Advanced Life Support - Guidelines 2010 (ALS)

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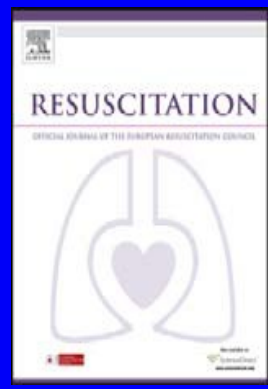
ARK, FN u sv. Anny

Resuscitation

journal homepage:
www.elsevier.com/locate/resuscitation

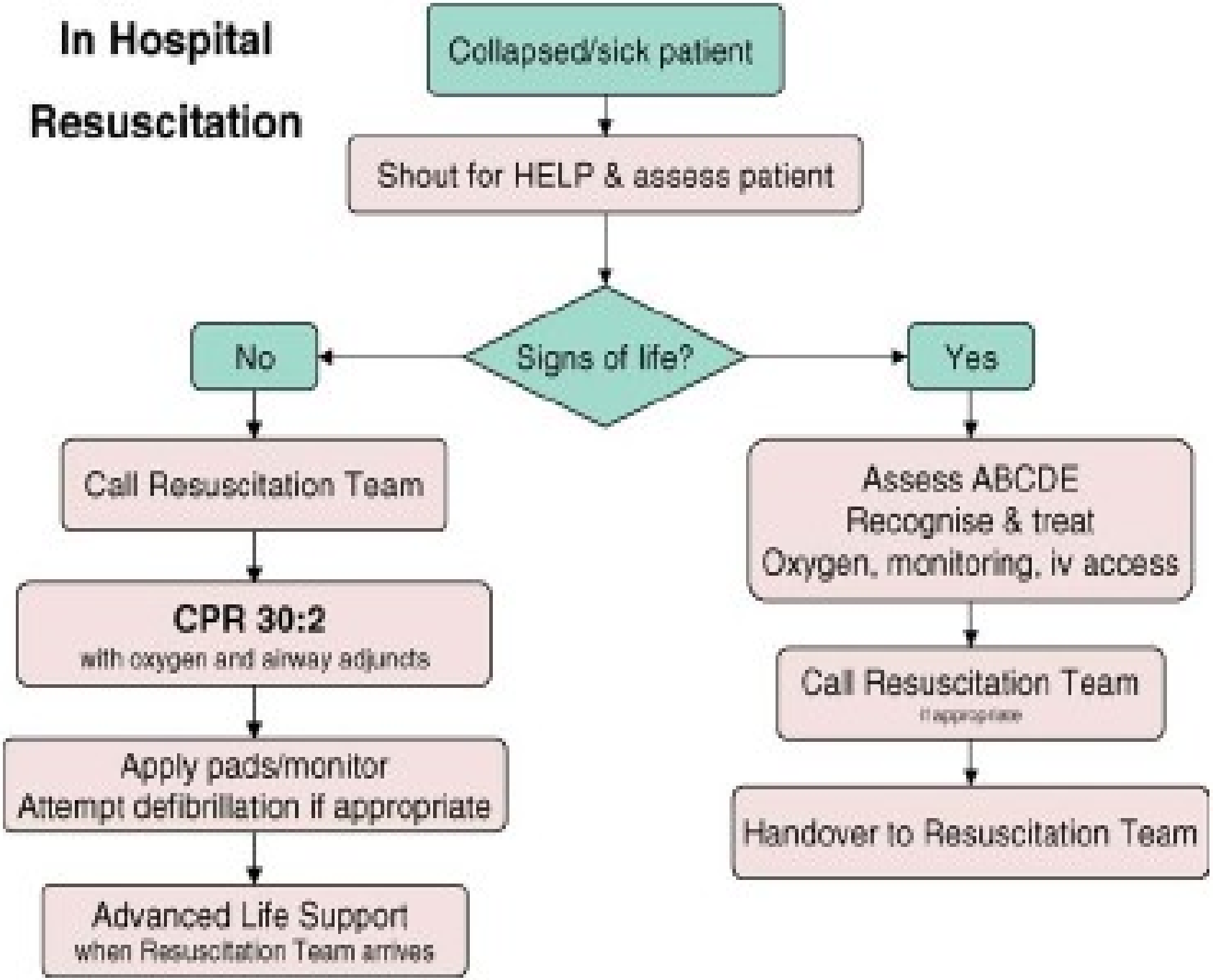


What is CPR?

Combination of chest compressions and rescue breathing delivered to victims thought to be in cardiac arrest.

- Basic Life Support = Základní neodkladná resuscitace
- Advanced Cardiac Life Support = Rozšířená neodkladná resuscitace

In Hospital Resuscitation

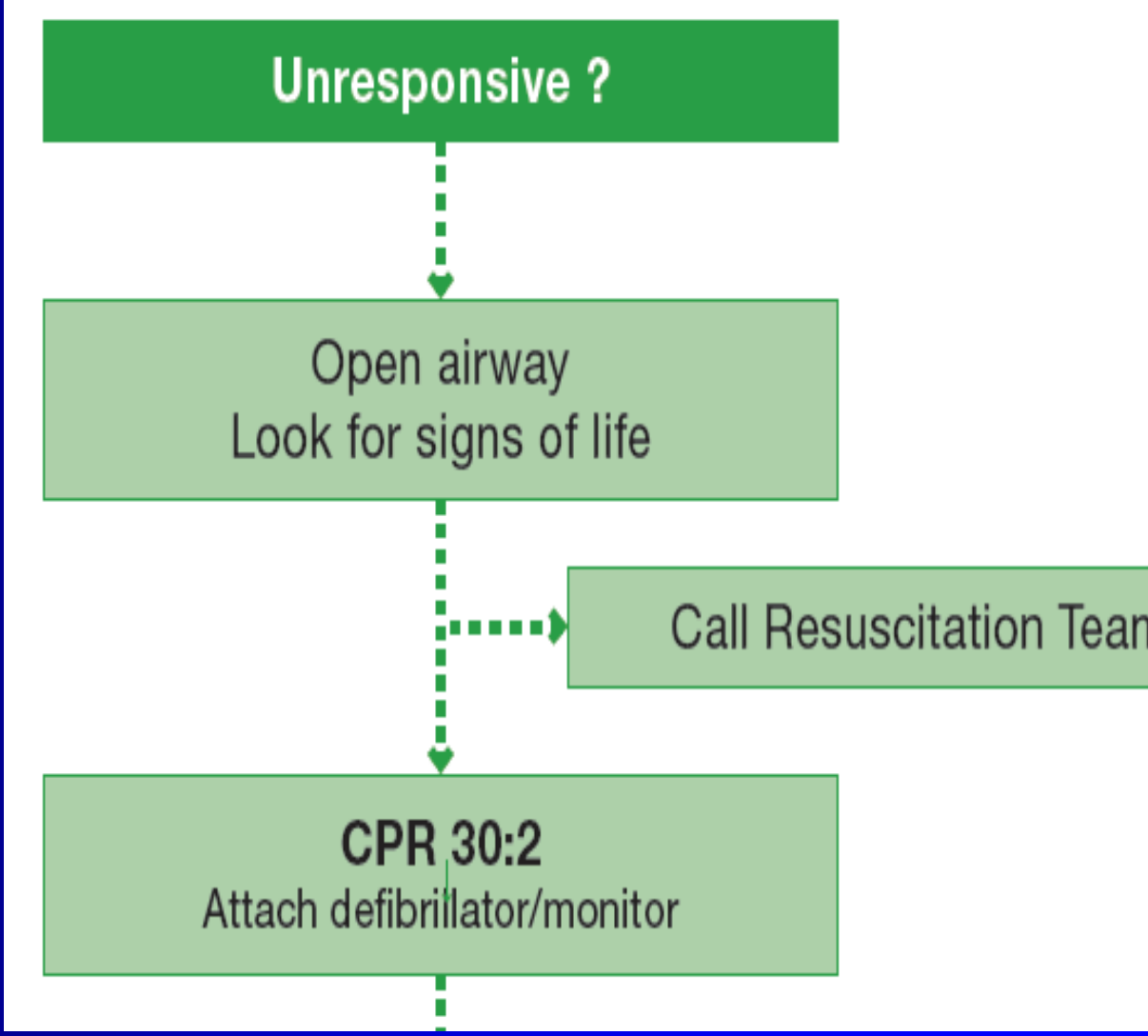


Basic Life Support 2005..2010

DR ABC

- Danger
- Response
- Airway

- Circulation
- Breathing



When to start?

