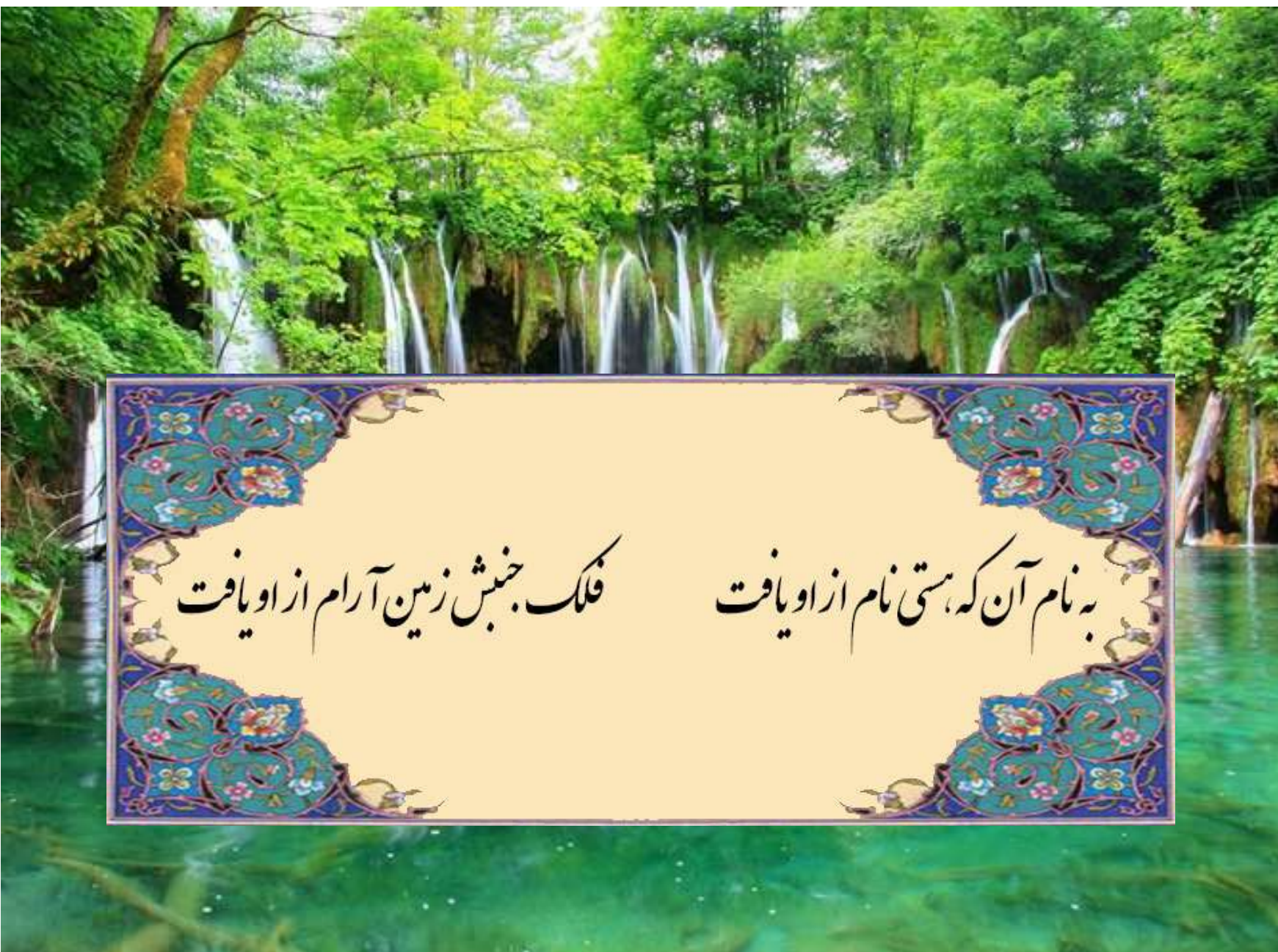




به نام آن که هستی نام از او یافت فلک جنبش زمین آرام از او یافت

STEMI

The **incidence of STEMI** has declined over the past decade, and overall the **prognosis has improved** considerably with increased **utilization of primary PCI** .

