



Department of Trauma Surgery FN Brno

Analgesia and anesthesia

Definition

- **Anesthesia** - from Greek, without perception
 - general - artificial sleep (coma) patient
 - local - desensitizing certain body parts
 - elimination of all sensation - tactile and painful
- **Analgesia** - algos, no pain
 - exclusion only pain perception
- **Analgo-sedation**
 - analgesia with a slight decline of consciousness
 - it is possible to make contact after a stronger pulse

History

- Antiquity (Egypt, Syria)
- Decoction of opium, mandrake

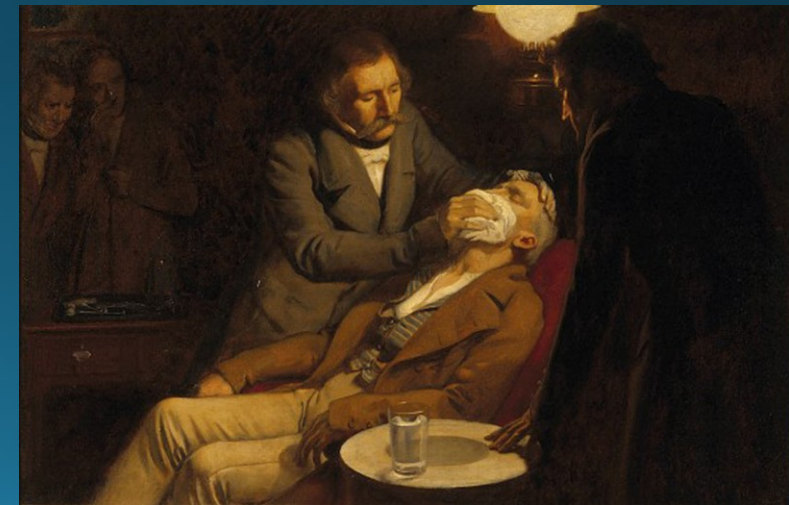
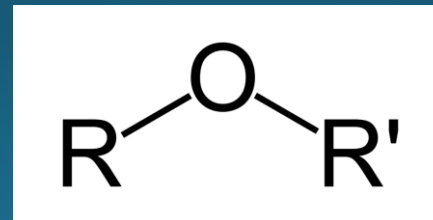


- Czech lands

1947 ether anesthesia in Prague (Celestin Opitz)

First anesthesia department after WW2

ÚVN, Sv. Anna Brno



Anesthesiology

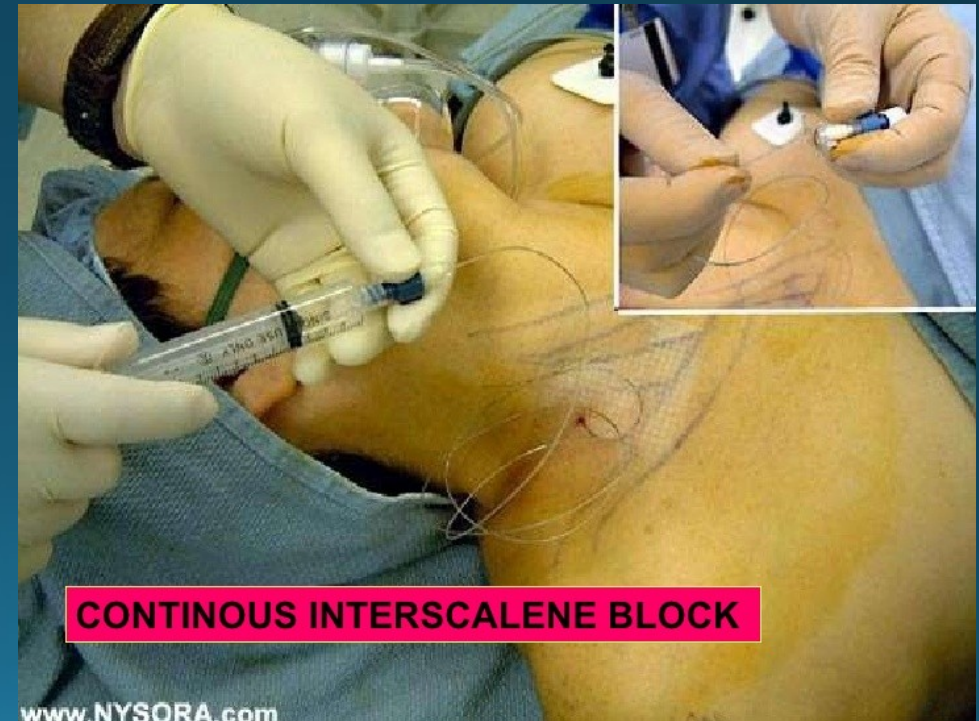
- **Anesthesiology** - is a branch of medicine that focuses on pain relief during and after surgery. This treatment is called anesthesia. Practitioners of anesthesiology are called anesthesiologists
- **Resuscitation** - is a term describing the process of correcting physiological disorders in an acutely unwell patient
- **Cardiopulmonary resuscitation** - commonly known as **CPR**, is an emergency procedure performed in an effort to manually preserve intact brain function until further measures are taken to restore spontaneous blood circulation and breathing in a person who is in cardiac arrest
- **Intensive care medicine** or **critical care medicine** is a branch of medicine concerned with the diagnosis and management of life-threatening conditions requiring sophisticated organ support and invasive monitoring.

General anesthesia

- medically induced coma and loss of protective reflexes resulting from the administration of one or more general anesthetic agents.
- a variety of medications may be administered, with the overall aim of ensuring unconsciousness, amnesia, analgesia, relaxation of skeletal muscles, and loss of control of reflexes of the autonomic nervous system.
- The optimal combination of these agents for any given patient and procedure is typically selected by an anesthesiologist or another provider such as an anesthesiologist assistant or nurse anesthetist, in consultation with the patient and the medical or dental practitioner performing the operative procedure

Combined anesthesia

General + Local



Surgery

- **Types of surgery**

- **elective** - to correct a non-life-threatening condition
- **semi-elective** - can be postponed for a short time
- **emergency** - must be done promptly to save life, limb, or functional capacity

preoperatively

- pre-operation examination
- treatment of laboratory values – CBC, ions



Perioperative period

- **Preoperative**

to perform tests, attempt to limit preoperational anxiety, include the preoperative fasting.

