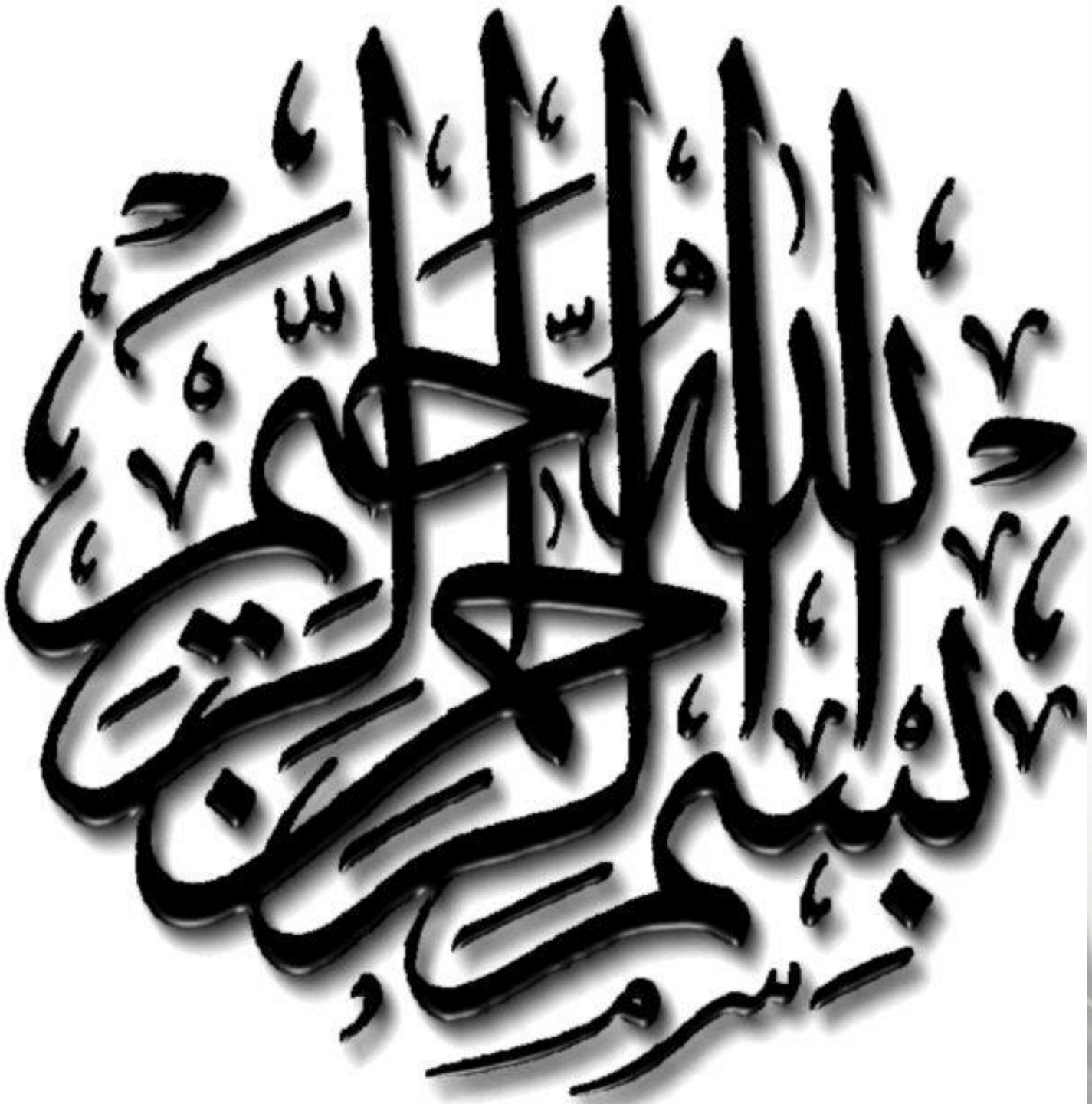