Person without sign of life

When Not to start?

- end stage disease, no prognosis
- trauma with no hope for life (decapitation)
- signs (indication) of death (patch, Tonelli sign)
- time factor (15 – 30 minutes from stop of circulation to your arrival), temperature, age.

When stop CPR:

- restored vital functions
- doctor takes care of victim
- no power to continue with CPR

Alphabet of CPR

BLS /basic life support/

A - airway

B - breathing

C - circulation

ACLS /advanced cardiac life support/

D – Defibrilation

E – everythink else

Advanced Cardiac Life Support

= BLS +

- A+ B:
  - Oxygen
  - Intubation, LM, Combitube
  - Positive Pressure Ventilation
- C:
  - Vein access, drugs, fluids
  - Therapy of fibrilation

Alphabet of CPR

BLS /basic life support/

A - airway

B - breathing

C - circulation

ACLS /advanced cardiac life support/

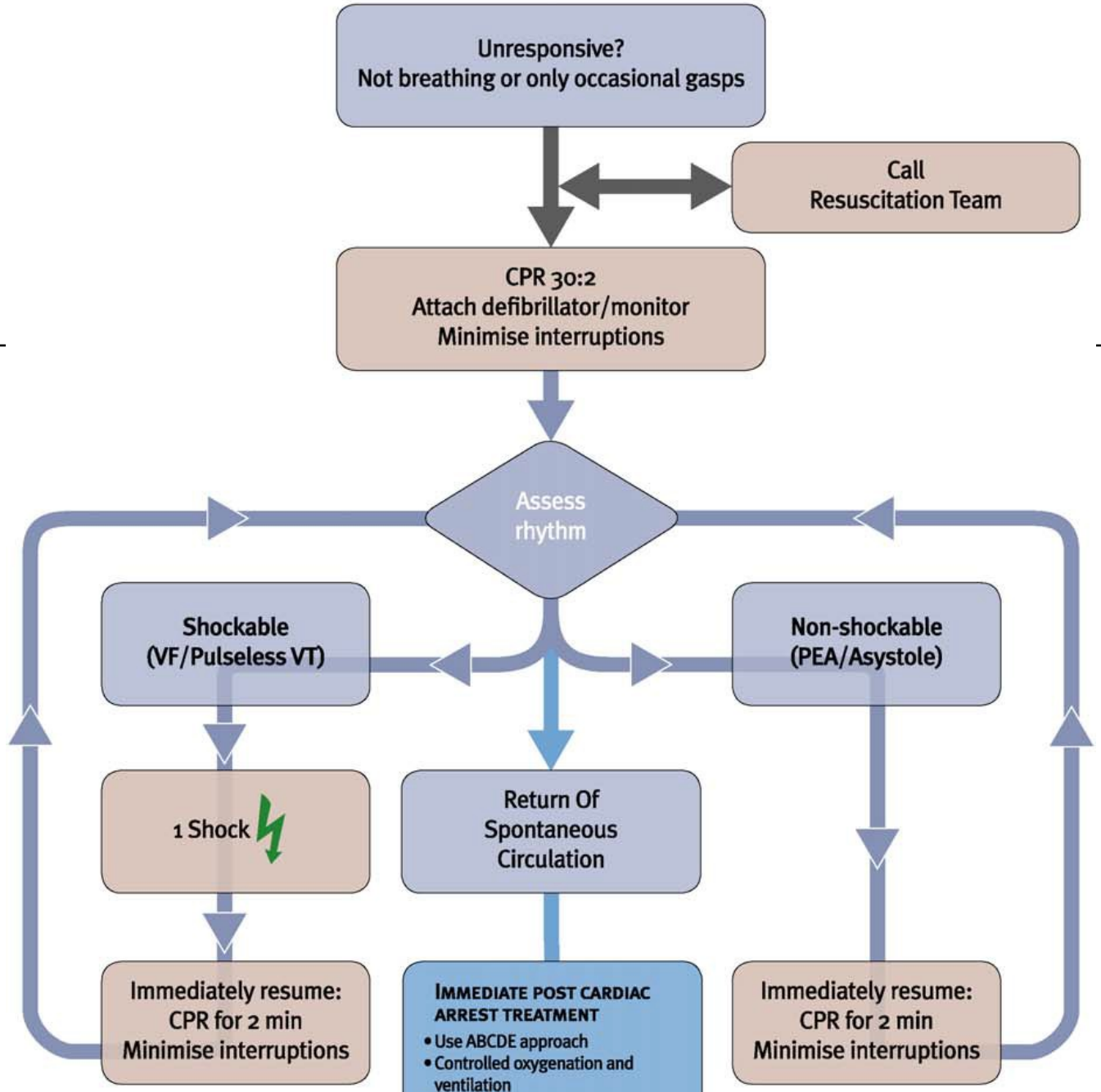
D - drugs and fluids

E - ECG

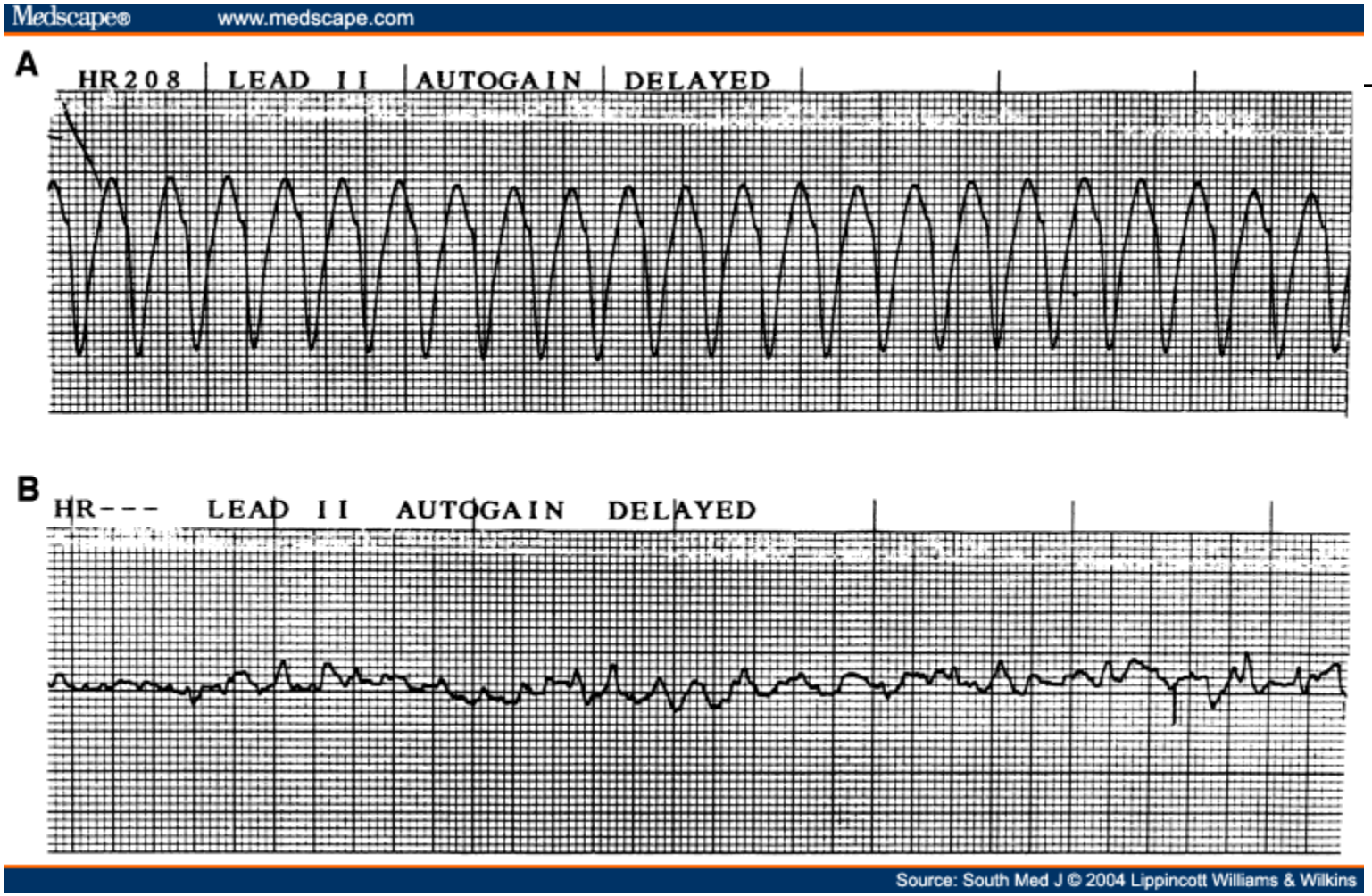
F - fibrilation treatment

Advanced Life Support

2010



VF/ VT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B
HR--- LEAD II AUTOGAIN DELAYED
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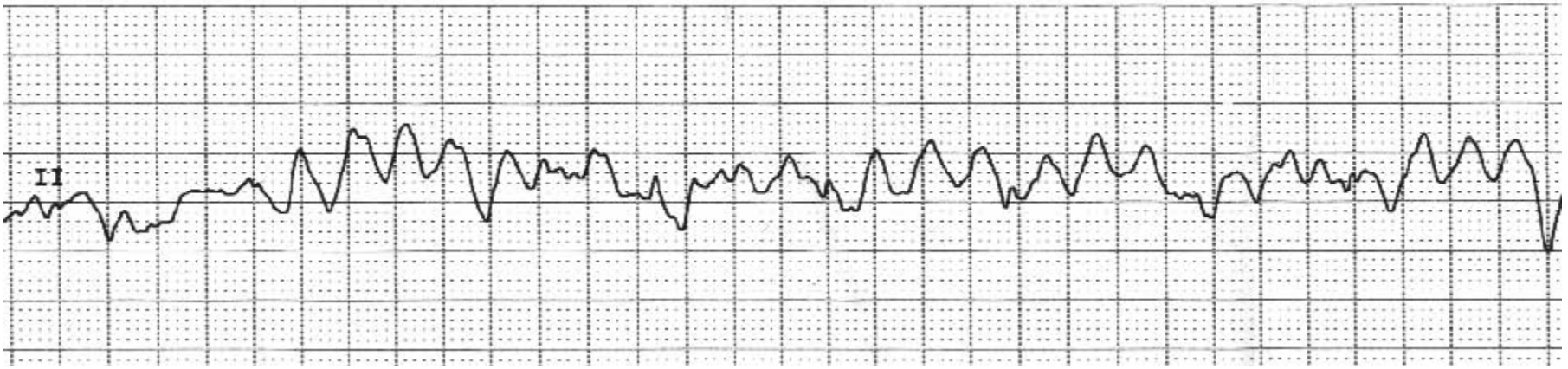
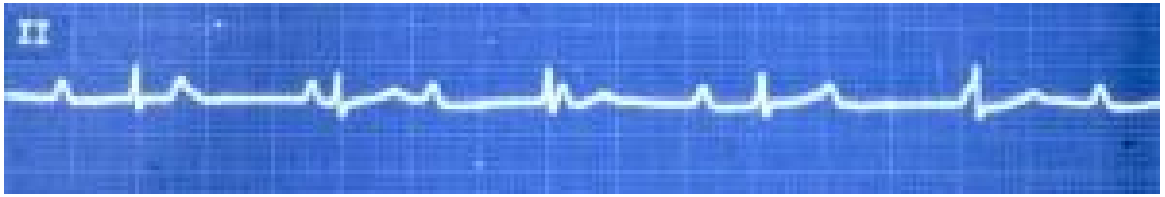

II

Co je to?

Co je to?



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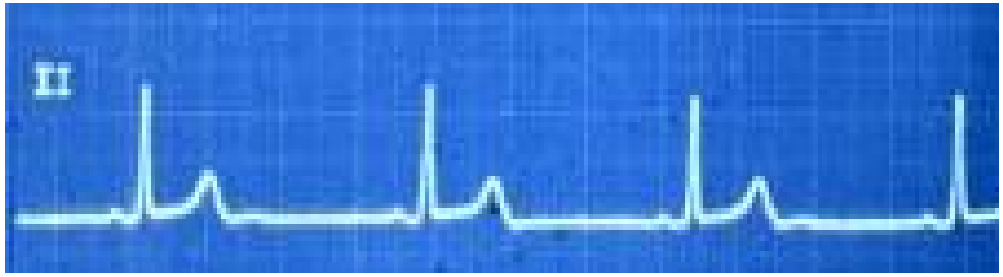

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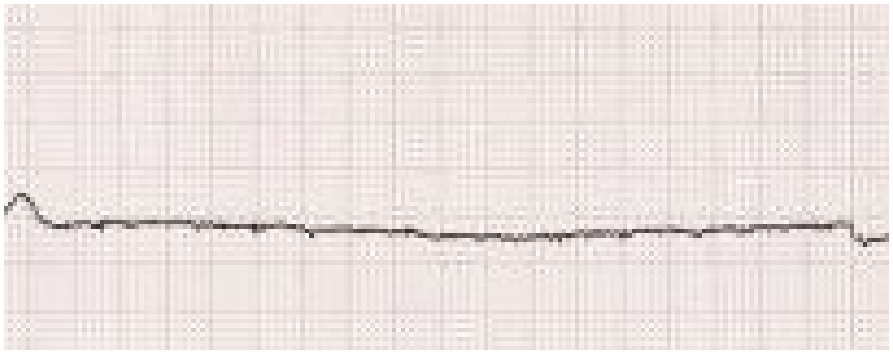
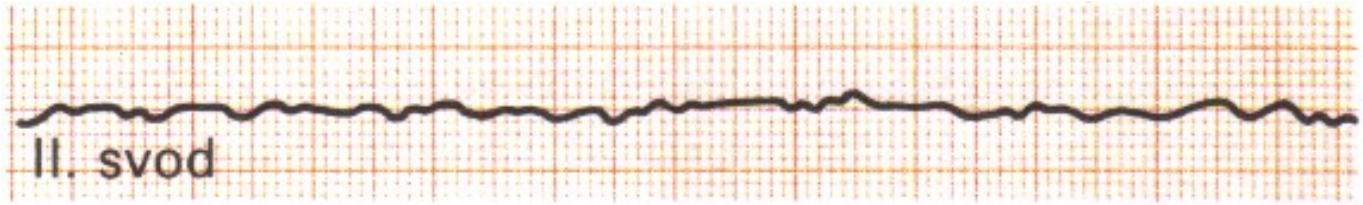
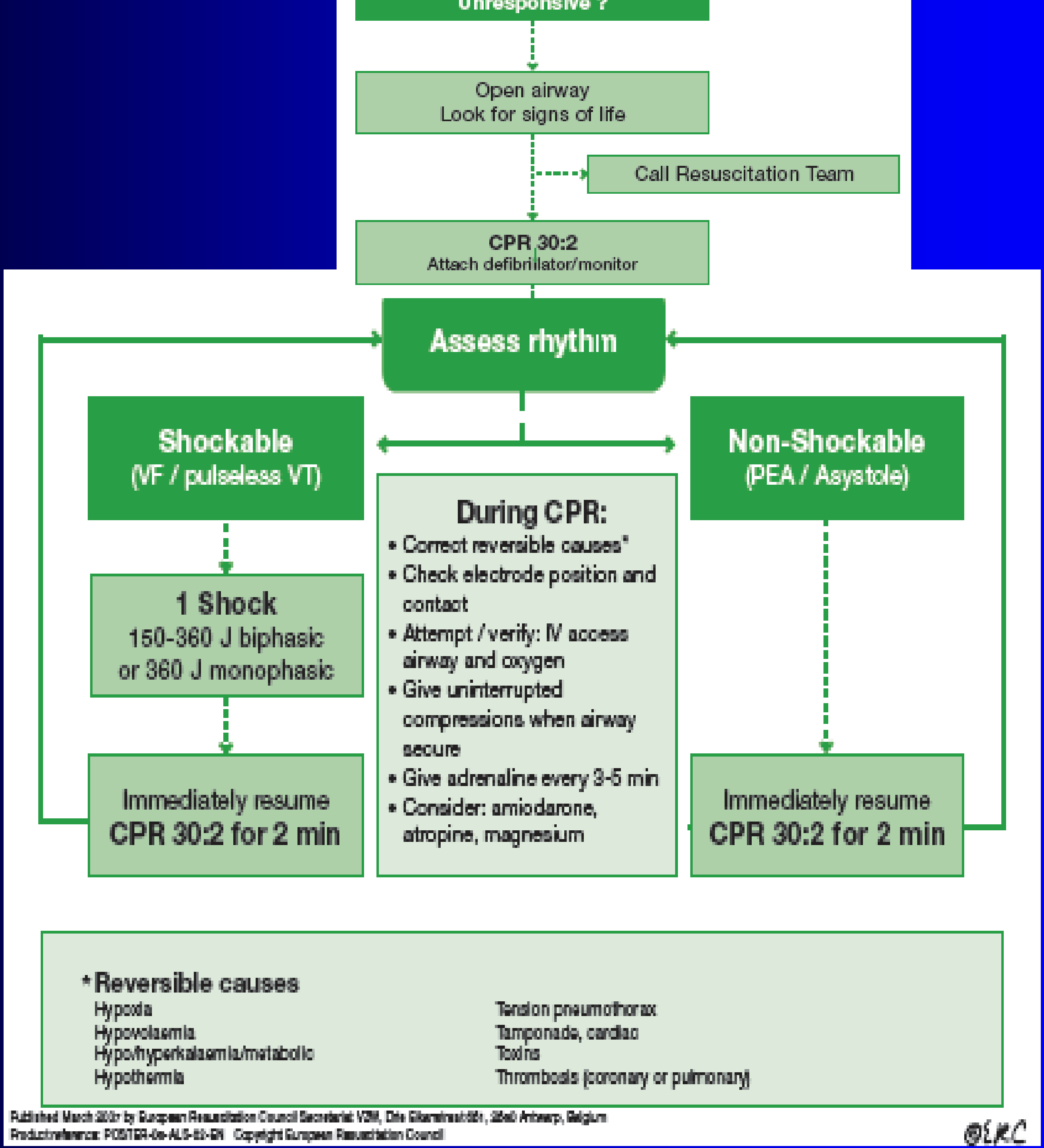


