

complications of anesthesia

Supervised by : Mohammad Amir

Done by:

-Marwan Rawashdeh

-Othman Alsoudi

-Yahya Rawashdeh

-Otbah Almasri

- Mohammad Alsaudi

-Ahmad Alsboul

Introduction:

Anesthesia is from the Greek word “without sensation “and it’s a state of controlled and temporary loss of sensation or awareness or both that is induced for medical purposes.

Anesthesia today is very safe but pre-operation complication still occur in up to one in 10,000 cases, and when they do, they can be life-threatening

Complications can occur at any stage (pre-,intra-, post-operative)

They can range from minor to major and they can be minimized or prevented through proper assessment and monitoring

The anesthesiologist can reduce anesthesia related risks by:

- Checking the general health of the patient
- Ask about any allergies or medication
- Previous anesthetic history, including family history
- Examine the airway, lungs, and heart
- Postoperative observation (oxygenation, early warning signs)
- Ask about tobacco and alcohol consumption

Regarding general health

ASA Physical Status Classification System

- | | |
|-------------|---|
| I. | A normal healthy patient |
| II. | A patient with mild systemic disease |
| III. | A patient with severe systemic disease |
| IV. | A patient with severe systemic disease that is a constant threat to life |
| V. | A moribund patient who is not expected to survive without surgical procedure |
| VI. | A declared brain-dead patient whose organs are being removed for donor purposes
The addition of 'E' indicates emergency surgery. |

Medication management before surgery and anesthesia

Regarding medication

The doctor should ask about the use of any recreational drugs:(cocaine, opioids, heroin)

some drugs must not be omitted before anesthesia:(cancer drug, immunosuppressant, thyroid drugs and anti-epileptic drugs)

Some drugs must be omitted before anesthesia:(NSAIDS, ACE inhibitor, diuretics and calcium channel blockers)

To check for airway and breathing, we use the mallampati score

The Mallampati Score



CLASS I
Complete
visualization of
the soft palate



CLASS II
Complete
visualization
of the uvula



CLASS III
Visualization
of only the
base of the uvula



CLASS IV
Soft palate
is not
visible at all

A high Mallampati score (class III and IV) is associated with more difficult intubation as well as a higher incidence of sleep apnea. Therefore, commonly complications happen in class III and IV

Lecture objectives:

- Identify circulatory complications of anesthesia
- Recognizing pulmonary complications
- Describe complications of local anesthesia
- Discussed complications of regional anesthesia
- Summarize basic principles of management for each category.

Circulatory complications

1 - cardiac arrest:

