POLTAVA STATE MEDICAL UNIVERSITY
Department of Anesthesiology and Intensive Care

Cardiac arrest

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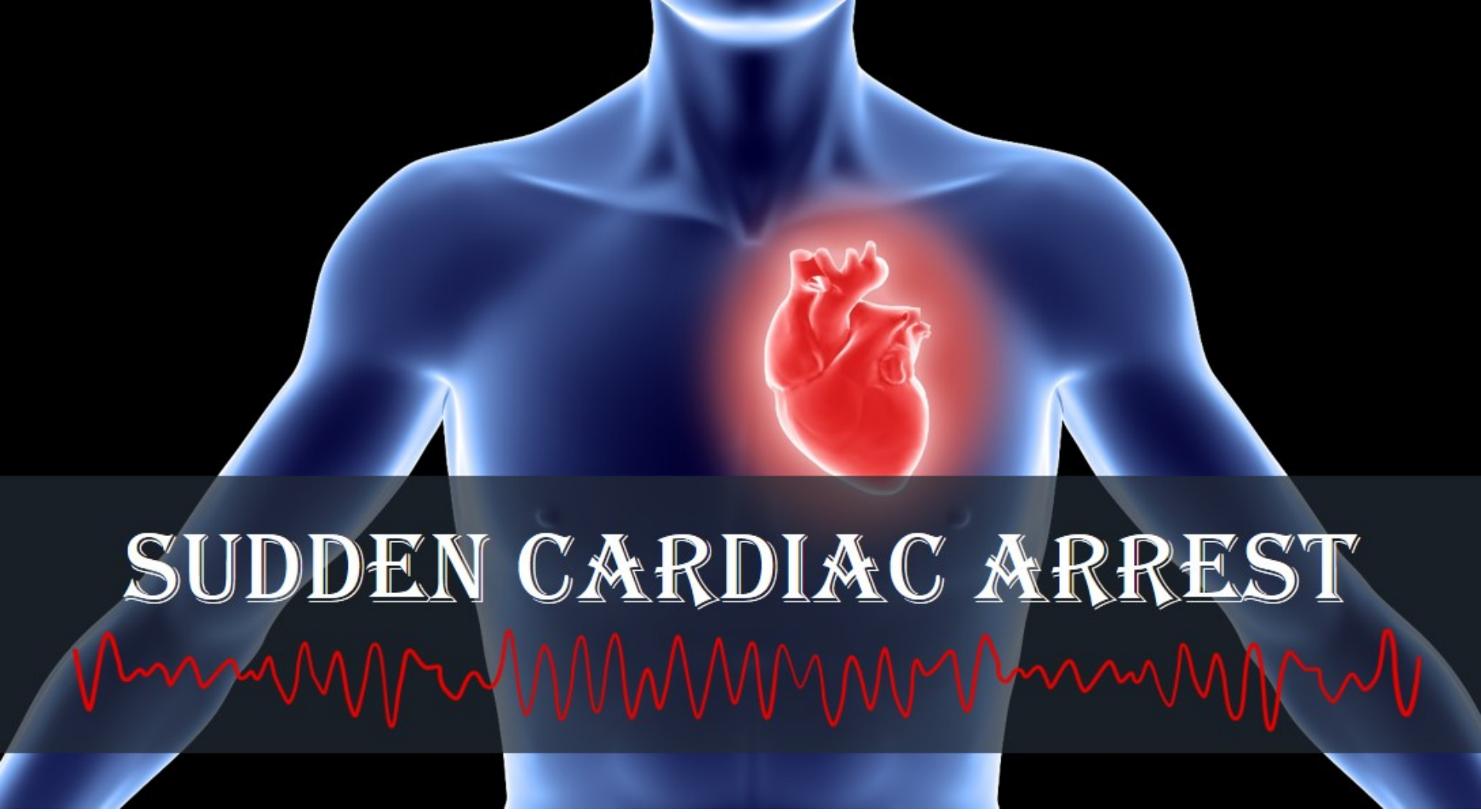
assistant professor