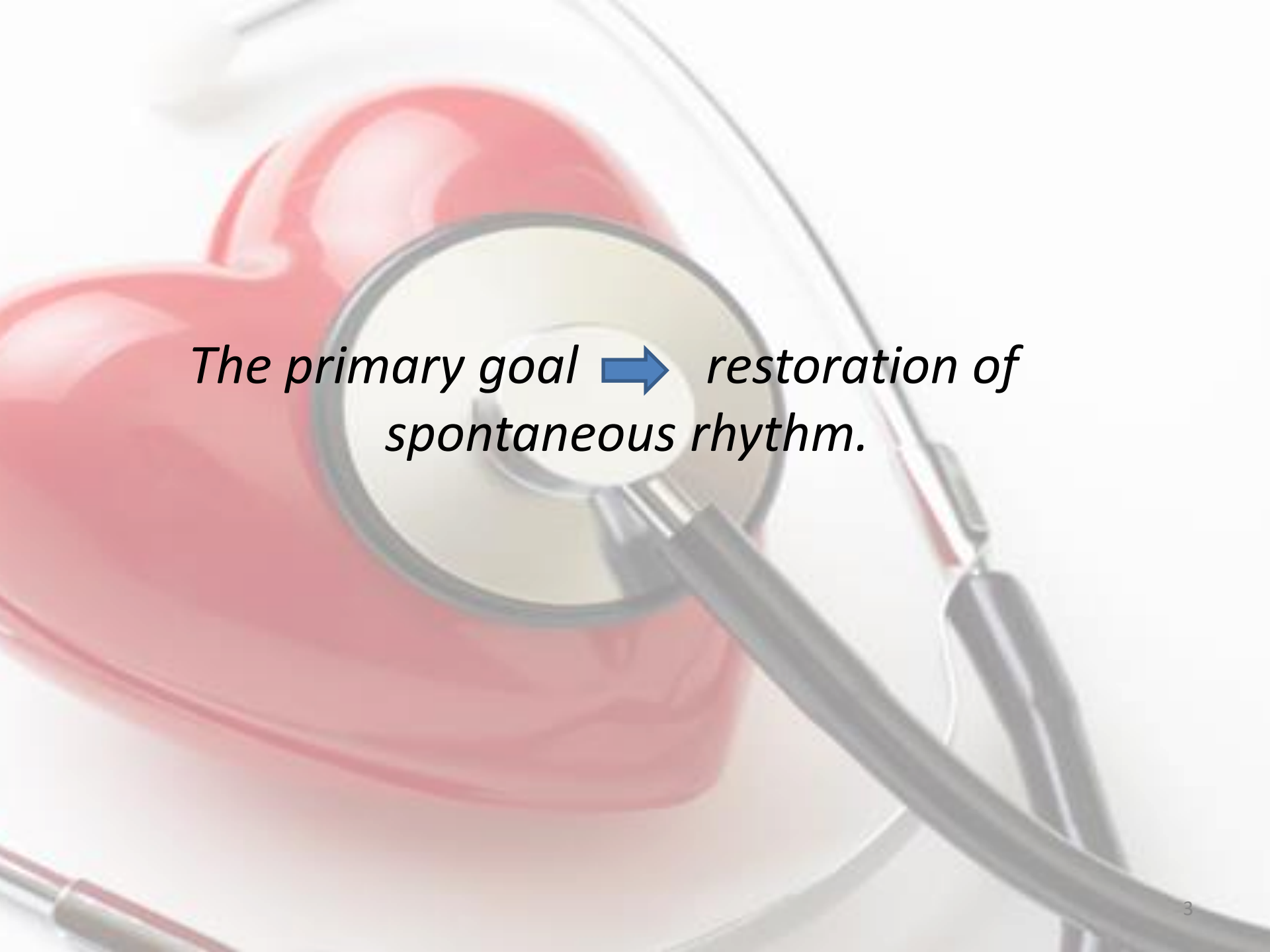