- **Intraoperative**

begins when the patient is transferred to the operating room bed ends with the transfer of a patient to the postanesthesia care unit (PACU). Patient is monitored, anesthetized, prepped, and draped, and the operation is performed. Nursing activities during this period focus on safety, infection prevention, and physiological response to anesthesia. Radiation therapy and blood salvage may also be performed during this time.

- **Postoperative**

transfer to the PACU (Post Anesthesia Care Unit) and terminates with the resolution of the surgical sequelae. It is quite common for this period to end outside of the care of the surgical team. It is uncommon to provide extended care past the discharge of the patient from the PACU.



Preoperative phase

- **Meeting anesthesiologist with patient**
evaluation of preoperative examinations
introduction to surgery
evaluate the degree of the fitness before surgery
 - **ASA physical status classification system**
prescribe premedication, reassure the patient
fasting - 6 hours
- **Premedication** - the evening before surgery
- **Premedication** - on the day of the surgery
sedation, sleep
 - tranquilizers (benzodiazepine)elimination of unwanted vagal reflexes
 - vagolytic (atropine)

Fig. 1a ASA classification

ASA I	Normal healthy patients
ASA II	Patients with mild systemic disease
ASA III	Patients with severe systemic disease that is limiting but not incapacitating
ASA IV	Patients with incapacitating disease which is a constant threat to life
ASA V	Moribund patients not expected to live more than 24 hours
ASA VI	A declared brain-dead patient whose organs are being removed for donor purposes

Intraoperative phase

- eliminate of painful stimuli
anesthesia, analgesia
- stabilization of the condition
sufficient breathing and
keeping the filling bloodstream
- muscle relaxation
- controlled hypotension
- cardiopulmonary bypass



Airway management

set of medical procedures performed in order to prevent airway obstruction

- head-tilt/chin-lift
- jaw-thrust maneuvers
- oropharyngeal airways (OPA)
- nasopharyngeal airways (NPA)
- laryngeal mask

does not prevent further leaking and aspirations

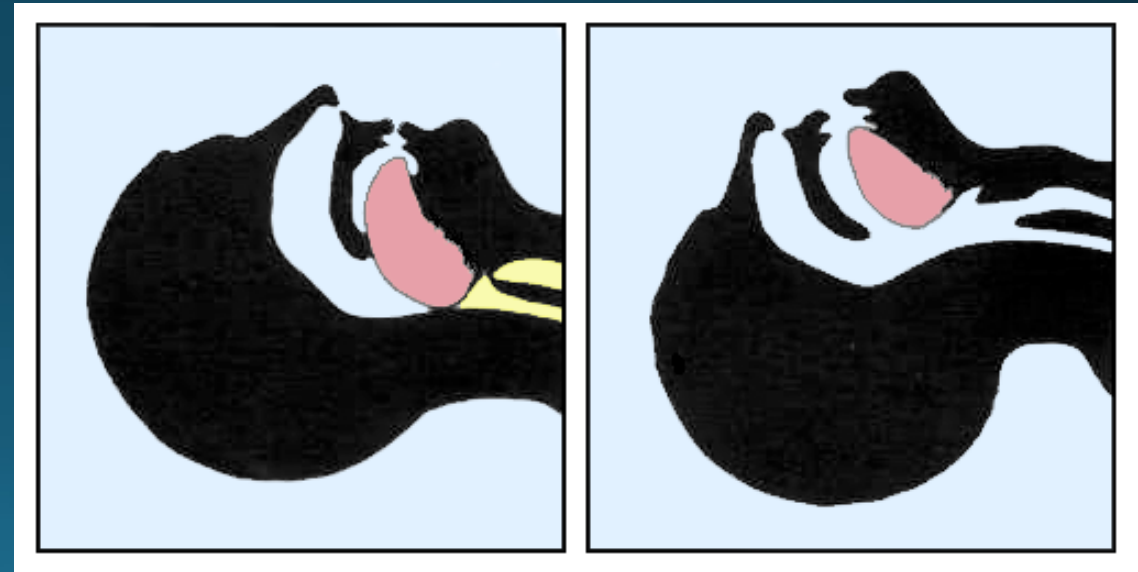
- endotracheal tube

indications - full stomach (ileus, trauma), position on the abdomen or side, muscle relaxation, circulatory and respiratory insufficiency