Asystoly ??
low amplitude VF ??

- if in doubt - asystoly

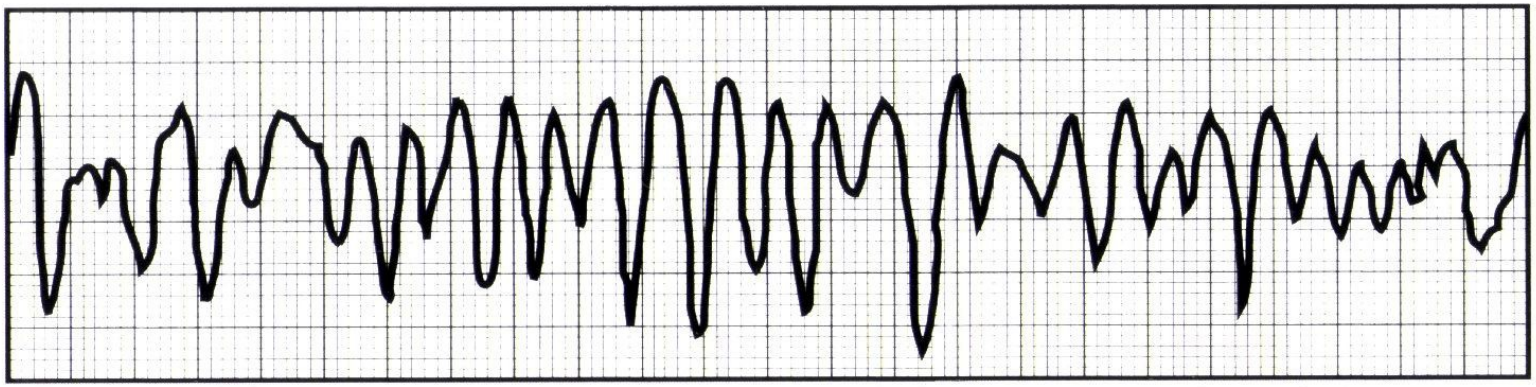




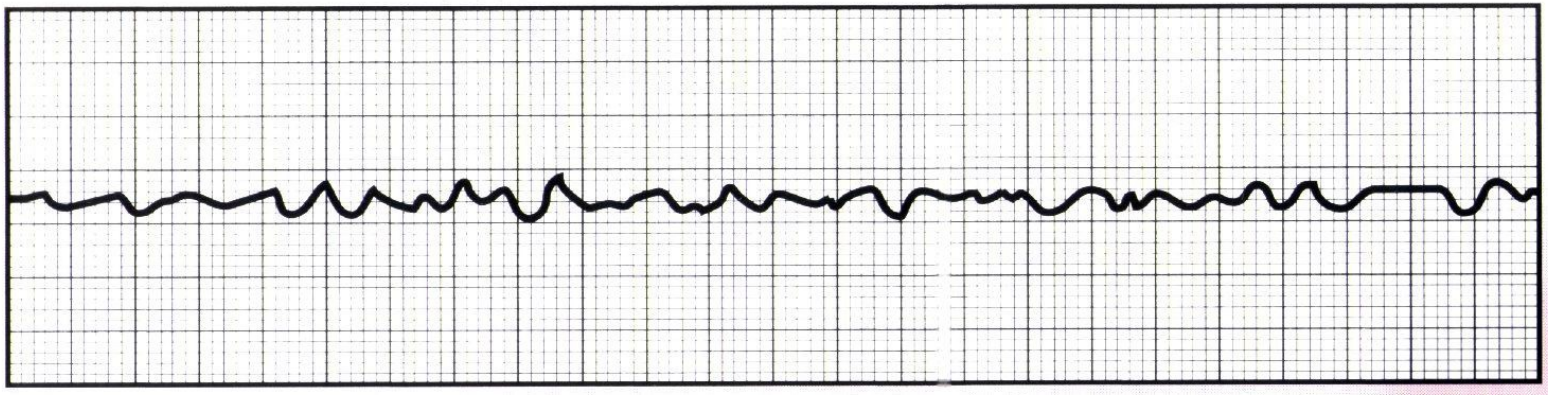
Unresponsive ?
Open airway
Look for signs of life
Call Resuscitation Team
CPR 30:2
Attach defibrillator/monitor
Assess rhythm
Shockable
(VF / pulseless VT)
Non-Shockable
(PEA / Asystole)
1 Shock
150-360 J biphasic
or 360 J monophasic
Immediately resume
CPR 30:2 for 2 min
During CPR:
• Correct reversible causes*
• Check electrode position and contact
• Attempt / verify: IV access airway and oxygen
• Give uninterrupted compressions when airway secure
• Give adrenaline every 3-5 min
• Consider: amiodarone, atropine, magnesium
Immediately resume
CPR 30:2 for 2 min
*Reversible causes
Hypoxia
Hypovolaemia
Hypo/hyperkalaemia/metabolic
Hypothermia
Tension pneumothorax
Tamponade, cardiac
Toxins
Thrombosis (coronary or pulmonary)

VENTRICULAR Fibrillation

Hrubovlnná komorová fibrilace



Jemnovlnná komorová fibrilace



Ventricular fibrillation

- electrical instability of heart muscle (ischemia, hypothermia)

sings:

- pulselessness

Th: defibrillation,

adrenalin, vasopressin

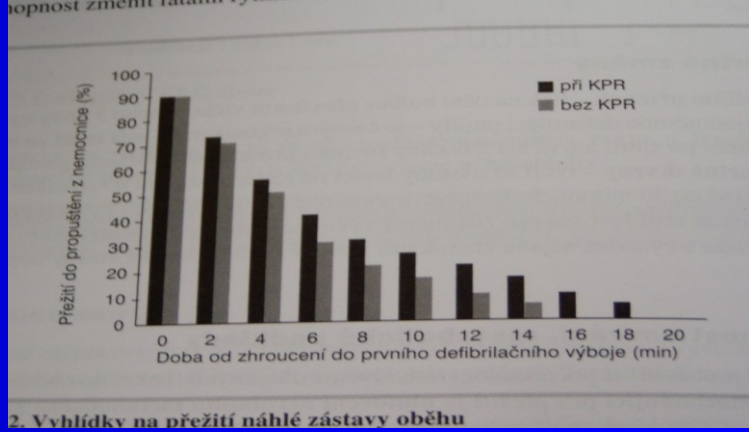
amiodarone

Please Shock-Shock-Shock, EVerybody Shock,
And Let's Make Patients Better

- (Please = precordial thrump)
- Shock 200J bifasic / 360J mono
- EVerybody = Epinephrine / Vasopressin

- And = Amiodarone
- Let's = Lidocaine
- Make = Magnesium
- Patients = Procainamide
- Better = Bicarbonate

Defibrillation



2. Vyhlídky na přežití náhlé zástavy oběhu

- Defibrillation sends a high energy DC electric shock through the heart, stopping it momentarily. The sinoatrial node should then take over and a coordinated rhythm restart. However, ventricular fibrillation often recurs so multiple shocks are used routinely.

