BASIC LIFE SUPPORT

Collapsed *victim*

A 45 year old gentleman collapsed. You are alone there, what will you do?

1. Make sure you the bystanders and the patient are safe

2. Assess for response

a. Shake and shout

b. Shake his shoulders and shout in to his ears

c. Check whether he is breathing normally or not

3. If the person is **not responding and** not **breathing normally** call for help

a) In a out of hospital scenario you may ask someone to call 108 and get the AED (if it available at the scene)

b) If no one is there you have to do it

c) If it's a hospital, activate the Emergency Response System

d) Make the victim lie on his back

4. Check for carotid pulse

a) Place the tip of your finger over the thyroid cartilage and slide it laterally into the groove between the trachea and sterno-cleidomastoid muscle, where we can feel the carotid pulse

b) 5-10 seconds is the maximum time that you can take to assess the pulse

5. If pulse is not palpable:

a) If **you cannot palpate pulse or if doubtful start chest compressions**

b) Place the heel of your hand in the center of the chest, i.e. on the nipple line. It is reasonable for laypeople and healthcare professionals to be taught to position the heel of their dominant hand in the centre of the chest of an adult victim, with the non dominant hand on top.

c) Give 30 compressions and followed by 2 breaths

d) Compressions should be at the rate of at least 100/mm

e) Compressions depth should at least be 2 inches

f) **Do not interrupt compressions for more than 10 seconds**

g) Breath over 1 second and wait for 5 seconds before giving the second breath

h) Lone should use mouth to mouth or Mouth to mask breaths; Bag and mask can be used only when there are two rescuers

i) In children and infants when there are two rescuers compression ventilation ratio is 15:2

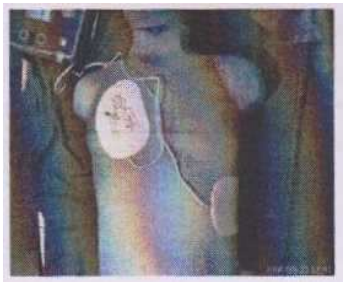
6. Attempt defibrillation as soon as the AED is available

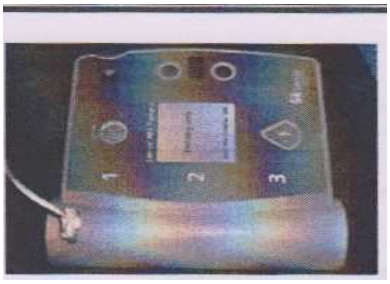
a) If the victim collapsed in front of you and you could get the AED and deliver shock within minutes you don't need to wait for the first 5 cycles of CPR to be over to deliver a shock, you can interrupt compressions and deliver shock.

b) If it’s been a while since collapse occurred then one has to finish 5 cycles of CPR before defibrillation.