بسم الله الرحمن الرحيم

Medications in cardiac arrest

K.Shadvar MD FCCM



The primary goal ➡ restoration of spontaneous rhythm.

Epinephrine

- *beneficial effects → vasoconstriction.*
- ***Dose:** 1 mg IV/IO every 3 to 5 minutes*
- *Higher doses may be indicated to treat specific problems, such as a -blocker or calcium channel blocker overdose.*
- *If IV/IO access is delayed or cannot be established, epinephrine may be given endotracheally at a dose of 2 to 2.5 mg.*

- *Do not administer catecholamines and sodium bicarbonate simultaneously through an IV catheter or tubing because alkaline solutions such as the bicarbonate inactivate the catecholamines.*

Vasopressin

- *Vasopressin is a nonadrenergic vasoconstrictor*
- *Dose: 1 dose of vasopressin 40 units IV/IO may replace either the first or second dose of epinephrine*
- removal of vasopressin has been noted in the Adult Cardiac Arrest Algorithm

Amiodarone

- *Amiodarone affects sodium, potassium, and calcium channels and has adrenergic blocking properties.*
- *considered for: VF or pulseless VT unresponsive to shock delivery, CPR, and vasopressor.*
- *Dose: 300 mg IV/IO can be followed by 1 dose of 150 mg IV/IO.*

- ***Precautions***
- *If the patient has a perfusing rhythm, administer the drug as slowly (over 20 to 60 minutes)*
- *Decrease the infusion rate if there is prolongation of the QT interval or heart block*
- *stop the infusion if the QRS widens to 50% of baseline or hypotension develops.*
- *Amiodarone should not be administered together with another drug that causes QT prolongation, such as procainamide.*

Lidocaine

- *Lidocaine may be considered if amiodarone is not available.*
- *The initial dose is 1 to 1.5 mg/kg IV.*
- *Additional doses of 0.5 to 0.75 mg/kg IV push may be administered at 5- to 10-minute intervals to a maximum dose of 3 mg/kg.*

Magnesium Sulfate

- *Indication: VF/pulseless VT is associated with torsades de pointes,*
- *Dose: 1 to 2 g IV/IO bolus*
- *Routine administration of magnesium sulfate in cardiac arrest is not recommended unless torsades de pointes is present.*
- ***Precautions** Magnesium produces vasodilation and may cause hypotension if administered rapidly.*

Atropine

- *Atropine **has been removed** from the cardiac arrest algorithm.*

Sodium Bicarbonate

- *Adverse effects of bicarbonate during cardiac arrest.*
  a) *Compromise CPP by reducing SVR*
  b) *Create extracellular alkalosis that will shift the oxyhemoglobin saturation curve and inhibit oxygen release.*
  c) *Produce hypernatremia and hyperosmolarity.*
  d) *Produces excess CO2, which freely diffuses into myocardial and cerebral cells and may paradoxically contribute to intracellular acidosis.*
  e) *Exacerbate central venous acidosis and may inactivate simultaneously administered catecholamines.*

- *Routine use is not recommended*
- *In some special resuscitation situations, bicarbonate can be beneficial:*
  - *preexisting metabolic acidosis, hyperkalemia, tricyclic antidepressant overdose,.*
- *initial dose of 1 mEq/kg*

Calcium

- *Routine use is not recommended.*
- *Calcium administration is not recommended for pediatric cardiopulmonary arrest in the absence of documented hypocalcemia, calcium channel blocker overdose, hypermagnesemia, or hyperkalemia.*

Fibrinolysis

- *Should not be routinely used.*
- *When pulmonary embolism is presumed or known to be the cause of cardiac arrest, empirical fibrinolytic therapy can be considered.*

IV Fluids

- *If cardiac arrest is associated with extreme volume losses, hypovolemic arrest should be suspected.*
- *These patients present with signs of circulatory shock advancing to PEA. In these settings intravascular volume should be promptly restored.*