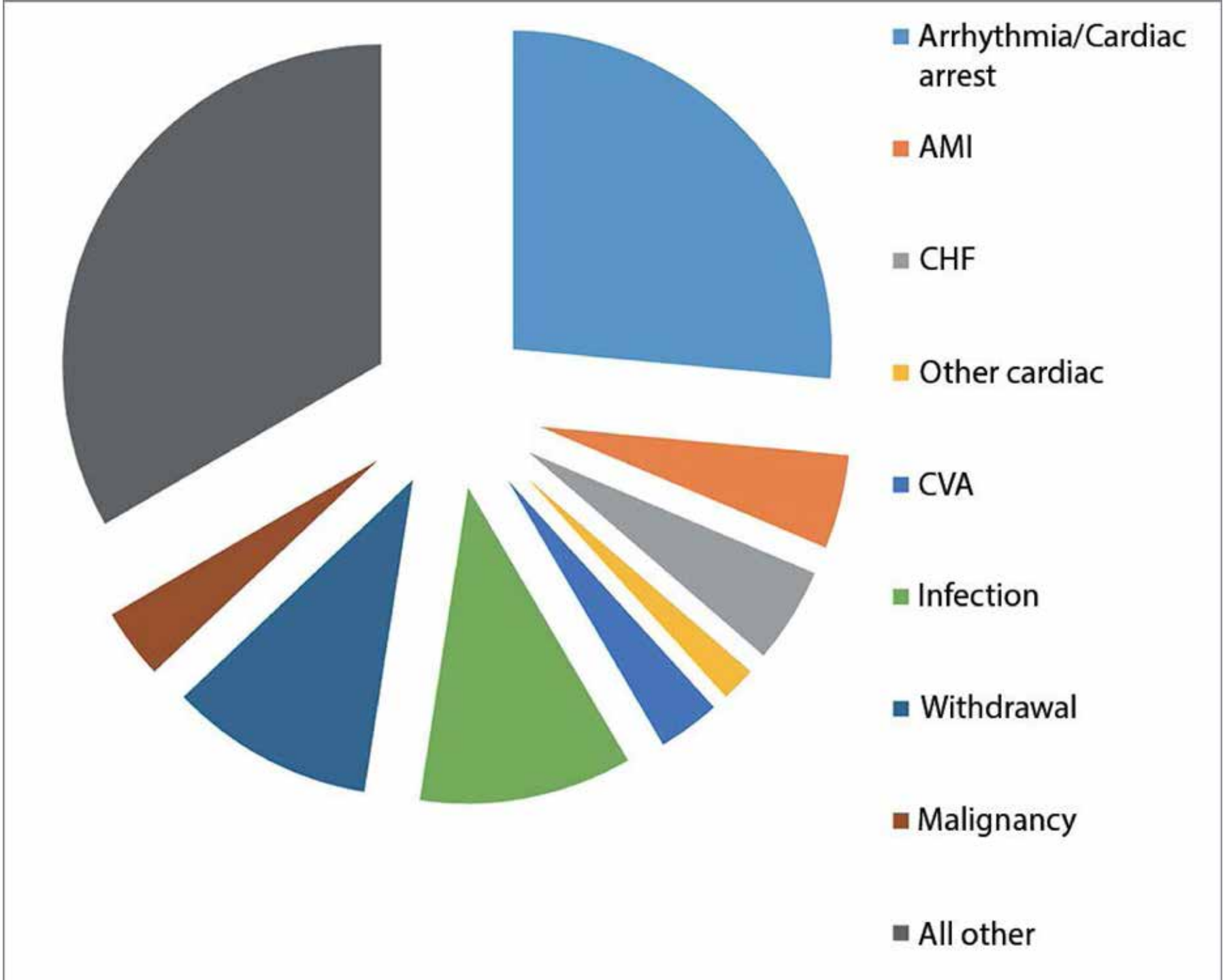


a sudden loss of blood flow resulting from the failure of the heart to pump effectively.

- SCA claims an estimated 325,000 lives each year
  - 1,000 lives every day, one life every two minutes
- SCA accounts for half of all cardiac-related deaths
- Over half of SCA victims have no prior symptoms
- Survival requires emergency medical intervention and defibrillation within the first few minutes following arrest
- The survival rate is as high as 90 percent if treatment is initiated within the first few minutes following arrest

[1]Heart Rhythm Society. "Sudden Cardiac Arrest Facts". 2008. HRS Online Feb 2009

Potentially reversible condition !!!


Arrhythmia/Cardiac arrest
AMI
CHF
Other cardiac
CVA
Infection
Withdrawal
Malignancy
All other

Cardiac arrest recognition

- Loss of consciousness
- Absence of pulse
- Not breathing normally, agonal breathing

Diagnosis **of cardiac arrest** only 10 sec.

Breathing

- Look
- Listen
- Feel

Pupils lie

atropine poisoning

eye injuries
iridocyclitis
eye prosthesis

DO NOT resuscitate!!!

- manifestations of biological death;
- injury incompatible with life;
- the last stage of incurable diseases;
- refusal of resuscitation

DO NOT resuscitate!!!

manifestations of biological death

Livor mortis

Rigor mortis

DO NOT resuscitate!!!

Injury incompatible with life

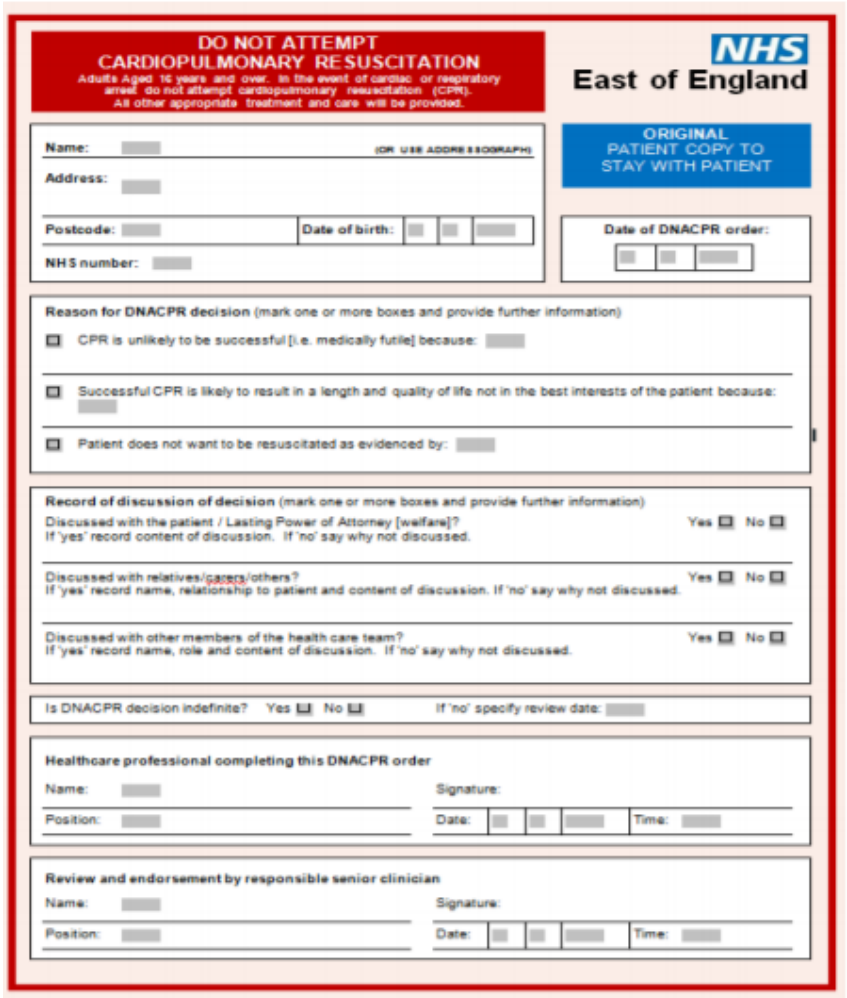
DO NOT resuscitate!!!

Incurable diseases

- **Cancer**
- **AIDS**
- **Tuberculosis**
- **Liver cirrhosis**
- **Multiple sclerosis**
- **Dementia (Alzheimer's disease)**

DO NOT resuscitate!!!

Refusal of resuscitation



DO NOT ATTEMPT CARDIOPULMONARY RESUSCITATION

Adults Aged 16 years and over. In the event of cardiac or respiratory arrest do not attempt cardiopulmonary resuscitation (CPR). All other appropriate treatment and care will be provided.

NHS East of England

Name: (OR USE ADDRESSOGRAPH)

Address:

Postcode: Date of birth:

NHS number:

ORIGINAL PATIENT COPY TO STAY WITH PATIENT

Date of DNACPR order:

Reason for DNACPR decision (mark one or more boxes and provide further information)

- ☐ CPR is unlikely to be successful [i.e. medically futile] because:
- ☐ Successful CPR is likely to result in a length and quality of life not in the best interests of the patient because:
- ☐ Patient does not want to be resuscitated as evidenced by:

Record of discussion of decision (mark one or more boxes and provide further information)

Discussed with the patient / Lasting Power of Attorney [welfare]? Yes ☐ No ☐
If 'yes' record content of discussion. If 'no' say why not discussed.

Discussed with relatives/carers/others? Yes ☐ No ☐
If 'yes' record name, relationship to patient and content of discussion. If 'no' say why not discussed.