Recently, the **improvements have plateaued**, and **significant challenges** remain to improve STEMI care further.

Challenges in STEMI care

- patients with CS
- OHCA(out of hospital cardiac arrest)
- an expected delay to reperfusion (>120 min),
- in-hospital STEMI
- Covid-19 pandemi

SCD in STEMI

- Many deaths occur very early after STEMI onset due to **ventricular fibrillation (VF)**.
- As this arrhythmia frequently **occurs at an early stage**, these deaths usually **happen out of hospital**.

OHCA

- STEMI patients with OHCA are **high-risk population** with a **10-fold** increase in **mortality** compared to non-cardiac arrest STEMI
- **Unconscious patients** admitted to critical care units after out-of hospital cardiac arrest are at **high risk for death**
- **neurologic deficits** are common among those who survive.

Unfavourable pre-hospital settings indicating a remote likelihood for **neurological recovery**

- **unwitnessed cardiac arrest**
- **late** arrival of a pre-hospital team without **lay basic life support (>10 min)**
- presence of an initial **non-shockable rhythm**
- more than **20-30 min** of **advanced life support** without return to spontaneous circulation(ROSC)

Out-of-hospital cardiac arrest (OHCA)

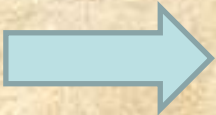
- Initial shockable rhythm and
- being awake after the initial resuscitation

have more favorable outcomes than non-shockable rhythm and being comatose .

Etiology of death in patients with *OHCA*

- Irrespective of initial rhythm or ECG findings, the **predominant cause of death**

2/3  **anoxic brain injury**

1/3  refractory **post arrest shock** and **multi-organ failure.**

OHCA

- with **shockable rhythm** and **STEMI** on post ROSC ECG
- with **shockable rhythm** **without STEMI** on post ROSC ECG
- with **non-shockable** rhythms

Shockable rhythm + **STEMI** on post ROSC ECG

- prevalence of **acute thrombotic coronary occlusion** or **culprit lesion** causing cardiac arrest is **greater than 85%**.

conscious survivors should be treated with **immediate angiography** and **primary PCI**.

Among **comatose OHCA** patients with ROSC and **STEMI**, there are **no RCTs** to **support favorable neurological outcomes or survival benefit of immediate angiography**.

Shockable rhythm **without STEMI** on post ROSC ECG

- Prevalence of an **acute thrombotic occlusion** is **3.4–30%**.
- The prevalence of **significant, stable or thrombotic, non-occlusive lesions** on angiography ranges from **24 to 60%**.

Non-shockable rhythms

- While the prevalence of **obstructive CAD** in patients resuscitated from **shockable rhythms** including VT or VF, ranges from **25 to 60%**
- prevalence of **CAD in OHCA** patients with initial **nonshockable rhythms**, **asystole**, or **pulseless electrical activity (PEA)**, **is not well-defined**

OHCA

Cardiac arrest



Recommendations	Class	Level
A primary PCI strategy is recommended in patients with resuscitated cardiac arrest and an ECG consistent with STEMI.	I	B

In patients following **cardiac arrest** and **ST-segment elevation** on the ECG
primary PCI is the strategy of choice.

OHCA Without STE

urgent angiography (within 2 h) should be considered in survivors of cardiac arrest, including

- unresponsive** survivors,
- when there is a **high index of suspicion of ongoing infarction** (such as the presence of chest pain before arrest, a history of established CAD, and abnormal or uncertain ECG results).

Cardiac arrest



Recommendations	Class	Level
Urgent angiography (and PCI if indicated) should be considered in patients with resuscitated cardiac arrest without diagnostic ST-segment elevation but with a high suspicion of ongoing myocardial ischaemia.	Ila	C

OHCA Without STE

quick evaluation at the emergency department to exclude:

non-coronary causes (cerebrovascular event, respiratory failure , non-cardiogenic Shock , pulmonary embolism , and intoxication), and

to perform **urgent echocardiography**, is reasonable.

Out-of-hospital cardiac arrest (OHCA)

- When coupled with revascularization, **therapeutic hypothermia (TH)** **improves survival** and **neurological outcomes** ,
- every hour delay in cooling increases in-hospital mortality by 20%.