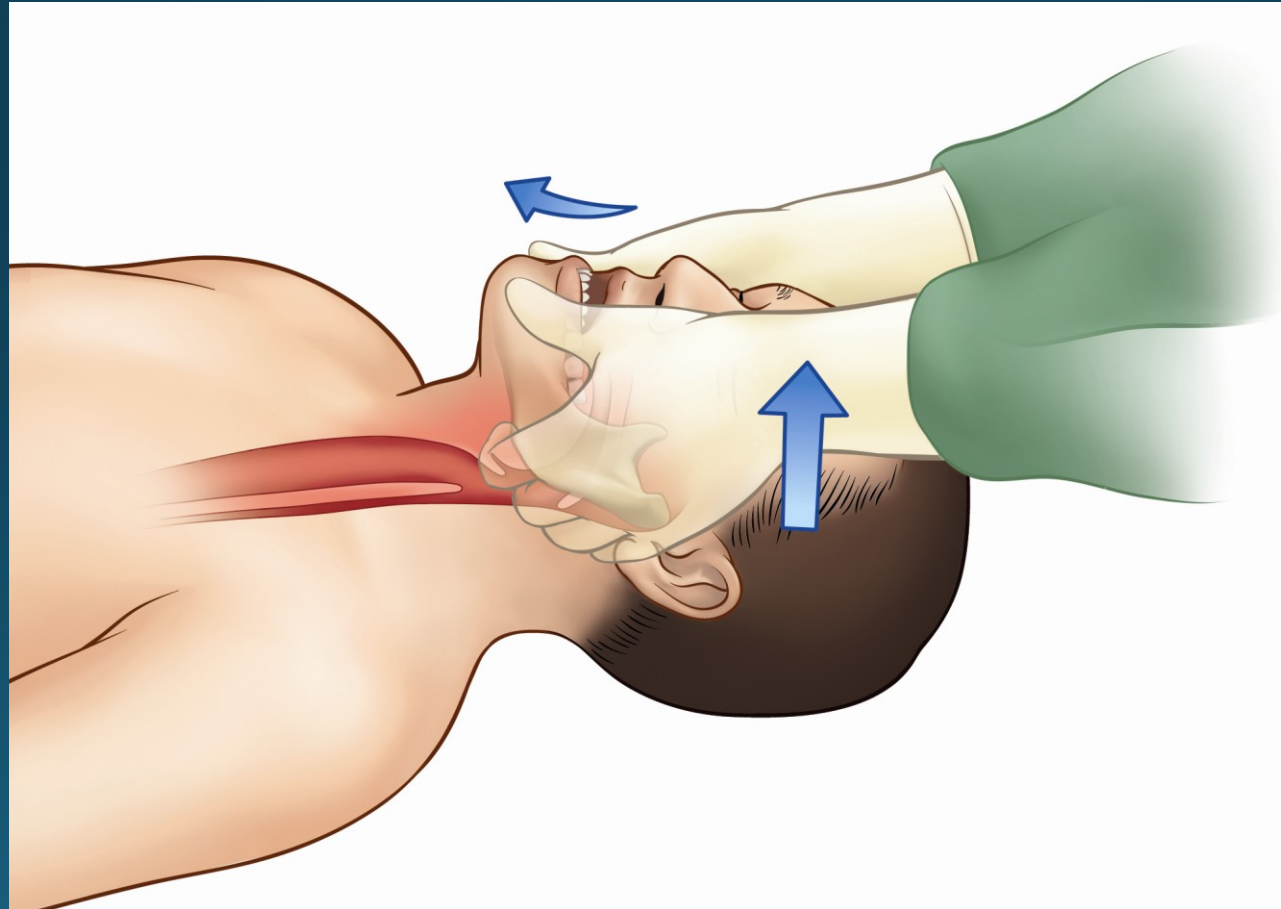
Airway management

- head-tilt/chin-lift



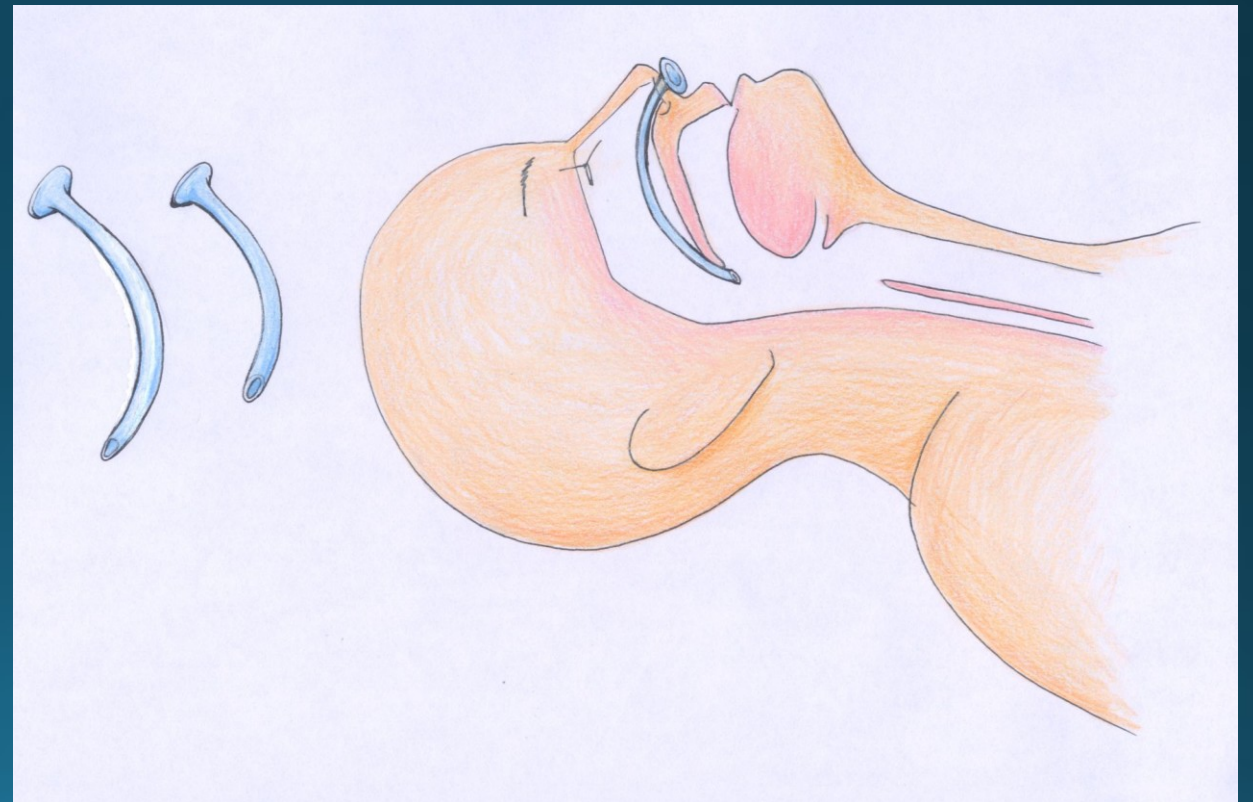
Airway management