Position of electrodes:

Energy:

Joule (Watt sec.)

heard - ONLY 4%/

monophasic shock

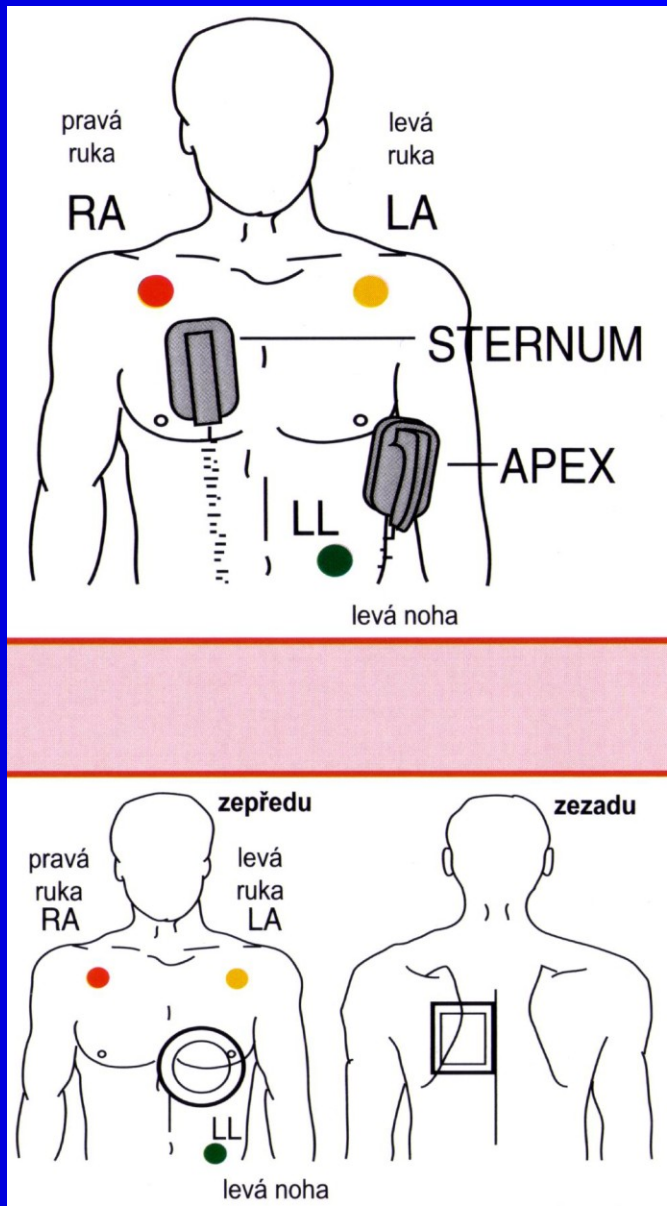
360 J

biphasic shock

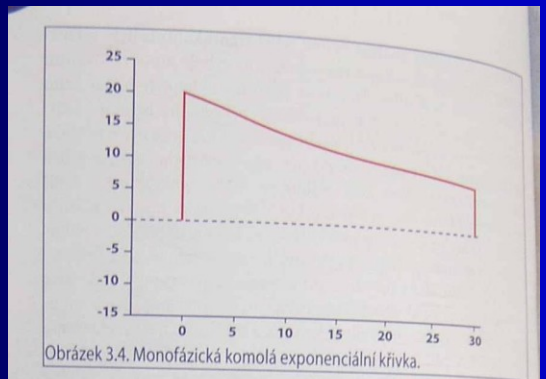
200 – 300 - 360J

internal shock

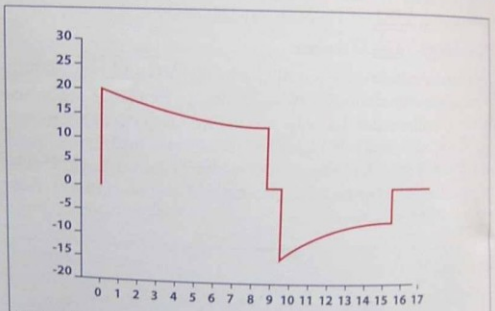
25 - 35 J



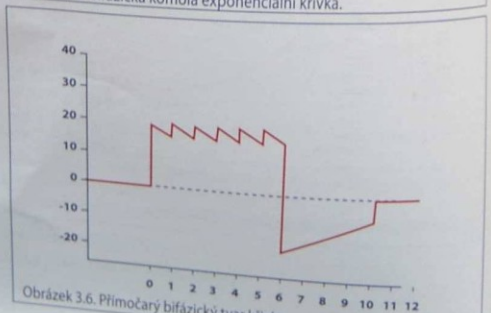
Biphasic versus monophasic



Obrázek 3.4. Monofázická komolá exponenciální křivka.



Obrázek 3.5. Bifázická komolá exponenciální křivka.



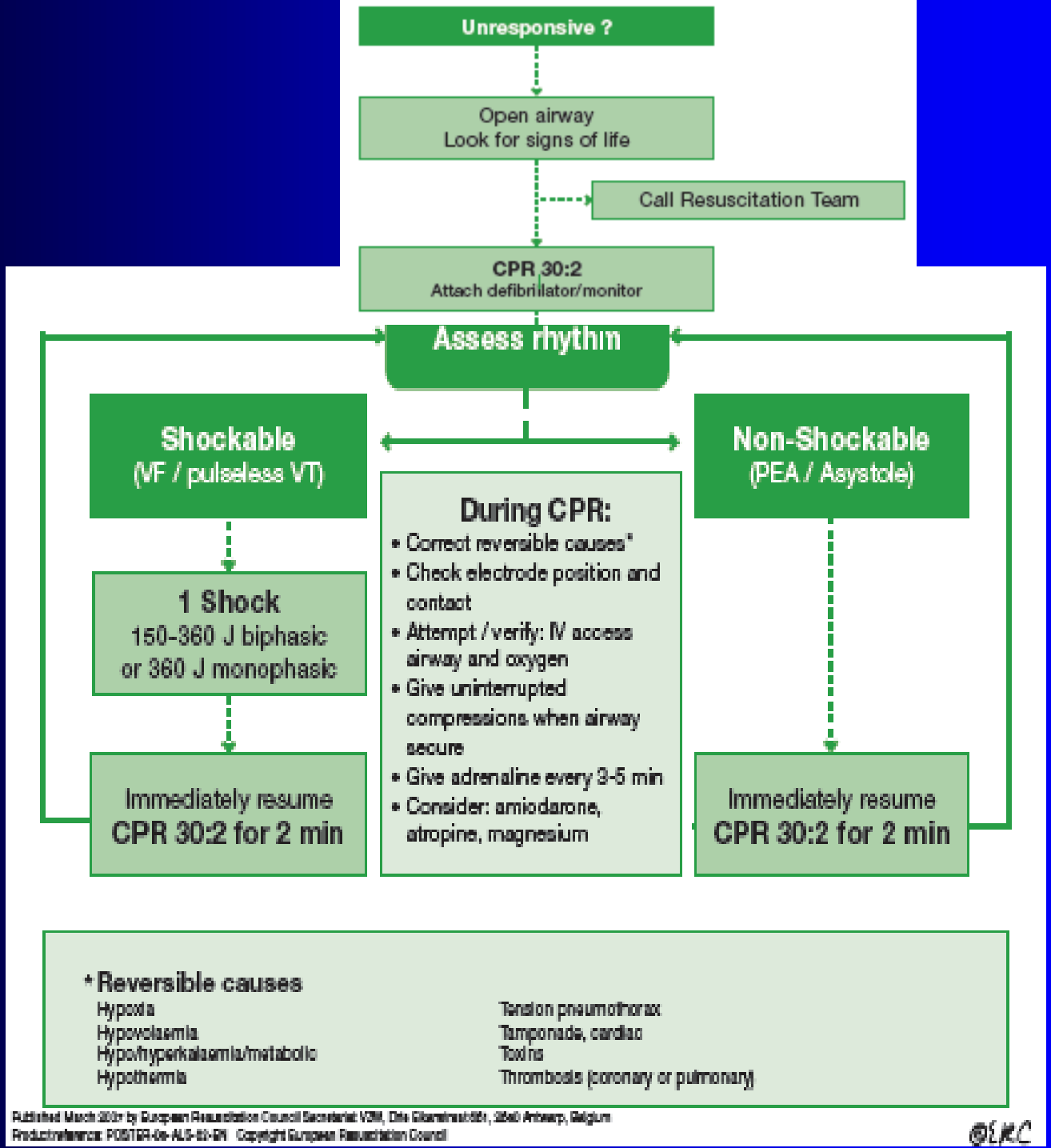
Obrázek 3.6. Přímočarý bifázický tvar křivky.

