Advanced Life Support in perspective

- **Chain of survival:**
  1. Early access to emergency services [911].
  2. Early Basic life Support [by hands only].
  3. Early defibrillation .
  4. Early Advanced Life Support.
Causes & prevention of Cardiorespiratory arrest

• **Definition:** A respiratory arrest is when breathing stops (apnea). A cardiac arrest is when the heart stops contracting & pumping blood.

• **Causes:**
  1. Airway problems.
  2. Breathing problems.
  3. Cardiovascular problems.
Airway Obstruction

• Complete airway obstruction will rapidly result in cardiac arrest.

• Partial airway obstruction may lead to cerebral or pulmonary edema, hypoxic brain damage as well as cardiac arrest.

• Causes of airway obstruction [blood, vomitus, F.B., direct throat / face trauma, CNS depression, epiglottitis, epileptic fit, bronchial secretions, mucosal edema, laryngeospasm, bronchospasm].
Cardiac Abnormalities

- Primary causes [ventricular fibrillation]:
  1. Ischemia.
  2. M.I.
  3. Drugs [digoxin, quinidine, phenothiazide, tricyclic antidepressant].
  4. Alcohol abuse.
  5. Acidosis.
  6. Abnormal electrolytes conc.[Ca, Mg & K].
• *Secondary causes of cardiac abnormalities:*

1. Asphyxia.
2. Apnea.
3. Acute sever blood loss.
4. Acute pulmonary edema.
5. Suffocation.
6. Hypoxemia, anemia, hypothermia, end-stage septic shock are having longer heart effect.
• **Prevention:**

1. History, examination & investigation when needed.

2. Breathing problems is pre cardio respiratory arrest clinical abnormalities.

3. Hypotension, confusion, restlessness lethargy & L.O.C. should be considered.

4. Metabolic abnormalities particularly acidosis.

5. Consider ICU admission in your plan.
Ventilation

- **Face mask**: [45 - 50% if more than 6 L/m].
- **Nasal Cannulae**: [30 - 35% on 3 L/m].
- **Ventorien**: [24 – 90%].
- **Non re-breathing mask**: [90%].
- **Laryngeal mask airway**: [100%].
- **Endotracheal tube**: [100%].
- **Needle cricothyroidotomy**: [full neck extension, feel the cricoid & prick 0.5 cm below it].
Cardiac Monitoring & rhythm Recognition

• **Remember:** Treat the patient not the ECG.
• A normal HR is defined as 60 – 100 b/m, a rate below 60 is known as bradycardia & a rate of 100 is known as tachycardia.
• **Rhythms causing cardiac arrest:**
  1. Supra-ventricular tachycardia [above bundle of His bifurcation].
  2. Ventricular tachycardia [distal to bifurcation].
• **Supra-ventricular tachycardia:**

1. **Atrial fibrillation:** [absent P wave & normal QRS complex].

2. **Atrial flutter:** [there is P wave but saw tooth in appearance & rate more than 200/m (250-300/m) with regular QRS complex].

3. **supra-ventricular tachycardia:** [you might find P wave or not, because it might start from A/V node].
• **Ventricular tachycardia:**
  1. wide QRS complex.
  2. rare more than 100/m.
  3. may sustain for more than 30 seconds (take it seriously). But if it was for less than 30 seconds it might be d.t. lytes imbalance or hypoxia.

• **Ventricular Fibrillation:**
  1. no pulse.
  2. ECG show absent QRS & T wave & replaced by cont., very rapid, bizarre, irregular appearance of apparently random frequency & amplitude.
Drugs & Their delivery

- **Priority in drug delivery:**
  1. central line [30 seconds].
  2. Peripheral line [5 minutes].
  3. E.T. Tube [but we double or triple the IV dose].
  4. Intra Cardiac [not used any more]:
     a) technically difficult.
     b) while doing the procedure CPR should stopped.
     c) high rate of complications:
        1. coronary laceration.
        2. intra mural injections.
        3. pneumothorax.
Defibrillation

- We paralyze the heart, to let S. A. Node to start working again.
- The delay in DC >>> the sever the arrhythmia >>> less favorable prognosis & less responsive to treatment.

**Types:**

1. Synchronized Cardio-version.
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if is used to convert Atrial or ventricular tach., it is important that the shock is synchronized to occur with the R wave of the ECG rather than with the T wave.

2. A synchronized Cardio-version:

it will shock at any ECG phase ,& it can cause ventricular fibrillation.

• **Mechanism of action:**

1. Monophasic:

receive single burst, 1 pad to another & don’t come back.
2. Biphasic:
less Jules (electric shock waves move from 1 pad to the other then go in reverse direction).

Types of Biphasic Defibrillator:
1. Manual (which we are using).
2. Shock Advisor (for non-expert people), with big electrodes they can read the rhythm then talk or write the order to be done.
3. Automated External (you just connect it to the patient & it will work & calculate the electric wave by itself & when to give it).
• **Position:**
  1. **Right** of the upper sternum below the clavicle
  2. **left** 5th inter-costal space ant. Axillary's line.

• **Technique:**
  1. apply pressure to the paddle [10kg] to decrease thoracic impedance (the distance by pr. The fat).
  2. keep the defibrillator paddles at least 12.5 cm from the pace maker if there is.
  3. **Keep oxygen flow away from from paddle** (not to kill the patient by burning instead of arrest)
  4. Don’t remove the paddle until 3 DC shock performed.
Treatment of Algorithms

• **During CPR:**

[If not already]
1. Check electrode/paddle position & contact.
2. Attempt/verify airway, oxygen & IV access.
3. Give adrenaline every 3 minutes (cycle).
4. Consider:
   a. Anti-arrhythmic.
   b. Atropine.
[Correct Reversible causes (4 H’s & 4T’s)]

1. Hypoxia.
2. Hypovolemia.
3. Hypo/Hyperkalemia & metabolic disorders.
4. Hypothermia.
5. Tension pneumothorax.
6. Tamponade.
7. Toxic/Therapeutic disturbances.
8. Thrombo-embolic/mechanical obstruction.
Management of VF/pulse-less VT

- **In each CPR cycle we provide:**
  - ✔ 1mg adrenaline IV.
  - ✔ 3 DC shocks (200, 200, & 360 joules).
  - ✔ 1 minute CPR.

- **Then after 1 min. CPR 3 DC shocks (each 360 joules)+ 1 minute CPR & adrenaline.**
Algorithm for management of non VF/VT rhythms

In case of a systole there is no rule of DC shock unless fine VF.

1mg adrenaline + 3mg atropine (USA)

3mg atropine but 0.5mg every 3 min & total of 3mg + 1mg adrenaline in each cycle.

Post DC shock heart can enter into a systole for 15 sec. Then return to normal.