General anaesthesia in oral surgery and outpatient surgery

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History

1844  Horace Wells  nitrous oxide  extraction of one of his own wisdom teeth by a colleague

1846  William Morton  ether  extraction

(pupil of Wells)

1946  introduction of lidocaine

General anaesthesia should be strictly limited to those patients and clinical situations in which local anaesthesia (with or without sedation) is not an option.

Coleman F. The history of nitrous oxide anaesthesia. Dental Record 1942; 62: 143-9

Types of general anaesthesia

Outpatient anaesthesia
• Dental chair anaesthesia
  Relative analgesia → for simple extraction

• Day care anaesthesia
  Conscious sedation (Sedoanalgesia) → for minor oral surgery

In patient anaesthesia
  Intubation with or without neuromuscular blocking →
  → for complicated extractions, oral- and maxillofacial surgical procedures
Indications of general anaesthesia

• Acute infection (pain)
• Children
• Mentally challenged patients
• Dental phobia
• Allergy to local anaesthetics
• Extensive dentistry & facio-maxillary surgery
Equipments

- anaesthesia machine, vaporizers
- oxygen, nitrous oxide
- breathing circuits (adult and pediatric)
- nasal and facial masks
- oral and nasal air-ways
- different laryngoscopes with all sizes of blades
- nasal and oral tracheal tubes
- Independent suction apparatus
Monitoring standards

• Peripheral arterial oxygen saturation,
• ECG,
• non-invasive blood pressure and capnography
• All resuscitation drugs
• Defibrillator
Conditions of general anaesthesia

• Anaesthesiologist
• Dedicated assistant
• Dentist
• Dental assistant

Minimum of four people are required!

Written and informed consent by the patient or parent/guardian!
Procedure

Only ASA physical status class I & II patients should be administered

Steps

• Pre-anaesthetic preparation
• Premedication
• Induction of anaesthesia
• Intubation
• Maintenance
• Recovery
Pre-anaesthetic preparation

Preoperative examinations are indicated:

• Anamnese
• Physical examinations (by the anaesthiologist)
• Blood tests
• Urine tests
• ECG
• Lung x-ray
• Informed consent form!
Premedication

Clear fluids are allowed up to 4 hours (children) or 6 hours (adult) preoperatively. (preoperative fasting)

**Premedication**

- **Anxiolysis**
  - Benzodiazepine: midazolam-Dormicum, alprazolam- Xanax →
    → Sedation, Amnesia, Anticonvulsive

- **Preemptive analgesia**
  - *NOA* (non opioid analgetic) metamizol, diclofenac, ibuprofen, paracetamol
  - In case of need **opioid** Tramadol, Pethidin, Morphin

- **Antisalivation**
  - Parasympathomlythic (Anticholinerg): Atropin (0.03mg/kg), Scopolamin, Glycopyrrolat (reflekt. Bradycardie)

- **Antacide**
  - Antihistamins: (H2-Blocker) ranitidin, famotidin
  - Protonpump inhibitors: omeprasole, esomeprasole, Na-citrat (p.o. 30 ml)

- **Antibiotic prophylaxis** (in case of need)
  - Cefazolin1-2 g, Ampicilllin/clavulic acide 1.2 g or Amoxicillin/sulbactam or Clindamycin 600 mg.
Induction of anaesthesia

Gaseous induction using sevoflurane or 66% nitrous oxide in oxygen (isoflurane, halothan)

Laryngeal mask airway (LMA) is being used for all but the simplest extractions. It provides some barrier to aspiration when compared to mask.
Intubation

Types of intratracheal intubations

• Oral
• Nasal
• Submental

Pharynx should be properly packed!
Risks of intubation

- Anatomic factors (Mallampati scores)
- Limited opening
- Oedema
- Mobility of neck
- Size of tongue
- Dental status

Methods in case of difficulties
- Fiberoscopic intubation
- Blind nasal intubation
- Preoperative tracheotomy
Class 1. Complete visualization of the soft palate
Class 2. Complete visualization of the uvula
Class 3. Visualization of only the base of the uvula
Class 4. Soft palate is not visible at all
Maintenance of general anaesthesia

Operating position
The most commonly used position is semi-supine. In this position, erect head and neck helps in maintenance of airway.

