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Basic pathophysiology of sudden cardiac arrest

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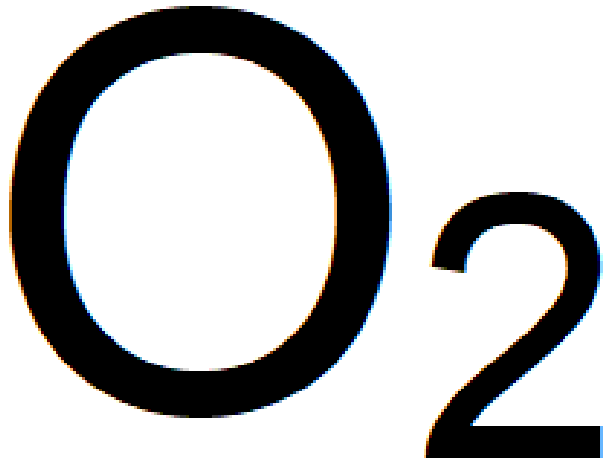
Learning objectives

- Student will learn what are the causes of primary circulatory arrest.
- Student will learn what are the causes of secondary circulatory arrest.
- Student will learn the basic facts about the role of oxygen in the sudden cardiac arrest.

What is essential for human?



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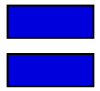
Cycle of oxygen

- Lungs oxygenate blood
- Oxygenated blood goes to heart
- Heart pumps oxygenated blood to whole body
- Deoxygenated blood goes to heart through veins
- Heart pumps deoxygenated blood to lungs



IDEAL STATE

SCA

- Sudden cardiac arrest
- Sudden interruption in blood flow in systemic bloodstream
- Heart does not pump blood
- Leads to death without help

Types of cardiac arrest

- Primary (Cardiac)
- Secondary (Not cardiac)

Primary SCA

- Problem with bloodstream
- Heart failure (heart attack, arrhythmias,…)
  → heart cannot pump blood
- Insufficient intravascular volume (bleeding,…)
  → nothing to pump

- → both cases lead to SCA

Secondary SCA

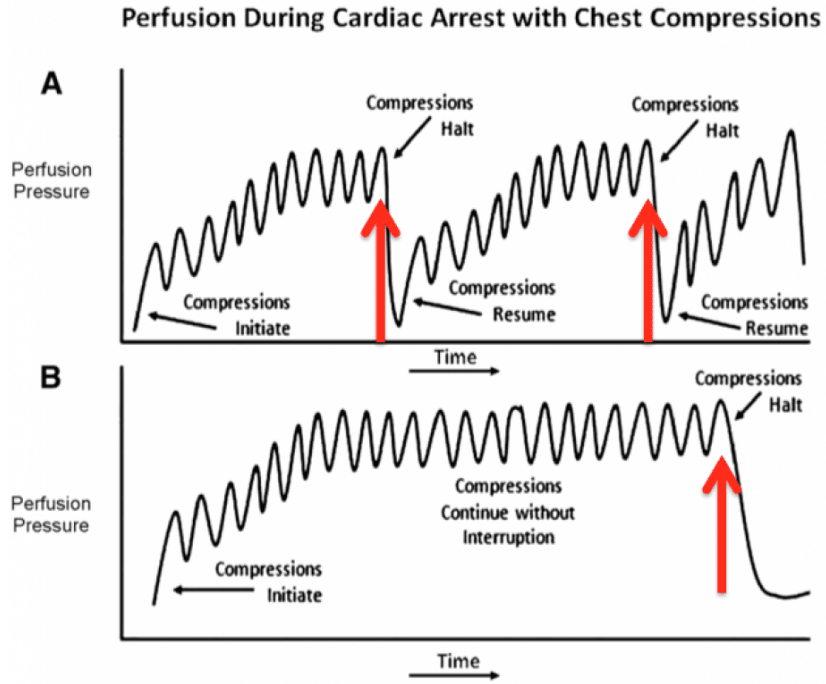
- Problem with ventilation
- For example: suffocation, drowning, asphyxia
- Heart pumps blood to lungs, but blood is not oxygenated over there
- Level of oxygen in blood is dropping
- Not enough oxygen for heart
- Leads to heart failure
- Heart stops → SCA

Secondary SCA – what follows?

- More often in childhood
- The blood oxygen level is lower than in case of primary SCA in time when heart stops
- Higher importance of rescue breaths
- Higher emphasis on rescue breaths in child CPR algorithm
- Do not palpate the pulse in BLS
  - If the victim is not breathing, the heart stops working very soon

What is the short term goal during CPR?

- Provide heart with enough oxygen → chance for restoration of spontaneous circulation (ROSC)
- Blood oxygenation – rescue breaths
- Oxygen distribution – chest compression



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What is the long term goal during CPR?

– Oxygen for brain - good quality of life

Fig. 2.2. The chain of survival.

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Learning outcomes

- Student knows the differences between primary and secondary cardiac arrest.
- Student is able to explain the importance of uninterrupted chest compressions.

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Thank you for your attention

Sources

- www.erc.edu

- Pictures:
  - https://rebelem.com/epinephrine-in-out-of-hospital-cardiac-arrest-poll/
  - www.erc.edu

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