Sudden cessation of cardiac activity during or after anesthesia

Causes:-

1-hypoxia due to ventilatory problems

2-post-induction hypotension

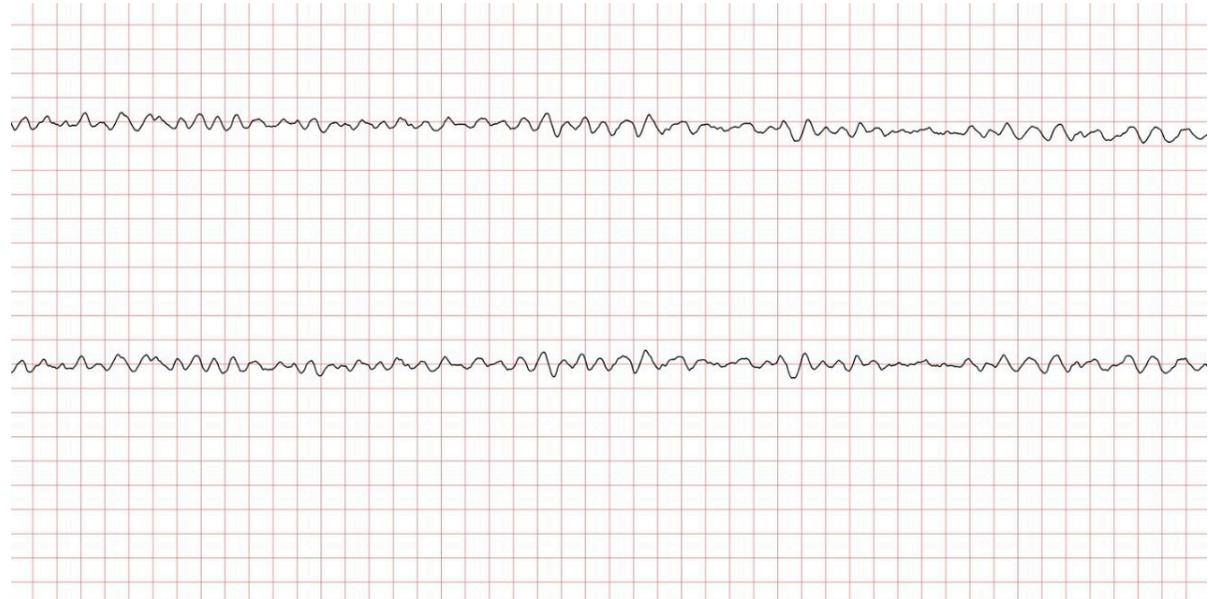
3-overdose of anesthetic agent

Management:-

1-Immediate CPR

2-epinephrine

3-DC shock



2-arrhythmia:

