## به نام خدا

## CPR

Cardio Pulmonary Resuscitation احیاء قلبی ریوی Presented by: Morteza Ghaderi MSN - EMS Educator

## مراحل CPR:

## 1) Basic cardiac life support

- Circulation
- Airway control
- Breathing

## 2) Advance cardiac life support

- Drug and fluids
- Electrocardiography
- Fibrillation treatment

## 3) Prolonged cardiac life support

- Gauging
- Human mentation
- Intensive care









## **Airway Management**





Select the proper size (corner of the mouth to tip of the ear)]

















## **E-C** clamp technique





## **Bag-Valve-Mask Components**





# **One-Person BVM Technique**



## How much is Oxygen Delivered?

## 1-Delevery oxygen by pure ambo bag :

**16% - 21%** 



## 2- Ambo bag plus Oxygen 40-60%



## 3- Ambo bag with reservoir bag plus oxygen:>90%



## **Endotracheal tube (ETT)**







## Sizing Endotracheal tubes

Diameter Neonate - 3.0 mm0-6 months -3.5 mm6-12 months -4.0 mmThen use



(Age in years / 4) + 4 = size of endotracheal tube (ET) mm



انتخاب سایز مناسب لوله

AGE	INTERNAL DIAMETER (mm)
Children	
Newborn	2.5
6 mo	3.5
1 yr	4.5
2 yr	5.0
4 yr	5.5
6 yr	6.0
8 yr	6.5
10 yr	7.0
12 yr	7.5
14 yr	8.0
Adults	
Female	7.0-8.0
Male	7.5-9.0
Special cases	



### endotracheal tubes

Newborn	1	10 cm
1 yr	Ĩ	11cm
2 yr	Į	12 cm
3 уг	1	13 cm
4 yr	1	14 cm
6 yr	9	15 cm
8 yr	1	16 cm
10 yr	1	17 cm
12 yr	ĩ	18 cm
a <del>n</del> teria da Canadara	energen (***	

Formula for length (at lips) of oral tube is Age/2 + 12







## Children Are Very Different Than Adults !!!



## In children < 2 y/o





## **Correct position**





## **Prepare Laryngoscope**



### Laryngoscope Should Be In Your LEFT Hand




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## Capnography

#### کاپنومتر سطح CO2 را می سنجد . سطح طبیعی ۴۰ mmHg است.







Figure 1-3. End-tidal CO<sub>2</sub> detector before application. The indicator is purple, which indicates failure to detect CO<sub>2</sub>. This is the appearance when the esophagus is intubated.



Figure 1-4. Positive detection of CO<sub>2</sub> turns the indicator yellow, indicating tracheal placement of the endotracheal tube.



## Esophageal/Tracheal Double Lumen Airway (Combitube®)



#### Esophageal/Tracheal Double Lumen Airway (Combitube®)



## Indications and Use for the Prehospital Provider







#### esophageal-tracheal combitube

#### حالتهای ممکن در استفاده از کامبی تیوب

۹۵% داخل مری

۵% داخل نای



#### ETC airway esophageal placement







#### ETC airway tracheal placement





## Indications

- Respiratory failure in an unconscious patient without an intact gag reflex
- Secondary method of airway management for paramedics when orotracheal intubation is not possible
- Primary method of airway management for EMT-B's (where allowed by local protocols)

### Contraindications

- The patient has in intact gag-reflex
- The patient is less than 5 feet tall or under 16 years old
- The patient has known esophageal disease The patient has ingested a chemical substance Burns involving the airway The patient has an allergy or sensitivity to latex (the pharyngeal balloon contains latex)

- Inflate both balloons prior to insertion to test the integrity of the balloons
- Should either balloon fail after insertion, maintenance of the patient's airway cannot be assured





- Place the patient in a supine position
- Provide artificial ventilation via BVM and hyperventilate the patient with 100% oxygen prior to device insertion



- Position the patient's neck in a neutral position.
- Lubricate the tube with sterile, water soluble lubricant
- Lift the tongue and lower jaw upward to open the oropharynx



- Insert the Combitube so that it curves in the same direction as the natural curvature of the pharynx
- If resistance is met, withdraw tube and attempt to reinsert



Advance tube until the patient's teeth are between the two black lines







Inflate the #1 blue pilot cuff with 100ml of air from the large syringe





#### Inflate the #2 white pilot cuff with 15ml of air from the small syringe







Begin ventilation through the longer blue tube labeled #1.
If auscultation of breath sounds is good and gastric inflation is negative, continue.





If auscultation of breath sounds is absent and gastric inflation is positive, then begin ventilation through the shorter clear tube labeled #2















# Laryngeal mask airway









	SIZE	PATIENT
	1	<5 kg
	1.5	5-10kg
	2	10-20kg
	2.5	20-30kg
	3	30-50kg
	4	50-70kg
	5	70-100kg
	6	>100kg




# Defibrillation



شوك الكتريكي:

 عبور دادن جریان مستقیم الکتریسیته از سلولهای میوکارد که باعث می شود تمام سلولهای میوکارد به طور همزمان دیلاریزه شده و در نتیجه نقاط نابجا سرکوب گردیده و با تقویت پیس میکرهای قلب اجازه می دهد گره سینوسی دهلیزی عملکرد خود را به عنوان اصلی ترین پیس میکر از سر گیرد.



