medis
MEDIZINISCHE MESSTECHNIK GmbH

NonInvasive CO Measurement

Overview of mostly used methods

Impedance Cardiography (ICG)

Method:

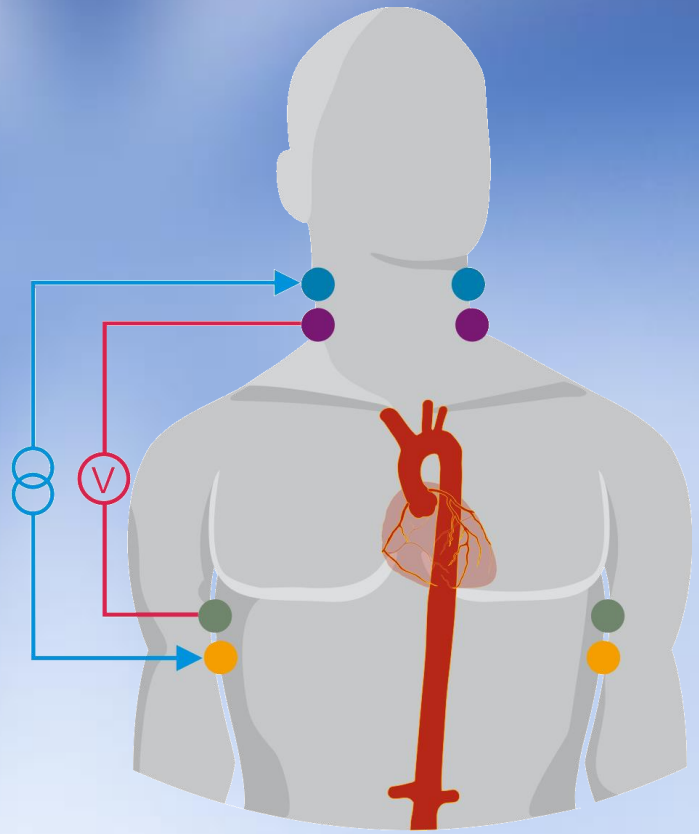
- Injection of an alternating current to the patient
- Calculation of cardiac output based on analysis of impedance change during heart cycle

Pro:

- Easy to use
- Operator independent
- Continuous measurement (monitoring)
- Beat-to-beat analysis

Contra:

- Limitations in case of severe aortic valve regurgitation and cardiac arrhythmia



Products: Niccomo (medis), NICOM (Cheetah), ICON (Osypka), PhysioFlow

Continuous Arterial Blood Pressure

Method:

- Continuous measurement of arterial pulse curve in the finger
- Calculation of cardiac output based on pulse contour analysis and transfer function

Pro:

- Easy to use
- Operator independent
- Continuous measurement (monitoring)
- Beat-to-beat analysis
- Continuous arterial blood pressure

Contra:

- Weak accuracy if pulse curve is not calibrated by invasive method
- Venous occlusion of the finger (uncomfortable)
- No information about thoracic fluid

Products: Portapres (FMS)

Inert Gas Rebreathing

Method:

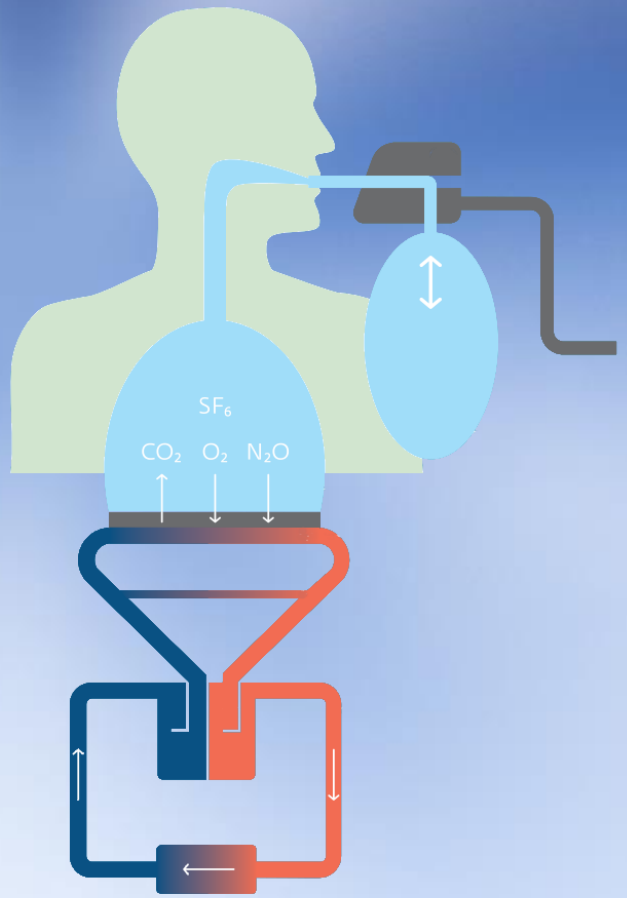
- Rebreathing of gas mixture
- Calculation of cardiac output based on measurement of soluble (N_2O) and insoluble (SF_6) gas concentrations

Pro:

- Accurate

Contra:

- Single measurement (no beat-to-beat analysis)
- Patient assistance is needed
- Not applicable for intensive care and during anaesthesia



Products: INNOCOR (Innovision)

Transthoracic Ultrasound

Method:

- Measurement of aortic flow by transthoracic Doppler placed on the chest
- Calculation of cardiac output based on the flow profile and cross section area in the aorta

Pro:

- Fast application

Contra:

- Single measurement (no beat-to-beat analysis)
- Limited accuracy caused by assumption of aortic cross sectional area
- User depended

Products: USCOM

Partial Gas Rebreathing

Method:

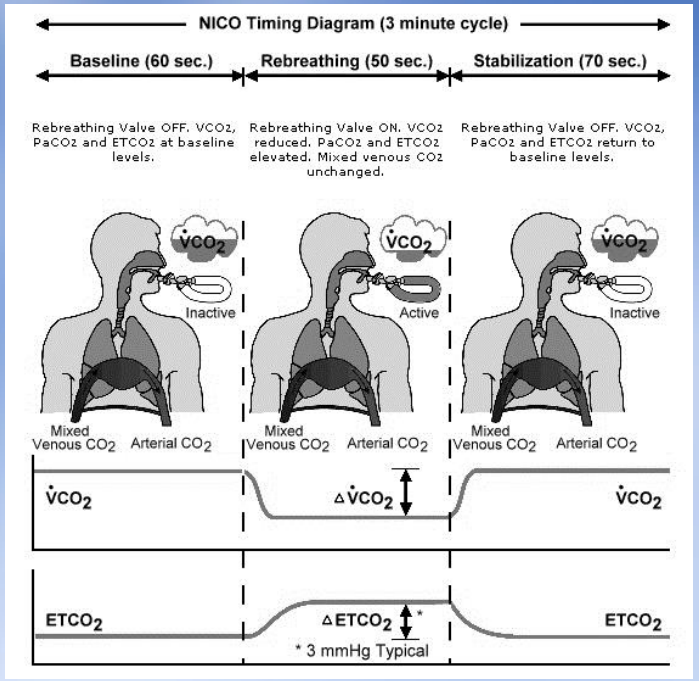
- Measurement of CO_2 concentrations during normal breathing and rebreathing
- Calculation of cardiac output based on modified Fick equation

Pro:

- No consumables needed

Contra:

- Single measurement (no beat-to-beat analysis)
- Only applicable in ventilated patients



Products: NICO (Respironics)