Stabilisation after Resuscitation & Transportation

European Resuscitation Council

Advanced life support

1. Airway management and ventilation
2. Cardiac support
3. Vascular access and drugs
4. Arrhythmia diagnosis and treatment
5. Stabilisation after resuscitation
6. Transport

Respiratory assessment

- ✓Clinical signs
  - Respiratory distress
  - Mucosal membrane colour
  - Bilateral auscultation
- ✓Complementary monitoring
  - Pulse oximetry
  - Capnography
  - Chest X-Ray

Objectives of the respiratory stabilisation

- ✓ Adequate oxygenation
- ✓ Normal ventilation
- ✓ Avoid and prevent lung damage
- ✓ Maintain airway control

Pulse oximetry and capnography

Respiratory Complications

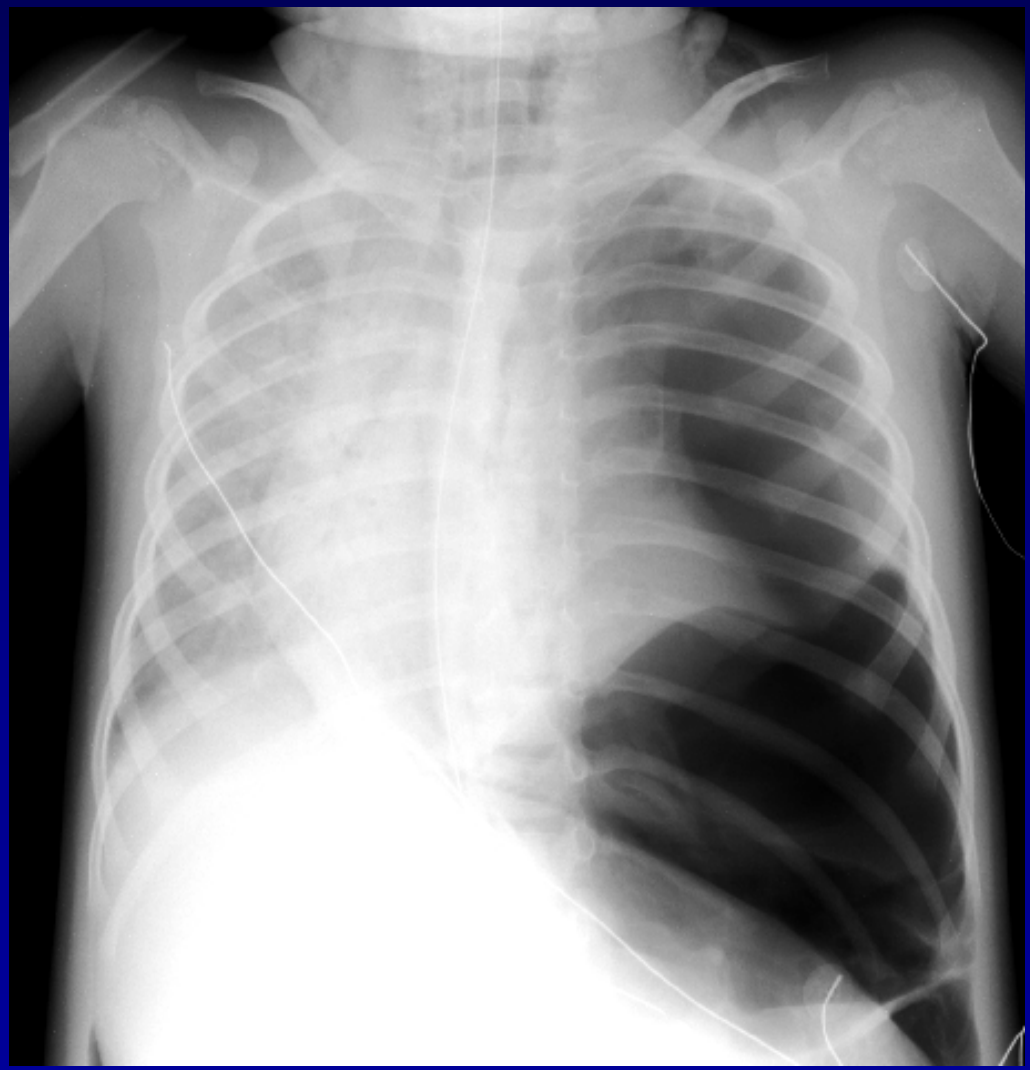
D eplacement

O bstruction

P neumothorax

E quipment

S tomach



Initial settings of ventilator

Volume tidal volume: 7 - 10 ml/kg

Pressure peak pressure: 20 - 25 cmH2O

Respiratory rate according to age

I/E ratio 1/2

PEEP 2 - 4 cm H2O

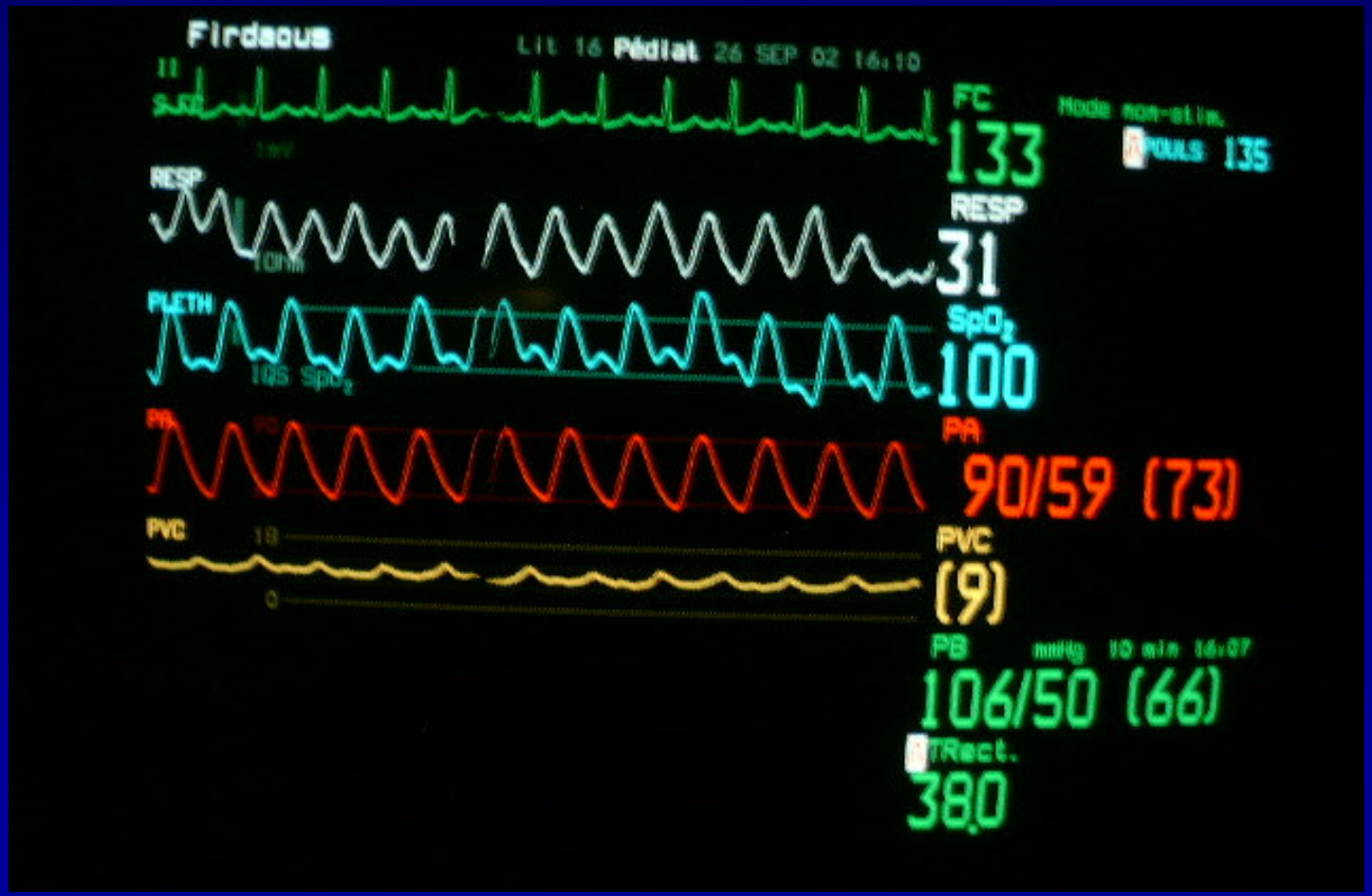
FiO2 start with 1 and try to wean to < 0.6