Intubation without neuromuscular blocking agent (short operation)
- Spontaneous respiration of inhalational agent, nitrous oxide and oxygen (50% inspired oxygen concentration → decrease hypoxaemic episodes)
- Continuous, controlled infusion of propofol or etomidate or tiopental (Hypnotikums) → MAINTENANCE OF ANAESTHESIA

Intubation with neuromuscular blocking agent
- Non-depolarizing neuromuscular blocking agent ((Esmeron, Tracrium, Norcuron, Nimbex) /depolarizing is not recommended (e.g. succinylcholine) because of muscle pains/)
- Anaesthesia is maintained with administration of halothane /sevoflurane and nitrous oxide in oxygen. Diclofenac and dexamethasone are administered to reduce pain and swelling. Local anaesthetic may be infiltrated into the sockets by the surgeon,
- For more extensive procedures, short acting opioid like fentanyl is administered
Recovery

- The LMA or endotracheal tube should not be removed until the cough reflex has returned.
- Prerequisites of extubation: sufficient spontaneous breathing, return of protective reflexes.
- Antagonizing:
  - Opioid with **naloxone**
  - non-depolarizing neuromuscular blocking relaxants with **Cholinestherase**
- Free airways!
  - Pharyngeal pack is removed
  - No bleeding towards to oral cavity
- Extubation
  - After the return of protective reflexes, muscle strength, sufficient spontaneous breathing
  - The presence of the surgeon and conicotomic readiness.
  - Extubate under constant sucking
  - Possibly delayed extubation
- Risks of free airway at: - laryngospasm - bleeding in the mouth - bleeding between the soft tissues (Compression airway obstruction) - obstruction caused edema - backwards falling tongue
Complications

Hypoxaemia
Arrhythmias
Emphysema
Dislocation of temporo-mandibular joint
Tooth fracture
Bleeding
Mucosa injury
Operating room pollution
General anaesthesia in outpatient surgery

- The surgical procedure usually lasts not longer than one hour and there are no anticipated post operative complications. ASA physical status class I or II.
- Advantages of outpatient surgery:
  - Cost savings
  - Conserving hospital beds for other patients
  - Fewer nosocomial infections
  - Fewer thromboembolic complications
  - Suitable conditions for the surgeon during surgery
  - Reduces the psychological burden of patients
- Types: Relative analgesia (Inhalation sedation technique)
  Conscious sedation (Sedoanalgesia)
Relative analgesia
Inhalation sedation technique

- **Premedication** is advised in form of oral alprazolam or midazolam, but it can delay recovery

- **Elements:**
  1. administration of nitrous oxide in oxygen (0-70%);
  2. nitrous oxide begins to exert its pharmacological effects
  3. use of failsafe gas preventing accidental administration of 100% nitrous oxide.
     e.g. Sevoflurane 0.1-0.3% and 40% nitrous oxide in oxygen has been used for inhalational conscious sedation in children

A proper consent is taken. Intravenous induction with propofol is done in adults and older children. Neuromuscular blockade is achieved with atracurium or vecuronium
Conscious sedation (Sedoanalgesia)

Conscious sedation may be induced by any one of the following modalities:
1. Oral administration of a single sedative drug (midazolam, diazepam, alprazolam, lorazepam, zolpidem, promethazine, chloral hydrate).
2. Nitrous oxide and oxygen
3. Combination of oral sedative drugs or nitrous oxide and oxygen with an oral sedative drug
4. Parenteral administration of sedative drugs (intravenous- midazolam, propofol; intramuscular; subcutaneous; submucosal or intranasal- midazolam
Drugs used in intravenous anaesthesia

**Benzodiazepine (midazolam):** dose-dependent anxyolitic, sedative and hypnotic
- Onset of action within 2-3 min. - Action time 10-15 min.
- Elimination half time 1.5-2 h.
- Sedo-analgesia: Dose, 0.05-0.1 mg / kg
- Antagonist flumazenil: **Anexat** (0.1-0.2 mg i.v.)
- Relativel contraindications: obesity, Alkholabusus, hepatopathy, older age

**Propofol:**
- Lipid emulsion - for induction of anesthesia 1.5-2.5 mg / kg,
- Onset of 30-45s - Duration of hypnotic effect 4-6 min
- Elimination half-time 1-3 h
- No analgesic effect – side effects: apnea, hypotension - Does not antagonists

**Barbiturate: thiopental (Trapanal)**
- No analgesic effects
- Dose 4-5 mg / kg i.v. - Onset of 20-50 s - Duration of hypnotic effect 5-10 min.
- Elimination half-time 5-10 h
- Antikunvulziv effect (epilepsia)
- Laryngo- and bronchospasm (histamine release)
- Contraindication: porphyria, asthma, allergy, severe liver damage

**Nalbuphin (Nubain)**
- belongs to opioids
- Duration of action is approximately 2-3 h
Aftercare

Observation

Modern anaesthetic drugs permit rapid recovery of consciousness and early discharge, but it should be recognised that it may take more than 24 hours for all traces of the agents to be eliminated.

Thus when, in the opinion of the anaesthesiologist, patients are ready for discharge they must be accompanied by a responsible, legally competent adult who has been given clear instructions regarding the implications of anaesthetic ‘hangover’ effects.