- jaw-thrust maneuvers



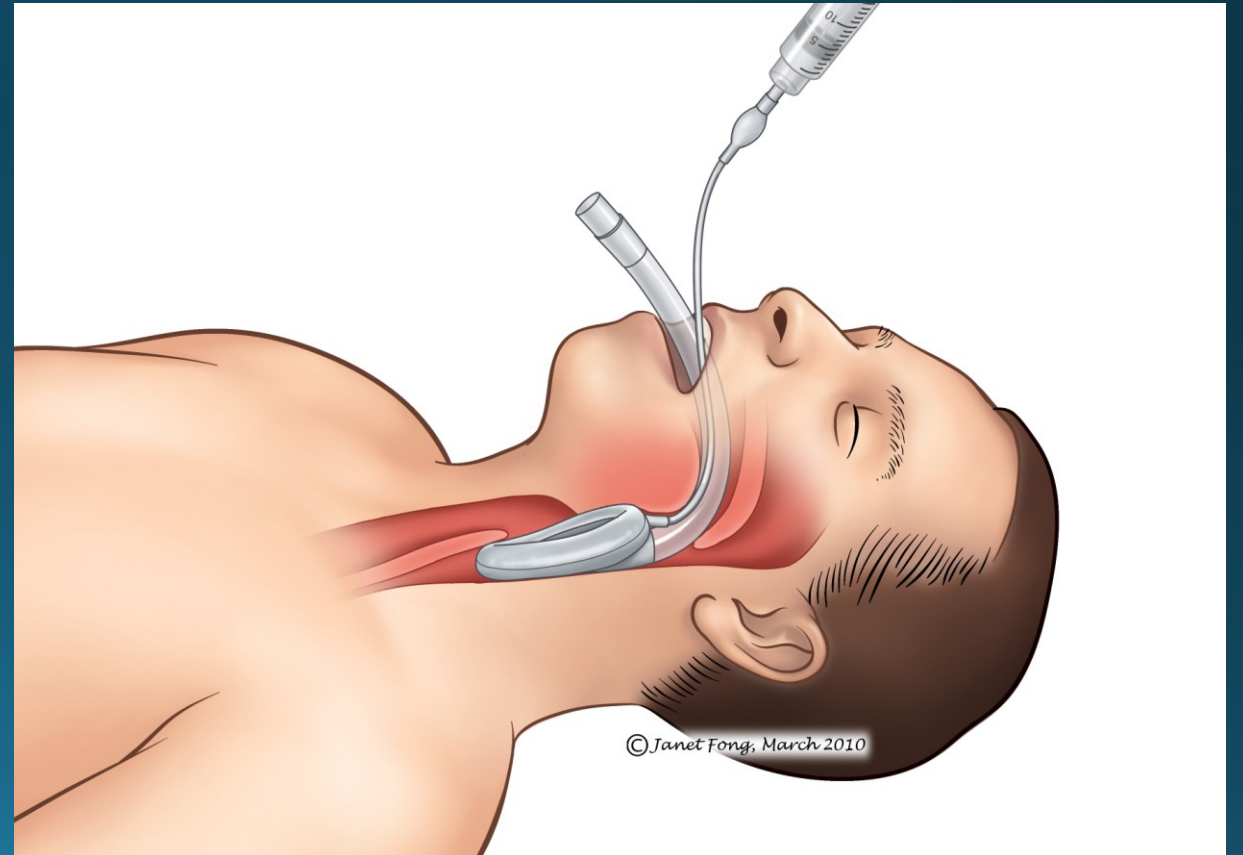
Airway management

oropharyngeal (OPA) and nasopharyngeal airways (NPA)



