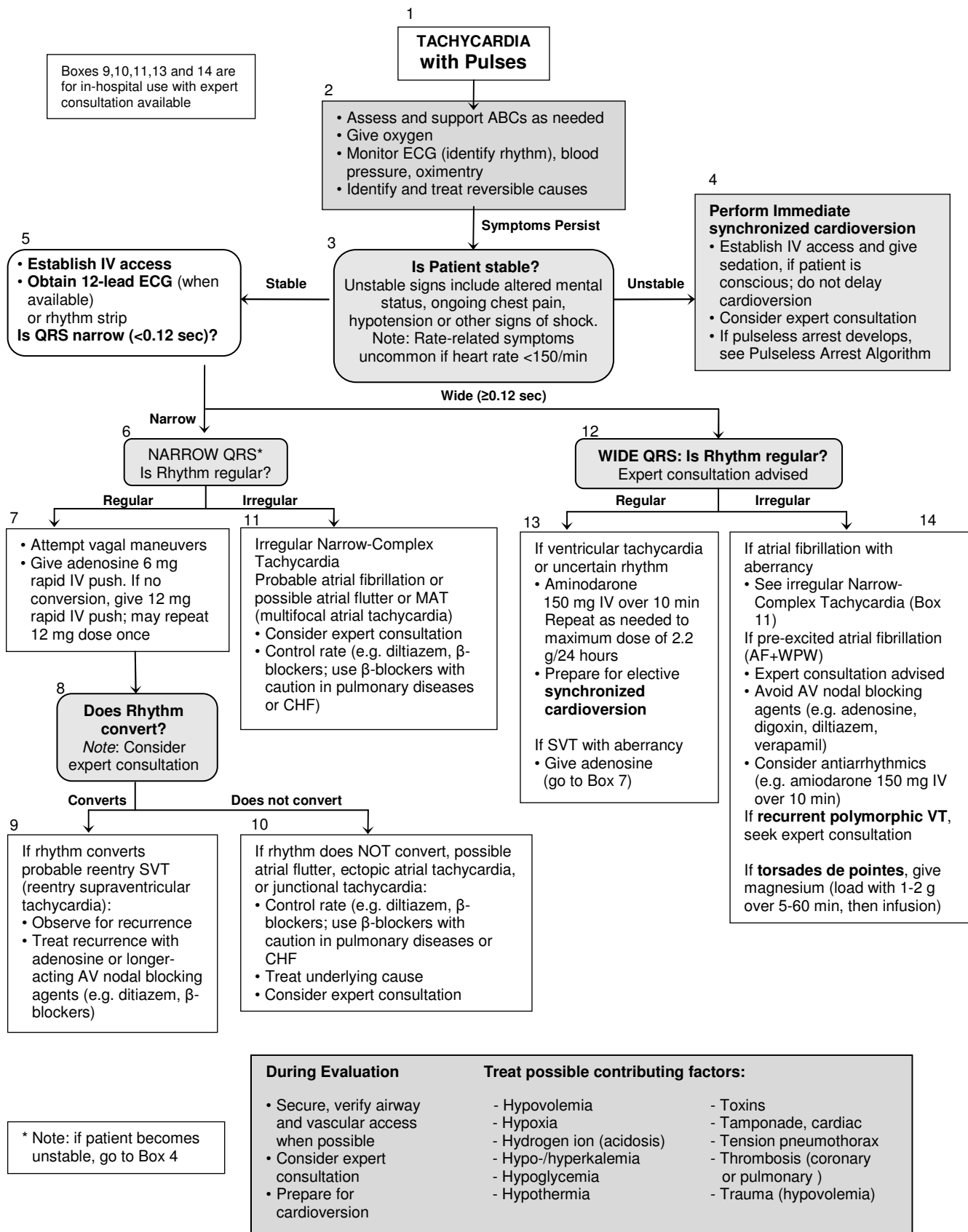


Fig 4. Tachycardia with Pulses Algorithm



for asphyxial arrest and in all forms of prolonged arrest. Most pediatric arrests would also require similar management with ventilations and chest compressions.

Inadequate ventilation is likely to reduce survival from pediatric and asphyxial arrests. If only a single rescuer is available, a universal compression-ventilation ratio of 30:2 is recommended. This approach is appropriate for victims from infancy (except newborns) to adulthood. For 2-rescuer CPR, the recommended compression-ventilation ratio is 15:2.

Rescuers should ensure that the chest compressions are effective (push hard, push fast). They should allow the chest to recoil completely after each compression, and avoid interruptions to the procedure. As physical fatigue could reduce the quality of the compressions, the rescuers should change roles during CPR.

Compression First vs. Shock First for VF SCA

There is insufficient data to recommend CPR before defibrillation for all victims of VF SCA.