- Monophasic defibrillation delivers a charge in only one direction.
- Biphasic defibrillation delivers a charge in one direction for half of the shock and in the electrically opposite direction for the second half.

Defibrillation

Voltage 1,5 – 3 kV
Current 30 – 40 A
Time 15 ms
Impedance of Th 70 – 80 ohms

- **Skin burns**
- **"stand clear" order**



Asystole

The worst situation

- **Diagnosis on ECG monitor – flat line**
- **Airway management - hypoxia**
- **Adrenalin 1 mg i.v. á 3 min.**

  children 10 μg/kg

Asystole ..... Check me in another lead, then let's have a cup of TEA."

- ((T = Transcutaneous Pacing)) ex 2005
- E = Epinephrine
- ((A = Atropine)) ex 2010

Pulseless Electrical Activity reasons:

- Hypovolemia
- Hypoxia
- H+ acidosis
- Hyper/hypocalemia
- Hypothermia

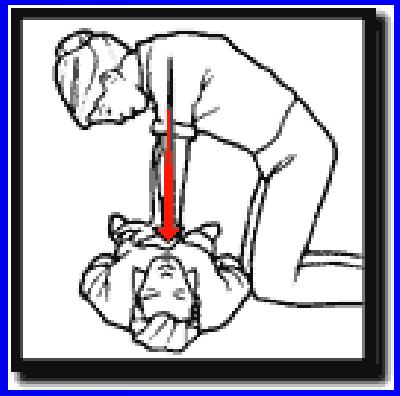
PEA - reasons:

- „**T**ablets“ (overdose)
- **Cardiac T**amponade
- **T**ension pneumothorax
- **T**rombosis of C.a.
- **T**rombosis of a.pulm. (embolie)

Pulseless electrical activity are guided by the letters P-E-A

- Problem (H, T)
- Epinephrine
- (atropin) ex2010

Chest compressions



- Rescuer should stand or kneel next to victim's side.
- in the centre of the chest
- Place heel of 1 hand on lower sternum and other hand on top of hand
- Apply pressure only with heel of hand straight down on sternum with arms straight and elbows locked into position so entire weight of upper body is used to apply force.
- During relaxation all pressure is removed but hands should not lose contact with chest wall.
- Sternum must be depressed at least 5 cm in average adult (palpable pulse when SBP >50 mm Hg)
- Duration of compression should equal that of relaxation.
- Compression rate should be at least 100 max 120/min.

Adequacy of chest compressions

- is judged by palpation of carotid or femoral pulse (palpable pulse primarily reflects Systolic Blood Pressure).

C – circulation

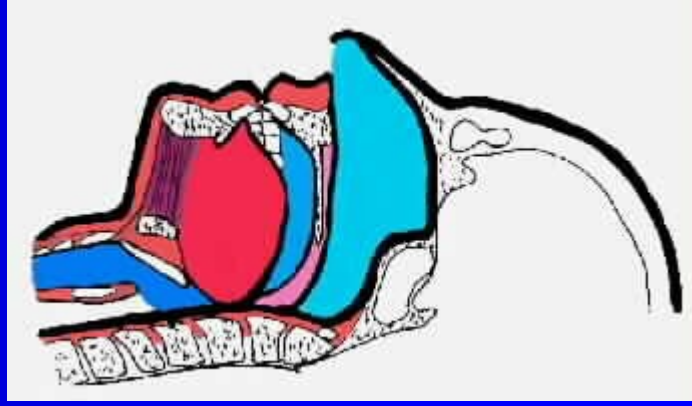
Signs of circulation = pulsations

- a. carotis communis
- a. femoralis

children

- a. brachialis

Airway



Problem = obstruction

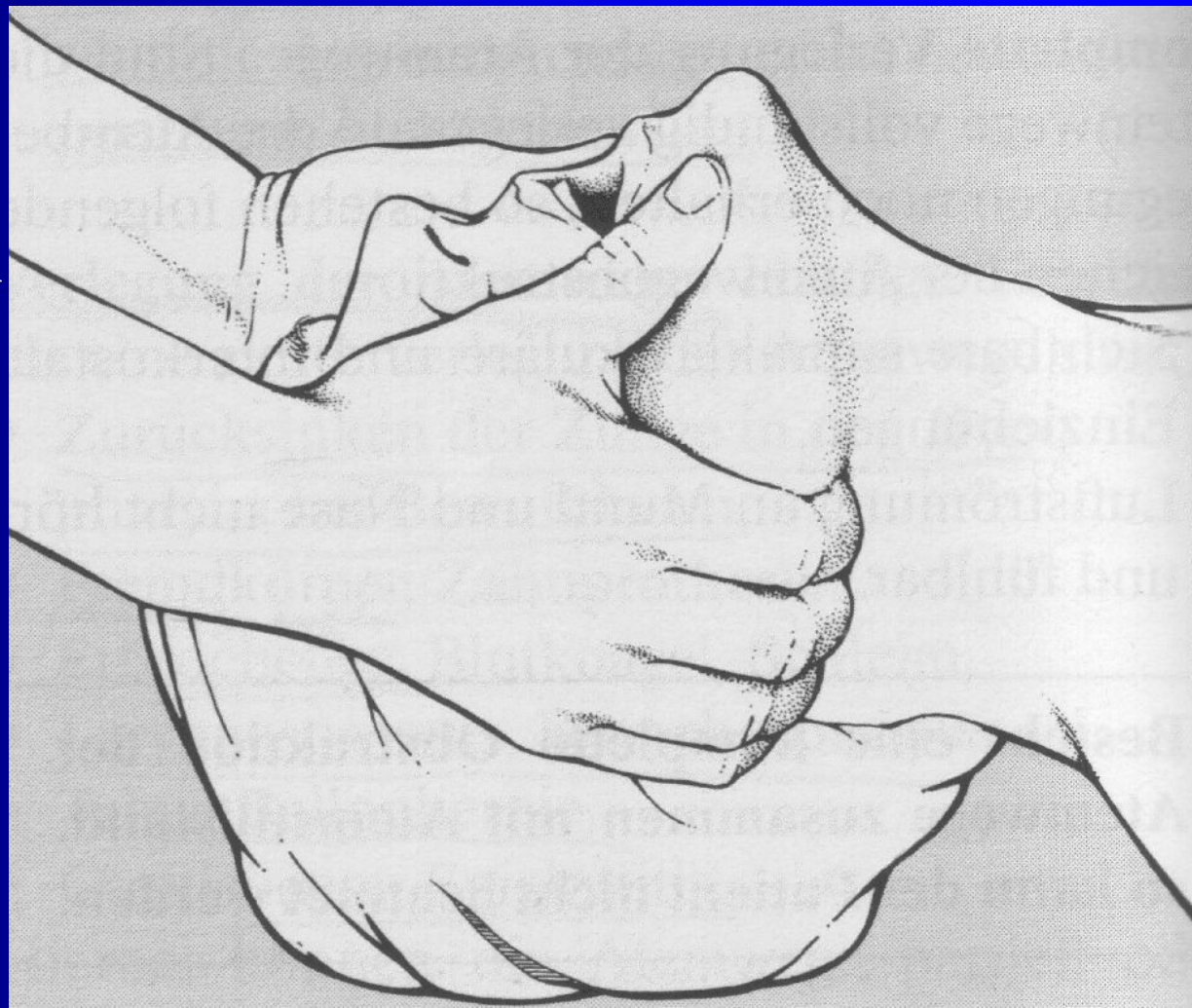
- relaxed tongue and neck muscles in an unconscious person
- foreign body