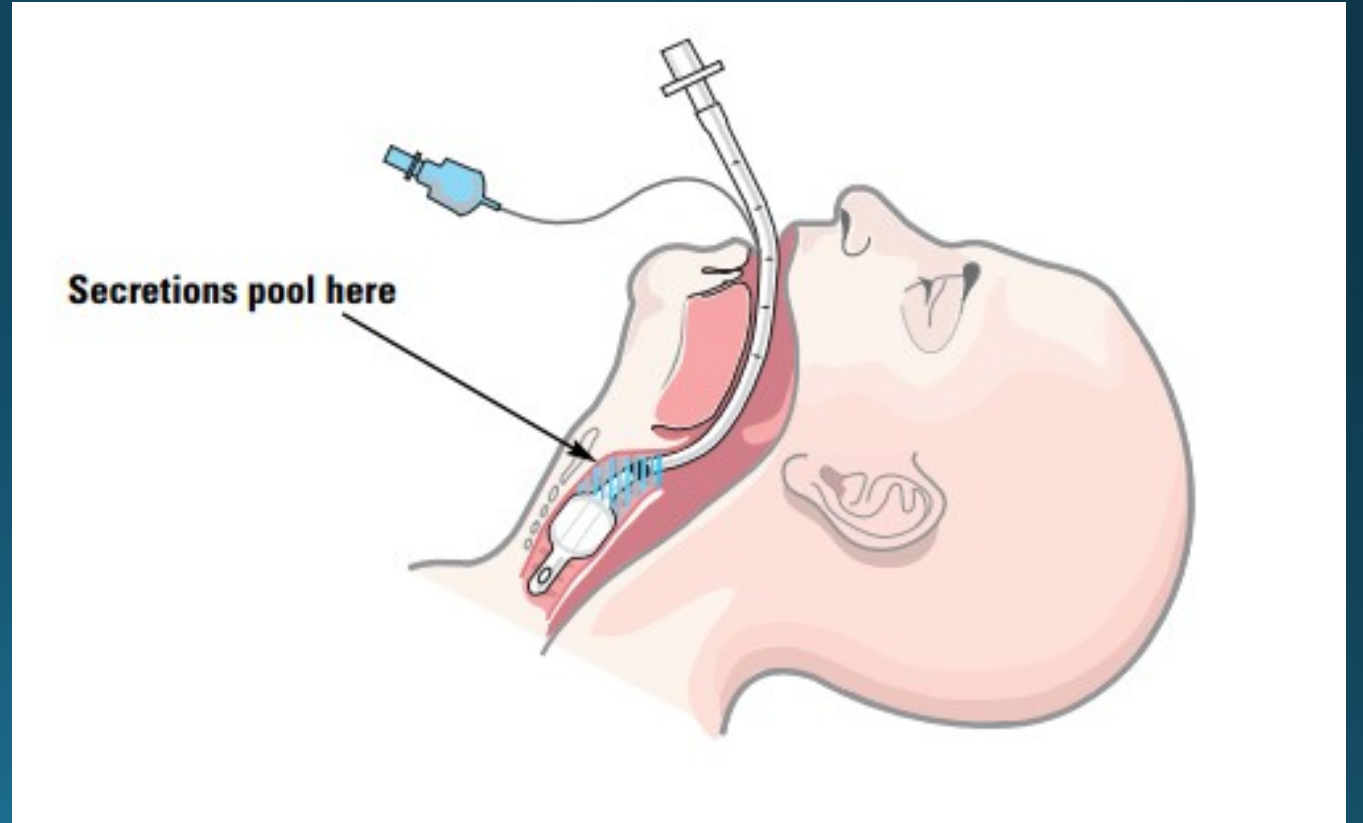
Airway management

- laryngeal mask



Airway management

- endotracheal tube



Mechanical ventilation

- method to mechanically assist or replace spontaneous breathing
- Indications - relaxed patients who are unable to spontaneous breathing (due to anesthesia, surgical position, surgery of the chest cavity ...)
- endotracheal tube connected to the device (ventilator)
- INSULFATION anesthetic mixture into the lungs
- inspirium (20-25 cm H₂o)
- expirium passive - INSULFATION is stopped, the pressure drop to atmospheric pressure
- can also be performed manually - useful at the beginning and end of anesthesia
- after anesthesia, the patient without respiratory effort, clears his throat, he raises his head



Types of general anesthesia

- By entering (routes) -

inhalation

injection (**intravenous**, intramuscular or subcutaneous)

oral

rectal



Stages of anaesthesia

- **Stage 1**

"**induction**", is the period between the initial administration of the induction agents and loss of consciousness. During this stage, the patient progresses from analgesia without amnesia to analgesia with amnesia. Patients can carry on a conversation at this time.

- **Stage 2**

"**excitement stage**", is the period following loss of consciousness and marked by excited and delirious activity. respirations and heart rate may become irregular. uncontrolled movements, vomiting, breath holding, and pupillary dilation. Since the combination of spastic movements, vomiting, and irregular respirations may lead to airway compromise, rapidly acting drugs are used to minimize time in this stage and reach stage 3 as fast as possible.

- **Stage 3**

"**surgical anaesthesia**", the skeletal muscles relax, vomiting stops, and respiratory depression occurs. Eye movements slow, then stop, the patient is unconscious and ready for surgery. It has been divided into 4 planes: eyes initially rolling, then becoming fixed, loss of corneal and laryngeal reflexes, pupils dilate and loss of light reflex, intercostal paralysis, shallow abdominal respiration

- **Stage 4**

"**overdose**", too much medication has been given relative to the amount of surgical stimulation and the patient has severe brain stem or medullary depression. This results in a cessation of respiration and potential cardiovascular collapse. This stage is lethal without cardiovascular and respiratory support.

Intraoperative phase

- procedure in the operating field
- operation of technical systems
- **Physiologic monitoring**
- state vital signs - blood pressure, ECG, pulse oximetry, carbone dioxide, agent concetration measurement, temperature
- the position of the patient - to prevent hyperextension, oppression NC structures
- keeping in stage III - adequate analgesia, anesthesia, payment amount, breath support.
- reliable venous access - infusion solutions, anesthetics ...
2x, insertion CVC (v. Subclavian, v. Jugularis)



Intraoperative phase

- drug infusion

provides volume replacement to increased capacity
bloodstream covers diuresis, blood loss, (HAES,
Ringer ...)

RBD under 80 -100 HBG, greater blood loss

- adjuvant pharmacotherapy - glucose,
arrhythmias, blood circulation support

Postoperative phase

Period termination and the unwinding of anesthesia

- full consciousness and alertness
- obey simple calls , to cough, head rises above the pad
- Supervision 2h - ICU / recovery room - Post Anesthesia Care Unit
- Monitoring 4-6 h after surgery - BP, consciousness
- Postoperative analgesia required quality
- after major surgery, the need for mechanical ventilation
 - hospitalization on ICU, Department of Anesthesiology