Pressure alarm 35 - 40 cm H2O

Objectives of haemodynamic stabilisation

- ✓Normal blood pressure
- ✓Adequate peripheral perfusion
- ✓Normal urinary output

Monitor the patient (ECG, BP, respiration, pulse oximetry, invasive pressures)



Haemodynamic management

- ✓ Obtain TWO venous access or one central or IO
- ✓ Medications
  - Dopamine
  - Dobutamine
  - Adrenaline
  - Noradrenaline
- ✓ Fluids : 10 to 20 mls/kg
  - Crystalloids (normal saline, Ringer)
  - Colloids (albumine, dextrane, Polymers)
  - Blood products (plasma, Red packed cells)

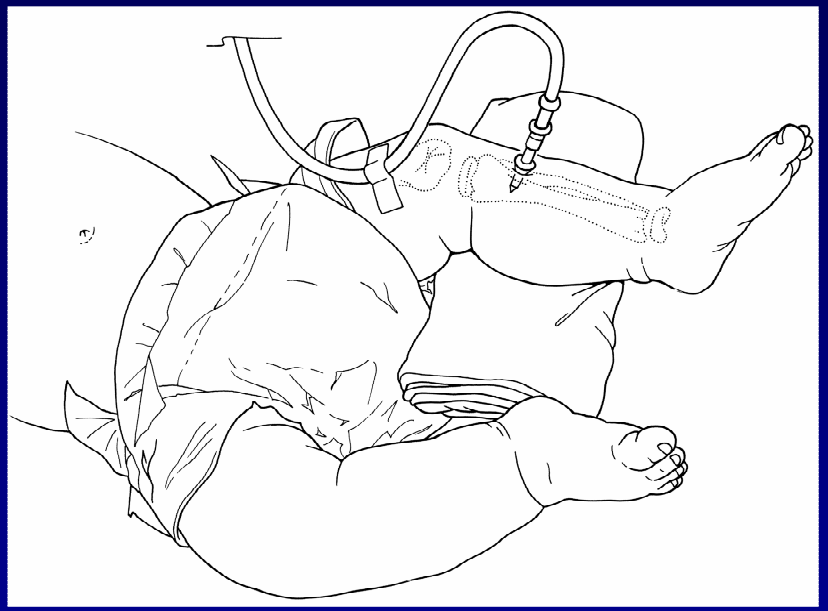


Chart for medications

Vasoactive medication and dosages

- ✓ Adrenaline
  - 0.1 - 0.3 mcg/kg/min: Inotropic
  - > 0.3 mcg/kg/min: Inotropic + Vasopressor
- ✓ Dopamine
  - 1 - 3 mcg/kg/min: Splanchnic vasodilator
  - 3 - 10 mcg/kg/min: Inotropic
  - > 10 mcg/kg/min: Inotropic + Vasopressor

Preparation of drug perfusions

- ✓ Constant concentration

  always the same to prepare, no calculation, easy to prepare and to use

- ✓ DOPAMINE - DOBUTAMINE
  - 1 vial of 50 mg in 50 mls
  - Weight / 3 ml/hour = 5 mcg/kg/hour
- ✓ ADRENALINE - NORADRENALINE
  - 1 vial of 1 mg in 50 mls
  - Weight divided 3 ml/hour = 0.1 mcg/kg/hour

ex: Child of 6 kg

Dopamine 50 mg in 50 mls: 2 mls/h = 5 mcg/kg/h

Preparation of drug perfusions

- ✓ Rule of 3
- ✓ ADRENALINE - NORADRENALINE

  0. 3 x weight in kg = **mg** of epinephrine to dilute in 50 ml of normal saline, then...