Solution:

- head tilt-chin lift
- airway
- laryngeal mask
- combitube
- intubation
- coniotomy

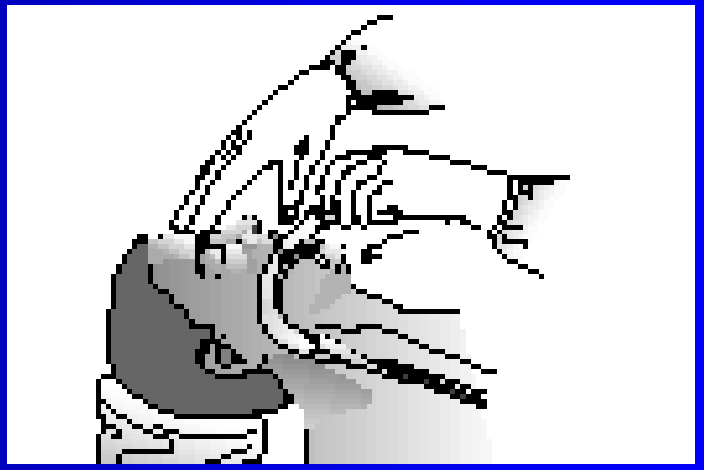
Esmarch:

- **Head tilt**
- **Chin lift**
- **Mouth open**

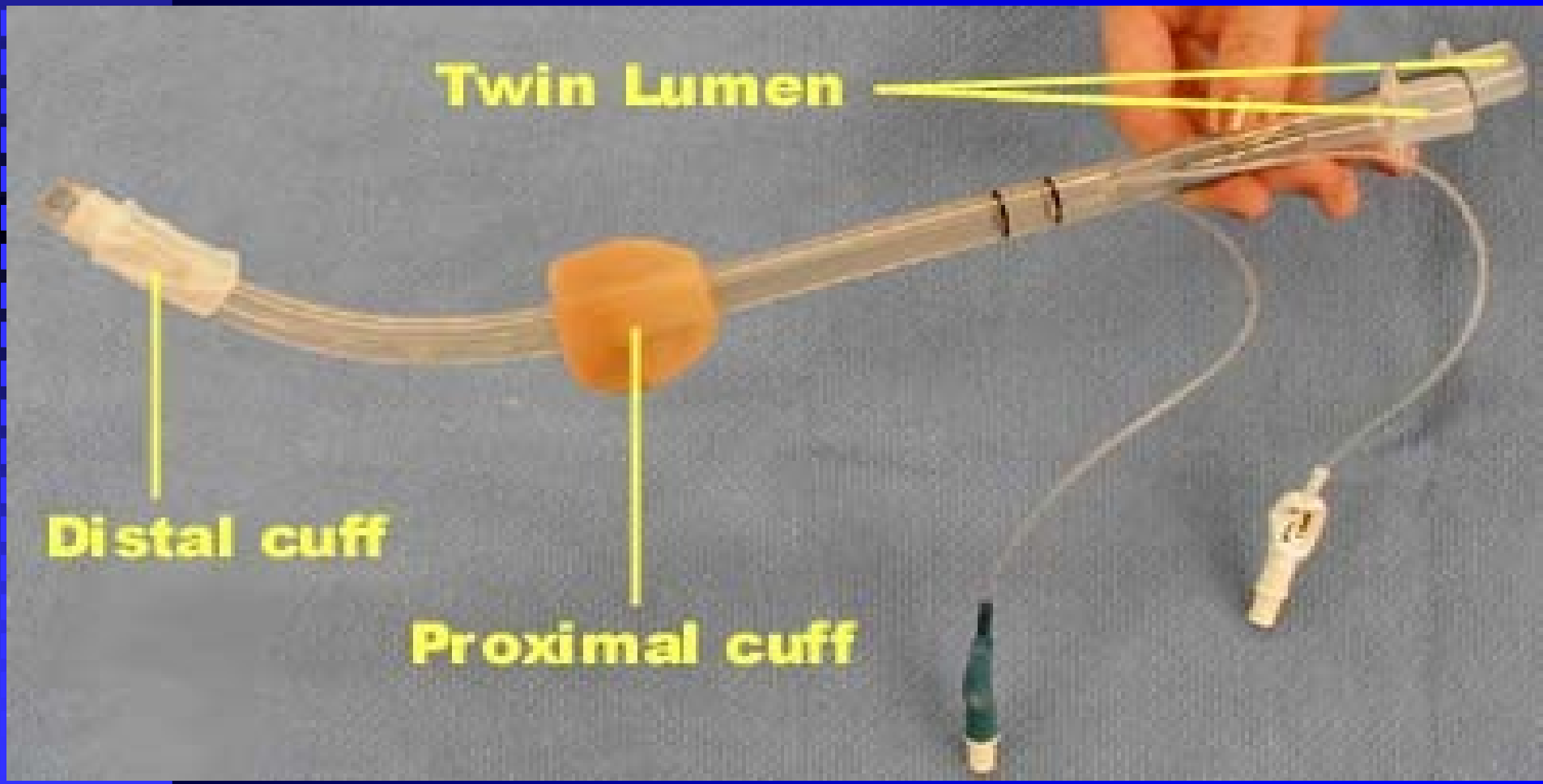


Airway

LM



Combitube

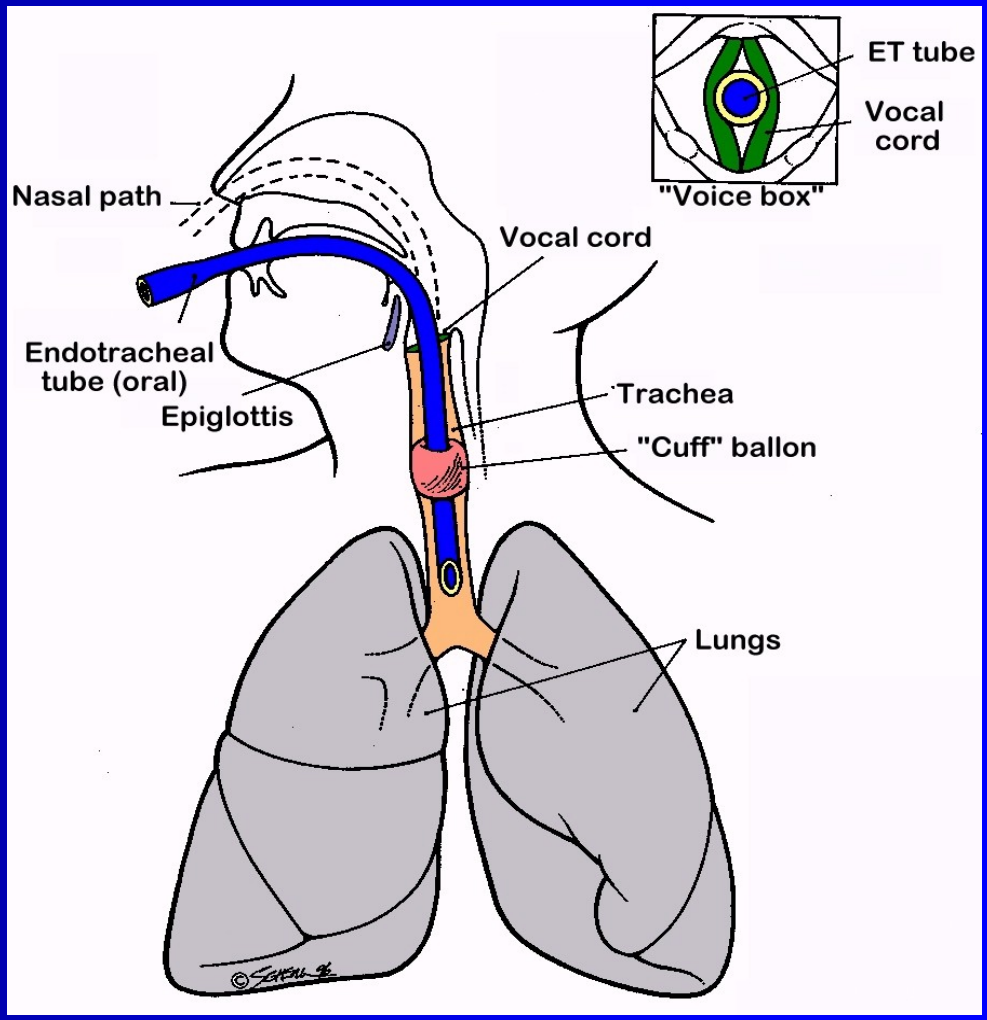


Intubation

- Laryngoskope
- Magill pincers
- tracheal tubes
- Introducer
- syringe

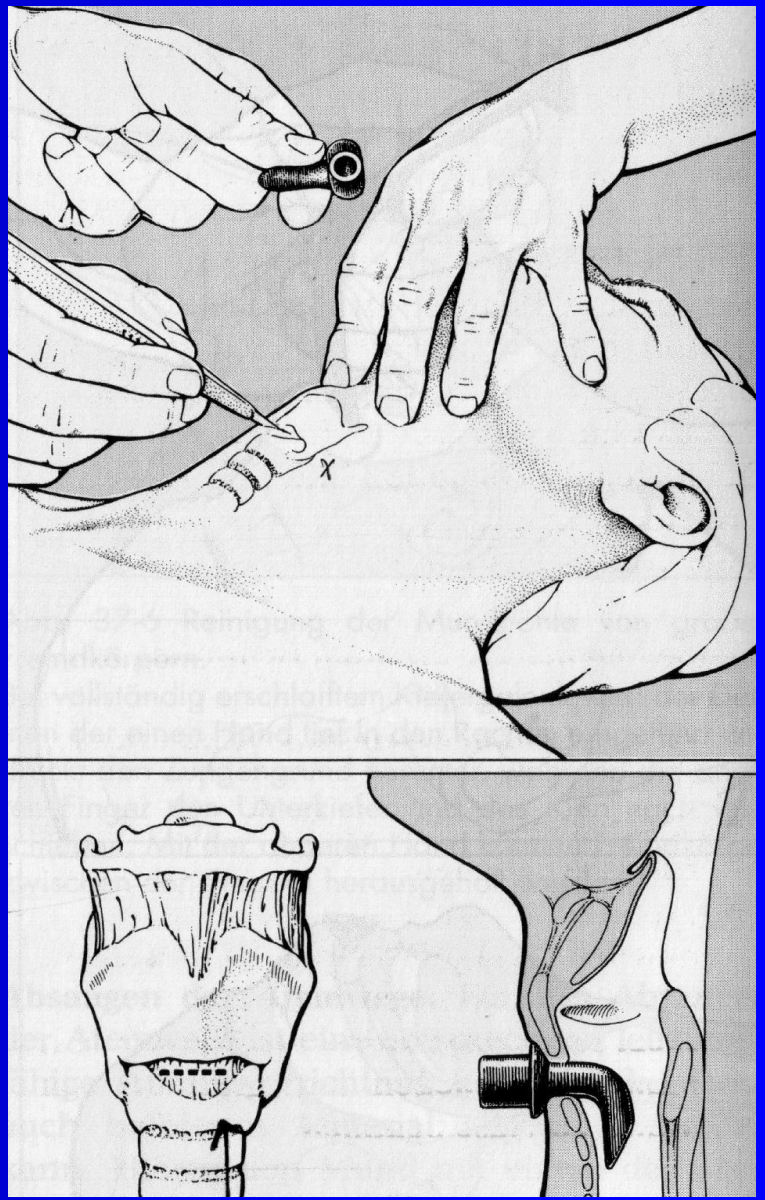
rarely:

- bronchoscope



Coniotomy

- urgent preservation of airways
- lig. cricothyreoideum (lig. conicum)



B – breathing ACLS

positive pressure ventilation

- bug („ambu“), holding mask by 1 or 2 hands
- (ventilator – Volume Control Ventilation)
- 6 ml/kg; 10/min, fiO2 100%
- ACLS 2 breaths
- inspiration 1st ratio – 2 : 30 - ventilated by mask
  no ratio = 10 : 100 – advanced airway
-

Oxygen

- as high FiO2 as possible – during compressions
- Hypoxia and acidosis contra efficiency of electric and pharmacology therapy

Hyperoxemia after recovery of circulation is harmfull
SpO2 .. 94%

Circulation

- pulsations on central arteries (a.carotis; a.femoralis)
- NEVER - periferal – wrist art.
- NEVER – (heart rate)
- NEVER – blood pressure
- NEVER - (capilary refill)

Ratio 2005..2010

	compressions : breaths
• adult nonintubated	30 : 2