Discussed with other members of the health care team? Yes ☐ No ☐
If 'yes' record name, role and content of discussion. If 'no' say why not discussed.

Is DNACPR decision indefinite? Yes ☐ No ☐ If 'no' specify review date:

Healthcare professional completing this DNACPR order

Name: Signature:
Position: Date: Time:

Review and endorsement by responsible senior clinician

Name: Signature:
Position: Date: Time:

Chain of life

Basic Life Support

Algorithm

Adults

CAB

1 cycle = 30 chest compressions to 2 rescue breaths

Children

ABC

1 cycle = 2 rescue breaths to 15 chest compressions

C

Stop massive bleeding

C

Place the victim on a hard surface

Compressions

- Place your palms midline, one over the other, on the lower 1/3 of the patient's sternum between the nipples.
- Provide 100 to 120 compressions per minute.
- Ppress to a depth of 5-6cm.
- Press hard and fast.
- Allow for full chest recoil with each compression

A

Triple Safar maneuver

Head Tilt-Chin Lift maneuver:
place your palm on the patient's forehead and apply pressure to tilt the head backward.
place the fingers of your other hand under the mental protuberance of the chin and pull the chin forward and cephalic.

Triple Safar maneuver

Jaw-Thrust maneuver :
Place your thumbs on the upper cheek bones.
Place your fingers on the lower rami of the jaw.
Provide anterior pressure to advance the jaw forward.

Bag Valve Mask

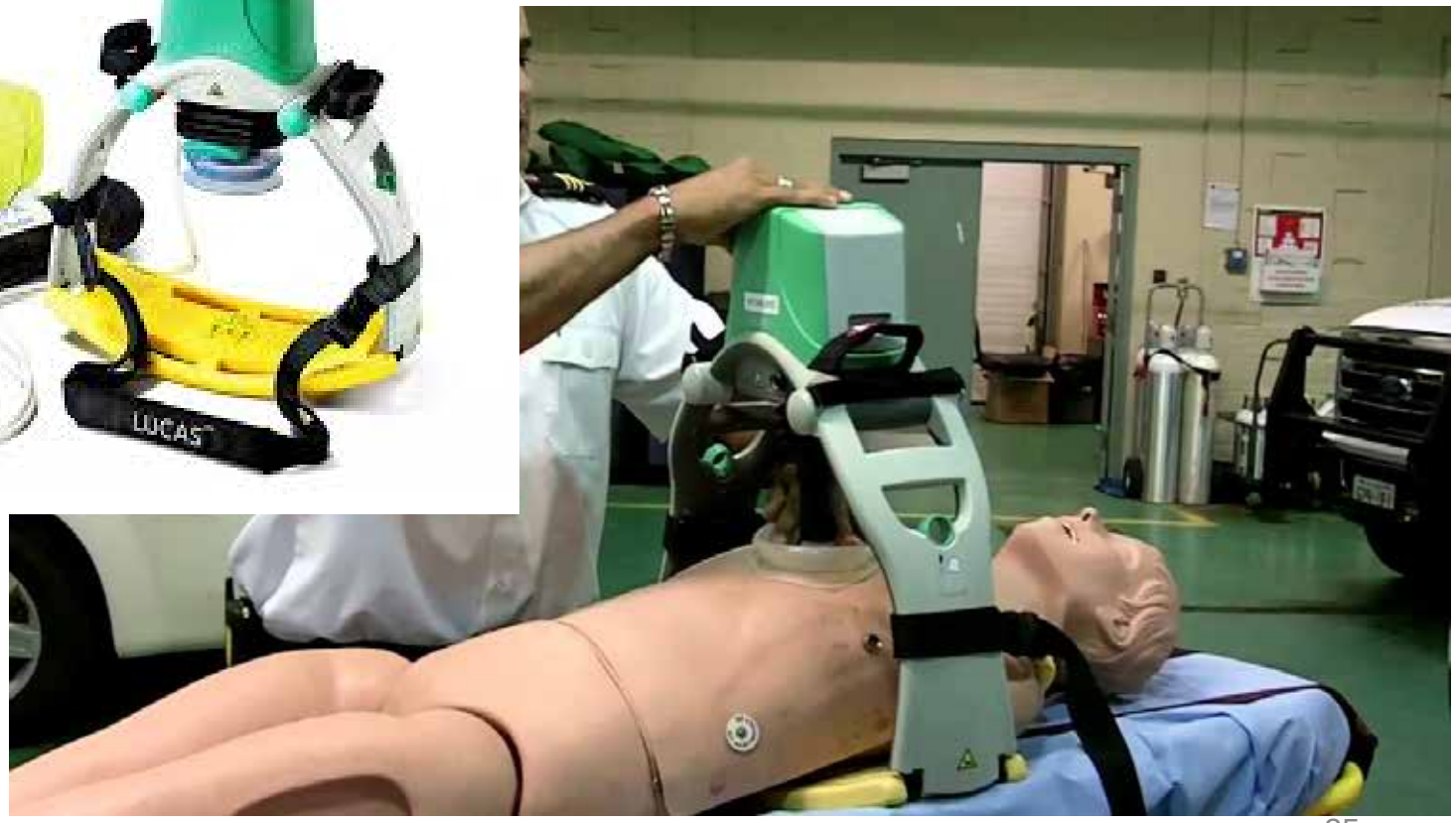
Advanced Life Support

Advanced Life Support

CPR Quality

- Push hard (2" to 2.4" or 5–6cm) and fast (100–120/min) and allow complete chest recoil.
- Minimize interruptions in compressions.**
- Avoid excessive ventilation
- Rotate compressor every 2 minutes
- If no advanced airway, 30:2 compression-ventilation ratio
- Quantitative waveform capnography
- If $PETCO_2$<10mm Hg, attempt to improve CPR quality
- If relaxation phase(diastolic) pressure<20mm Hg, attempt to improve CPR quality.