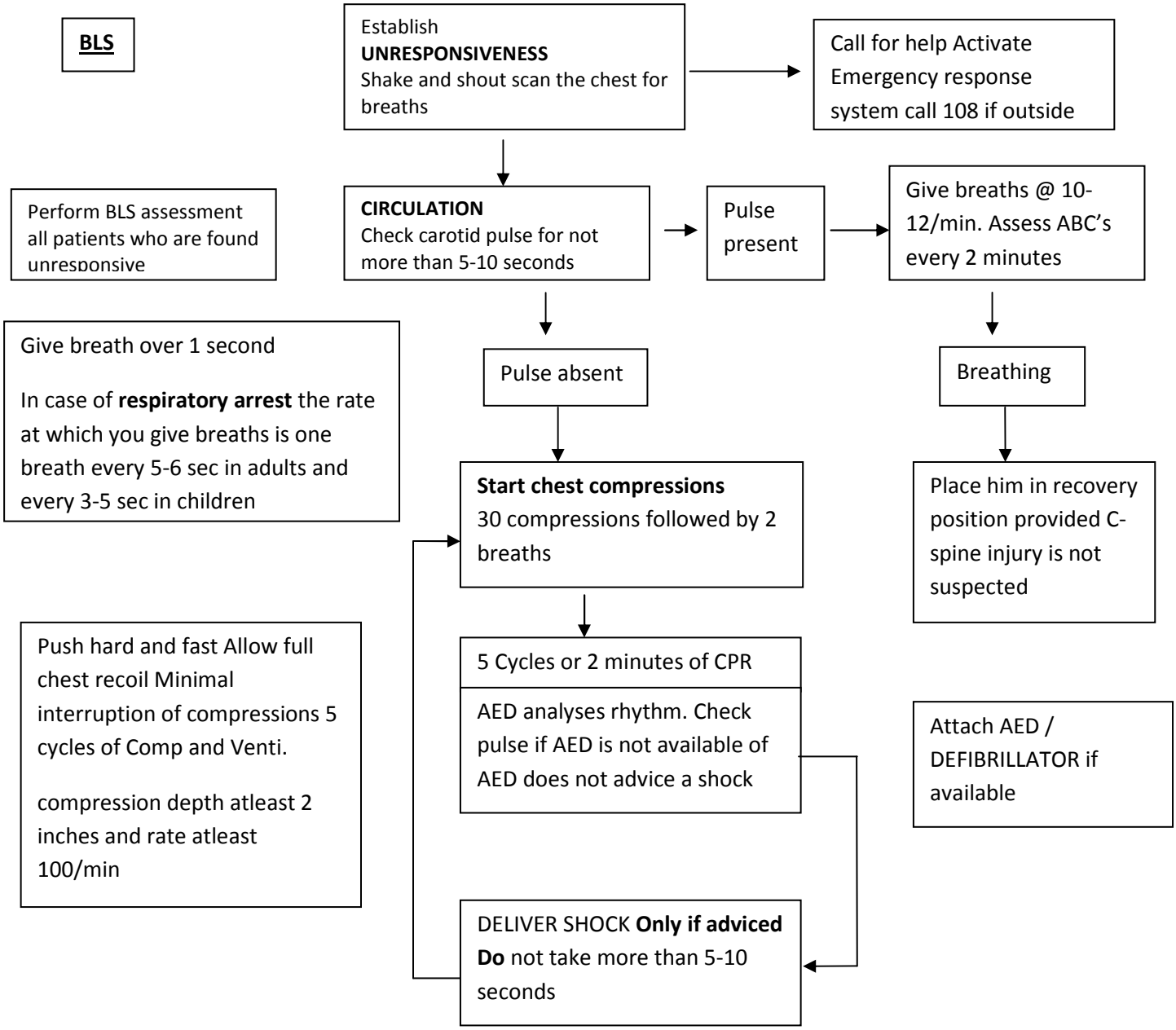
- Steps of operating AED

1. Power on
2. Attach pads to patients bare chest and then plug in the connector to the machine
3. Clear
4. Analyze
5. Clear
6. Shock
7. Resume compressions immediately

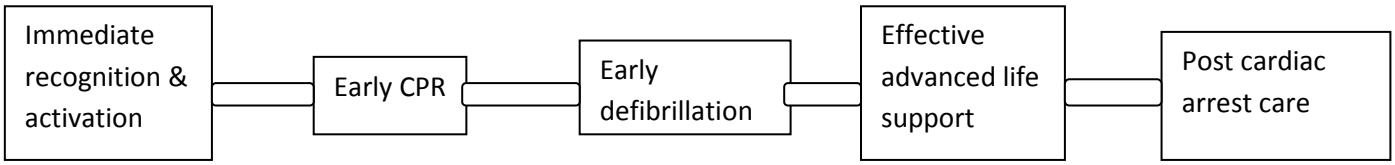




7. Continue CPR advanced help arrives



Adult Chain of survival



CHOKING

Adult choking is not that common in Indian context. Incidents where in a children gets choked is quite common. Obstruction of airway by a foreign body often occurs while eating. Foreign bodies may cause mild or severe airway obstruction. If it's a mild airway obstruction the victim may speak and breathe. Severe airway obstruction makes the victim unable to speak and breathe, has wheezing, will be respiratory distress.

Adult choking sequence

Victim with symptoms of mild airway obstruction

Encourage the victim to cough
Make arrangements to shift the victim to emergency room.

Victim with symptoms of severe airway obstruction and conscious

- Ask the victim "Are you choking?"
  A choking victim clutches his neck and would be unable to speak except for a nod

- Reassure the victim that you are going to help him. give abdominal thrusts.
  Stand behind the victim, with your arms encircle the victims upper part of abdomen.

- Place the fist of one hand between the navel and xiphoid sternum and grasp it with the other hand.

- Apply upward and backward thrusts.

- Continue abdominal thrusts till the foreign body are dislodged or the victim comes unconscious.

Infant Choking:

- Position the baby as shown

- Give 5 back blows

- Follow back blows with S chest compressions

- Do it till the foreign body is dislodged or the baby becomes unconscious

Unresponsive victim

Carefully get the victim onto the floor and start chest compressions. 30 compressions followed by 2 breaths. Look for foreign body in the mouth before giving breath. Use finger sweep to be to remove foreign body only if you can visualize it.

Visualize the pharynx and larynx with a laryngoscope and try to remove the foreign body with Magill's forceps.

ADVANCED LIFE SUPPORT

It involves use of adjuncts, equipments, drugs to assist the resuscitation process. ALS requires a well coordinated team to execute an effective resuscitation effort.
Individuals trained to provide advanced life

- recognize the importance of team concept
- respect individual members of the team
- As a team leader avoid giving multiple tasks at a time
- Work within the limits of the role they play
- Give clear instructions
- Closed loop_communication

ARREST ALGORITHM

A 45yr old gentleman came to the emergency room complaining of chest pain. You started examining him. He is a hypertensive and diabetic. He has become unresponsive. What will you do?