Glucose

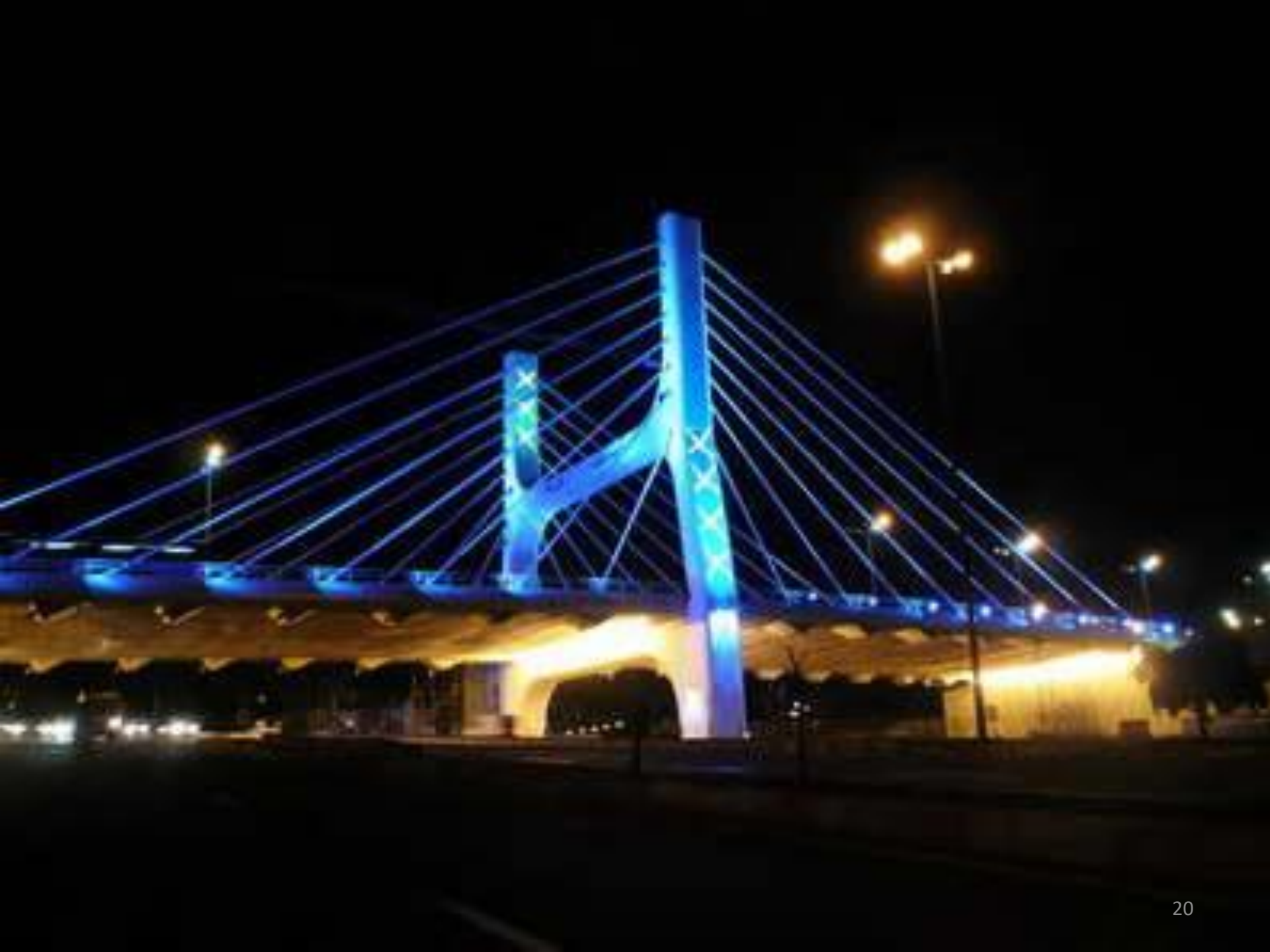
- *infants may develop hypoglycemia when energy requirements rise.*
- *Check blood glucose concentration during the resuscitation and treat hypoglycemia promptly*