Chest Compression System

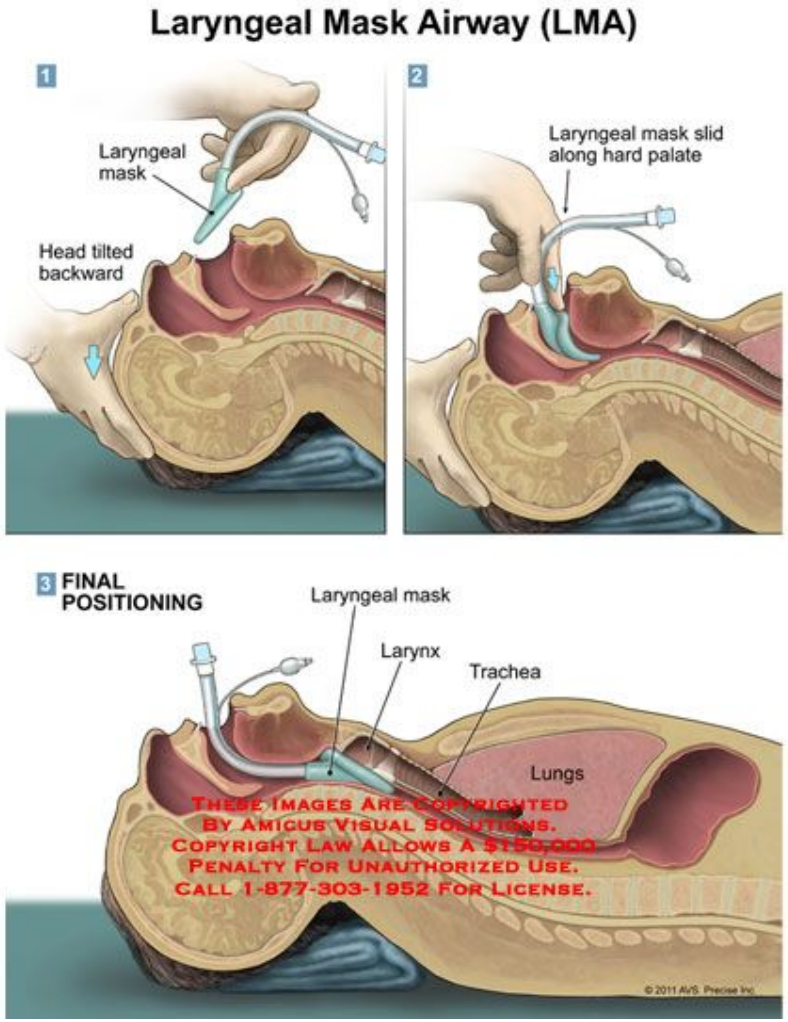


Advanced Life Support

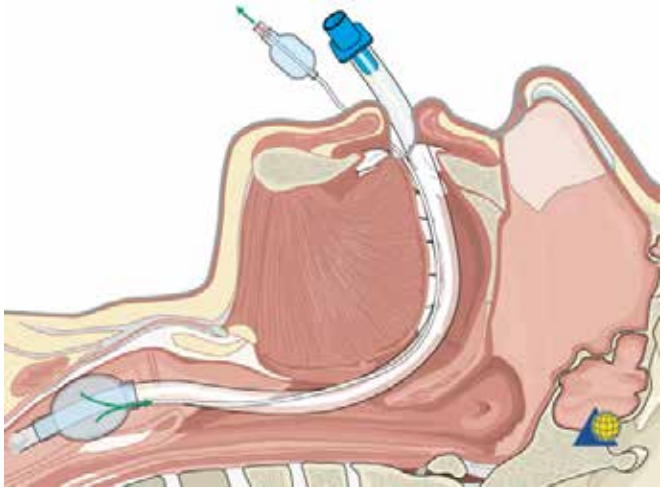
Advanced Airway****

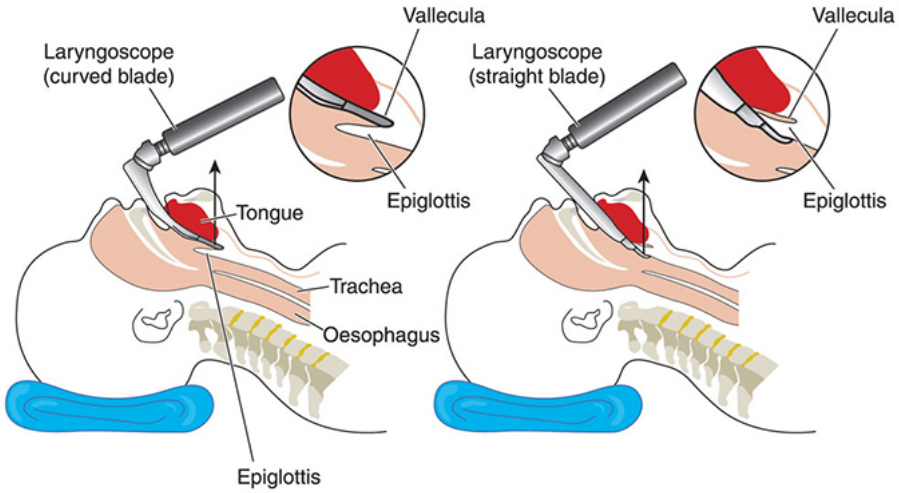
- Supraglottic advanced airway or endotracheal intubation
- Waveform capnography to confirm and monitor ET tube placement
- 10 breaths per minute with continuous chest compressions