- Scan the chest to check whether he is breathing
- Check his pulse
  Assign a person to start chest compressions if the patient does not have a pulse
- Assign roles to give compressions, give breaths attach monitor, place an IV and document the events
- Assess the rhythm
- Deliver shock if it is shockable i.e. VF/ VT
  360 J Monophasic or 200 J Biphasic
- Resume compressions immediately after the shock without delay
- Not more than 10 sec should we take to assess rhythm and deliver shock

- Assess rhythm after every 2 minutes,
    - o deliver shock if it is shockable rhythm,
    - o continue compressions if it's non shockable (Asystole/ PEA),
    - o check for pulse only if an organized rhythm is seen on monitor which can have pulse.

- Injection Adrenaline 1 mg can be administered as soon as the Intravenous line or intraosseous line is available. Can be repeated every 3-5 minutes and as many doses as needed.

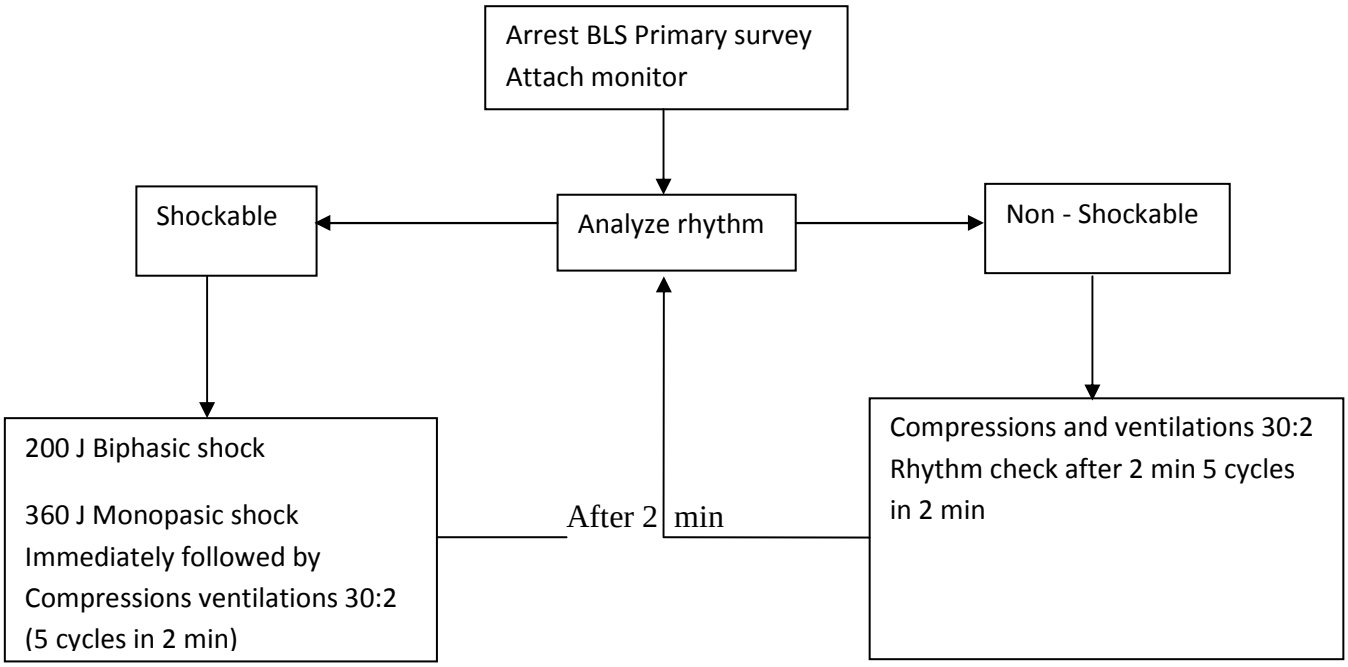
- If it is a shockable rhythm, lnj Amiodarone has to be administered. Half the first dose can be repeated if rhythm did not respond to the first dose.

- If you are sure that it is Torsades de pointes 2-3gm of Magnesium sulphate can be given IV/IO

Always look for and correct reversible causes

- Hypoxia
- Hypovolema
- Hypo/ hyperkalaemia
- Hydrogen ions- acidosis/ alkalosis
- Hypothermia
- Thrombosis-cardiac
- Thrombosis-pulmonary
- Tension pneumothorax
- Tamponade
- Toxins

- Push hard and push fast
- Allow full chest recoil
- Avoid hyperventilation
  - o Hyperventilation increases intrathoracic pressure and decreases venous return to the heart
- Consider the need for advanced airway



Inj Adrenaline 1 mg IV/IP just before or after the shock during compressions followed by 20cc NS bolus Repeat every 3-5 min Can be given in all four rhythms