Postoperative phase

- **Risks**

hypoventilation

hidden shock with temporary centralization

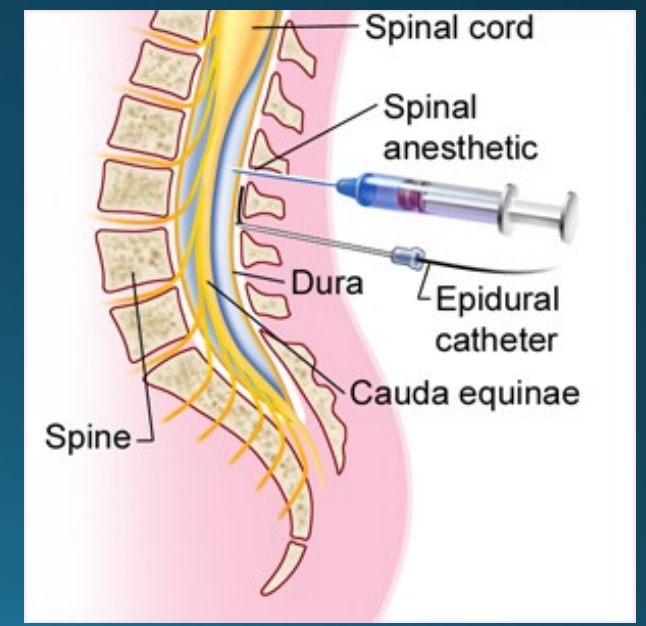
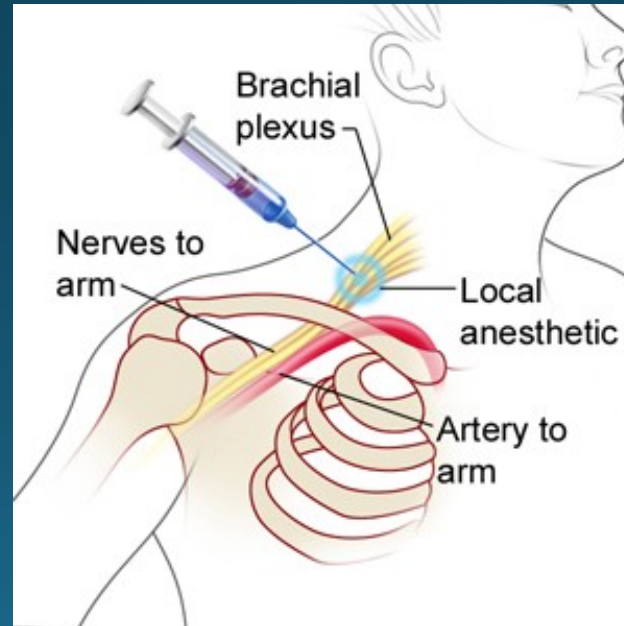
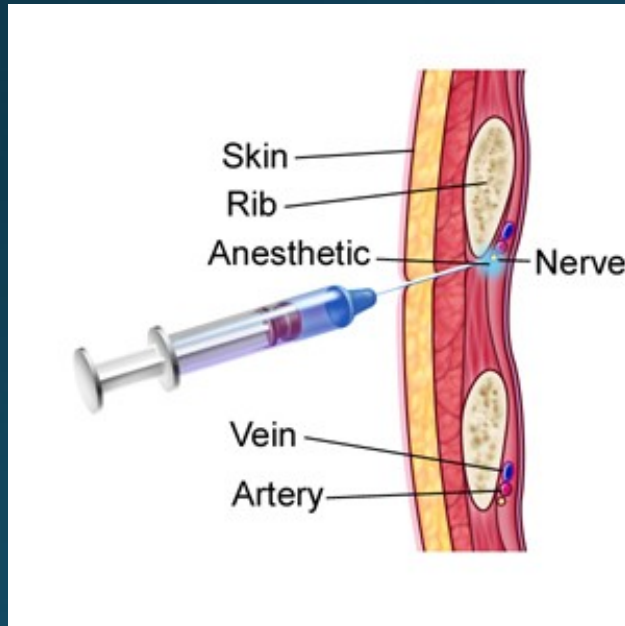
surgical complications - bleeding

Risks and Complication of GA

- introduction and awakening are most risky
- polymorbid patient and emergency surgery
- aspiration (acid content, a full or atonic stomach)
- anaphylactic shock, embolism, myocardial infarction, malignant hyperthermia, arrhythmias
- hypoventilation (on the end of GA)
- Prevention of the aspiration - NGT, prokinetic agents and H₂ block premedication

Local anesthesia

- It acts on the peripheral nerves - no CNS
- from the output of radicular nerves to the terminal end



Local anesthesia

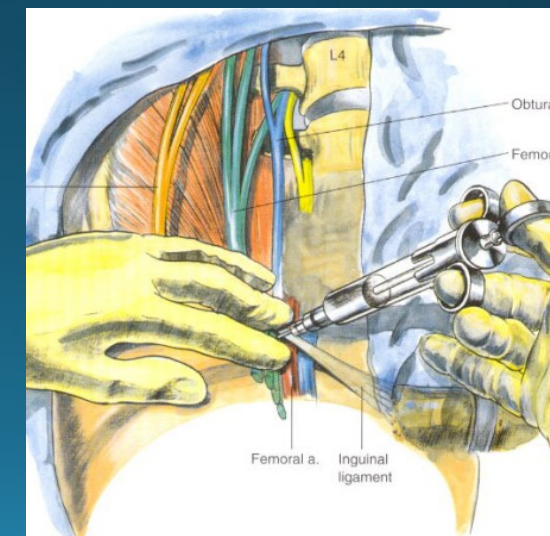
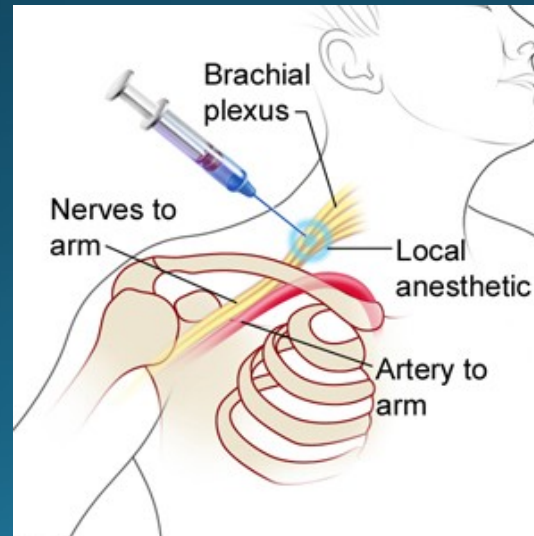
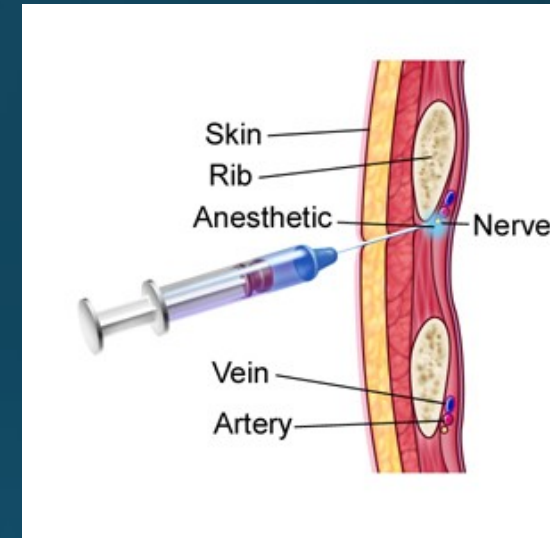
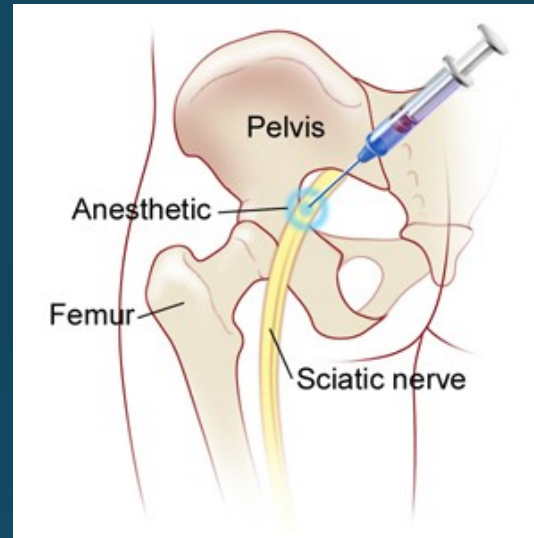
- A wide range of performances - bronchoscopy to TEP
- Consciousness is retained
- Positives: analgesia (persists postoperatively), improves perfusion, does not restrict breathing, allows contact with patients
- Surgeon - infiltration anesthesia
- Anesthesiologist - conduction anesthesia, nerve block, epidural and subarachnoidal anesthesia

