

# **Update in Emergency Medicine for Nurse**

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# Outline

- CPR 2015 & 2018
- EKG quiz and management
- Stroke
- Sepsis
- Anaphylaxis
- Animal bites
- Interesting cases and Cases discussion





American  
Heart  
Association.

# **Adult Advanced Cardiovascular Life Support**

(Integrated 2015 & 2018 American Heart Association Guidelines for CPR and ECC)

# IHCA and OHCA Chains of Survival

## IHCA



## OHCA



## 2018 Summary of Key Issues and Major Changes

- Use of antiarrhythmic drugs during resuscitation from adult VF/pVT cardiac arrest
- Use of antiarrhythmic drugs immediately following return of spontaneous circulation (ROSC) following adult cardiac arrest

## 2018 Summary of Key Issues and Major Changes

- Use of antiarrhythmic drugs during resuscitation from adult VF/pVT cardiac arrest
  - **Amiodarone or lidocaine** may be considered for VF/pVT that is unresponsive to defibrillation
  - The routine use of magnesium for cardiac arrest is not recommended in adult patients. Magnesium may be considered for torsades de pointes

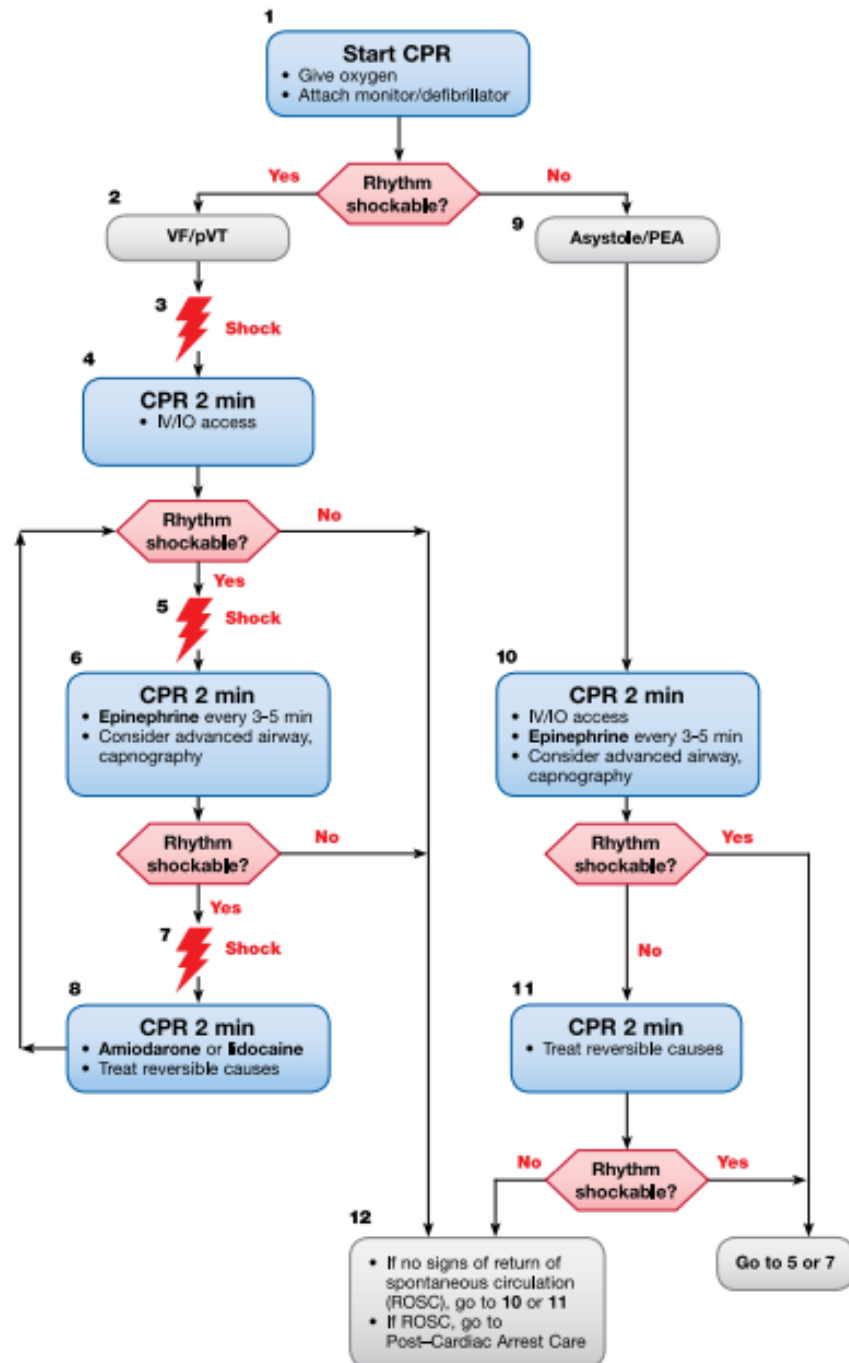
## 2018 Summary of Key Issues and Major Changes

- Use of antiarrhythmic drugs immediately following return of spontaneous circulation (ROSC) following adult cardiac arrest
  - There is insufficient evidence to support or refute the routine use of a  $\beta$ - blocker early (within the first hour) after ROSC.
  - There is insufficient evidence to support or refute the routine use of lidocaine early (within the first hour) after ROSC





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- Push hard (at least 2 inches [5 cm]) and fast (100-120/min) and allow complete chest recoil.
- Minimize interruptions in compressions.
- Avoid excessive ventilation.
- Change compressor every 2 minutes, or sooner if fatigued.
- If no advanced airway, 30:2 compression-ventilation ratio.
- Quantitative waveform capnography
  - If  $\text{PetCO}_2$  <10 mm Hg, attempt to improve CPR quality.
- Intra-arterial pressure
  - If relaxation phase (diastolic) pressure <20 mm Hg, attempt to improve CPR quality.

#### Shock Energy for Defibrillation

- **Biphasic:** Manufacturer recommendation (eg, initial dose of 120-200 J; if unknown, use maximum available. Second and subsequent doses should be equivalent, and higher doses may be considered.
- **Monophasic:** 360 J

#### Drug Therapy

- **Epinephrine I/O dose:** 1 mg every 3-5 minutes
- **Amiodarone I/O dose:** First dose: 300 mg bolus. Second dose: 150 mg.
- **-OR-**
- **Lidocaine I/O dose:** First dose: 1-1.5 mg/kg. Second dose: 0.5-0.75 mg/kg.