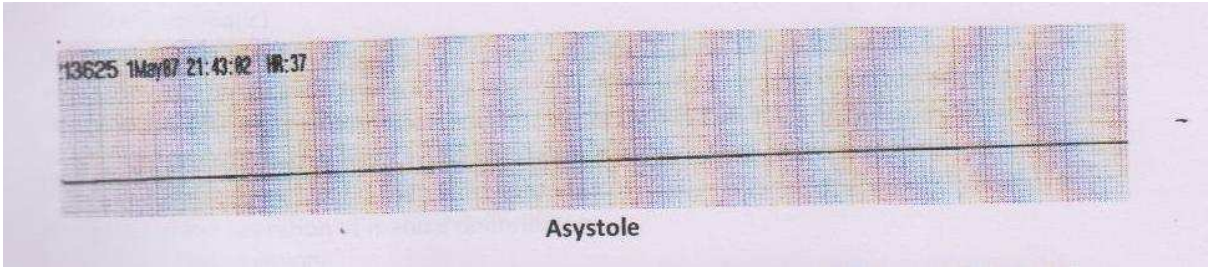
Inj Amiodarone 300 mg IV/IO Bolus followed by 20cc NS bolus Can repeat 150 mg additional dose after 3-5 min if there is no response to first dose Amiodarone indicated only in shockable rhythms

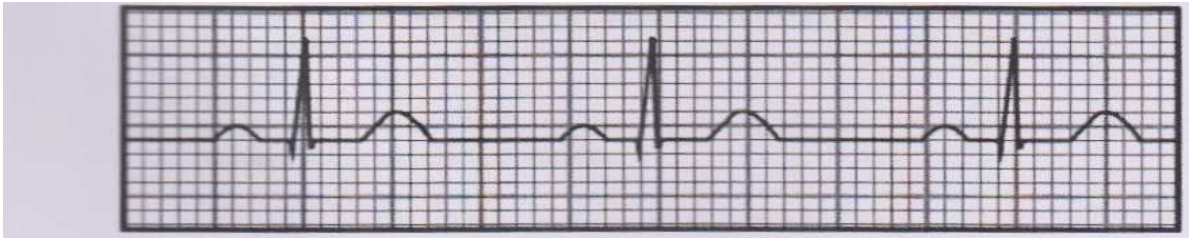
Always look for reversible causes

Hypoxia Hypovolemis Hypokalemia/hyperkalemia Hydrogen ions Hypothermia	Tension Pneumothorax Tamponade Thrombosis – Cardiac Thrombosis – Pulmonary Thrombosis – Pulmonary Toxins	Push Hard Push fast Allow full chest recoil Avoid hyperventilation

***Four Rhythms seen in case of* arrest:**

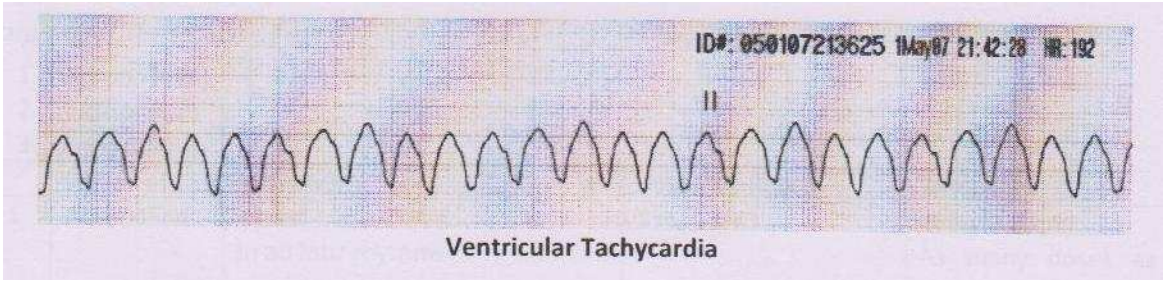
1. Asystole
2. Pulseless electrical activity
3. Ventricular tachycardia without pulse
4. Ventricular fibrillation