Laryngeal Mask

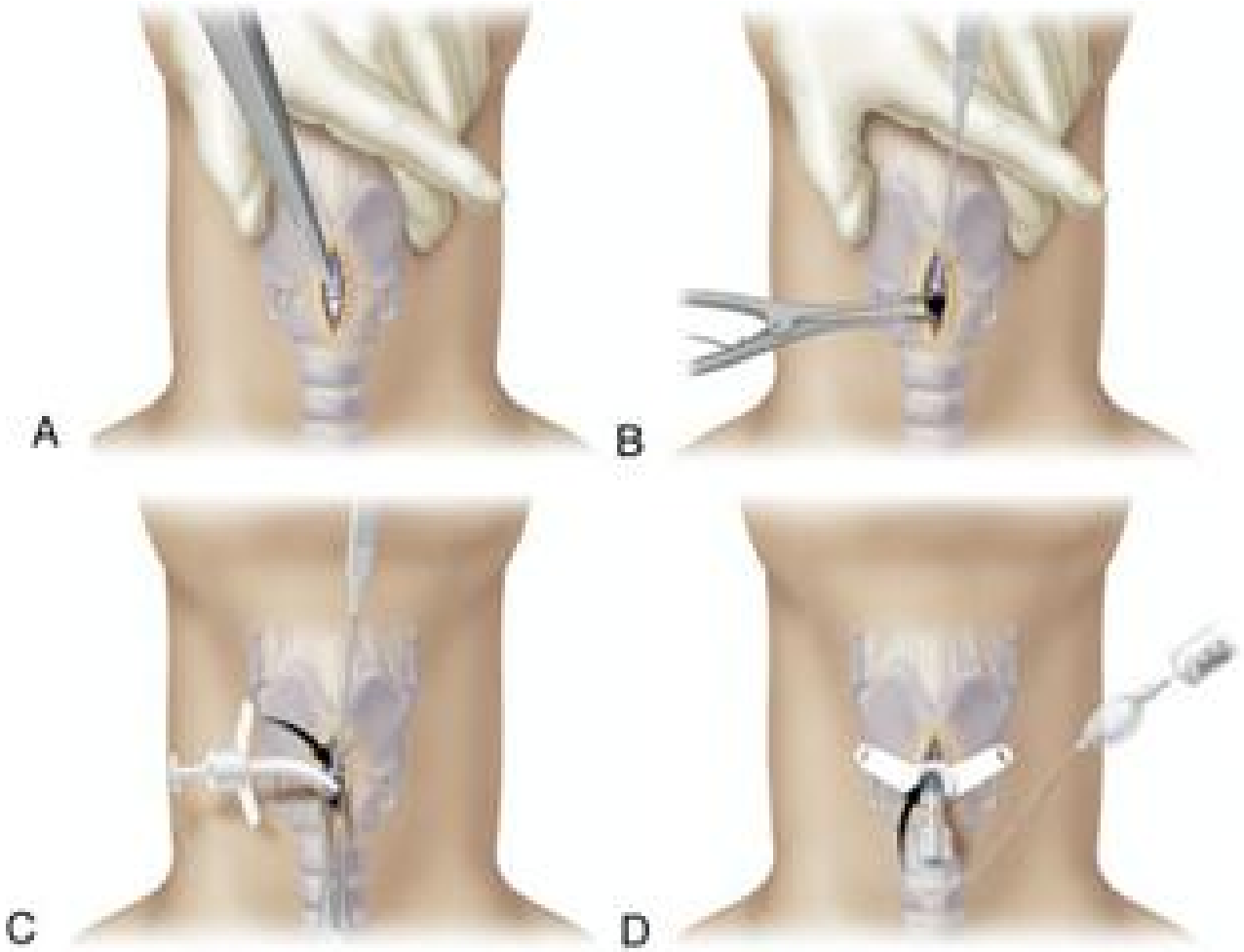


Trachea intubation

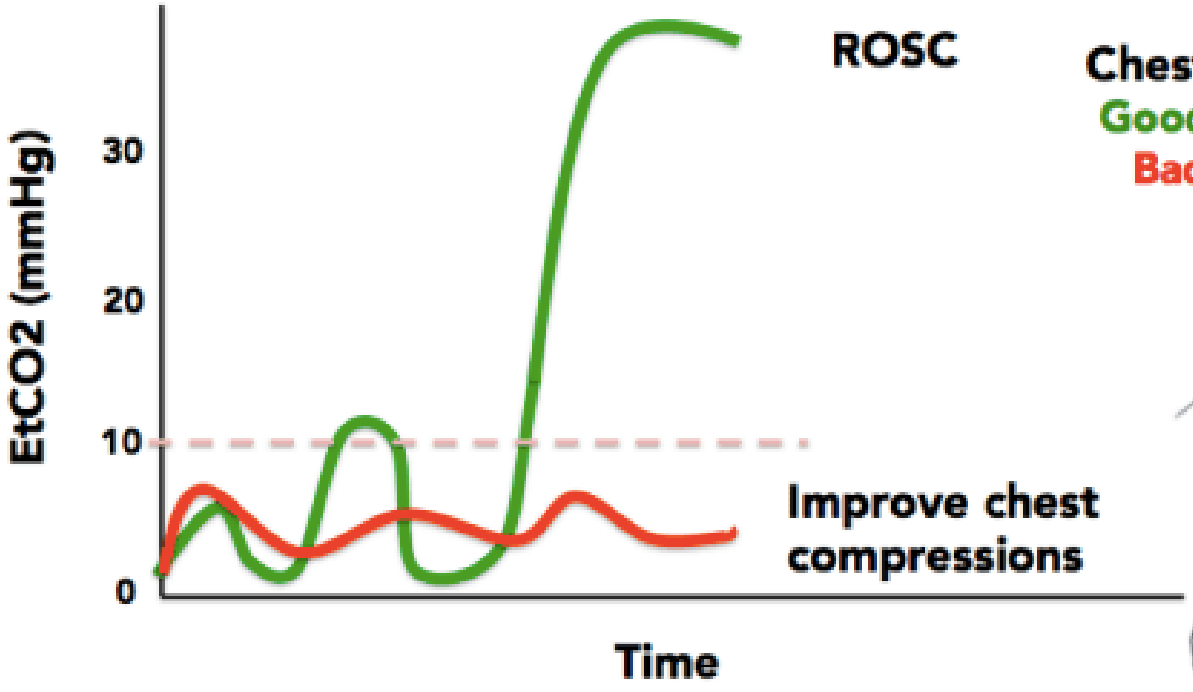




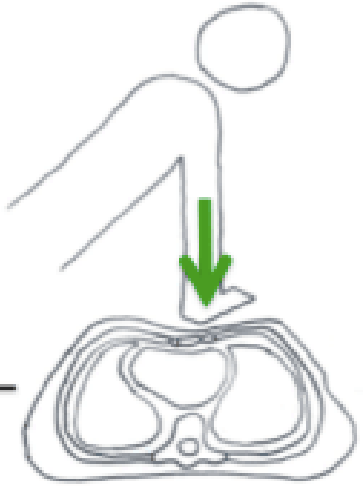
Conicotomy



End-Tidal CO_2 in Cardiopulmonary Resuscitatio



Chest compression depth:
Good: 2-2.4 inches (5-6 cm)
Bad: < 2 inches (< 5 cm)