#### Advanced Airway

- Endotracheal intubation or supraglottic advanced airway
- Waveform capnography or capnometry to confirm and monitor ET tube placement
- Once advanced airway in place, give 1 breath every 6 seconds (10 breaths/min) with continuous chest compressions

#### Return of Spontaneous Circulation (ROSC)

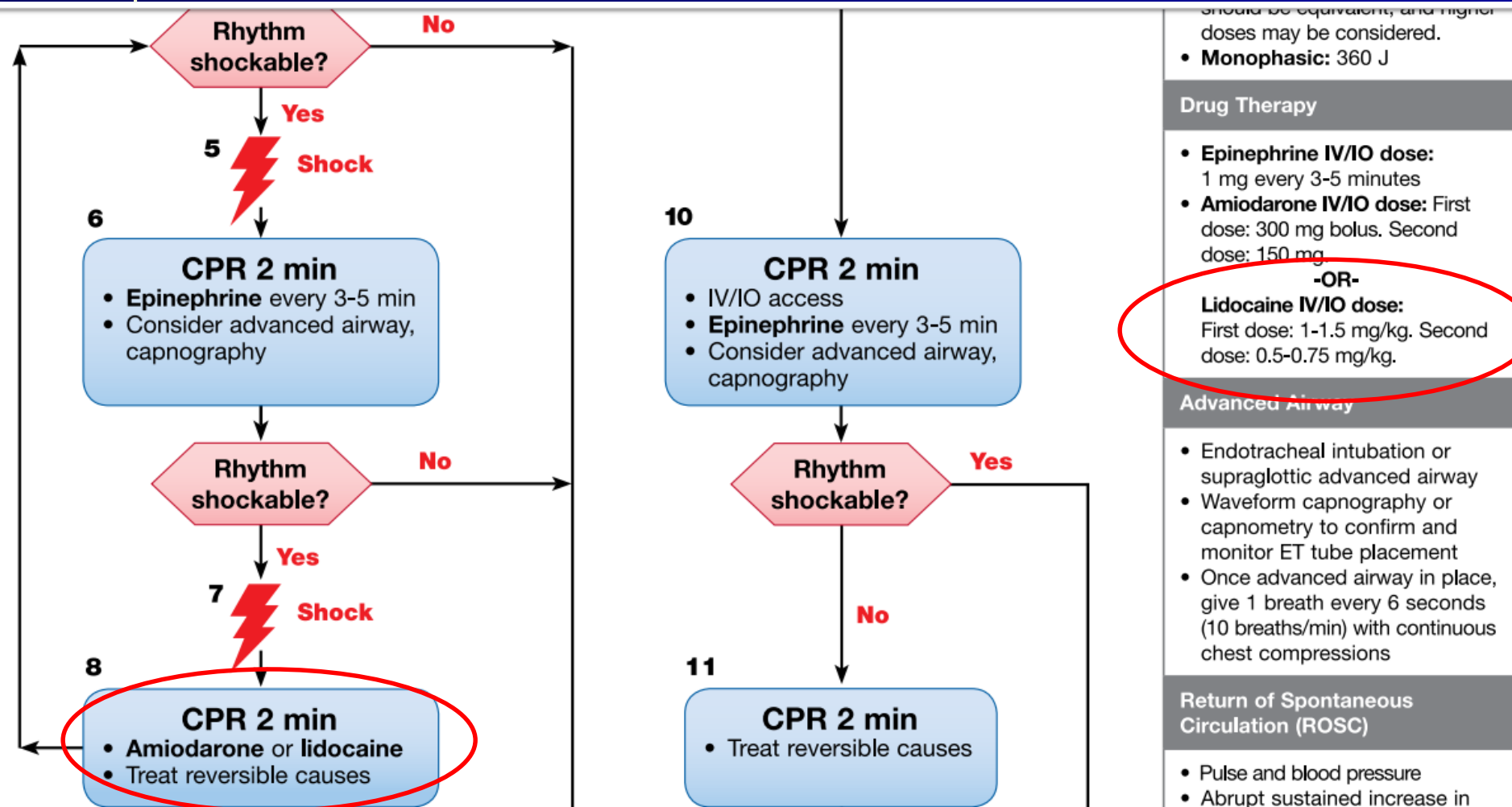
- Pulse and blood pressure
- Abrupt sustained increase in  $\text{PetCO}_2$  (typically >40 mm Hg)
- Spontaneous arterial pressure waves with intra-arterial monitoring

#### Reversible Causes

- Hypovolemia
- Hypoxia
- Hydrogen ion (acidosis)
- Hypo-/hyperkalemia
- Hypothermia
- Tension pneumothorax
- Tamponade, cardiac
- Toxins



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# Adult Tachycardia With a Pulse Algorithm

1

Assess appropriateness for clinical condition.  
Heart rate typically  $\geq 150/\text{min}$  if tachyarrhythmia.

2

## 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

3

## Persistent tachyarrhythmia causing:

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

4

## Synchronized cardioversion

- Consider sedation
- If regular narrow complex, consider adenosine

6

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

5

Wide QRS?  
 $\geq 0.12$  second

7

- IV access and 12-lead ECG if available
- Vagal maneuvers
- Adenosine (if regular)
- $\beta$ -Blocker or calcium channel blocker
- 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.

### Antiarrhythmic 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.

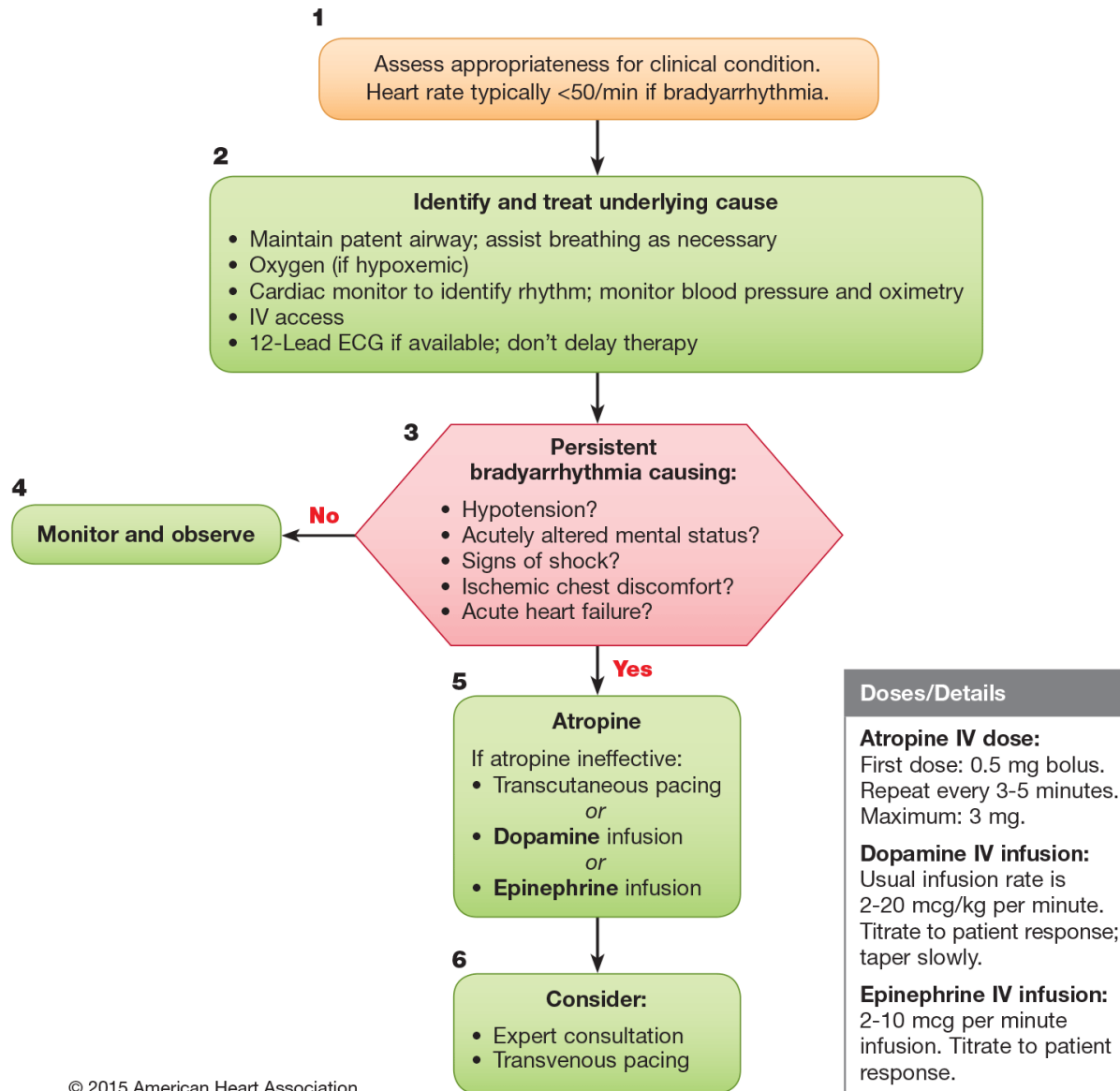
#### Amiodarone IV dose:

