# PALS WORKBOOK

## SAFETYNET OF FLORIDA

# Team roles and responsibilities

- Know limitations- can’t perform task as requested ask for different role
- Constructive interventions- politely correct in real time-CLARIFY
- Closed loop communication- repeat orders

# Vital Signs — Blood Pressure (BP)

| Lower Limit of Normal Systolic BP by Age | |
|---|---|
| Age | Lower Limit of Normal Systolic BP |
| Term neonate (0 to 28 days) | > 60mm Hg or strong central pulse |
| Infant (1 to 12 months) | >70 mm Hg or strong central pulse |
| Child 1 to 10 years | >70 + (2 x age in years) |
| Child ≥ 10 years | >90 mm Hg |

# PEDIATRIC VITAL SIGNS

| AGE GROUP | RESPIRATORY RATE | HEART RATE | BLOOD PRESSURE |
|---|---|---|---|
| NEWBORN | 30-50 | 120-160 | 60-70 |
| INFANT | 20-30 | 100-140 | 70-100 |
| TODDLER (1-3YR) | 20-30 | 80-130 | 80-110 |
| PRESCHOOL (3-5 YR) | 20-30 | 80-120 | 80-110 |
| SCHOOL AGE (6-12) | 20-30 | 70-110 | 80-120 |
| ADOLESCENT | ADULT VALUES | ADULT | ADULT |

# OVER 10 YEARS ADULT VITALS

- RESPIRATORY 12-20
- BP GREATER THAN 90 SYSTOLIC
- HEART RATE 60-100

# Hypovolemic Shock

- Most common cause of shock in children
- Can be caused by internal/external bleeding 75 cc blood for every Kg of body weight
- Can be caused by vomiting diarrhea

# Early Shock

- Shock with “normal” blood pressure
- Presence of compensated shock can be identified by:
  - Evaluation of heart rate
  - Presence and volume (strength) of peripheral pulses
  - Adequacy of end-organ perfusion
    - Brain — assess mental status
    - Skin — assess capillary refill, skin temperature
    - Kidneys — assess urine output

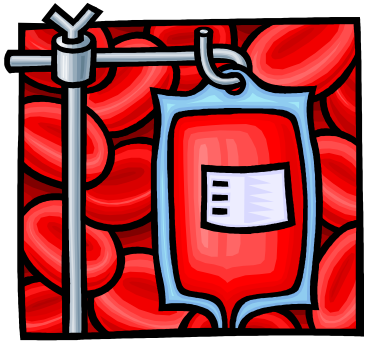
# Late shock -Hypotensive

- Clinical signs of hypotension
  - Low BP/less than (70+ 2 times age)
  - Increased heart rate
  - Increased respiratory rate
  - Decreased mental status

# TYPES OF SHOCK

- HYPOVOLEMIC-MOST COMMON- Blood loss/ dehydration
- CARDIOGENIC- USUALLY RELATED TO BIRTH DEFECT
- NEUROGENIC
- SEPTIC (DISTRIBUTIVE)-**FEVER** CHEMOTHERAPY OR ELEVATED TEMP- CONSIDER ANTIBIOTICS

# Hypovolemic Shock — Interventions



- Type and cross emergently if the child has severe trauma and life-threatening blood loss
- Administer a bolus of **10-20** ***mL/kg of isotonic crystalloid solution (NS or LR) over 5 to 10 min***
- Assess response (i.e., mental status, capillary refill, heart rate, respiratory effort, BP)

# I/O ACCESS

- MANUAL OR MECHANICAL
- LOCATION
- NO FX OR CRUSH INJURIES
- NO INFECTION
- NO PREVIOUS ATTEMPTS

# Definitions

- Respiratory distress
  - INCREASED work of breathing (respiratory effort) MAY STILL BE “PINK”
  - DECREASED/ELEVATED RESPIRATORY RATE

- Respiratory failure
  - A clinical condition in which there is inadequate blood oxygenation and/or ventilation to meet the metabolic demands of body tissues