Local anesthesia

- **Topical** (skin, mucosal) - application to the surface anesthetics, amide type anesthetics
vocal cords, trachea, urethra
- **Infiltration** - infiltration on-site surgery
- **Field block** - interrupts conduction of nerve fibers in small distance from the surgical site
- **Peripheral nerve block**
- **Plexus anesthesia**
- **Epidural anesthesia**
- **Spinal anesthesia**

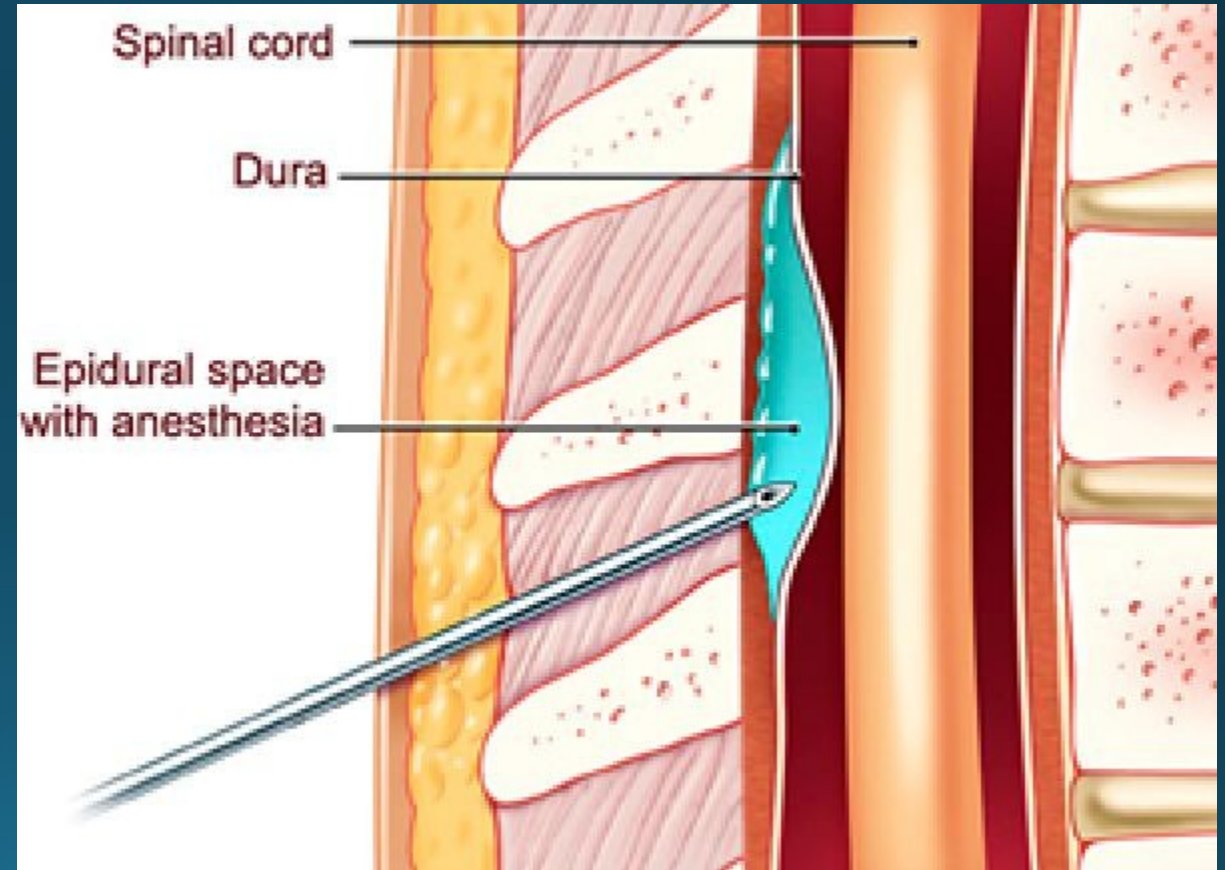
Peripheral nerve block and plexus anesthesia

- Plexus brachialis
- Axillary block
- Intercostal nerv
- Sciatic nerv
- Femoral nerv