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.

# Adult Bradycardia With a Pulse Algorithm





**Stroke**



# Stroke



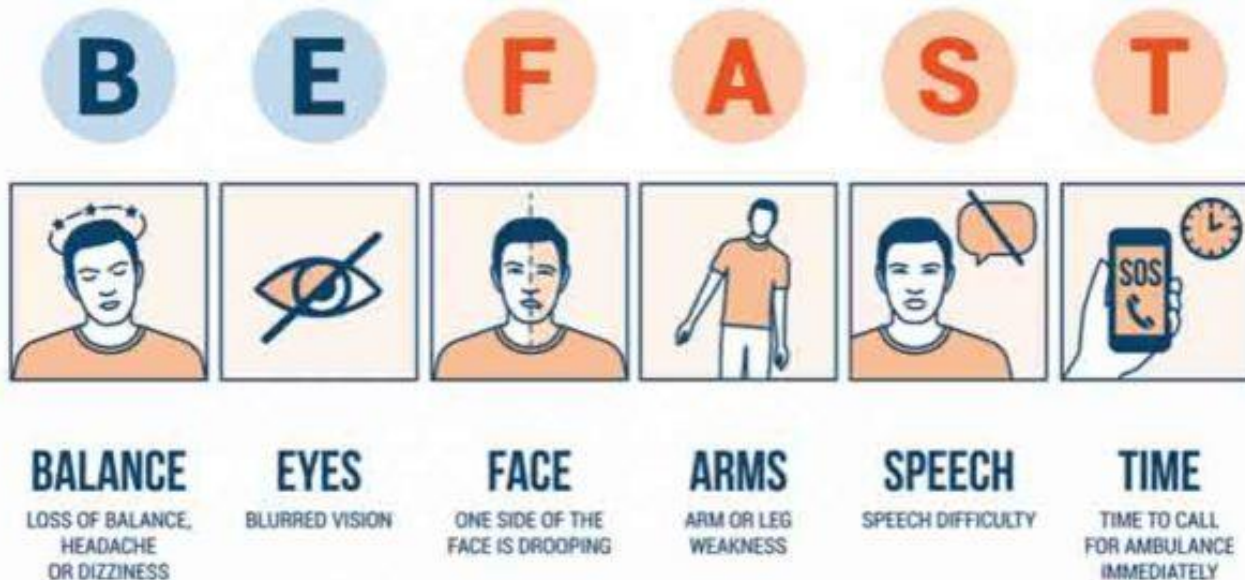
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## AHA/ASA Guideline

### 2018 Guidelines for the Early Management of Patients With Acute Ischemic Stroke

A Guideline for Healthcare Professionals From the American Heart  
Association/American Stroke Association



# Prehospital Stroke Management and Systems of Care

- Prehospital Systems
- EMS Assessment and Management
- EMS Systems

# Emergency Evaluation and Treatment

- Stroke severity scales
  - NIHSS
- Brain Imaging
  - noncontrast CT within 20 mins of arrival in the ED
- Other Diagnostic Tests
  - blood glucose **must**
  - Baseline ECG, troponin, chest radiographs



# General Supportive Care and Emergency Treatment

- Airway, Breathing, and Oxygenation
  - maintain oxygen saturation >94%
- Blood Pressure
  - before IV alteplase required the SBP<185 mmHg, DBP < 110 mmHg
  - after treatment BP 180/105 mmHg

# Treat Arterial Hypertension in Patients With AIS

**Table 5. Options to Treat Arterial Hypertension in Patients With AIS Who Are Candidates for Acute Reperfusion Therapy\***

Class IIb, LOE C-EO
Patient otherwise eligible for acute reperfusion therapy except that BP is >185/110 mm Hg:
Labetalol 10–20 mg IV over 1–2 min, may repeat 1 time; or
Nicardipine 5 mg/h IV, titrate up by 2.5 mg/h every 5–15 min, maximum 15 mg/h; when desired BP reached, adjust to maintain proper BP limits; or
Clevidipine 1–2 mg/h IV, titrate by doubling the dose every 2–5 min until desired BP reached; maximum 21 mg/h
Other agents (eg, hydralazine, enalaprilat) may also be considered
If BP is not maintained $\leq$ 185/110 mm Hg, do not administer alteplase
Management of BP during and after alteplase or other acute reperfusion therapy to maintain BP $\leq$ 180/105 mm Hg:
Monitor BP every 15 min for 2 h from the start of alteplase therapy, then every 30 min for 6 h, and then every hour for 16 h
If systolic BP >180–230 mm Hg or diastolic BP >105–120 mm Hg:
Labetalol 10 mg IV followed by continuous IV infusion 2–8 mg/min; or
Nicardipine 5 mg/h IV, titrate up to desired effect by 2.5 mg/h every 5–15 min, maximum 15 mg/h; or
Clevidipine 1–2 mg/h IV, titrate by doubling the dose every 2–5 min until desired BP reached; maximum 21 mg/h
If BP not controlled or diastolic BP >140 mm Hg, consider IV sodium nitroprusside

# General Supportive Care and Emergency Treatment

- Temperature  $>38^{\circ}\text{C}$  should be identified and treated
- Blood Glucose
  - achieve blood glucose levels in a range of 140 to 180 mg/dL
- Hypoglycemia (blood glucose  $< 60$  mg/dL should be treated

# General Supportive Care and Emergency Treatment

- IV Alteplase
  - 0.9 mg/kg
  - maximum dose 90 mg over 60 minutes
  - initial 10% of dose bolus > 1 min
- Treated for within 3 - 4.5 hrs of ischemic stroke symptom onset or patient last known well.

