DEFINITION

• (an) aisthetos = (un) perception

• general anaesthesia = "narcose"
• regional anaesthesia = local
Theoretical Plasma Drug Concentration for Adequate Anaesthesia
PHARMACO-ANAESTHESIA METHODS

- Inhalational anaesthesia ... VIMA
- Intravenous anaesthesia... TIVA
- Intramuscular
- Rectal
- Combined anaesthesia
BASAL PARTS OF GA

- Analgesia
- Balanced Anaesthesia
- Muscle relaxation/Areflexia

Hemodynamic Monitoring

Monitoring Anaesthetic Endpoints

BIS Monitoring

Consciousness/Hypnosis

Peripheral Nerve Stimulator Monitoring
CIRCULATORY EFFECTS INHAL. ANAESTHETICS

(Barash, 1997)

• ↓ BP according to dose (vasodilation, ↓ C.O., cardiodepression, ↓ sympat. activity)
• ↓ consumption O₂ about 10-15%
• ↓ blood flow in liver, kidneys and gut, ↑ in brain, muscles & skin
• N₂O ↑ SVR, PVR and BP, ↓ C.O.
• Sensibilisation myokardium to catecholamines: ↓ in children, HAL > ENF > ISO > DES > SEV (more in ↑ CO₂, more with thiopental)
• No influence to pacemaker functions
• No coronary steal effect in man
RESPIRATORY EFFECTS INHAL. ANAESTHETICS  
(Barash, 1997)

- All ↓ $V_T$ and bronchodilational effect
- Bloc histamin effects on bronchi – bronch. 
  **asthma** treatment: HAL, SEV
- **Respiratory** depression: $N_2O > $HAL $> ISO >$DES
- No influence to hypoxic **pulmonary hypertension**

- Up to 3x increase effects of **muscle relaxants**
CNS EFFECTS OF INHAL. ANAESTHETICS

(Barash, 1997)

- ↓ intellectual functions, HAL for 2-8 days (B?)
- ↓ intensity of cerebral metabolism (CMRO$_2$): ISO > EFL > HAL.
- Vasodilat. cerebr. a. & ↑ pressure CSF: HAL > ISO = DES = SEV,
- HAL > ISO influence production & absorption CSF
- Light hypocapnia - lower ↑ ICP in ISO than HAL
- Autoregulation to CO$_2$ is more blocked by HAL than ISO
- Epi EFL
TOXICITY

- HAL = **hepatotoxicity** (imuno, repeated expositions)
- N\textsubscript{2}O = **hematotoxicity** „perniciose“ anaemia
- In **septic** pat. weakening Ne and Le functions
- Change **platelets** functions
- **Myometrium** relaxation – bleeding during C.s. (HAL > 0,5, ISO > 1,0)

Barash, 1997
DISTRIBUTION COEFF. ANAESTHETICS (BLOOD / GAS)

Less solubility = faster onset

- Desflurane: 0.45
- Nitrous Oxide: 0.47
- Sevoflurane: 0.65
- Isoflurane: 1.43
- Enflurane: 1.8
- Halothane: 2.5

GAS CONSUMPTION DURING ANAESTHESIA

Low flow...

Calculation of total gas uptake for a patient weighing 75 kg.
ADVANTAGES OF INHAL. ANAESTHESIA

• Easy regulation (deep of anaesthesia)
• Elimination by expiration
• Easier monitoring of anaesthesia deep
• Less risk of postanaesthetical respiratory depression
• Potentiation of muscle relaxation effect
• Ambulatory anaesthesia
• Price
ANAESTHETIC MACHINE LAYOUT
GENERAL ANAESTHESIA

ROTAMETER

VAPORISER

VOLATILE ANAESTHETICS

Campbell
ANAESTHETIC CIRCUIT LAYOUT
UNI-DIRECTIONAL ANAESTHETIC SYSTEM LAYOUT

From machine

Reservoir

Corrugated tubing

Heidbrink expiratory valve

Mask
DEFINITIONS

- **Intravenous anaesthesia (IVA)** = administration of intravenous anaesthetics with addition of $\text{N}_2\text{O}$ in inhalatory mixture

- **Total intravenous anaesthesia (TIVA)** = all anaesthetics are administered only by i.v. route, inspiratory gas contains only oxygen and air (nitrogen)
INDICATIONS OF IV ANAESTHESIA

- Support of inhalational anaesthesia
- Sedation during local anaesthesia
- Ambulantory anaesthesia
- Difficult administration of inhal. anaesthetics (military or civil injuries, hyperbaric chamber)
- Impossible administration of N₂0 (↑FiO₂) as bronchoscopy, laryngeal or tracheal surgery
- Where is N₂0 relative CI - one lung anesthesia, vestibule ear surgery, neuroanaesthesia, ileus, air embolia...
- Extracorporeal circuit
DISADVANTAGES OF TIVA

• Difficulties in an. depth assessment
• Postoperative respiratory depression after opioids
• Necessity of several IV accesses
• Drug incompatibilities
• More infusion pumps and deliveries
• Air and oxygen source
INSTRUMENTS FOR TIVA

- Linear pump
- Infusion bottle delivery
- Two IV lines or Y connector
- Oxygen flow-meter
MEDICAMENTS USED FOR TIVA

- **Anaesthetics**: propofol, thiopental, metohexital, ketamin, midazolam...
- **Opioids**: morphin, fentanyl, alfentanil, sufentanil, remifentanil...
- **Muscle relaxants**: sukcynylcholine, vecuronium, atracurium, rocuronium, pipecuronium...
MUSCLE RELAXATION

- N.-m. junction, mediators
- **Depolarising** muscle relaxation
- **Undepolarising** muscle relaxation

- Curarisation
- Decurarisation
- Recurarisation
POSTOPERATIVE OBSERVATION

• No diffusion hypoxia ($N_2O$)
• Absorption atelectase (during high $FiO_2$)
• Early administration analgetics in cases using short-acting opioids
• Possibilities aplication of antidots
RISK FACTORS FOR PONV

What are the warning signs for postoperative nausea and vomiting?

- Female
- History of motion sickness/postoperative nausea and vomiting
- Opioid therapy
- Non-smoker