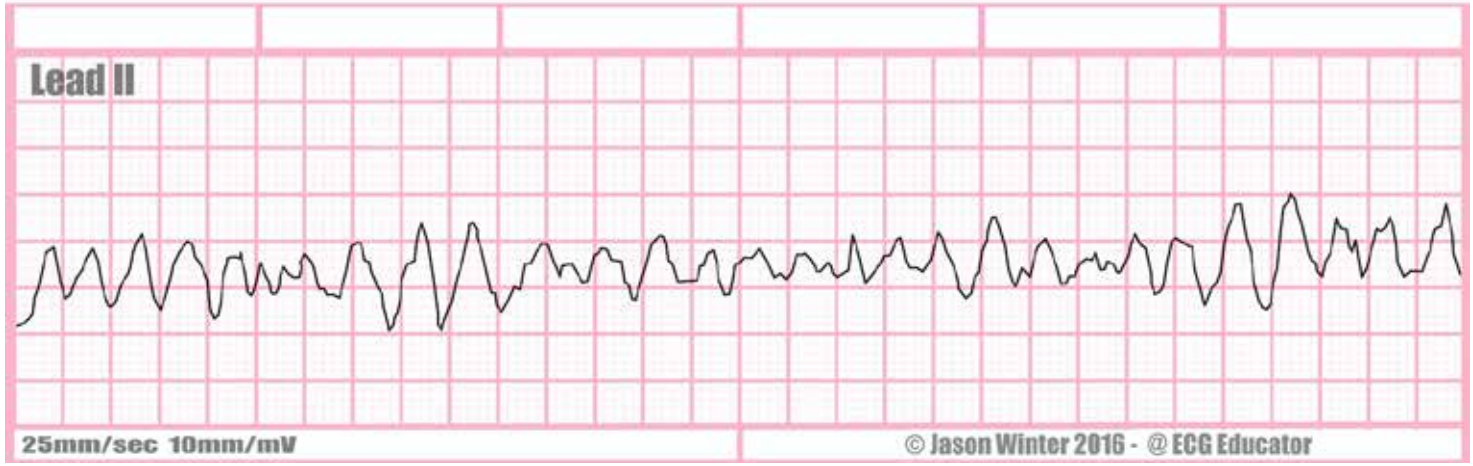


B

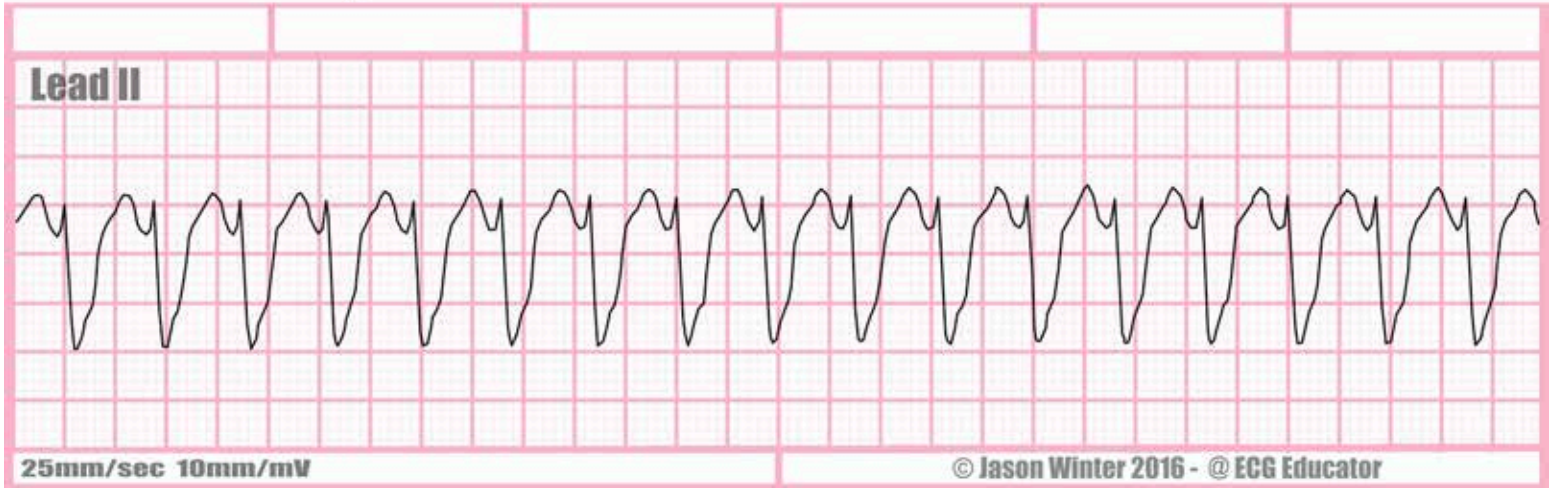
Bag Valve Mask

ECG

Ventricular Fibrillation (VF)

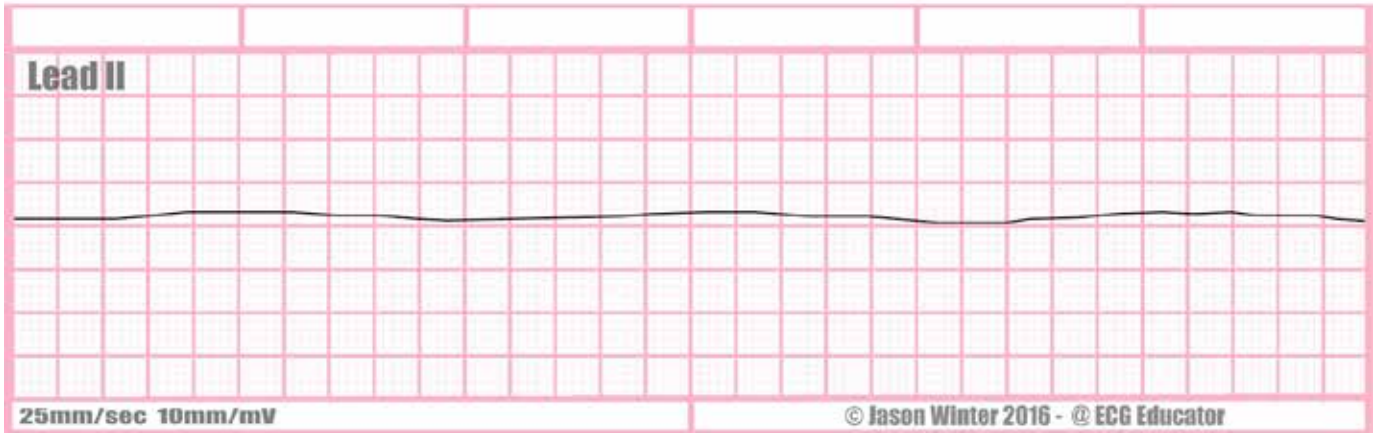


Ventricular Tachycardia (VT)