# General Supportive Care and Emergency Treatment

## ■ IV Alteplase Indications

- patients  $\geq 18$  y
- within 3 - 4.5 hrs of onset or patient last known well.
- BP 180/105 mmHg
- initial glucose levels  $>50$  mg/dL
- NIHSS score  $\leq 25^*$

# General Supportive Care and Emergency Treatment

- IV Alteplase Contraindications
  - Time of onset > 3 - 4.5 hr
  - intracranial hemorrhage
  - Ischemic stroke within 3 mo
  - Severe head trauma within 3 mo
  - Intracranial/intraspinal sx within 3 mo
  - History of intracranial hemorrhage
  - Platelets < 100,000/mm<sup>3</sup> INR >1.7, aPTT >40 s, or PT >15 s

# General Supportive Care and Emergency Treatment

- IV Alteplase Contraindications
  - LMWH within the previous 24 h
  - Seizure at onset
  - initial glucose levels  $<50$ , or  $>400$  mg/dL
  - Recent major surgery
  - GI and genitourinary bleeding  $< 3$  wk

# General Supportive Care and Emergency Treatment

- After treatment BP 180/105 mmHg at least the first 24 hrs
- BP  $\geq 220/120$  mmHg who did not receive IV alteplase requiring treatment, lower BP by 15% during the first 24 hours after onset of stroke



# Case discussion

1. ชาย 55 ปี แขนขาช้ำเขียวอ่อนแรง 2 ชม.

# Case discussion

2. หญิงอายุ 60 ปี เวียนศีรษะบ้านหมุน 1 ชม.

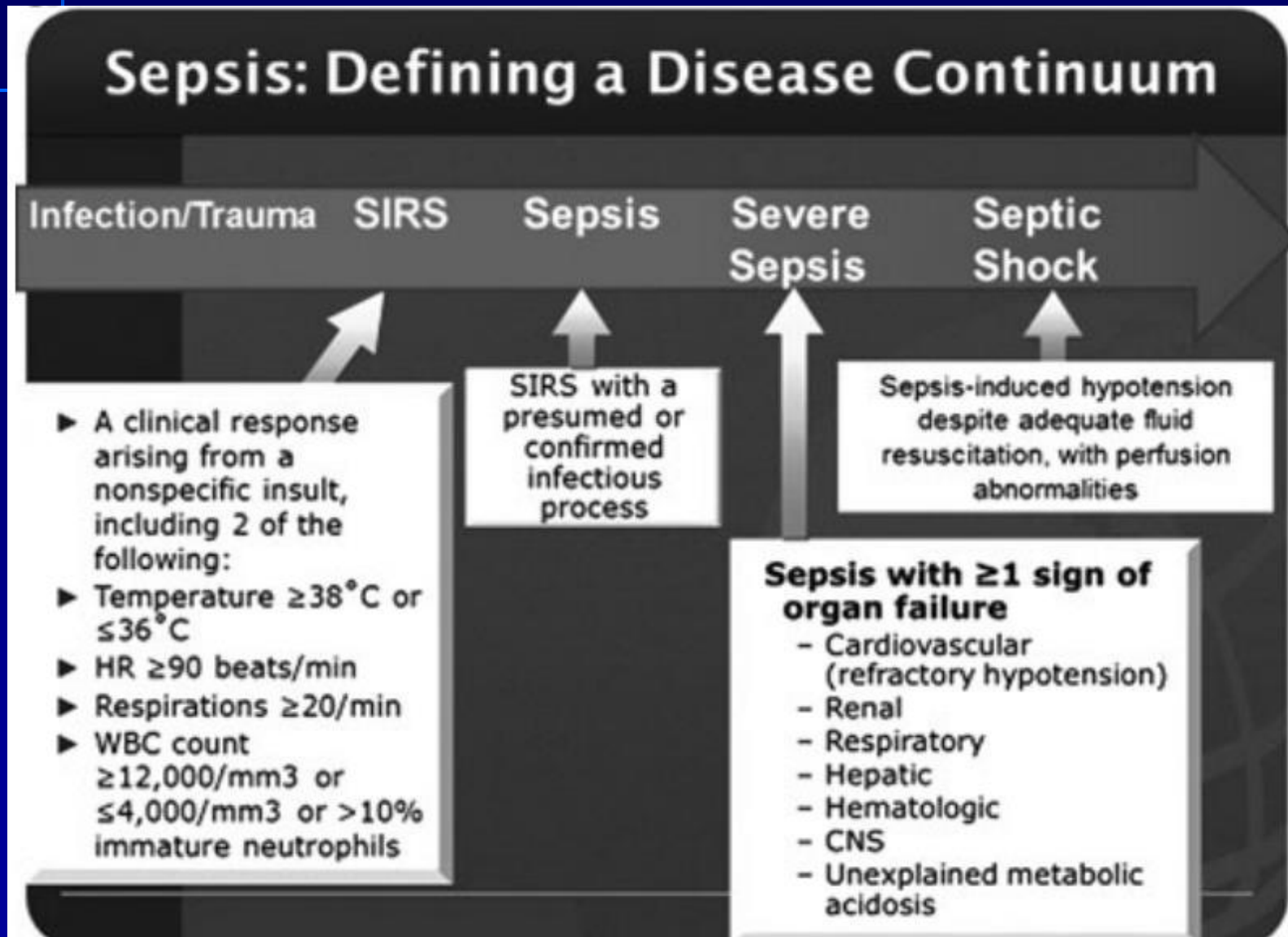
A microscopic view of blood, showing numerous red blood cells (erythrocytes) and a few white blood cells (leukocytes). The red blood cells are biconcave and appear as bright red discs. The white blood cells are larger, with prominent nuclei and some have visible granules. The background is a dark, slightly blurred red, suggesting the plasma of the blood.