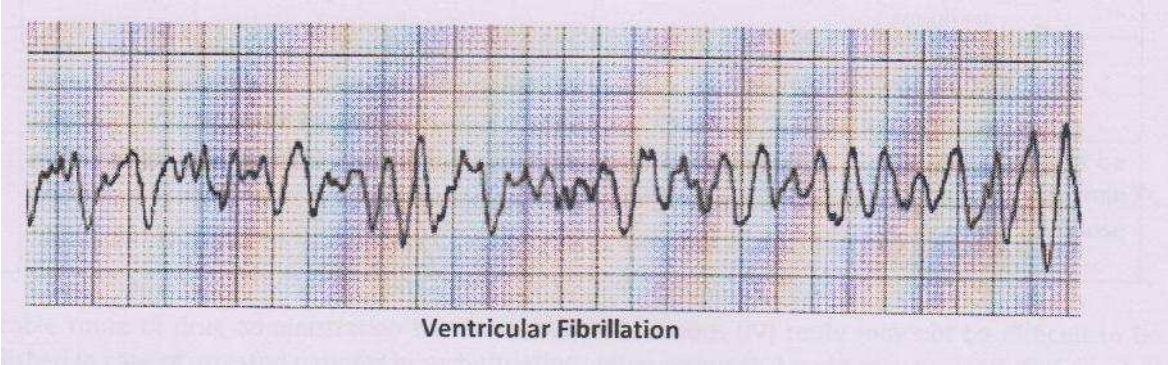




This rhythm seen on the Monitor but the pulse is not palpable

Pulseless electrical activity





Importance of shocks

- Arrhythmias' need to be stopped
- Shock stops the heart
- Once the heart stops the normal rhythm takes over
- Of the four rhythms seen in case of arrest two are shockable and two are non-shockable
- Shockable Rhythms
    1. Ventricular Fibrillation
    2. Ventricular Tachycardia without pulse
- **Non-shockable**
    1. Asystole
    2. Pulseless Electrical Activity (PEA)
- Shocks can be delivered using Automated External Defibrillator or Manual defibrillator
- Automated External Defibrillators(AED) detect the shockable Rhythms and deliver shocks on their own (fully automatic) or prompt the rescuer to deliver shock by pressing the button (Semiautomatic)
- The rescuer needs to read the ECG when using the Manual Defibrillators
- Shocks delivered are either Monophasic or Biphasic depending on the machine used.

- Low energy Biphasic shocks give equal or better results than the Monophasic shocks

- Select the maximum energy available on the defibrillator and deliver the shock

- AED's select energy and charge automatically

- Steps in the operation of manual defibrillators
    1. Select energy
    2. Apply jelly at the sites of pad placement on patients chest
    3. Apply paddles
    4 Charge
    5. Clear
    6. Shock
    7. Resume compressions immediately

***Drugs useful* in *case of* arrest**

1. Adrenaline

2. Vasopressin

3. Amiodarone

	Drug	**Indication**	**Dose and Route**	**Frequency**
1	Adrenaline	Arrest In all four rhythms	1 mg IV/ IO	Every 3-5 min As many doses as required
2	Vasopressin	Replace either the first or second dose of Adrenaline, if you opt to give it	40 IU IV/IO	
3	Amiodarone	Shockable rhythms in case of arrest	300 mg first dose 150 mg second dose	Second dose can be given after 3-5 min only of the first dose has no effect

Preferable route of drug administration is Intravenous. Intravenous (IV) route may not be difficult to be established in case of arrested patients in such situations Intra-osseus (10) route may be used. The onset of action with 10 administration is equivalent to IV administration.

Vascular access: Placement of an Intra-osseous needle

Usually reserved for acute life threatening situations such as cardiac arrest

INDICATIONS

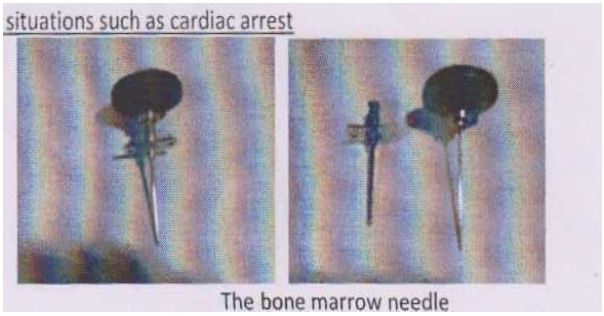
- When immediate venous access is needed for delivery of fluids, drugs or blood products and IV is not available.
- lntra-venous access is unobtainable and access is needed to deliver medication and fluids such as in arrest

DONTS

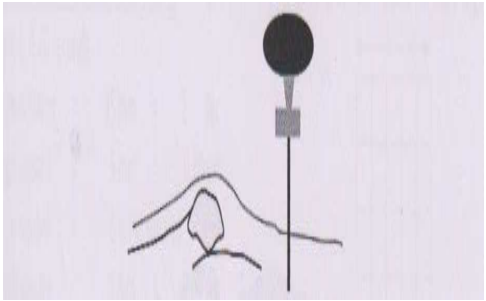
- Do not select a fractured site; old or new
- Do not select an infected site
- Do not go for 10 line when IV access is available
- Do not keep the 10 line for more than 24 hours

SITES

- Proximal tibia(most often used site), Distal tibia, Distal femur, Medial malleolus, Iliac crest, Sternum

