

Ep 23 Code Blue – Dr Jonathan Chan

Opening Remarks? 1:36

- High quality CPR is shown to be associated with better outcomes
- Intubation is not shown to be associated with better outcomes
- Chest compression only CPR is as good as CPR with ventilation

What do you do before attending to the patient? 2:54

- PPE – always protect yourself: Glove, gown, mask, eye protection (especially during COVID times)
- Consider preparing equipment: Gloves, IV cannula, tourniquet
- Manpower activation and allocation
- Information Gathering: Past medical issues, current medical issues; however, the patient should be seen first because time is of the essence

What are the immediate things you perform at the bedside? 8:09

- CHECK RESUSCITATION STATUS
- Quick corroborative history: What happened? Down time?
- Establish whether patient is really in cardiac arrest (pulse check) and rhythm
- Establish Privacy: Draw curtains/screens
- Optimise environment: Clear tables/bedside drawers, push the bed forward and remove headboard to make space for the airway personnel, adjust height of bed to facilitate intubation/CPR

How should roles be assigned? 11:26

Uninterrupted CPR with frequent rotation is key

IV access and drugs over ventilation

- First Responder
 - Call for help
 - Pulse check
 - Start CPR
 - Take note of timings
- Second Responder
 - Obtain IV access
 - Prepare IV adrenaline
 - Prepare to take over CPR
- Third Responder
 - Focus on airway
 - BVM (30:2 or 10:1 ratio)

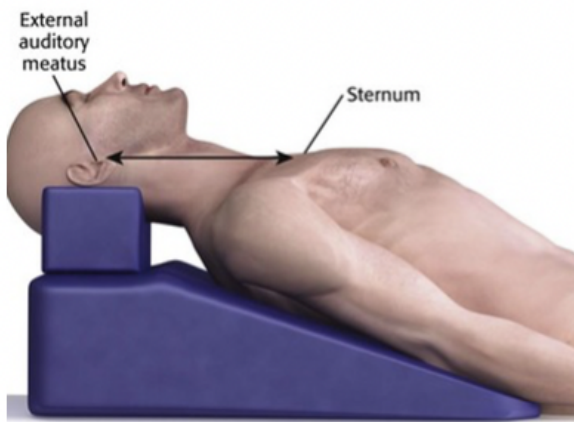
- If able to intubate, then proceed
- Forth Responder
 - Dedicated Scribe + Timer
- More people: Take over CPR, draw drugs, referrals etc

Role of the Scribe

- Call out whatever has not been done
- Remind regarding matters like pulse check, CPR change, take a step back and think about treating possible underlying cause of cardiac arrest

Airway 19:27

- Positioning
 - Sniffing morning air position: Flexion of C-spine and extension of atlanto-occipital joint; alignment of oral-pharyngeal-laryngeal axes
 - Facilitated by having something under the patient's head: Pillow or rolled up blanket
 - Tragal line should be anterior to the sternum – in a patient of large habitus, will need to ramp the patient up from the back upwards (as per the image)



- Equipment Preparation
 - Working laryngoscope with working batteries
 - Suction
 - Blade sizes: Size 3 or 4
 - ETT Size: 7 for women, 8 for men
 - Consider using a bougie up front if inexperienced
- If endotracheal intubation fails, return to BVM and escalate to the airway team

Breathing 25:58

- While ventilation is important, ensuring uninterrupted CPR is more critical in the collapsed patient because
 - In these states, ensuring systemic circulation with good chest compressions for any O₂ delivery often more rate limiting
 - Good passive recoil in CPR achieves some degree of ventilation through negative pressure mechanics
- Ventilation
 - Rate
 - § 30:2 – Synchronised OR
 - § 10:1 – Un-synchronised
 - Bag 1/3 the mask (~400-600ml) each time at a low rate in order to reduce gastric insufflation and barotrauma; DON'T BAG TOO HARD OR TOO QUICKLY
- Assessing for reversible respiratory pathology (e.g. tension pneumothorax)
 - Assessment during pulse check; but important to not let assessment interrupt CPR
 - Asthma: May need to give continuous MDI bronchodilator puffs
 - Pulmonary Embolism: Definitive treatment is rTPA