# Sepsis

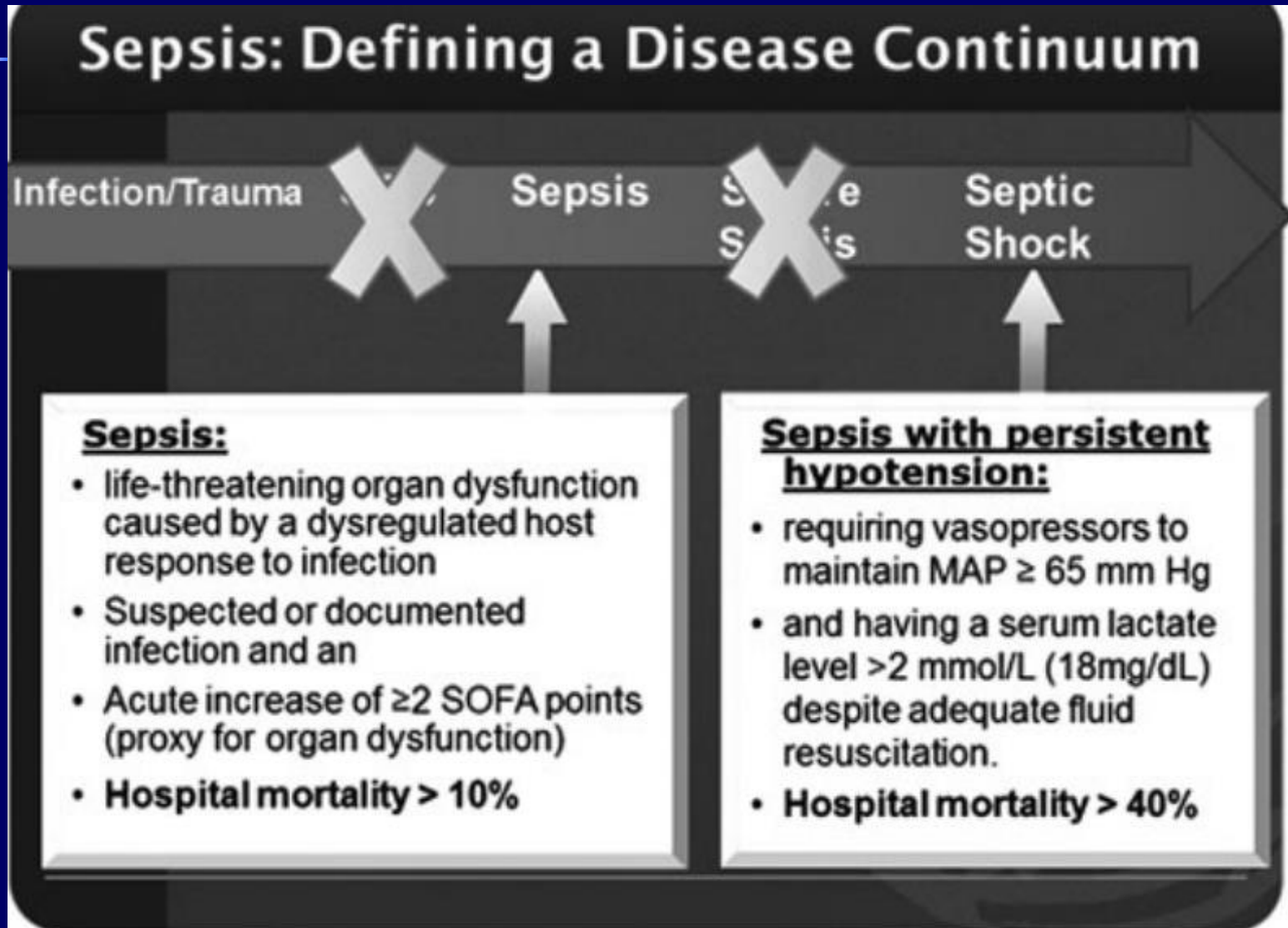
# Sepsis Definitions

- Sepsis: “dysregulated host response to infection that leads to acute organ dysfunction” (SEPSIS-3, 2016)
  - Suspected or documented infection and an acute increase in SOFA scores  $\geq 2$
  - Suspected or documented infection plus  $\geq$  SIRS (SEPSIS-2, 2013)
- Septic shock
  - Suspected or documented infection plus vasopressor therapy needed to maintain MAP at  $\geq 65$  mmHg and serum lactate  $> 2.0$  mmol/L despite adequate fluid resuscitation

# Sepsis : Definitions and Guideline



# Sepsis 2018: Definitions and Guideline Changes



# quick Sepsis related Organ Failure Assessment

How can you measure qSOFA?

## THREE CRITERIA



ALTERED MENTAL  
STATUS

**GCS < 15**



FAST RESPIRATORY  
RATE

**≥ 22 breaths per min**



LOW BLOOD  
PRESSURE

**SBP ≤ 100 mmHg**

**2 or more** criteria suggests  
a greater risk of a poor outcome



# SOFA Score

The European Society of Intensive Care Medicine

SOFA score	0	1	2	3	4
Respiration PaO <sub>2</sub> /FIO <sub>2</sub> or SaO <sub>2</sub> /FIO <sub>2</sub> mmHg	>400	<400 221-301	<300 142-220	<200 67-141	<100 <67
Coagulation	>150	<150	<100	<50	<20
Liver Bilirubin(mg/dl)	<1.2	1.2-1.9	2.0-5.9	6.0-11.9	>12.0
Cardiovascular Hypotension	No hypotension	MAP <70	Dopamine ≤5 or any	Dopamine >5 or norepinephrine ≤0.1	Dopamine >15 or norepinephrine >0.1
CNS (GCS)	15	13-14	10-12	6-9	<6
Renal Creatinine (mg/dl) or urine output (ml/d)	<1.2	1.2-1.9	2.0-3.4	3.5-4.9 or <5.00	>5.0 or <200



# The Surviving Sepsis Campaign Bundle: 2018 Update

Mitchell M. Levy, MD, MCCM<sup>1</sup>; Laura E. Evans, MD, MSc, FCCM<sup>2</sup>;  
Andrew Rhodes, MBBS, FRCA, FRCP, FFICM, MD (res)<sup>3</sup>

- Measure lactate level. Remeasure if initial lactate is  $>2$  mmol/L.
- Obtain blood cultures prior to administration of antibiotics.
- Administer broad-spectrum antibiotics.
- Begin rapid administration of 30ml/kg crystalloid for hypotension or lactate  $\geq 4$  mmol/L.
- Apply vasopressors if patient is hypotensive during or after fluid resuscitation to maintain MAP  $\geq 65$  mm Hg.

*\*“Time zero” or “time of presentation” is defined as the time of triage in the Emergency Department or, if presenting from another care venue, from the earliest chart annotation consistent with all elements of sepsis (formerly severe sepsis) or septic shock ascertained through chart review.*

**Figure 1.** Hour-1 Surviving Sepsis Campaign Bundle of Care.\*

# Measure Lactate Level

- Initial lactate is elevated ( $> 2\text{mmol/L}$ )
- Remeasured within 2–4 h to guide
- Resuscitation to normalize lactate
- Elevated lactate levels as a marker of tissue hypoperfusion

# Obtain Blood Cultures Prior to Antibiotics

- Blood cultures at least two sets
  - Recommend blood culture before ATB
- Starts as soon as possible
- Duration 7-10 days
- Control source of infection

# Fluid therapy

- Crystalloid: fluid of choice
- Either balanced crystalloid or saline for resuscitation
- Minimum of 30mL/kg
- Albumin may be added in addition to crystalloid

# Vasoactive medications

- Norepinephrine: first choice
- Adults: 2-20 mcg/min  
(4 mg + D5W 250 ml start 8mcg/min and titrate keep MAP >65 q 2-5 min)
- Dopamine: alternative, use only in highly selective patient
- Persistent hypoperfusion: dobutamine
- Arterial catheter