- Respiratory arrest
  - Absence of breathing

# Respiratory Failure

- Respiratory failure
- INCREASE OXYGENATION OR VENTILATIONS
- Most common cause of cardiopulmonary arrest in children
  - Often preceded by respiratory distress
  - IMMEDIATELY START VENTILATIONS WITH BVM

# PULSE OXIMETRY

- GOAL POST ROSC – 94-99%
- CAN BE UNRELIABLE
- CAN INDICATE RESPIRATORY FAILURE
- LESS THAN NORMAL O2 SAT WITH SUPPLEMENTAL OXYGEN REPOSITION AIRWAY /BASIC AIRWAY ADJUNCT AND BVM

# SOUNDS

- INSPIRATORY STRIDOR/INCREASED INSPIRATORY EFFORT- UPPER AIRWAY OBSTRUCTION
- GRUNTING- **SEVERE** RESPIRATORY ISSUES
- WHEEZES – LOWER AIRWAY
- CRACKLES – LUNG TISSUE DISEASE
- Respiratory sounds - Wikipedia

- INSPIRATORY STRIDOR-REMOVE AIRWAY  OBSTRUCTION /CROUP- NEB EPI
- GRUNTING- **SEVERE** RESPIRATORY ISSUES
- WHEEZES – ASTHMA / ALBUTEROL
- CRACKLES – LUNG TISSUE DISEASE PNEUMONIA/ANTIBIOTICS

# GRUNTING

- **SEVERE** RESPIRATORY ISSUES
- LATE STAGE PNEUMONIA
- CARDIAC ISSUES
- HEAD TRAUMA

# AIRWAY OBSTRUCTION

- PARTIAL AIRWAY INCREASED INSPIRATORY EFFORT AND RETRACTIONS
- INFANT 5 BACK SLAPS/ 5 CHEST THRUST
- CHILD –ABDOMINAL THRUSTS
- UNRESPONSIVE START CPR AND CHECK MOUTH BEFORE BREATHES

# PEDIATRIC CPR

- 10 SEC/ 2 MIN RULE
- 30:2 BY YOURSELF/15:2 WITH HELP
- RESUME CPR IMMEDIATELY AFTER DEFIB
- ALLOW FOR COMPLETE CHEST RECOIL
- Usually Hypoxic event
- If alone do 2 minutes CPR then go get help
- 15/2 compressions to ventialtions with 2 or more rescuers to increase oxygen saturation

# Pediatric CPR

- Usually Hypoxic event
- If alone do 2 minutes CPR then go get help

- 15/2 compressions to ventialtions with 2 or more rescuers to increase oxygen saturation

# Infant CPR — Summary

| **Age** | **Under 1 year** |
|---|---|
| **Ventilation rate** | 1 breath every 3 to 5 sec<br>(12 to 20 breaths/min) |
| **Assess pulse** | Brachial or femoral |
| **Compress with** | 2 fingers or 2 thumbs encircling chest (2 rescuers) |
| **Compression depth** | 1/3 the depth of chest<br>(up to 2 inch) |
| **Compression rate** | About 100/min |
| **Compression to ventilation ratio** | 1 rescuer 30:2,<br>2 rescuers 15:2 |

# Child CPR — Summary

| **Age** | **1 to 12 to 14 years** |
|---|---|
| **Ventilation rate** | 1 breath every 3 to 5 sec<br>(12 to 20 breaths/min) |
| **Assess pulse** | Carotid |
| **Compress with** | Heel of 1 hand;<br>heels of two hands (adult technique) acceptable |
| **Compression depth** | 1/3 to 1/2 depth of chest<br>(1 to 1 1/2 inch) |
| **Compression rate** | About 100/min |
| **Compression to ventilation ratio** | 1 rescuer_____, 2 rescuers _____ |