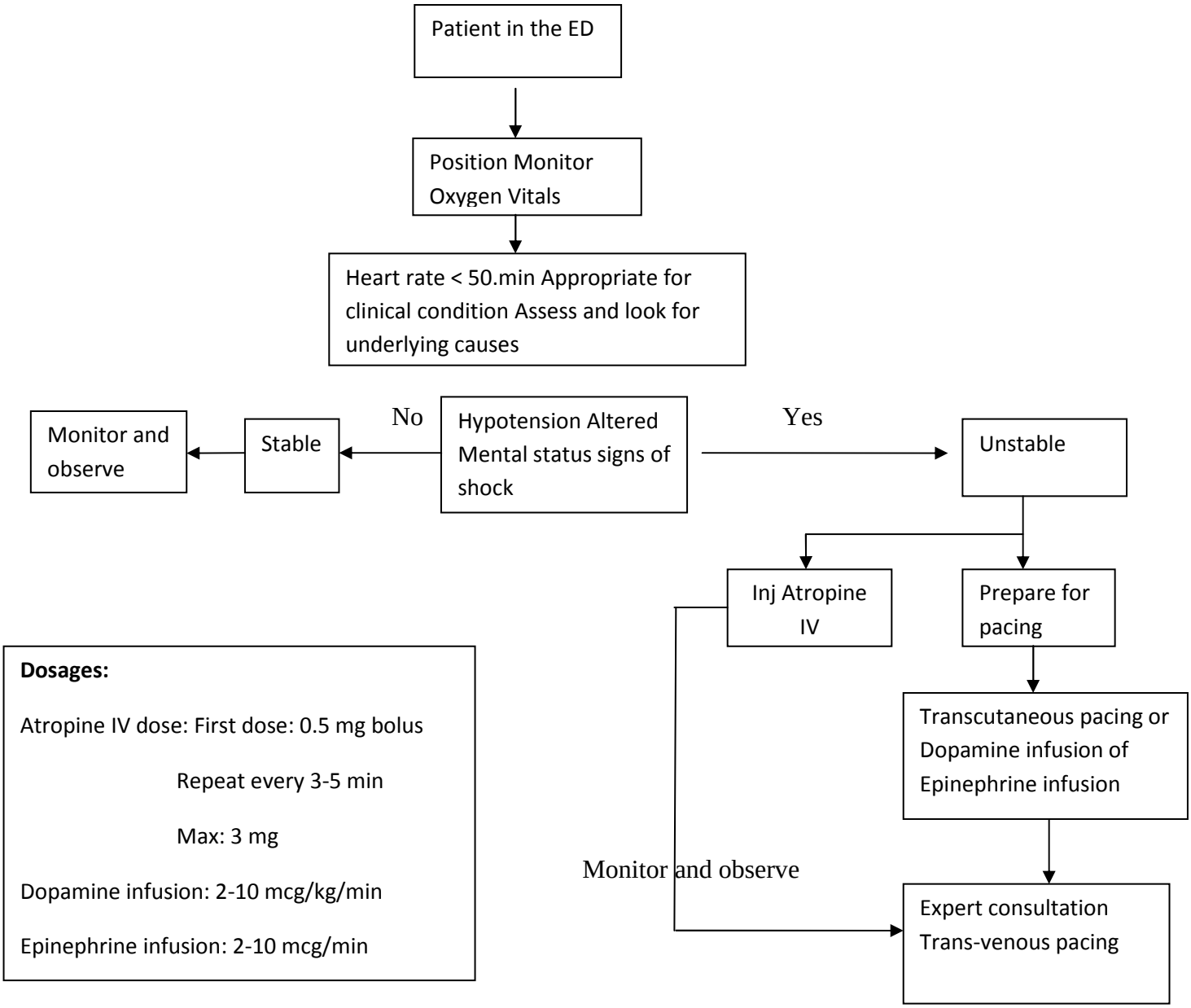


The bone marrow needle



- Identify landmarks:
    1. tibial tubercle
    2. the site of insertion is 1-2 cm below the tubercle a little medially
- BSI/universal precautions
- Prepare IV tubing and fluid
- Cleanse skin over the insertion site
- Take out the needle and check whether the stylet and the needle are intact.
- Hold the head of stylet with your dominant hand and place the tip of your index finger 1- 1.5 cm from the tip of the needle
- Insert the needle with screwing motion. As we advance, a sudden release of resistance as soon as **we** enter the marrow
- Withdraw stylet and try to aspirate
- Attach IV tubing check for flow
- Stabilize the needle using gauze and tape.
- Avoid mobility of the needle, which may result in extravasations' of fluid.

Management of Bradycardia:



Dosages:

Atropine IV dose: First dose: 0.5 mg bolus

Repeat every 3-5 min

Max: 3 mg

Dopamine infusion: 2-10 mcg/kg/min

Epinephrine infusion: 2-10 mcg/min

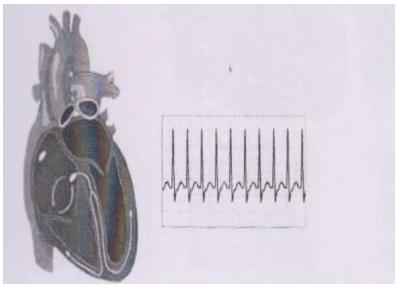
Tachycardia

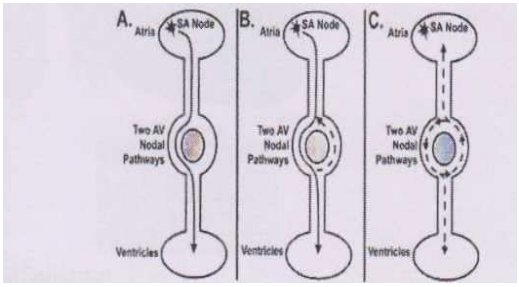
Tachycardia, defined as a heart rate more than 100/mm, can compromise cardiac output if excessive and associated with other morbidity such as cardiomyopathy, hypovolemia, valvular disorders e.t.c.

Narrow complex regular tachycardia

Supra ventricular tachycardia

PSVT (AVRT & AVNRT): Foci of impulse generation are supraventricular and most often the tachycardia is due to reentry through an accessory pathway located either within the AV bundle (AVNRT AV nodal reentry tachycardia) or a separate bundle (AVRT- Atrioventricular reentry tachycardia). The P wave is either not there or is buried within the QRS complex.