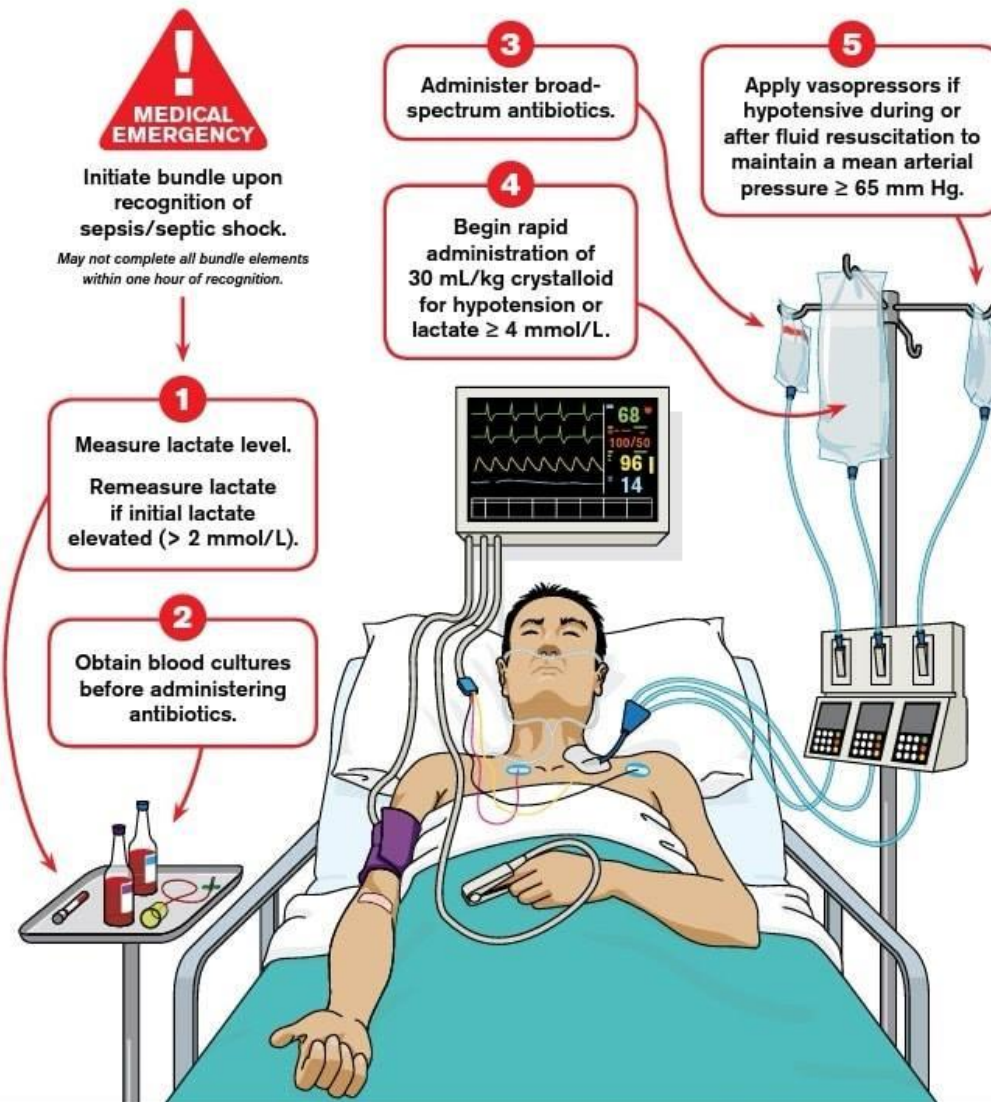
# Corticosteroids

- Hydrocortisone 200 mg IV per day
- Only hemodynamic instability after adequate fluid resuscitation and vasopressor therapy

# Hour-1 Bundle

## Initial Resuscitation for Sepsis and Septic Shock

Surviving Sepsis  
Campaign

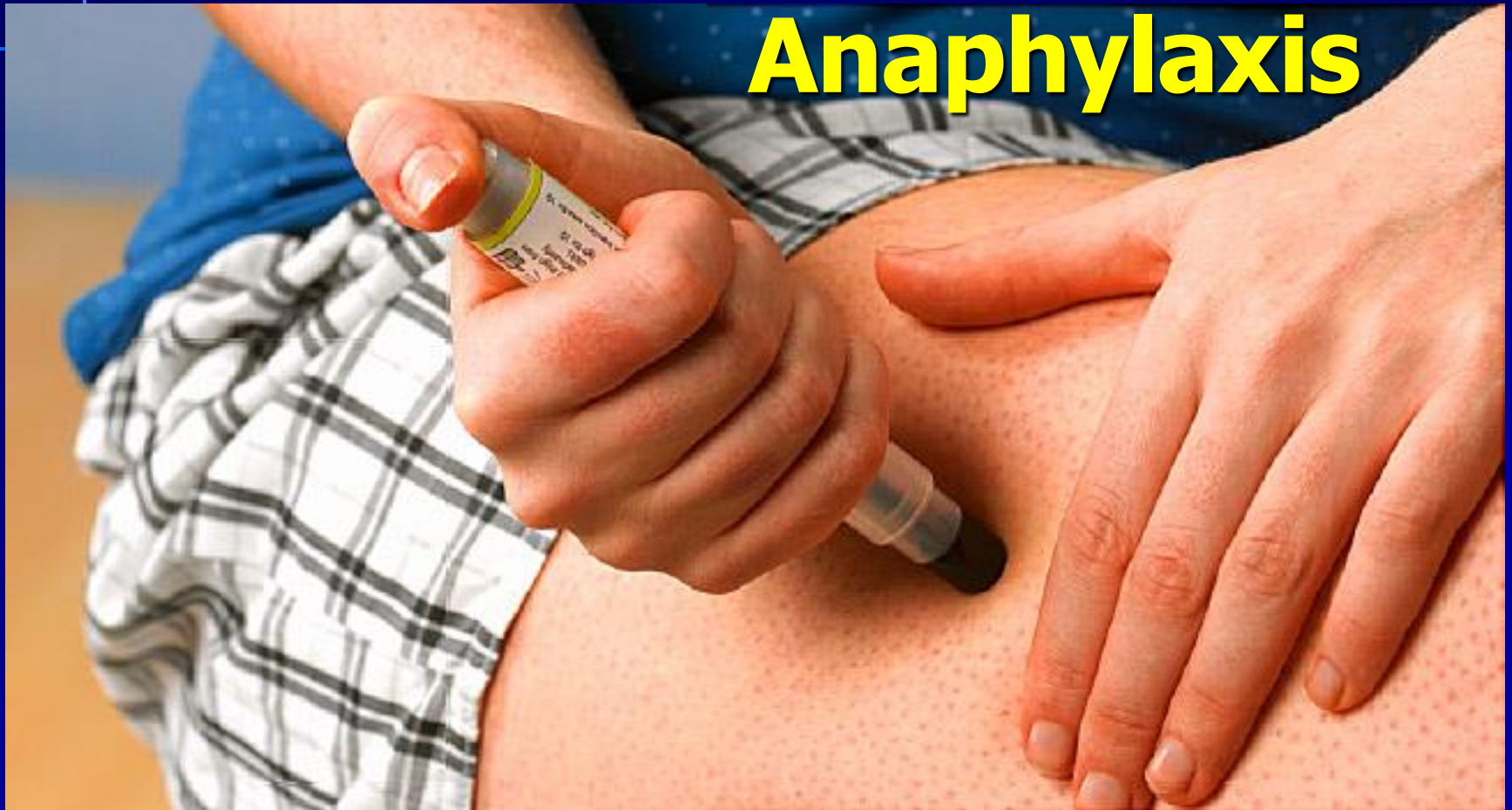


Bundle: [SurvivingSepsis.org/Bundle](https://www.survivingsepsis.org/Bundle)

Complete Guidelines: [SurvivingSepsis.org/Guidelines](https://www.survivingsepsis.org/Guidelines)