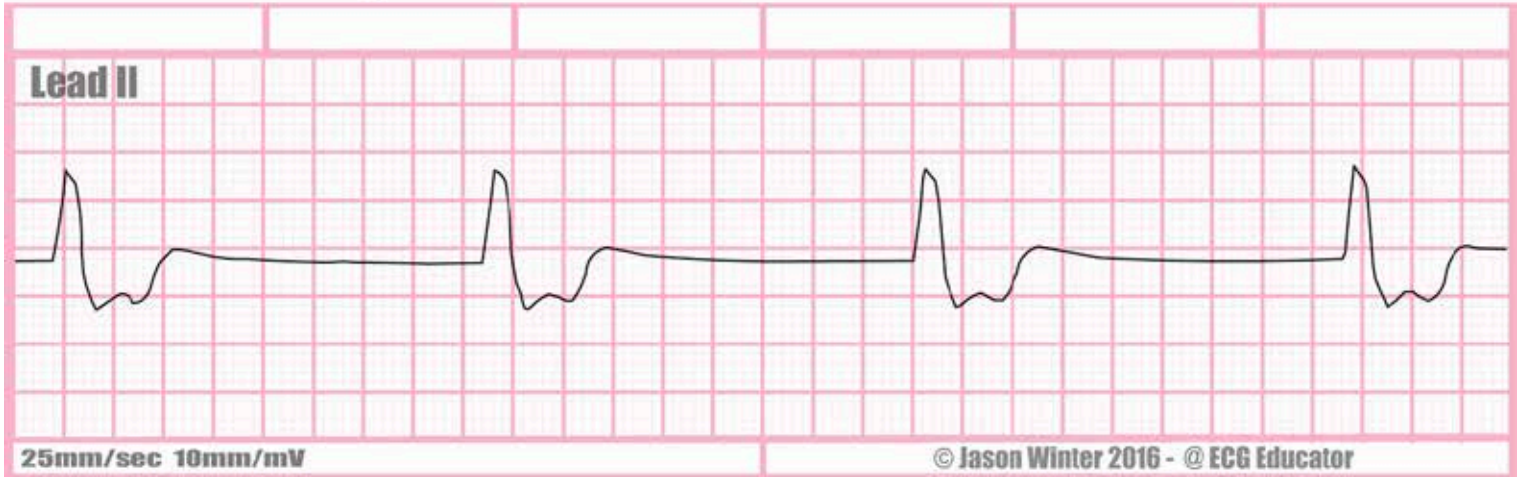


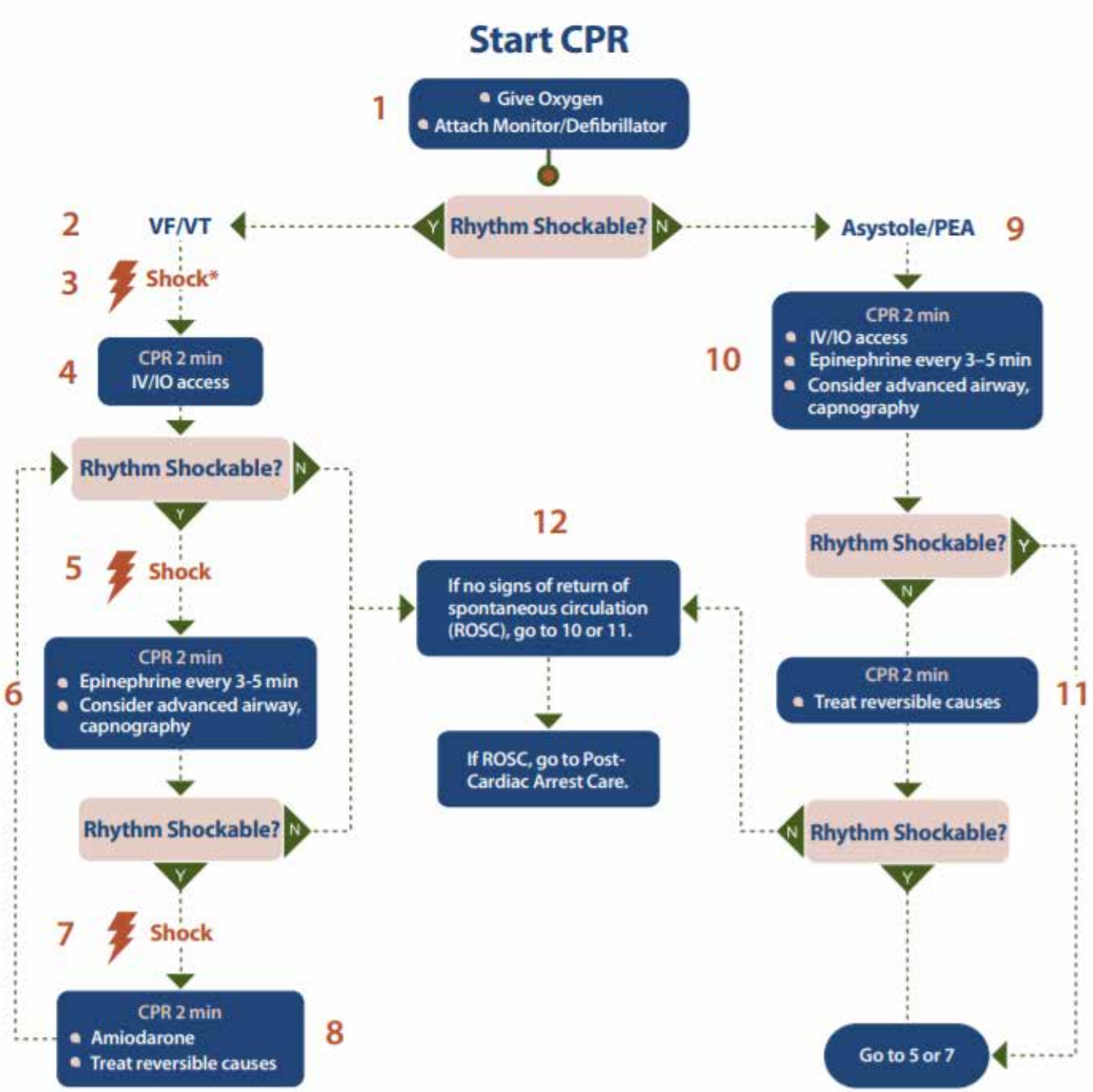
ECG

ASYSTOLE

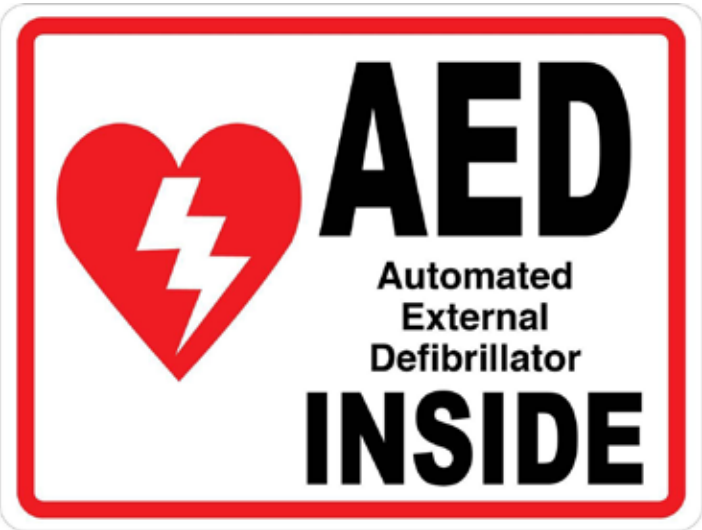


Idioventricular Rhythm

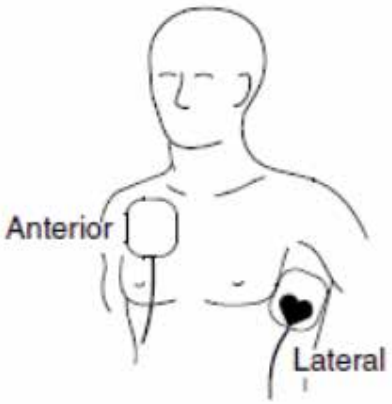



Start CPR
1
Give Oxygen
Attach Monitor/Defibrillator
Rhythm Shockable?
Y
N
2
VF/VT
3
Shock*
4
CPR 2 min
IV/IO access
Rhythm Shockable?
N
Y
5
Shock
6
CPR 2 min
Epinephrine every 3-5 min
Consider advanced airway, capnography
Rhythm Shockable?
N
Y
7
Shock
8
CPR 2 min
Amiodarone
Treat reversible causes
9
Asystole/PEA
10
CPR 2 min
IV/IO access
Epinephrine every 3–5 min
Consider advanced airway, capnography
Rhythm Shockable?
Y
N
11
CPR 2 min
Treat reversible causes
Rhythm Shockable?
N
Y
Go to 5 or 7
12
If no signs of return of spontaneous circulation (ROSC), go to 10 or 11.
If ROSC, go to Post-Cardiac Arrest Care.

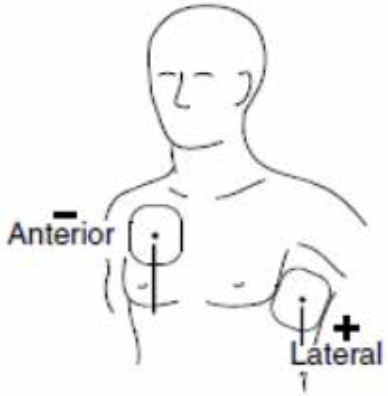
Defibrillation



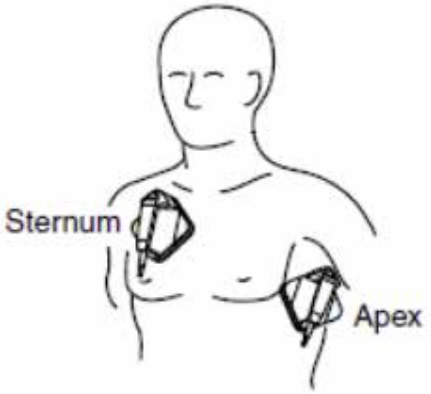
Defibrillation



QUIK-COMBO Electrodes



FAST-PATCH Electrodes



Standard Paddles

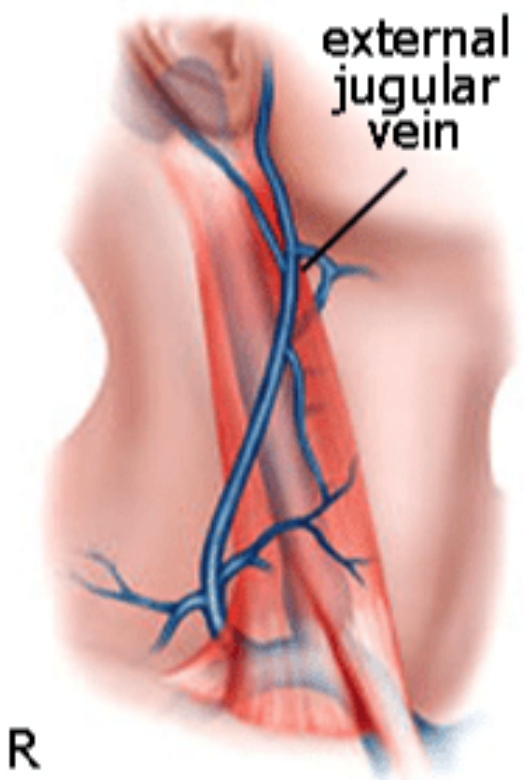
Defibrillation

Shock Energy

- Biphasic: Manufacturer recommendation (eg. initial dose of 120–200 J): if unknown, use maximum available.
- Second and subsequent doses should be equivalent, and higher doses may be considered
- Monophasic: 360 J

IV / IO access

IV access



IO access

FAST 1

BIG

EZ-IO

IO access

Indications:
•more than two attempts IV access
•attempt duration more than 90 sec

Contraindications:
•fracture of the bone into which the infusion is planned;
•skin infection at the puncture site;
•the presence of intramedullary metal structures in the bone;
•preliminary use of this bone for intraosseous infusion;
•burn at the puncture site (relative);