Emergency medical services (EMS) rescuers could give 5 cycles of CPR (about 2 minutes) before attempting defibrillation in patients with VF in out-of-hospital settings or for treating pulseless ventricular tachycardia (VT). If more than one rescuer is available, one rescuer could perform CPR while another gets the defibrillator ready. This would help to provide immediate CPR and early defibrillation.

Shock vs. 3- Shock Sequence for Attempted Defibrillation

For treating VF/pulseless VT, a "stacked" sequence of 3 shocks with no interposed chest compressions was recommended in Emergency Cardiovascular Care (ECC) Guidelines 2000. This approach needs to be changed to 1-shock followed immediately by CPR.

The current biphasic defibrillators have over a 90% efficacy with one shock. However, if there is no positive result with one shock and VF persists, another shock is less likely to be beneficial. These patients stand to benefit more if CPR is immediately resumed with effective chest compressions than with an immediate second shock.

Rescuers should resume CPR with chest compressions immediately after attempting defibrillation. They should continue with chest compressions for 5 cycles (or about 2 minutes) without stopping the procedure.

The optimum energy recommended for the initial and subsequent monophasic waveform doses is 360 J. This dose is aimed at simplifying the attempted defibrillation.

The consensus is that it is reasonable to use 150 J to 200 J for the initial shock with a biphasic truncated exponential waveform or 120 J with a rectilinear biphasic waveform.

Vasopressors, Antiarrhythmics and Sequence of Actions during Treatment of Cardiac Arrest

There is no evidence that any medication or giving a vasopressor during cardiac arrest increases survival to hospital discharge. The situation is similar with antiarrhythmic drugs. Thus, the importance of basic life support is re-emphasized, with drug administration being de-emphasized.

Although rescuers had previously been advised to check pulse and rhythm after each shock, it is now recommended that chest compressions should be started immediately after a shock without interruptions for pulse and rhythm checks. Vasopressors or antiarrhythmics should be administered during CPR as early as possible after a rhythm check.

Performing high-quality chest compressions with minimal interruptions is the most important element in the sequence.

Postresuscitation Care

After the patients have received initial resuscitation, care providers must support myocardial and organ function. The components of the recommended management include support of blood pressure, control of temperature (esp. preventing hypothermia) and glucose concentration, and avoidance of routine hyperventilation.

Highlights of the 2005 AHA Guidelines for CPR and ECC Recommendations

Classification and management of patients with acute coronary syndromes require risk stratification with the use of ECGs. The time

to reperfusion could be reduced by undertaking 12-lead ECGs prior to arrival at hospital and transmitting their interpretations.

The use of tissue plasminogen activator (tPA) by physicians in acute ischemic stroke in accordance with the eligibility criteria and the regimen recommended by the National Institute of Neurological Disorders and Stroke (NINDS) is re-emphasized. Improved commitment by hospitals to stroke care can improve outcomes for patients with acute stroke, and an approach recommended is establishing a dedicated stroke unit staffed by a multidisciplinary team experienced in managing stroke.

References

1. Clayton RA, Henderson J, McCracken SE, Wigmore SJ, Paterson-Brown S. Practical experience and confidence in managing emergencies among preregistration house officers. *Postgrad Med J* 2005;81:396-400.
2. Hesketh EA, Allan MS, Harden RM, Macpherson SG. New doctors' perceptions of their educational development during their first year of postgraduate training. *Med Teach* 2003;25:67-76.
3. Premadasa IG, Shehab D, Al-Jarallah KF, Thalib L. Frequency and confidence in performing clinical skills among medical interns in Kuwait. *Med Teach* 2008;30:e60-e65.
4. Hazinski MF, Nandkarni VM, Hickey RW, O'Connor R, Becker LB, Zaritsky A. Major changes in the 2005 AHA Guidelines for CPR and ECC: Reaching the tipping point for change. *Circulation*. 2005;112:IV-206 – IV-211.
5. Hazinski MF, Nandkarni VM, Hickey RW, O'Connor R, Becker LB, Zaritsky A. Major changes in the 2005 AHA Guidelines for CPR and ECC: Reaching the tipping point for change. Illinois: American Heart Association; 2008. Available from: URL: http://circ.ahajournals.org/cgi/content/full/112/24_suppl/IV-206.

CME/CPD Questions

After you have completed reading the article *Cardiac Life Support training for healthcare providers: updated recommendations*, take the test given below. Circle T (True) or F (False) in the Answer Sheet on page 34 to show the correct answer to each question. Questions 1 to 5 are related to the content in this article.

1. If only a single rescuer is available, a universal compression-ventilation ratio of 30:2 is recommended.
2. For 2-rescuer CPR, the recommended compression-ventilation ratio is 15:2.
3. For treating VF/pulseless VT, a "stacked" sequence of 3 shocks with no interposed chest compressions is recommended.
4. The optimum energy recommended for the initial and subsequent biphasic waveform doses is 360 J.
5. Performing high-quality chest compressions with minimal interruptions is the most important element in the sequence in treating cardiac arrest.