# Anaphylaxis



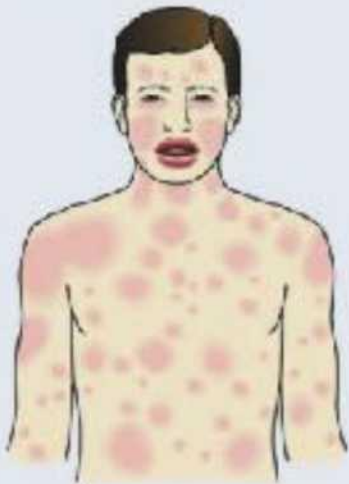


# Diagnostic Criteria

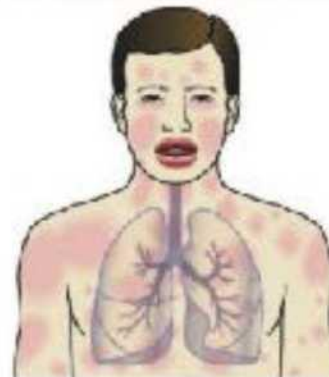
## ข้อที่ 1 ไม่มีประวัติการแพ้

1

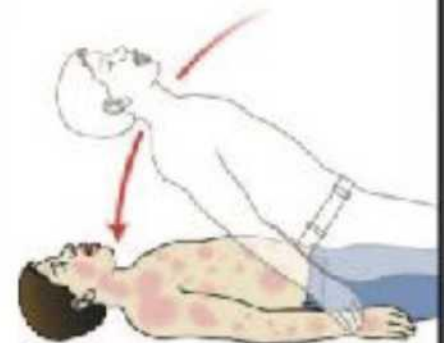
Sudden onset of an illness (minutes to several hours), with involvement of the skin, mucosal tissue, or both (e.g. generalized hives, itching or flushing, swollen lips-tongue-uvula)



AND AT LEAST ONE  
OF THE FOLLOWING:



Sudden respiratory symptoms  
and signs  
(e.g. shortness of breath, wheeze,  
cough, stridor, hypoxemia)



Sudden reduced BP or  
symptoms of end-organ  
**dysfunction** (e.g. hypotonia  
[collapse], incontinence)

Skin / Mucosa



Respiratory

หรือ

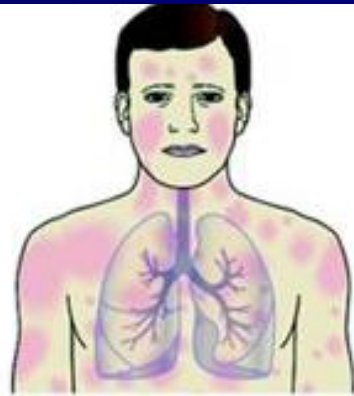
CVS

# Diagnostic Criteria

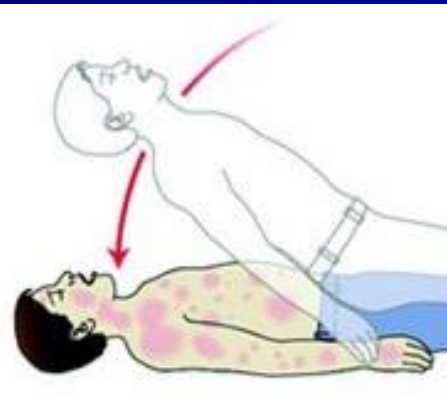
## ข้อ 2 สัมผัส Likely allergen



Skin/Mucosa



Respiratory



CVS



GI

เอา 2 ใน 4 ข้อย่อย

# Diagnostic Criteria

## ข้อ 3 สัมผัส Known allergen



Infants and children: low systolic BP (age-specific) or greater than 30% decrease in systolic BP\*\*\*



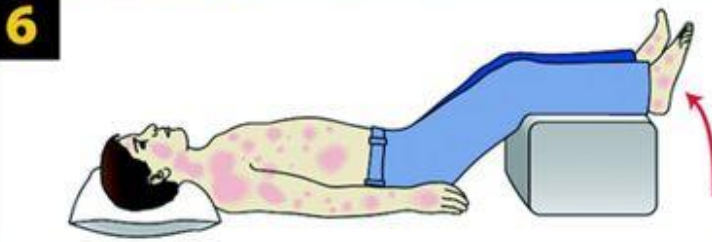
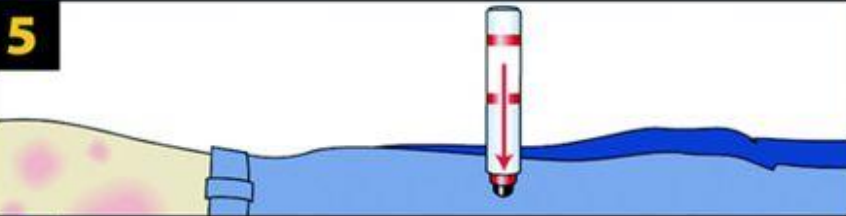
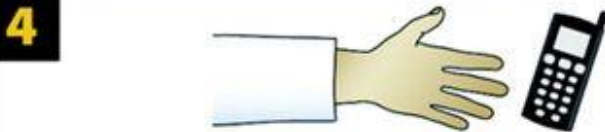
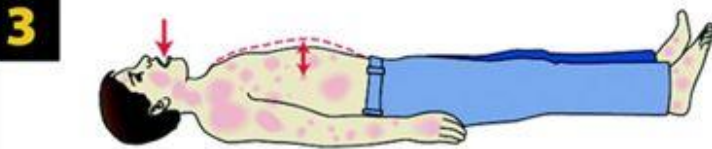
Adults: systolic BP of less than 90 mm Hg or greater than 30% decrease from that person's baseline

เฉพาะ BP (CVS)

# Anaphylaxis Management

**1** Have a written emergency protocol for recognition and treatment of anaphylaxis and rehearse it regularly.

**2** Remove exposure to the trigger if possible, eg. discontinue an intravenous triggering symptoms.



◆ Remove trigger  
(Decontamination)

◆ BLS (Airway, Breathing,  
Circulation)