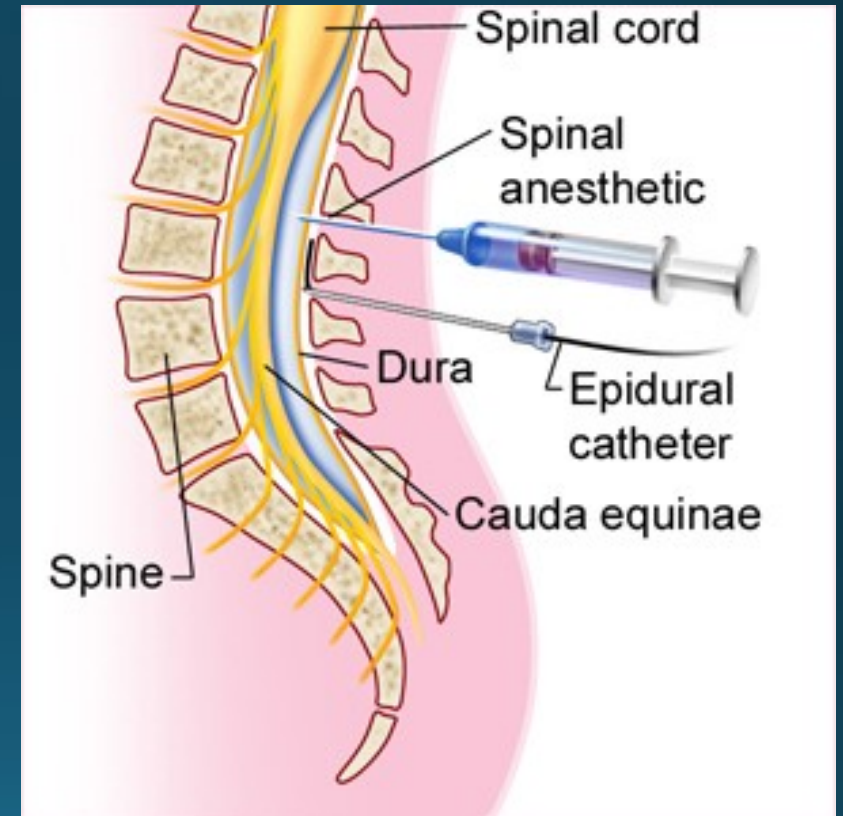
Epidural anesthesia

- surgery purposes
- ongoing analgesia - serial rib fracture, burns
- complex effect - analgesia, improving perfusion
- disposable needles
- cannula for repeated administration - epidural catheter



Spinal anesthesia

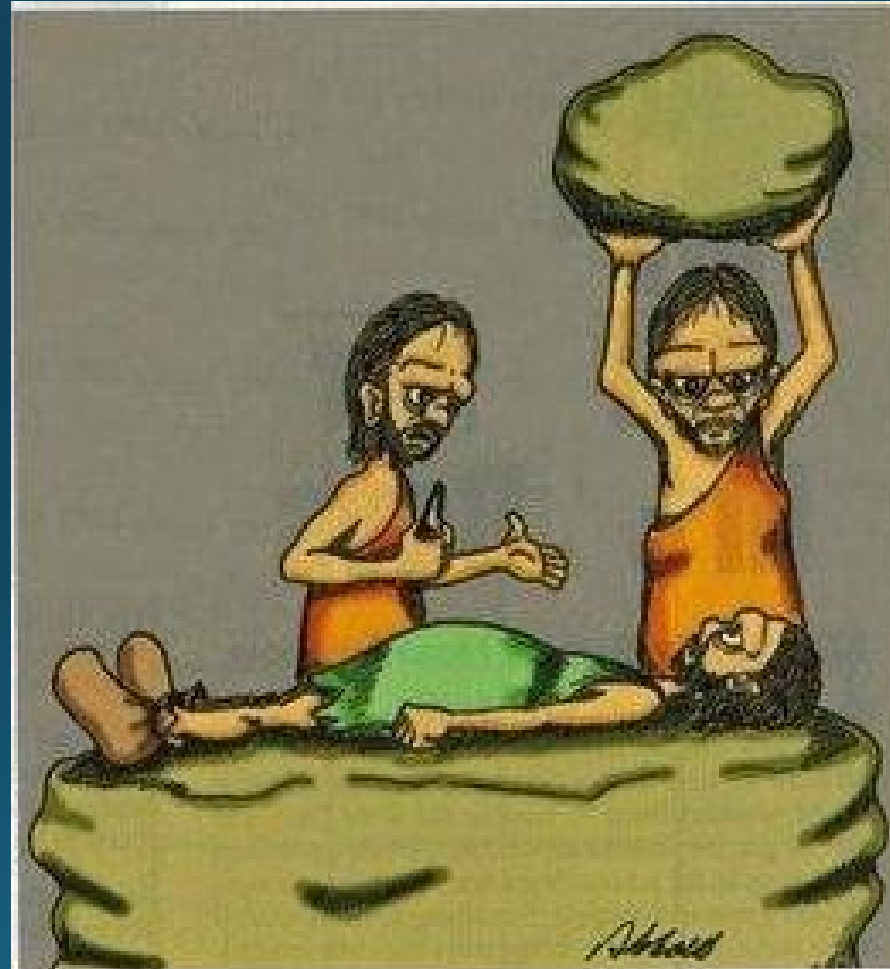
- subarachnoid anesthesia
- applications below under the arachnoid into the spinal fluid
- spreading density and body position
- instillation L1-L2 - "Spinal Tap,,



Complication SA

- failure effect
- wrap catheter in the epidural space
- hypotension during epidural anesthesia -volumotherapie, ephedrine
- the upward extension of the anesthetic in the subarachnoid anesthesia (cough, hypobaric solution, incorrect posture) => motor paralysis, hypotension, respiratory insufficiency
- urinary retention

Thank you for your attention



"And this is Dr. Og, your anesthesiologist."