Circulation 30:48

- Coronary perfusion pressure = diastolic pressure at aorta – right atrial pressure
 - Increasing diastolic pressure at aorta: Push hard (4-5cm) + Push fast (100BPM)
 - Decrease R atrial pressure: Full recoil and frequent changing of rescuers every 2 minutes
 - Minimise interruptions to CPR
- Role for IV hydration usually takes a backseat in an acute resuscitation unless there is a clear hypovolemic source

Defibrillation 34:03

- 3 phases of VF arrest:
 - Electrical phase (first 4 minutes): Susceptible to defibrillation
 - Circulatory phase (4-10 minutes): Heart is more susceptible to defibrillation after some degree of perfusion; hence suggest to perform 1 cycle of CPR before defibrillation
 - Metabolic phase (after 10 minutes): Success of defibrillation and CPR is significantly lowered; consideration of ECMO or therapeutic hypothermia
- ACLS:
 - If shockable rhythm, shock immediately
 - Follow by 2 minutes of continuous CPR straight (without intervening pulse check after shock)

Medications 28:54

- Adrenaline
 - Works by alpha adrenergic effect (peripheral vasoconstriction)
 - Higher doses or more frequent doses of adrenaline are not associated with better outcomes because of worsening ischemia, increased myocardial O2 demand
 - Recommendation: every 3-4 minutes (~ every 2 pulse checks); *common mistake is adrenaline is given with every pulse check*
- Sodium Bicarbonate
 - Indicated in severe hyperkalemia or TCA overdose
 - Should not be given routinely because of risk of respiratory acidosis and high sodium load has its ill effects

Operationalising ACLS Algorithms 32:14

- Shockable Rhythm

Time	0	2	4	6
CPR	→			
Defibrillation	Y	Y	Y	Y
Adrenaline		Y		Y
Amiodarone		300 mg	150 mg	-

- Adrenaline usually given at second shock (rather than upfront)
- Amiodarone given in refractory VF (if VF is still present after 2 minutes of CPR)
- Non-shockable rhythm

Time	0	2	4	6
CPR	→			
Defibrillation				
Adrenaline		Y		Y
Amiodarone				

OR

Time	0	2	4	6
CPR	→			
Defibrillation				
Adrenaline	Y		Y	
Amiodarone				

- Adrenaline given every alternate pulse check (can give upfront or after 1 cycle of CPR depending whether adrenaline is immediately available)
- Intervention (adrenaline/amiodarone/defib) is given AFTER a pulse check rather than in the middle of CPR

Where and when do investigations fit into the picture? 35:30

- Investigations generally are secondary priority in the midst of a resuscitation because
 - Most of the blood test don't immediately change management in resuscitation until ROSC happens, and take some time to come out
 - Interpretability of labs like acidemia/hyperkalemia is challenging – *is it the cause or effect of the collapse?*
 - Blood taking can be dangerous in the midst of a resus
- There might be a role for a blood gas – if hyperkalemia is shown early into the resuscitation, hyperkalemia should be treated
- For most other tests (laboratory and imaging), they can be performed post resus

What to do after ROSC/Post ROSC bundle? 38:24

- Clinical Targets
 - SpO₂: 94-98%
 - Normocarbia: pCO₂ ~ 40
 - MAP: >65
 - Normoglycemia
- Investigations: 12 lead ECG (check for STEMI which may need PCI), CXR, other labs
- Post-ROSC Medications: Amiodarone (for VF), Sodium Bicarbonate (TCA), Sedation/Analgesia (if patient starts waking up)
- Specialist Consults
- Protect the secured airway
- Ventilation at faster rate to correct acidosis - ~20 breaths/min

Preparing and Executing Transfers 41:05

- Know routes and timings to destination
- Make journey as smooth as possible

- Plan manpower (adequate expertise to troubleshoot a ventilated patient/manage infusions) – DOPES mnemonic
 - Displacement of ETT
 - Obstruction of ETT
 - Patient: Pneumothorax/PE/Pulmonary edema
 - Equipment: Ventilator problems
 - Stacked Breaths: Bronchospasm and ventilator settings
- Airway: Ensure the ETT is always held and stabilized to prevent displacement
- Breathing: Check oxygen tank supply, ensure BVM is pre-assembled prior to transfer
- Circulation: Ensure sufficient medications
- Disability: Lorazepam if you anticipate seizures
- Ensure that receiving team (i.e. ICU) is ready to receive the patient

Take Home Points 44:42

- Don't interrupt CPR + Frequent changeovers
- Scribe and take note of timings