Cardiac arrest			 ESC European Society of Cardiology	
Recommendations	Class	Level		
Targeted temperature management is indicated early after resuscitation of cardiac arrest patients who remain unresponsive.	I	B		

Targeted temperature management ,therapeutic hypothermia (TTM,TH)

- **Active methods** (i.e. *cooling catheters,cooling blankets*, and application of *ice applied around the body*)
- to achieve and maintain **a constant** specific **body temperature** between **32 and 36 C** for **>= 24 h**.
- indicated in patients who **remain unconscious after resuscitation** from cardiac arrest (of presumed cardiac cause).
- Cooling **should not delay primary PCI** and can be started in parallel in the catheterization laboratory

Cardiac arrest



Recommendations	Class	Level
Prehospital cooling using a rapid infusion of large volumes of cold i.v. fluid immediately after return of spontaneous circulation is not recommended.	III	B

Cardiac arrest

Recommendations	Class	Level
A primary PCI strategy is recommended in patients with resuscitated cardiac arrest and an ECG consistent with STEMI.	I	B
Targeted temperature management is indicated early after resuscitation of cardiac arrest patients who remain unresponsive.	I	B
It is indicated that healthcare systems implement strategies to facilitate transfer of all patients in whom a myocardial infarction is suspected directly to the hospital offering 24/7 PCI-mediated reperfusion therapy via one specialized EMS.	I	C

Cardiac arrest

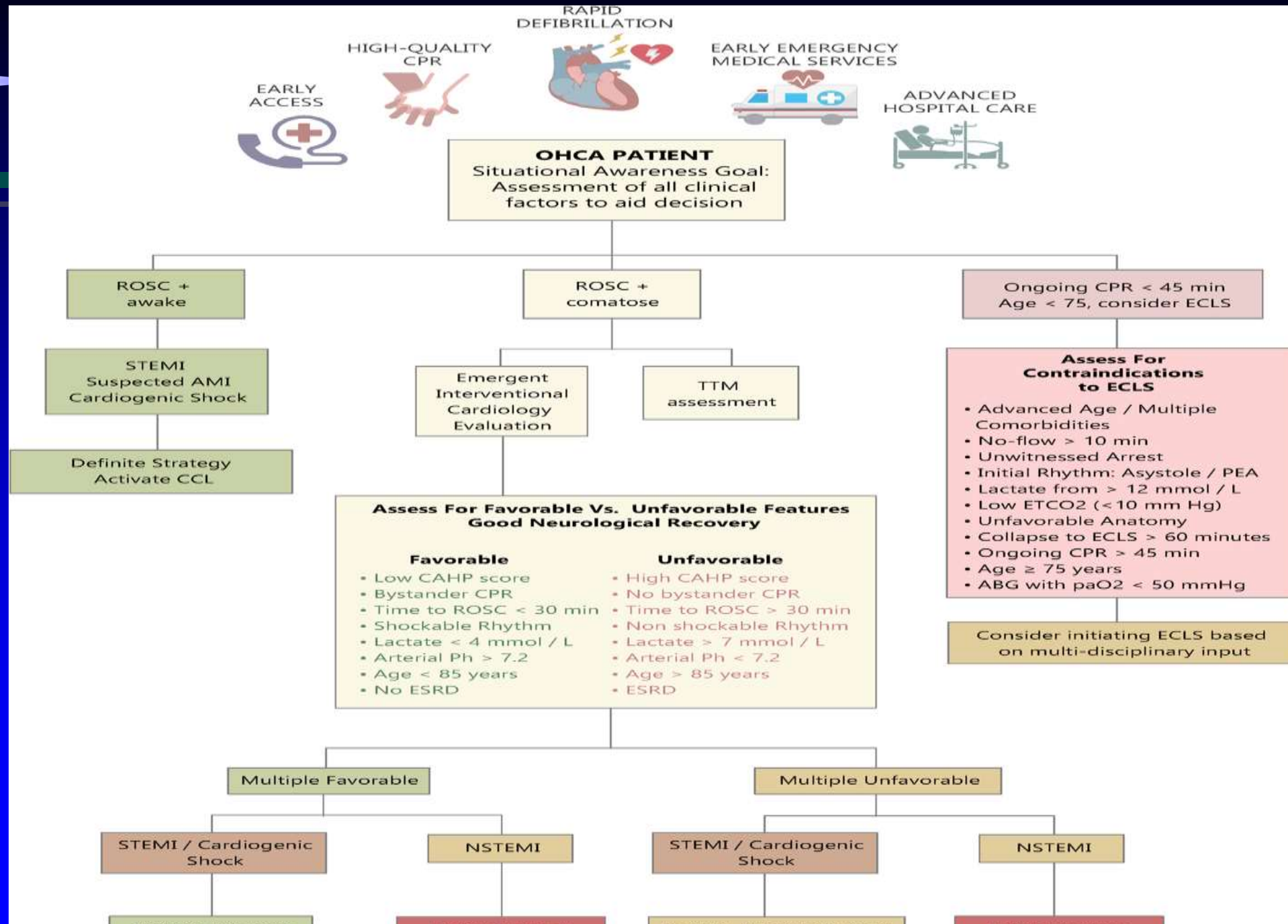
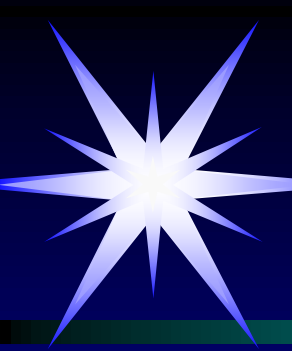
Recommendations	Class	Level
It is indicated that all medical and paramedical personnel caring for suspected myocardial infarction have access to defibrillation equipment and are trained in basic cardiac life support.	I	C
Urgent angiography (and PCI if indicated) should be considered in patients with resuscitated cardiac arrest without diagnostic ST-segment elevation but with a high suspicion of ongoing myocardial ischaemia.	IIa	C
Prehospital cooling using a rapid infusion of large volumes of cold i.v. fluid immediately after return of spontaneous circulation is not recommended.	III	B