Procainamide

- *Procainamide prolongs the refractory period of the atria and ventricles and depresses conduction velocity.*
- *500mg interval (max 17mg/kg)*
- ***Precautions***
- *Infuse procainamide very slowly (over 30 to 60 minutes)*
- *Decrease the infusion rate if there is prolongation of the QT interval, or heart block;*
- *stop the infusion if the QRS widens to 50% of baseline or hypotension develops.*
- *Do not administer together with another drug causing QT prolongation, such as amiodarone.*

Table 1. Medications for Pediatric Resuscitation

Medication	Dose	Remarks
Adenosine	0.1 mg/kg (maximum 6 mg) Second dose: 0.2 mg/kg (maximum 12 mg)	Monitor ECG Rapid IV/IO bolus with flush
Amiodarone	5 mg/kg IV/IO; may repeat twice up to 15 mg/kg Maximum single dose 300 mg	Monitor ECG and blood pressure; adjust administration rate to urgency (IV push during cardiac arrest, more slowly–over 20–60 minutes with perfusing rhythm). Expert consultation strongly recommended prior to use when patient has a perfusing rhythm Use caution when administering with other drugs that prolong QT (obtain expert consultation)
Atropine	0.02 mg/kg IV/IO 0.04–0.06 mg/kg ET* Repeat once if needed Minimum dose: 0.1 mg Maximum single dose: 0.5 mg	Higher doses may be used with organophosphate poisoning
Calcium Chloride (10%)	20 mg/kg IV/IO (0.2 mL/kg) Maximum single dose 2 g	Administer slowly
Epinephrine	0.01 mg/kg (0.1 mL/kg 1:10,000) IV/IO 0.1 mg/kg (0.1 mL/kg 1:1000) ET* Maximum dose 1 mg IV/IO; 2.5 mg ET	May repeat every 3–5 minutes
Glucose	0.5–1 g/kg IV/IO	Newborn: 5–10 mL/kg $D_{10}W$ Infants and Children: 2–4 mL/kg $D_{25}W$ Adolescents: 1–2 mL/kg $D_{50}W$
Lidocaine	Bolus: 1 mg/kg IV/IO Infusion: 20–50 mcg/kg/minute	
Magnesium Sulfate	25–50 mg/kg IV/IO over 10–20 minutes, faster in torsades de pointes Maximum dose 2 g	
Naloxone	Full Reversal: <5 y or ≤20 kg: 0.1 mg/kg IV/IO/ET* ≥5y or >20 kg: 2 mg IV/IO/ET*	Use lower doses to reverse respiratory depression associated with therapeutic opioid use (1–5 mcg/kg titrate to effect)
Procainamide	15 mg/kg IV/IO Adult Dose: 20 mg/min IV infusion to total maximum dose of 17 mg/kg	Monitor ECG and blood pressure; Give slowly–over 30–60 minutes. Use caution when administering with other drugs that prolong QT (obtain expert consultation)
Sodium bicarbonate	1 mEq/kg per dose IV/IO slowly	After adequate ventilation



Intravenous Access in CPR

- *The preferred venous access site during CPR is the **largest, most accessible vein that does not require the interruption of resuscitation**.*
- *Peripheral venous access is attempted before attempting other forms of vascular access*

Methods of Drug Delivery

- *Jugular Venous*
- *Peripheral Venous*
- *Intraosseous*
- *Intra-tracheal*
- *Intra-cardiac*