# Older Child/Adult CPR — Summary

| | |
|---|---|
| **Age** | **After puberty** |
| **Ventilation rate** | 1 breath every 5 to 6 seconds<br>(10 to 12 breaths/min) |
| **Assess pulse** | Carotid |
| **Compress with** | Heels of 2 hands |
| **Compression depth** | 2- 2.4 inches |
| **Compression rate** | About 100/min |
| **Compression to ventilation ratio** | 30:2 |

# PEDIATRIC SIEZURES

- FEBRILE- TEMP > 101.°F
- VALIUM DOSING- 0.2 MG/KG
- ANTIDOTE FOR VALIUM-**flumazenil**
- MAY CAUSE DISORDERED CONTROL OF BREATHING USE SUPPLEMENTAL O2

# Medications - Epinephrine Intravenous or Intraosseous

- Bradycardia, Pulseless/VT/VF
- 0.01 mg/kg of the 1:10,000 concentration
  - repeat same dose
  - FIRST LINE DRUG FOR ALLERGIC REACTIONS –UPPER RESPIRATORY OBSTRUCTION
  - NEBULIZED for stridor and “barking cough”

# Medications - Glucose

- Suspected or documented hypoglycemia
- ALWAYS CHECK BGL W/ N&V, AMS or LETHARGY and/or POLYURIA
- Dose = 500 mg - 1000 mg/kg
  - 1-2 ml/kg of 50% Dextrose
  - 2-4 ml/kg of 25% Dextrose
  - 5-10 ml/kg of 10% Dextrose

# Defibrillation — Key Points

- In cardiac arrest due to pulseless VT/VF, defibrillation and CPR are more important than starting an IV, inserting an advanced airway, and giving drugs.

- Energy settings:
  - 2 to 4 J/kg initially
  - Then escalate max 8 J/kg
  - Or equivalent biphasic energy

# Ventricular Fibrillation (VF)

- CPR/DEFIB/  I/O / EPI /AMIO/DEFIB EPI/DEFIB/ AMIO/DEFIB H'S &T'S

# Pulseless Electrical Activity (PEA)

- PEA exists when organized electrical activity (other than VT) is present on the cardiac monitor, but the patient is apneic and pulseless

# Pulseless Electrical Activity (PEA)

- CPR/ EPI AND RULE OUT H'S &T'S
- PEA has a poor prognosis unless the underlying cause can be rapidly identified and appropriately managed

Causes of PEA — 4 H's and 4 T's

- **H**ypovolemia
- **H**ypoxemia
- **H**ypothermia
- **H**yperkalemia
- **T**amponade, cardiac
- **T**ension pneumothorax
- **T**hrombosis: lungs (massive pulmonary embolism)
- **T**ablets/toxins: drug overdose

# Stable SVT (NARROW)

- ABCs, oxygen, monitor
- Obtain 12 LEAD ECG, consult pediatric CARDIOLOGIST
- Try vagal maneuvers-PREFERABLY ICE TO FACE
- Start IV, identify/treat causes
- Give adenosine IV
- If delayed cardiovert

# UNSTABLE SVT

- CARDIOVERT 1- 2 joules per kg
- DOUBLE FOR SUBSEQUENT CARDIOVERSIONS
- CAN TRY MEDS
- CONSULT CARDIOLOGIST

# BRADYCARDIA

- HYPOXIA CAUSES BRADYCARDIA
- AIRWAY AND BVM CORRECTS HYPOXIA
- RARELY CONDUCTION PROBLEM

# Drug Pearl — Atropine

- Epinephrine is drug of choice if bradycardia is due to hypoxia **and if oxygen and ventilation do not correct the bradycardia**

- Give atropine before epinephrine if bradycardia is due to increased vagal tone or if AV block is present

# Tension Pneumothorax

- Decreased lung sounds/ O2 sats drop/SOB /Tracheal shift (late)

- Insert needle midclavicular over 3rd rib

# HEAD TRAUMA

- SPINAL IMMOBILIZATION
- POSTURING
- AVPU

# METABOLIC/TOXIC CAUSES

- OBTAIN COMPLETE HISTORY
- ASK FAMILY AND BYSTANDERS
- 1-800-222-1222