## **Types of Defibrillators :**

- External Manual Defibrillator
- Internal Manual Defibrillator







## **Types of Defibrillators :**

- Automated External Defibrillator (AED)
- Implantable Cardioverter-Defibrillator









# Shockable U VF Pulseless VT

## Nonshockable



Asystole PEA







# Correct position for electrode/paddle placement





# Front/back position of electrodes on patient (alternate position .(





# IV ACCESS FOR MEDICATION

 $\lambda V$ 

## IV Access for Medications:

- *Central line access* is not needed in most resuscitation attempts.
- Drugs typically require 1 to 2
   minutes to reach the central circulation when given via a peripheral vein but require less time when given via central venous access.

peripheral venous route:

 Follow with a 20 ml bolus of IV fluid
 Elevate the extremity for 10 to 20 seconds to facilitate drug delivery to the central circulation. Intraosseous (/// cannulation provides access to a noncollaps-ible venous plexus, enabling drug delivery similar to that achieved by central Venous access.

foot or

۹.

If IV and IO access cannot be established, some resuscitation drugs may be administered by the *endotracheal route* 





- Atropine
- Lidocaine
- Epinephrine
- Naloxone



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The optimal endotracheal dose of most drugs is unknown but typically the dose given by the endotracheal route is 2 to 2.5 times the recommended V dose.

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# Providers should *dilute* the recommended dose in 5 to 10 mL of <u>water</u> or <u>normal saline</u>

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## Drug:

#### 1) Anti arrhythmics :

Amiodarone : 300 mg first dose if needed after 15-20 min,
150 mg max, 450 mg

 Lidocaine :
 1.5 mg/kg first dose
 if needed Q 10 min--- 0.75 mg/kg for 2 doses max. 3 mg/kg Epinephrine :
 NS rhythms

 1 mg- IV, ET
 Q 3-5 min/ cont to END

2) Vasopressors :

 Atropine:
 Only asystole & PEA with HR<60</li>
 1 mg- IV, ET Q 3-5 min max. 3 mg

# Drug:

As a law:

## Drugs injections in CPR must be: PUSH

#### **ETT** administration:

## 2 - 2.5 times as IV doses plus 5-10 ml distilled water



## Alternative IV Sites and Techniques



- Intraosseous (IO) needles
  - Used for emergency venous access when other IV access is difficult or impossible
  - Often patients are experiencing a lifethreatening situation.
  - Generally inserted in the proximal tibia

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# Pulseless arrest and your reaction:

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#### **Adult Cardiac Arrest**



# **ASYSTOLE / PEA**











- Push hard (>2 inches [5 cm]) and fast (>100/min) and allow complete Minimize interruptions in compressions Avoid excessive ventilation chest recoil CPR Quality
- Rotate compressor every 2 minutes
- If no advanced airway, 30:2 compression-ventilation ratio
  - If PETCO<sub>2</sub> <10 mm Hg, attempt to improve CPR quality</li> Quantitative waveform capnography
- If relaxation phase (diastolic) pressure <20 mm Hg, attempt to</li> improve CPR quality Intra-arterial pressure
- Return of Spontaneous Circulation (ROSC)
  - Pulse and blood pressure
- Abrupt sustained increase in PETCO<sub>2</sub> (typically ≥40 mm Hg)
- Spontaneous arterial pressure waves with intra-arterial monitoring

# Shock Energy

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

# Drug Therapy

- Epinephrine IV/IO Dose: 1 mg every 3-5 minutes
- Vasopressin IV/IO Dose: 40 units can replace first or second dose of epinephrine
- Amiodarone IV/IO Dose: First dose: 300 mg bolus. Second dose: 150 mg.

# Advanced Airway

- Supraglottic advanced airway or endotracheal intubation
- Waveform capnography to confirm and monitor ET tube placement
  - 8-10 breaths per minute with continuous chest compressions
- **Reversible Causes**
- Tension pneumothorax
  - Tamponade, cardiac
    - Toxins
- Thrombosis, pulmonary
- Thrombosis, coronary

## **Reversible Causes :**

- Hypovolemia
- Hypoxia
- Hydrogen ion (acidosis)
- Hypo-/hyperkalemia
- Hypothermia

- Tension pneumothorax
- Tamponade, cardiac
- Toxins
- Thrombosis, pulmonary
- Thrombosis, coronary



#### در چه زمانی عملیات احیا را شروع نکنیم ؟

- اگر بیمار نشانه های آشکار مرگ را داشت:

   جمود نعشی که ۶ تا ۱۰ ساعت پس از مرگ پیدا میشود
   (سفت شدن بدن)
   کبودی وابسته به جاذبه
   گندیدگی (فساد) یا تجزیه بدن
   وجود شواهدی از آسیبهای غیر قابل برگشت به زندگی :
   جدا شدن سر از بدن
  - سوختگی های شدید که شناسایی مصدوم ممکن نباشد

## در چه زمانی عملیات احیا را شروع نکنیم ؟



کبودی وابسته به جاذبه


معیار پایان CPR:

- در صورت احساس نبض و تنفس در مددجو
  - وجود علائم مرگ
    - خستگی احیاگر

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