The First Four Actions
- The first four actions are the initial steps that must be taken in every cardiac arrest. If you walk in the room, and the patient has just lost a pulse, these are the first things you must initiate:
  - Begin chest compressions
  - Get pads on the patient, charge the defibrillator
  - Start BVM to oxygenate/ventilate the patient
  - Give 1 mg of epinephrine (place IO if needed)

Treatment During Arrest
- The treatment algorithms can be complicated to remember and especially difficult to recall while leading the resuscitation of a cardiac arrest. A simplified treatment algorithm is as follows:
  - Everyone: Epinephrine 1 mg Q3-5 minutes. V Fib, unstable V Tach, PEA, and asystole all receive epinephrine. The hope is that epinephrine will help raise the blood pressure enough to perfuse the coronaries to increase the likelihood of successful electrical cardioversion
  - V Fib/V tach
    - Electrical defibrillation: 200 J Biphasic, 360 J monophasic
    - Amiodarone 300 mg IVPB followed by a 150 mg IVPB if conversion not achieved
    - Can also consider lidocaine (1.5 mg/kg or 100 mg) for VF/pulseless VTach
    - If VTach is suspected to be Torsades de pointes, give magnesium (2g in 10 mL D5W administered over 5 min)
    - Consider calcium chloride, dextrose, or sodium bicarbonate as indicated based on known medical history
  - PEA/Asystole:
    - Epi and compressions
    - Consider giving Ca/glucose/bicarb
  - Consider tPA for suspected pulmonary embolism (PE) or acute myocardial infarction (AMI)
    - PE: If a cardiac arrest patient has confirmed PE, major risk factors for PE, or bedside ultrasound findings concerning for PE (RV strain pattern), consider giving tPA
    - AMI: Obtain an EKG immediately following ROSC. If a STEMI is present, activate cath lab. If patient is too unstable for the cath lab or not at cath center, consider pushing tPA in consultation with a cardiologist
    - tPA dosing: 50-100 mg push, generally CPR should be continued for at least 15 minutes following administration of tPA
  - The most important factors in ACLS are good chest compressions and electrical cardioversion when indicated. Give everyone epi and start thinking through more advanced treatments tailored to the reversible causes

Reversible Causes
- Remembering the H’s and T’s is another tough challenge. Think through reversible causes like you think through every critically ill patient:
  - Airway/Breathing: hypoxia, tension pneumothorax
• BVM/intubate patient, listen for bilateral breath sounds (or use US) and needle decompress if tension pneumothorax present
  - Circulation: Hypovolemia, Myocardial Infarction, Tamponade, PE
    • Use cardiac US to diagnose tamponade, RV strain (could be PE or AMI)
    • Look for signs of wall motion abnormalities or “blown-out” poorly contracting LV concerning for AMI/LAD lesion
    • Give fluids. One of the most common causes of in hospital PEA is hypovolemia (also helpful in an RV infarct)
    • Consider tPA if suspicion for AMI/PE. Some data show large survival benefit with tPA in massive PE
    • Get an EKG if you get ROSC
  - Drugs/Metabolic: Hyperkalemia, Na channel blockers/BB/CCB, Acidosis, Hypoglycemia, Hypo/Hyperthermia
    • Obtain stat VBG
    • Calcium will help stabilize cardiac membrane in hyperkalemia
    • Sodium bicarb pushes will treat Na Channel Blockade (look for wide QRS). Bicarb drips are never effective for this indication
    • Glucose for hypoglycemia
    • Will likely see wide QRS on EKG with hyper K, Na blockers, acidosis
    • Look for sinus bradycardia and AV nodal blocks in BB/CCB overdose
  - ROSC Management
    • Again, start over with your ABCs, as done with every critical patient
      - Airway/Breathing: intubate, avoid hypoxia, avoid hypercarbia
        • Low tidal volume ventilation (6-8 cc/kg)
        • Order post intubation sedation/analgesia
        • Check ABG
      - Circulation: fluids as needed, norepinephrine/vasopressors as needed
        • Post-ROSC patients develop distributive shock
        • Obtain adequate resuscitative lines (which can large bore peripheral lines)
        • Place central venous catheter and/or arterial line for additional access and monitoring as able.
    • Disability/Neuro: targeted normothermia or hypothermia per hospital guidelines
  - EKG = Disposition
    • Cath Lab vs ICU
    • STEMIs: get these patients to the cath lab
      • You can see ST elevation in post arrest patients simply due to compressions/epinephrine/shocks. Consider rechecking another EKG in 15 minutes
      • An initial rhythm of V fib is predictive for AMI
    • No STEMI: discuss the utility of cardiac catheterization with cardiology, 20-30% of these patients will still have a culprit lesion

References

https://foundationsem.com/