Sinus nodal re entry tachycardia: Some times the accessory pathway is within the SA node wherein the tracing looks similar to sinus rhythm but it responds to vagal maneuvers. This is sinus nodal reentry tachycardia

An impulse from foci within the atria may overtake the SA nodal rhythm and result in tachycardia. Here we have a p -wave of abnormal morphology but all of them are similar (uni-focal). The P-wave may sometimes be inverted as the wave front travels upward direction.

Atrial flutter is created by reentry rhythm within the atria with a regular rate of 300/mm but not all waves are conducted to the ventricles, the conduction may be 2:1, or 3:1, 4:1. When the conduction is 1:2 the tracing may look like a sinus tachycardia wherein any measure which slows the rate reveals flutter waves. The p-wave morphology is abnormal and these waves are called flutter waves rather than P-waves. QRS complexes are regular but if the conduction is variable the rhythmbecomesirregular.

Junctional tachycardia: Sometimes the AV nodal junction may form the foci of impulse generation when the sinus node is not functioning or when there is a block.

Narrow complex irregular tachycardia

Multifocal atrial tachycardia: (wandering atrial pacemaker) Sometimes the impulses may arise from multiple foci within atria resulting in P waves of different morphology (Multifocal atrial tachycardia- MAT). Three or more P wave morphologies should be present to call it MAT. These P-waves precede irregularly placed narrow QRS complexes.

Atrail fibrillation: Chaotic conduction within the atria with impulses generated at multiple foci and variable conduction through the AV bundle leads to a rhythm without formed P waves and the QRS complexes which are narrow but irregular. The rate depends on the ventricular response. A fast ventricular response leads to a fast ventricular hythm which may make the patient unstable.

Wide complex regular tachycardia

A wide complex regular tachycardia is either ventricular tachycardia or sinus tachycardia with aberrant conduction or preexcitation syndrome (WPW syndrome). If we cannot differentiate between a wide complex due to VT and that due to aberrant conduction, better treat as VT

ventricular tachycardia

Rate tachycardia

P wave may not be seen even if present is buried in the QRS complex

QRS complex- wide and regular

PR interval —

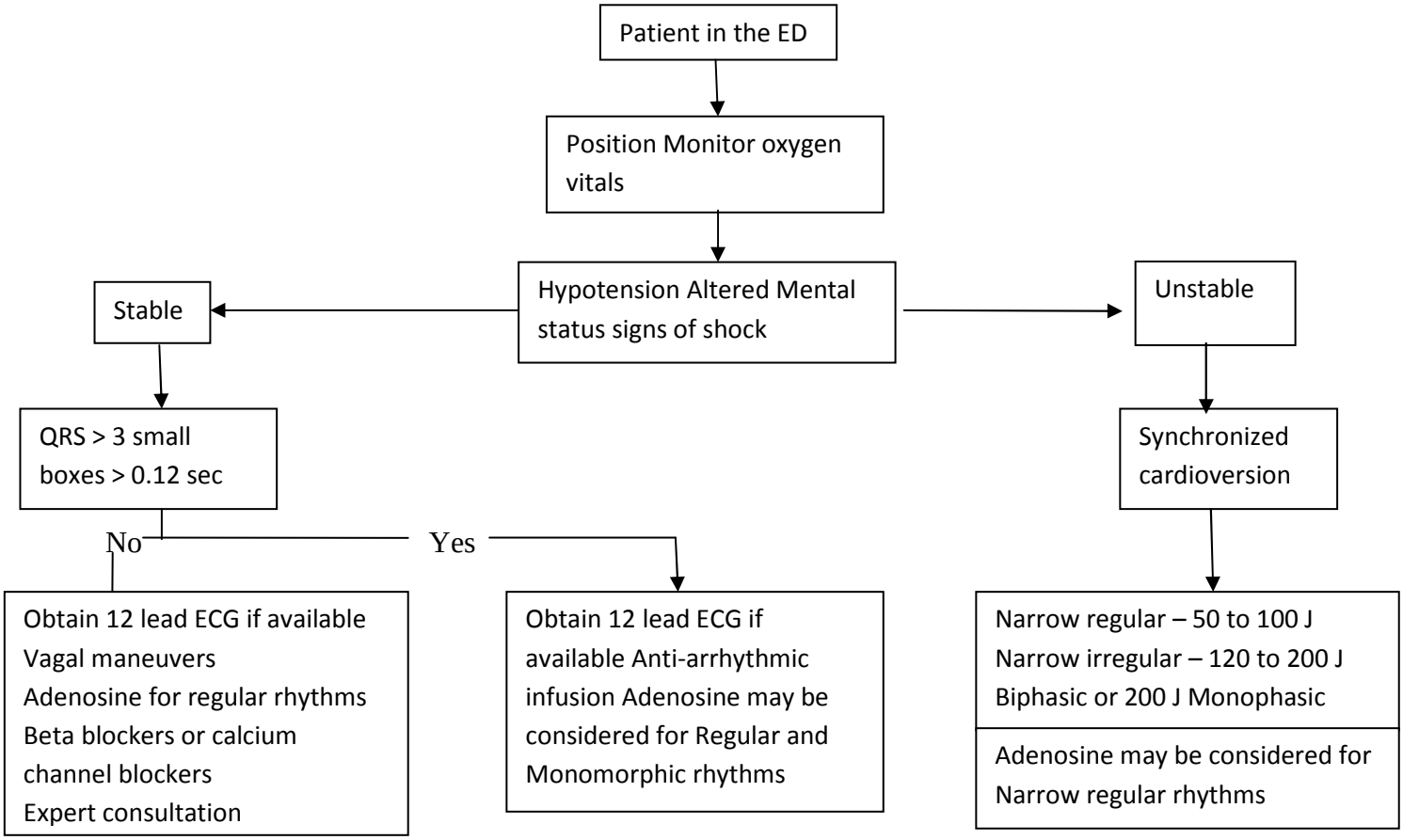
Sinus tachycardia with bundle branch block