•osteoporosis and imperfect osteogenesis (relative).

IO access

IO Infusion Rates Under Pressure (300mmHg): Cadaver Study

Outcome	Sternum	Humerus	Proximal Tibia
Mean Flow Rate	93.7 mL/min	57.1 mL/min	30.7 mL/min
1st Attempt Success Rate	100%	100%	81%

BOTTOM LINE: The IO site with the highest 1st attempt success rate and infusion rate was the sternum > humerus > proximal tibia.

REBEL REVIEWS

PMID: 25757113

IO access

Flow Rates in IV/IO Access

Gauge	Approximate Flow Rate to Gravity (mL/min)	Time to Infuse 1L (min)
14G	250	4
16G	150	7
Cordis	130	8
18G	100	10
15G Humeral IO	80	13
16G Distal Port Triple Lumen	70	15
15G Tibial IO	70	15
20G	60	17
22G	35	29
18G Prox Port Triple Lumen	30	34

REBEL REVIEWS

PMID: 20581377; 20157465

Intracardiac Injection

Strongly contraindicated!

Reversible Causes

- Hypovolemia
- Hypoxia
- Hydrogen ion (acidosis)
- Hypo-/Hyperkalemia
- Hypothermia
- Tension pneumothorax
- Tamponade, cardiac
- Toxins
- Thrombosis, pulmonary
- Thrombosis, coronary

Literature

- Perkins GD, Graesner JT, Semeraro F, et al. European Resuscitation Council Guidelines 2021: Executive summary [published correction appears in Resuscitation. 2021 May 4;163:97-98]. Resuscitation. 2021;161:1-60. doi:10.1016/j.resuscitation.2021.02.003
- Olasveengen TM, Semeraro F, Ristagno G, et al. European Resuscitation Council Guidelines 2021: Basic Life Support. Resuscitation. 2021;161:98-114. doi:10.1016/j.resuscitation.2021.02.009
- Van de Voorde P, Turner NM, Djakow J, et al. Lebensrettende Maßnahmen bei Kindern (Paediatric Life Support, PLS): Leitlinien des European Resuscitation Council 2021 [Paediatric Life Support] [published online ahead of print, 2021 Jun 2]. Notf Rett Med. 2021;1-70. doi:10.1007/s10049-021-00887-9

Questions?