  1 ml/h = 0.1 mcg/kg/min

- ✓ DOPAMINE - DOBUTAMINE

  3 x weight in kg = **mg** of dopamine to dilute in 50 ml of normal saline, then...

  1 ml/h = 1 mcg/kg/min

Neurological stabilisation

- ✓Objective

  To avoid secondary brain damage

Neurological assessment simple, but essential!

- ✓Conscious level
- ✓Glasgow coma score
- ✓Pupils reactivity
- ✓Focal signs
- ✓Intracranial hypertension signs
- ✓Seizures

Brain damage factors in cardiopulmonary arrest

- ✓Hypoxia - Ischaemia
- ✓Hyperthermia
- ✓Hyperglycaemia
- ✓Seizures
- ✓Hyperaemia-hyperoxia?

Brain protection

- ✓ Circulation
  - Normal or high blood pressure (optimise cerebral perfusion pressure)
- ✓ Ventilation
  - Normo-ventilation
  - Normo-oxygenation
- ✓ Sedation
  - Avoid pain and agitation
- ✓ Avoid hyperglycaemia and hyperthermia

Treatment to protect the brain?

- ✓ If signs of brain herniation
  - Hypertension, Bradycardia, Anisocoria
  - Moderate hyperventilation
  - Mannitol
- ✓ Therapeutic hypothermia?
- ✓ Preventive anticonvulsivants?

Other organs

- ✓Kidney
- ✓Liver
- ✓Stomach
- ✓Gut

Analgesia and sedation a priority!

- ✓ Do not maintain or transport a child in pain
- ✓ Give attention to the intubation procedure
- ✓ Do not maintain or transport an intubated child if agitated
- ✓ Analgo-sedation is not necessary in coma
- ✓ Differentiate: Analgesia / Sedation / Neuromuscular relaxation
- ✓ Titrate dosage by clinical effect

Analgesics, sedatives and muscle relaxants dosages

- ✓Opioids
  - Morphine: 0.1 mg / kg
  - Fentanyl: 2 - 5 mcg/ kg
- ✓Benzodiazepines
  - Midazolam: 0.1 - 0.3 mg / kg
  - Diazepam: 0.3 - mg / kg
- ✓Neuromuscular blocking agents
  - Vecuronium: 0.1 mg / kg
  - Rocuronium: 1 mg / kg

Drugs for endotracheal intubation

✓Rapid sequence of Intubation

- Atropine 0.01- 0.02 mg/kg (min 0.1- max. 1 mg)
- Morphine 0.1 mg/kg or Fentanyl
- Ethomidate 0.3 mg/kg
- Succinylcholine 2 mg / kg

✓Alternatives in particular cases

- Hypovolemia: Ketamine (2 mg / kg)
- Status asthmaticus: Ketamine (2 mg / kg)
- Intracranial hypertension: Thiopental: (3 mg / kg)
- Hyperthermia, multiple trauma, burns: Rocuronium

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Before transportation

- ✓Stabilise the patient!
- ✓Look for bone fractures
- ✓Secure airway
- ✓Secure intravenous access
- ✓Nasogastric tube and bladder catheterisation
- ✓Extract blood to analysis

Conditions for transportation

- ✓Contact with the PICU
- ✓Check equipment and prepare medications
- ✓Optimal vehicle?
- ✓Experienced staff
- ✓Maintain surveillance

Transport

Summary

- ✓ Life support do not ends with the restoration of spontaneous circulation
- ✓ Stabilisation is essential for prognosis
- ✓ Transport must be anticipated and organised