Wolf-Parkinson white syndrome: Also called preexcitation syndrome, has a short PR interval, a delta wave-a slur at the upstroke of the R wave. The QRS complex is wide.

Wide complex irregular tachycardia

Atrial fibrillation with bundle branch block

Management of Tachycardia



Dosages: Adenosine: 6 mg fast IV immediately followed by NS bolus. Subsequent two doses 12 mg each

Anti-arrythmics:

1. Procoinomide:

    20-50 mg/min until arrhythmia suppressed, hypotension ensues, QRS duration increases > 50%, or maximum dose 17 mg/kg given

    Maintenance infusion of 1-4 mg/min

    Avoid if proloanged QT or CHF

2. Adenosine:

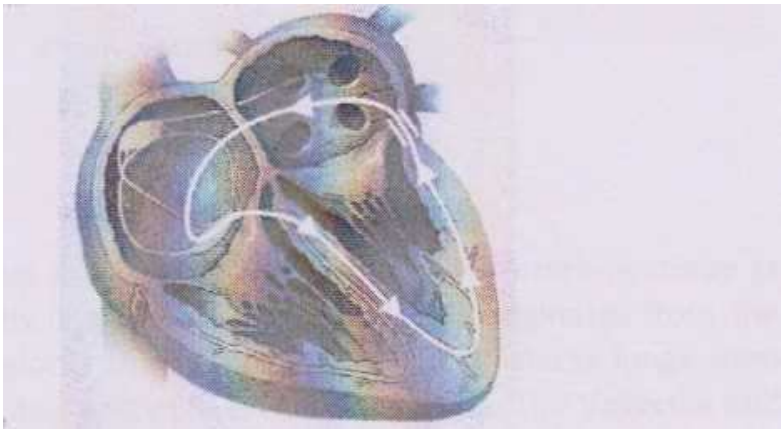
    150 mg slow IV over 15 min

    Maintenance infusion of 1 mg/min for next 6 hours

3. Sotalol:

    100 mg (1.5 mg/kg) over 5 min

    Avoid of prolonged QT



ALLERGY AND ANAPHYLAXIS

An individual's exaggerated immune response to a substance with which the body comes in contact involves release of bioactive molecules such as histamine, leukotrienes, and prostaglandins from inflammatory cells

Insect bites
Insect stings (bee)
Plants
Food, Medications, Chemicals

Position
Oxygen
Place Monitor
Vitals
IV line
Prepare drugs

AIRWAY BREATHING CIRCULATION

LABS

History Physical examination

More than 90% of patients have some combination of urticaria, erythemia, pruritus, or angioedema

- From sneezing and nasal congestion to frank bronchospasm and laryngeal edema
- Hypotension, dysrhythmias, myocardial ischemia nausea, vomiting, diarrhea
- Eye itching and tearing, conjuctival injection
- Activation of intrincsic coagulation pathway sometimes leading to disseminated intravascular coagulation, thrombocytopenia
- seizures

High flow O2
Intubate if required
Laryngeal edema failed intubation Needle cricothyrotomy / tracheotomy

Establish 2 large bore IV lines volume resuscitation for hypotension

<u>H1 Blockers</u>
Inj chlorpheneramine maleate IV/IM stat for In Diphenhydramine 25-50 mg IM/IV
<u>He blockers</u>
Inj ranitideine 50mg IV/IM/
Cimetidine 300 mg PO/IM/IV

B2 agonist inhalation
Salbutamol 5 mg in 2-5 ml NS

Inj Hydrocortisone 100 mg IV stat

Inj epinephrine 0.3 mg-0.5 mg IM
Repeat Q 15-20min Insusion if required 1-4 µgms / min

IF pt. on β blockers give Inj Glucagon 1-2 mg IM Q5M
Nebulise with Ipratropium bromide

REFERRAL and MANAGEMENT:
After early and extended clinical interventions, refer the patient to a centre with intensive medical care unit.

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