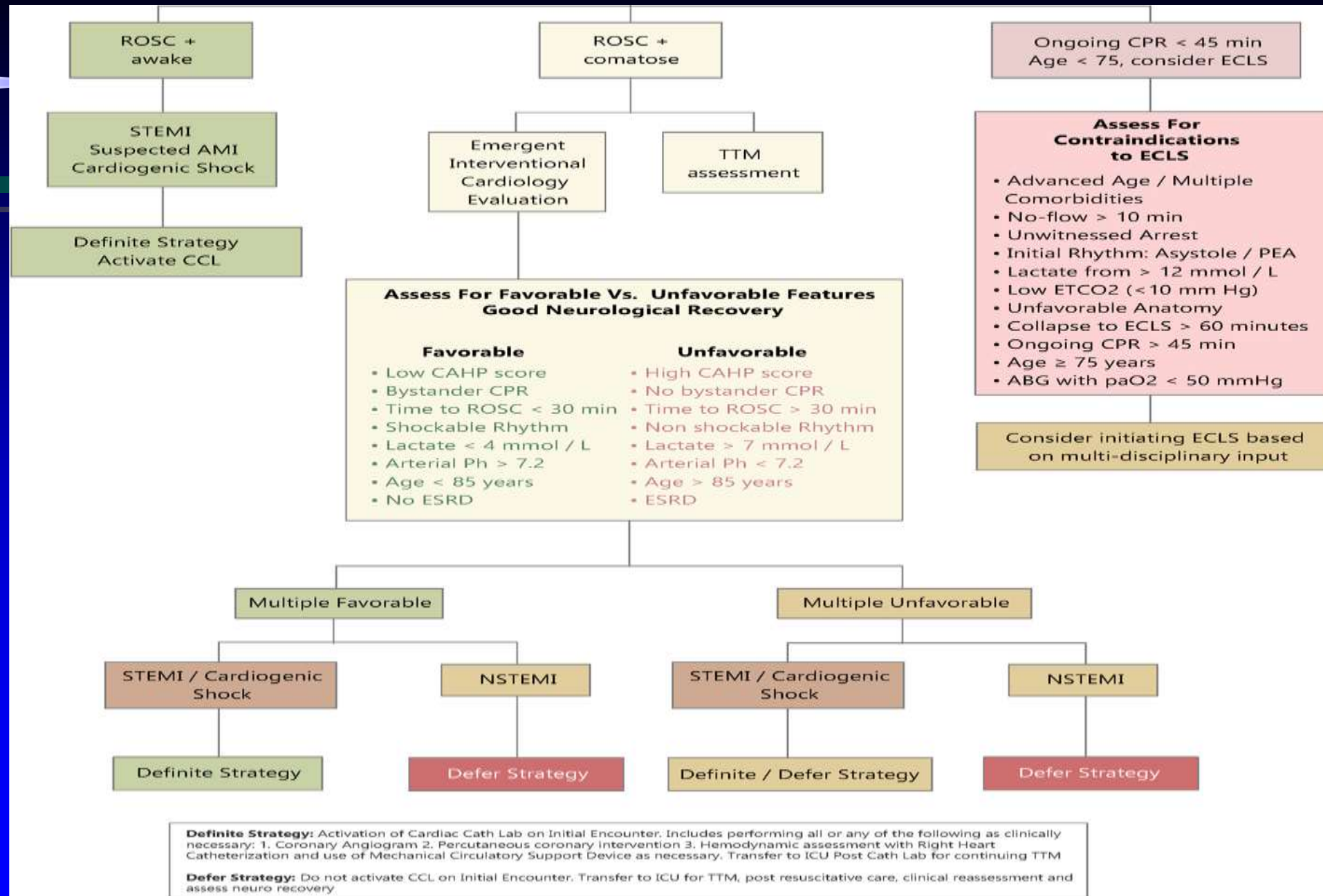
TH

- slow uptake,
- delayed onset of action,
- and **diminished effects of oral antiplatelet agents** (i.e. clopidogrel, ticagrelor, and prasugrel).
- Moreover, **metabolic conversion of clopidogrel in the liver may be reduced** in hypothermia conditions.

Vascular access

- **Radial access** is associated with reduced risk of bleeding complication compared with femoral access among patients undergoing PCI for ACS.
- In the **setting of OHCA**, especially if there is concomitant shock, traditionally the **femoral access site has been preferred**—due to concerns of vasospasm, increasing procedural time to reperfusion and convenience of restricting the working field to groin area if hemodynamic support is required.







Rehabilitation



Organ Donor



Palliation

Pre-Hospital Care

Hospital Care

Discharge Care

Emergency Medical Services

Cardiac, Medical, and/or Neuro Critical Care

Emergency Department

Neurology and Neuro-Rehabilitation

Interventional Cardiology and Mechanical Circulatory Support Teams

Electrophysiology

Medical or Surgical Consultants

Allied Health Professionals: pharmacists, PT, OT,
dietitians, social workers, speech language pathologists