• adult intubated	100:10
• child	30:2
- 2medical team	15:2
• newborn	3:1

Drugs - administration

Intravenously – periferal cath. - v. jugul. externa
- v. femoralis
- central v. cath. - v. subclavia
- v. jugul. interna

Intraoseal access - children

- Add 20ml i.v of fluids to move the drug.
- Effect in 1 min

drugs of VF

- **after 3rd defibrilation:**
- **Adrenalin 1 mg i.v. á 3 min.**
  children 10 μg/kg

- **Antiarhythmics:**

Amiodaron 5 mg/kg
300 mg slowly i.v.

Epinephrine = Adrenalin

Alfa effect = **raise diastolic pressure**

- raise brain, heart perfusion pressure

Beta effect - raise contractility

- change of type of fibrillation

D: **1 mg i.v. a 3 min**

Amiodarone (CORDARONE)

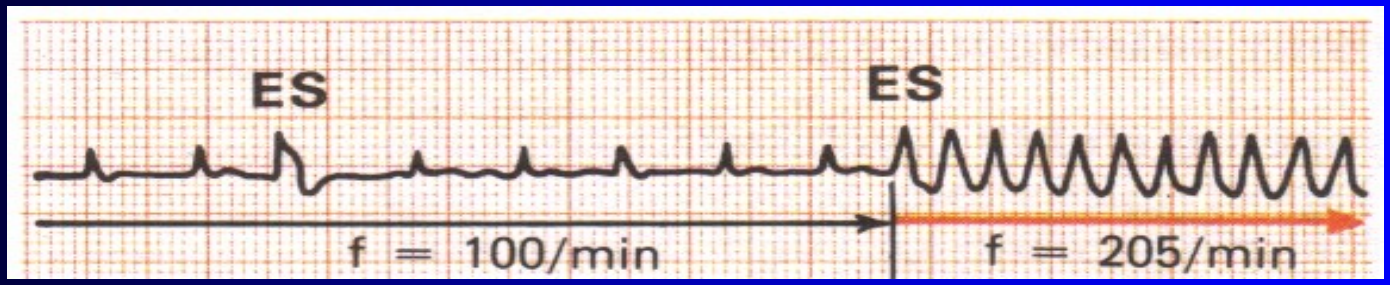
- antiarytmic drug

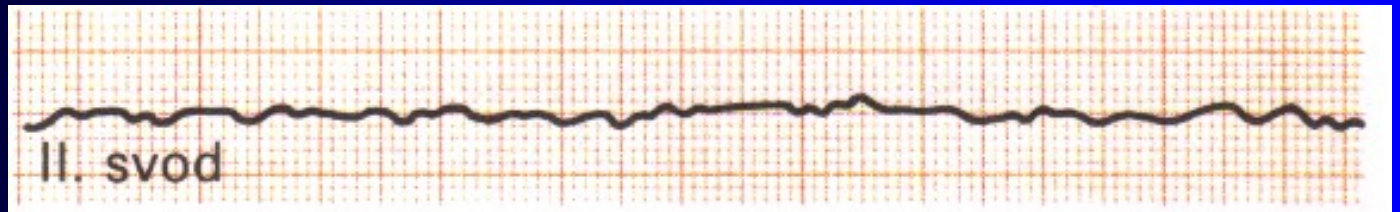
I:

- recurent VF

D:

- 5mg/kg (150mg iv.)





Fluids

- Bolus of 20ml after each dose = movement of drug
- Acute bleeding – rubt. AAA, EUG;

Types:

- Crystaloids – Ringer, Hartman, physiol. sol.
- Coloids – Gelatina, HAES = stark
- Glc – do NOT use – wrong neurology result

After recovery of circulation

- Stabilisation of vital functions (circulation, ventilation, AB)
- Diagnosis and treatment of reason of cardiac arrest
- Hypothermia 32 – 34 C for 12 – 24 h

(better neurological outcome)