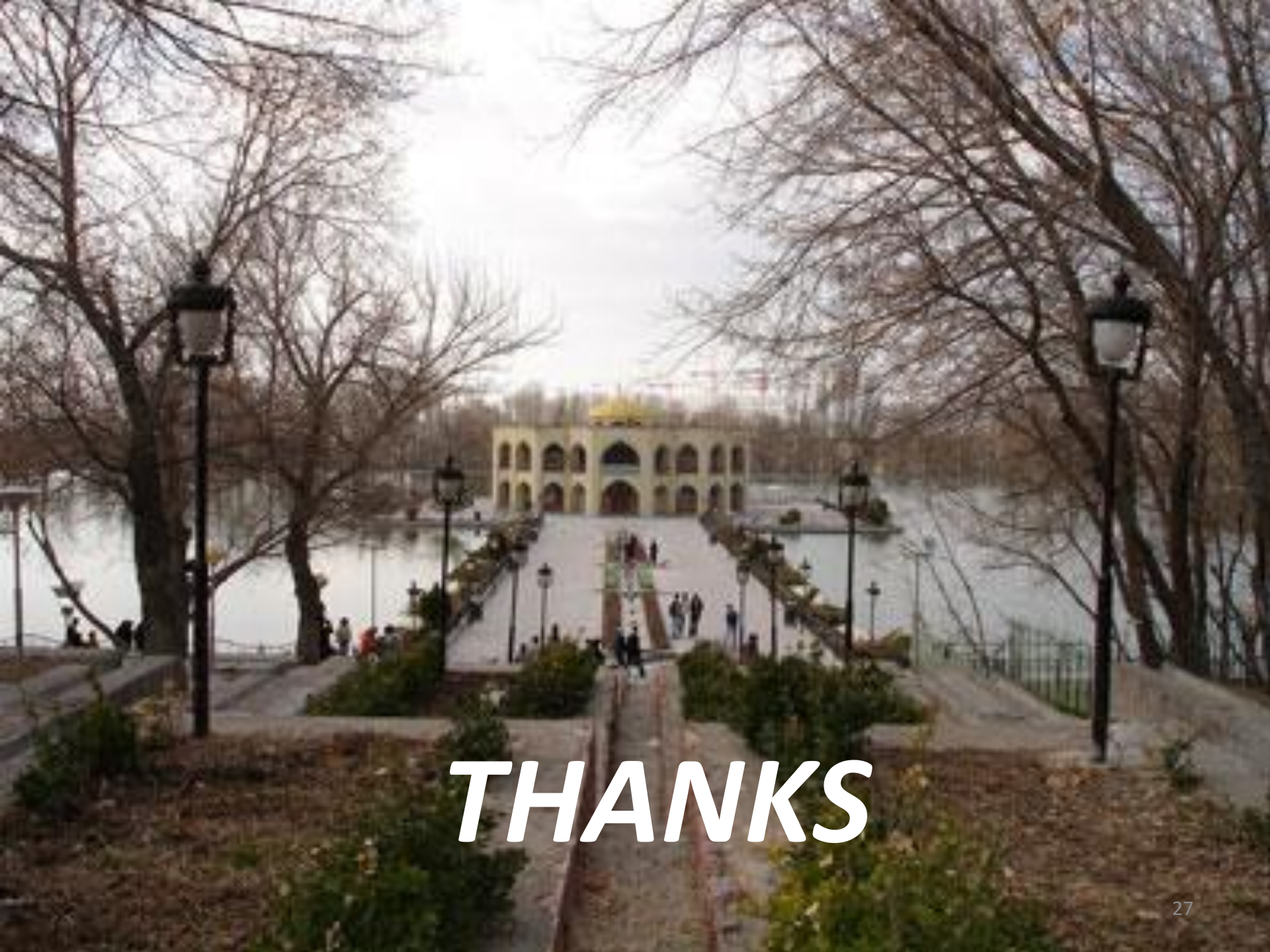
- *lidocaine, epinephrine, atropine, and naloxone **("LEAN")** can be given via the endotracheal tube*
- *Flush with a minimum of 5 mL normal saline followed by 5 assisted manual ventilations.*
- *typically the dose given by the endotracheal route is **2 to 3 times** the recommended IV dose.*

IO Access

- *Intraosseous (IO) cannulation provides access to venous plexus, enabling drug delivery similar to that achieved by central venous access.*
- *safe and effective for fluid resuscitation, drug delivery, and blood sampling*

Intra-cardiac

- *American Heart Association* ***de-emphasized*** *the use of intracardiac injections.*
- *there are several* ***potential complications*** *associated with this procedure:*
  - *myocardial trauma, lacerated coronary arteries, pericardial effusion, and refractory ventricular fibrillation*
- *use of this route is* ***reserved as a last resort*** *after all other methods have failed.*


THANKS