Palliative Care and/or Organ Donation Professionals

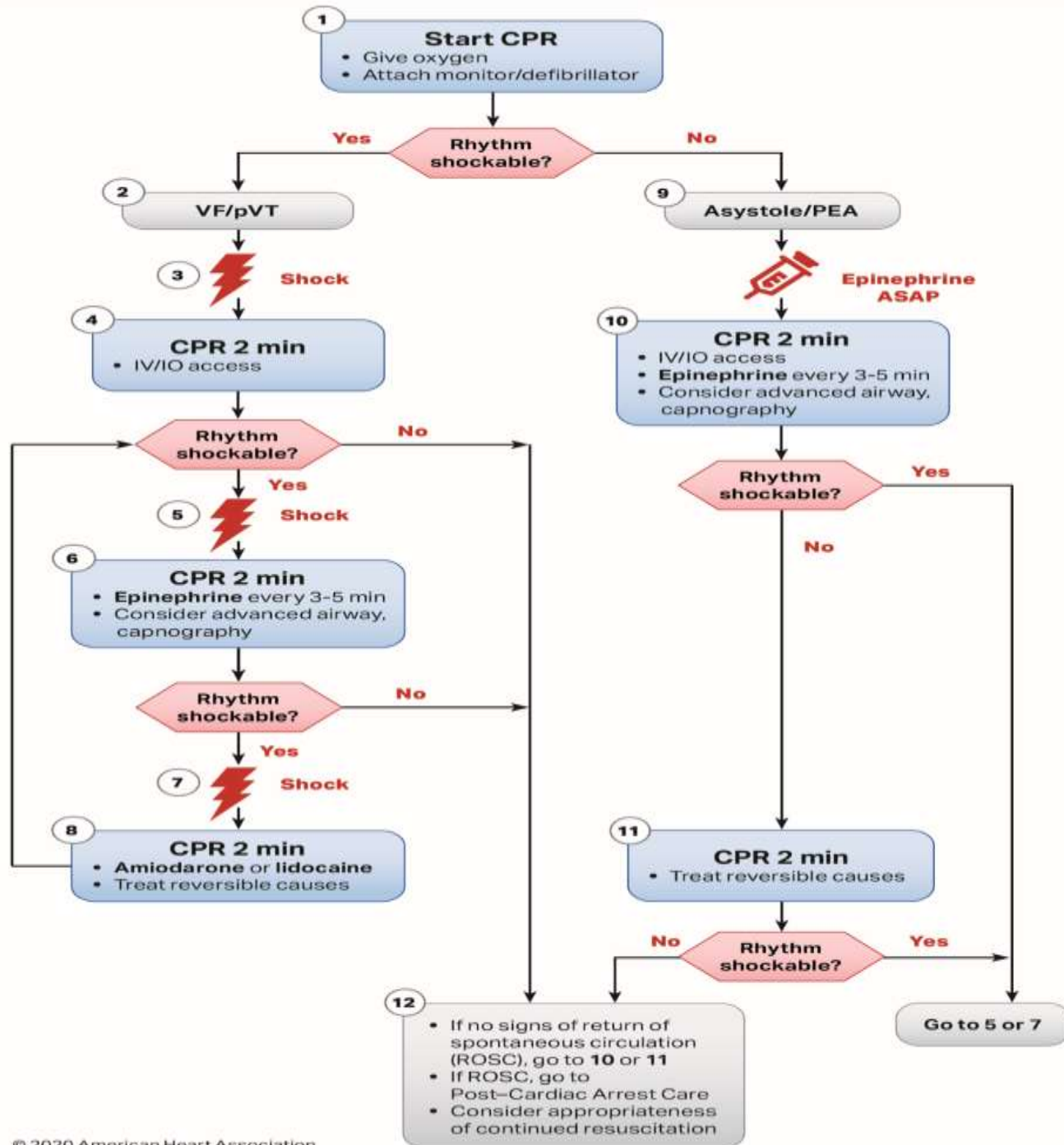
OHCA Care Team

IHCA



OHCA





CPR Quality

- 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 PETCO₂ is low or decreasing, reassess 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 IV/IO dose:** 1 mg every 3-5 minutes
- **Amiodarone IV/IO dose:** First dose: 300 mg bolus. Second dose: 150 mg.
- **Lidocaine IV/IO dose:** First dose: 1-1.5 mg/kg. Second dose: 0.5-0.75 mg/kg.