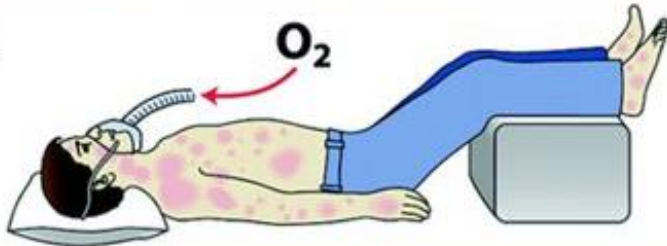
◆ Call for help

◆ Inject epinephrine **auto injection**

◆ Place patient on back,  
Elevate leg

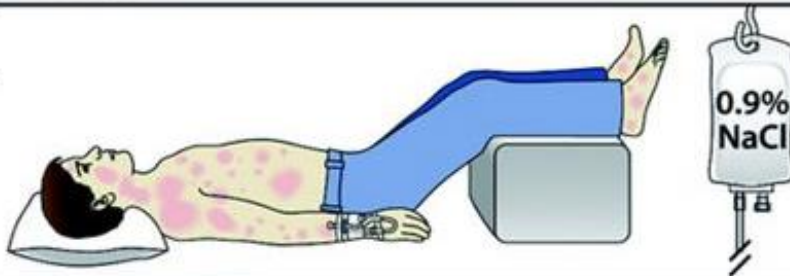
# Anaphylaxis Management

7



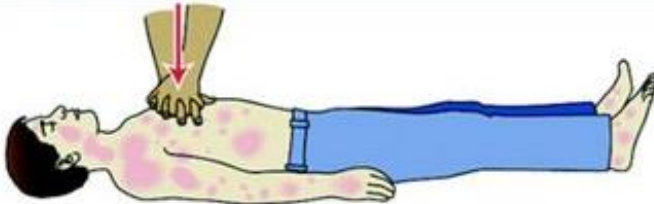
- ◆ Oxygen supplement

8



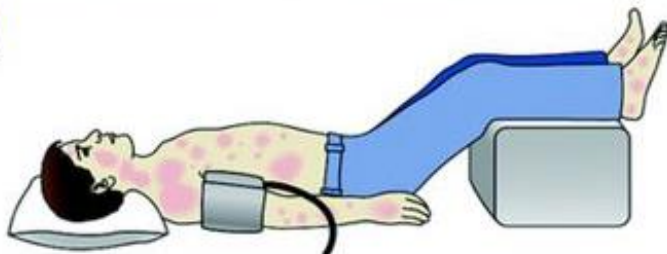
- ◆ IV access
- ◆ 0.9% NaCl 5-10 ml/kg  
(Ped 10 ml/kg)

9



- ◆ Arrest — > CPR

10



- ◆ Regular monitor

# Anaphylaxis Management

## **Epinephrine = First line (priority medication)**

### ☐ Adult:

Epinephrine (cone 1:1000 = 1mg/ml) 0.3-0.5 ml  
IM q 5 - 15 min (most respond to 1 or 2 doses)

### ☐ Ped:

Epinephrine (cone 1:1000 = 1mg/ml)  
0.01 ml/kg (0.01 mg/kg) IM q 5 - 15 min  
(MAX 0.3 mg)

☐ IM at Mid-anterolateral thigh

# Anaphylaxis Management

## Indication IV Epinephrine

- ☐ Hypotension or Shock refractory to basic initial treatment, including IV fluid resuscitation, repeated doses of epinephrine IM, cardiovascular collapse
- ☐ Epinephrine (1:1000) 0.1 mg + NSS 10 ml (= 1:100,000 dilution) IV slowly push over 5-10 min\*
- ☐ If refractory to the initial bolus — > Start IV infusion Epinephrine (1:1000) 1 mg + 5%D/W 250 ml [Cone = 4mcg/ml] IV infusion start 1 meg/min (15 ml/hr) and titrating to effect.



# Anaphylaxis Management

	Medication	Adult	Ped
<b>Corticosteroid</b>	Hydrocortisone IV	200 mg	Max 100 mg
	Methylprednisolone IV	50-100 mg	1 mg/kg (Max 50 mg)
<b>H1-Antihistamine H2-Antihistamine</b>	Chlorpheniramine (CPM) IV	10 mg	2.5-5 mg
	Diphenhydramine IV	25-50 mg	1 mg/kg (Max 50 mg)
	Ranitidine IV	50 mg	1 mg/kg (Max 50 mg)
<b>B2-adrenergic agonist</b>	Salbutamol (albuterol) (Ventolin®) solution	2.5 mg/2.5 mL or 5 mg/3 mL NB	2.5 mg/2.5 mL NB



**Dog bite**

คลินิกป้องกันโรคพิษสุนัขบ้า  
สถานเสาวภา สภากาชาดไทย



แนวทางการดูแลรักษาผู้สัมผัส

**โรคพิษสุนัขบ้า**

สถานเสาวภา สภากาชาดไทย

พ.ศ.2561

และ คำถามที่พบบ่อย

# Category of exposure

- CAT I: สัมผัส ให้อาหารสัตว์ หรือ เลี้ยง  
ผิวหนังที่ไม่มีแผล
- CAT II: แผลขบ ข่วน ถลอกที่ไม่มีเลือดออก  
เลียผิวหนังที่มีแผล รับประทานผลิตภัณฑ์  
จากสัตว์ที่สงสัยว่าเป็นโรคพิษสุนัขบ้าโดยไม่  
ทำให้สุก

# Wound care

- ล้างแผลทันทีด้วยน้ำไหลผ่านนาน  
ประมาณ 15 นาที ฟอกสบู่และทาแผลด้วย  
povidone-iodine
- Tetanus prophylaxis
- ATB ถ้ามีข้อบ่งชี้ 3-5 วัน

# Rabies prophylaxis

## RIG ให้ใน CAT III

- ให้เร็วที่สุดไม่เกิน 7 วันหลังให้ vaccine
- ERIG (max dose 40 IU/kg) หรือ
- HRIG (max dose 20 IU/kg)
- ไม่ต้องทำ skin test
- ฉีดรอบแผลในปริมาณมากเท่าที่จะฉีดได้ โดยไม่เกิน maximum dose

# Rabies prophylaxis

**Rabies vaccine** ใน CAT II, III

- **ID PEP regimen:** ฉีด 2 ตำแหน่ง *days 0, 3, 7, 28*
- **IM PEP regimen:** ฉีด 1 ตำแหน่ง *days 0, 3, 7, 14, 28*
- กรณีที่มาฉีดช้ากว่าวันนัดให้  
ฉีด vaccine ต่อไปได้ โดยไม่ต้องเริ่มนับใหม่



# Rabies prophylaxis

## Rabies vaccine ใน CAT II, III

### ■ วัคซีนเข็มสุดท้าย

- < 6 เดือนให้ฉีด 1 ตำแหน่ง *day 0*
- > 6 เดือนให้ฉีด 1 ตำแหน่ง *days 0, 3*

# Preexposure prophylaxis

## Primary immunization:

- ID (0.1 mL) 2 ตำแหน่ง หรือ
- IM (1 vial) 1 ตำแหน่ง days 0, 7 (คนทั่วไป)

และผู้ที่เสี่ยงสูง *days 0, 7, 21 หรือ 28*

**Interesting case**

# Interesting case

- ชาย 16 ปี เจ็บหน้าอกซ้าย 3 ชม.

# Interesting case

- หญิง 19 ปี ปวดท้องใต้ลิ้นปี่ คลื่นไส้อาเจียน

# Interesting case

- ชาย 50 ปี หลังฉีดยา Diazepam 10 mg  
ซึมไม่รู้สีกตัว

# Interesting case

- หญิงไทย 24 ปี G2P1 GA 38 wk ชักเกร็ง  
ไม่รู้สึกรู้สีกตัว 30 min



# Interesting case

- เด็กชายอายุ 6 ปี จมน้ำไม่รู้สึกรู้ตัว กู้ภัยงมหา  
เด็กเอามาขึ้นจากน้ำ

# Interesting case

- ชาย 60 ปี สำลักกล้วย ไอ

# References

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- AHA/ASA Guideline; 2018 Guidelines for the Early Management of Patients With Acute Ischemic Stroke
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**Thank you**