Advanced Airway

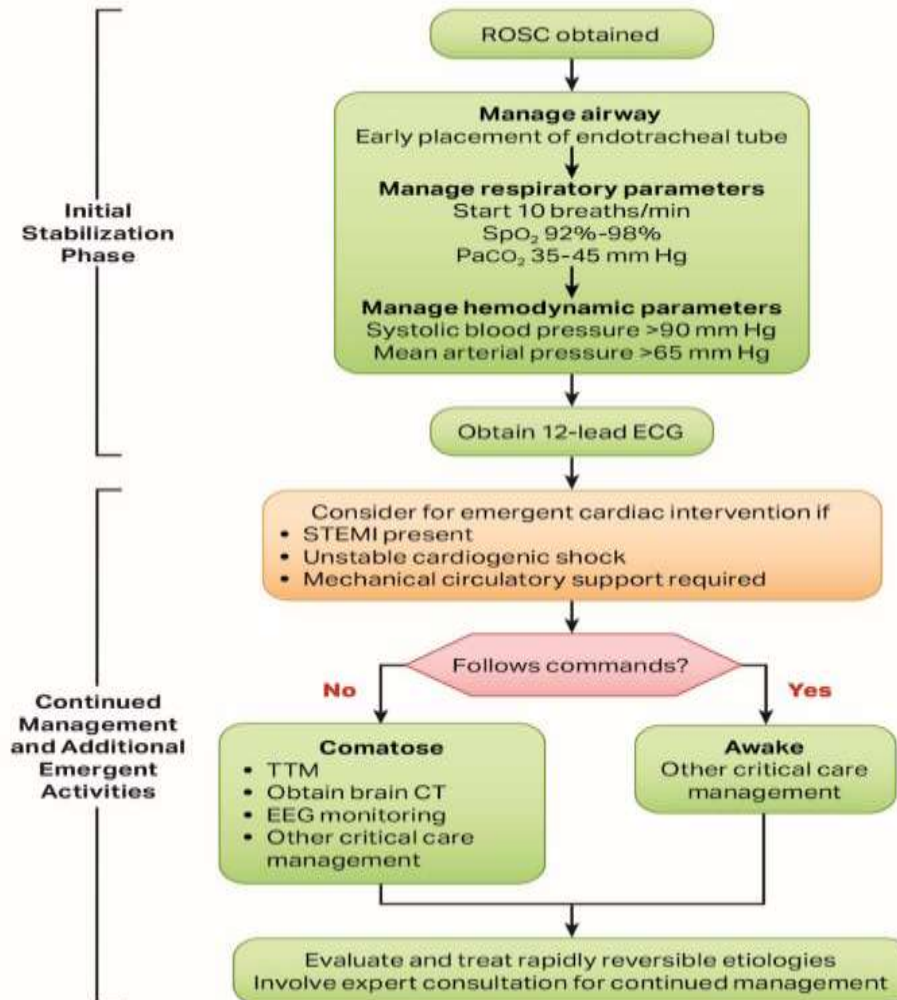
- Endotracheal intubation or supraglottic advanced airway
- Waveform capnography or capnometry to confirm and monitor ET tube placement
- Once advanced airway in place, give 1 breath every 6 seconds (10 breaths/min) with continuous chest compressions

Return of Spontaneous Circulation (ROSC)

- Pulse and blood pressure
- Abrupt sustained increase in PETCO₂ (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
- Thrombosis, pulmonary
- Thrombosis, coronary



Initial Stabilization Phase

Resuscitation is ongoing during the post-ROSC phase, and many of these activities can occur concurrently. However, if prioritization is necessary, follow these steps:

- **Airway management:**
Waveform capnography or capnometry to confirm and monitor endotracheal tube placement
- **Manage respiratory parameters:**
Titrate FIO₂ for SpO₂ 92%-98%; start at 10 breaths/min; titrate to PaCO₂ of 35-45 mm Hg
- **Manage hemodynamic parameters:**
Administer crystalloid and/or vasopressor or inotrope for goal systolic blood pressure >90 mm Hg or mean arterial pressure >65 mm Hg

Continued Management and Additional Emergent Activities

These evaluations should be done concurrently so that decisions on targeted temperature management (TTM) receive high priority as cardiac interventions.

- **Emergent cardiac intervention:**
Early evaluation of 12-lead electrocardiogram (ECG); consider hemodynamics for decision on cardiac intervention
- **TTM:** If patient is not following commands, start TTM as soon as possible; begin at 32-36°C for 24 hours by using a cooling device with feedback loop
- **Other critical care management**
 - Continuously monitor core temperature (esophageal, rectal, bladder)
 - Maintain normoxia, normocapnia, euglycemia
 - Provide continuous or intermittent electroencephalogram (EEG) monitoring
 - Provide lung-protective ventilation

H's and T's

Hypovolemia
Hypoxia
Hydrogen ion (acidosis)
Hypokalemia/hyperkalemia
Hypothermia
Tension pneumothorax
Tamponade, cardiac
Toxins
Thrombosis, pulmonary
Thrombosis, coronary

با سپاس از توجه شما