Abnormal heart rhythm

Causes:-

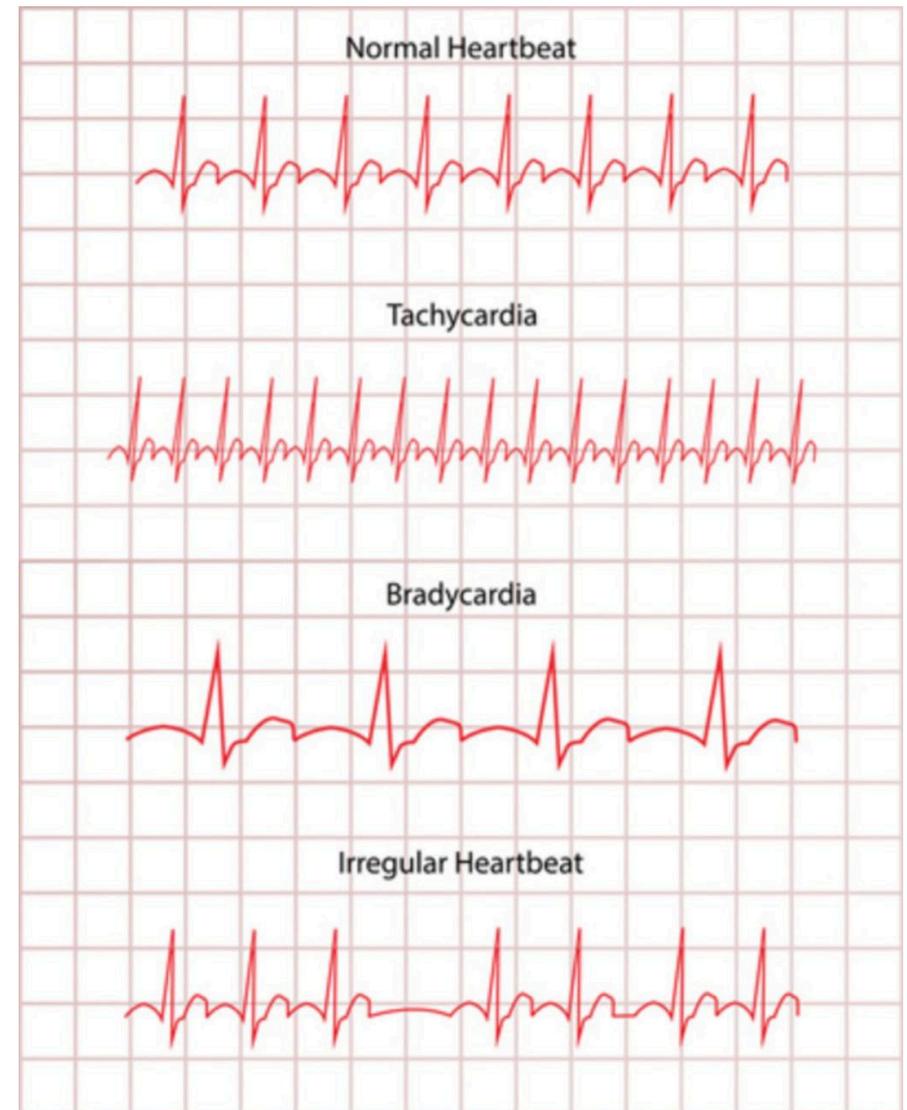
1-electrolyte imbalance

2-drug effects such as succinylcholine

3-sympathetic stimulation due to stress

Management:-

anti-arrhythmic drugs



3-hypotension:

MAP less than 60 mmHg

Causes:-

1-depression of the vasomotor center

2-reduced cardiac output

3-release of histamine due to pre-medication

Management:-

1-IV fluid

2-vasopressor agent



4-hypothermia:

Reduction in core temperature below 36°C

Causes:-

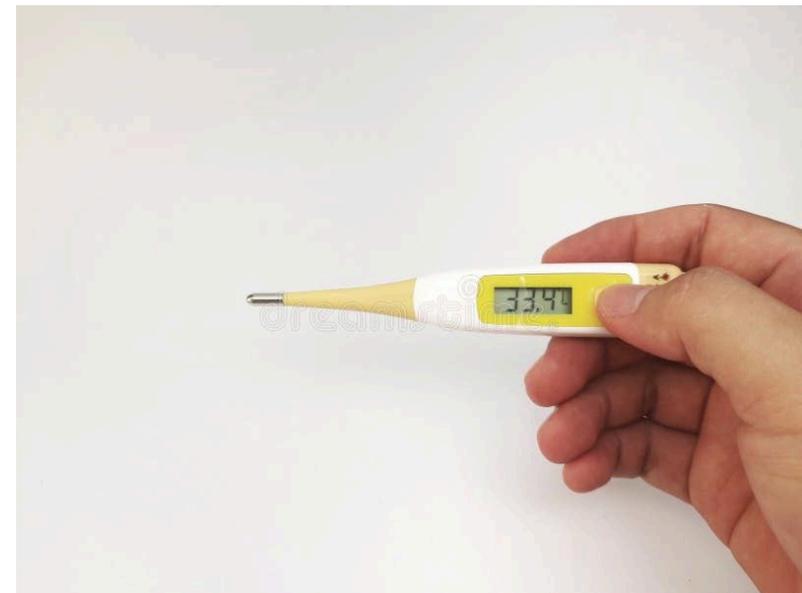
1-disruption of the thermal regulation center by anesthesia

2-no muscle shivering due to muscle relaxant

3-administration of cold fluid

Management:-

Warm blankets and fluids



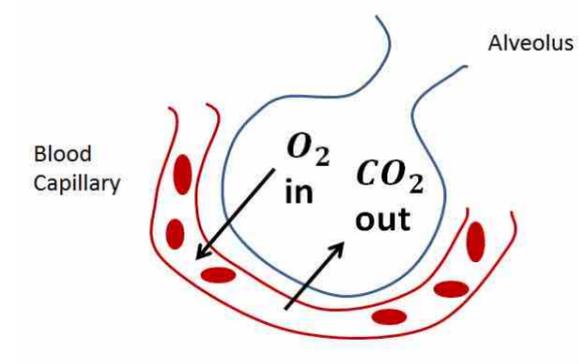
Pulmonary complications

Risk factors are age, DM, obesity, smoking and COPD

1- Hypoventilation:

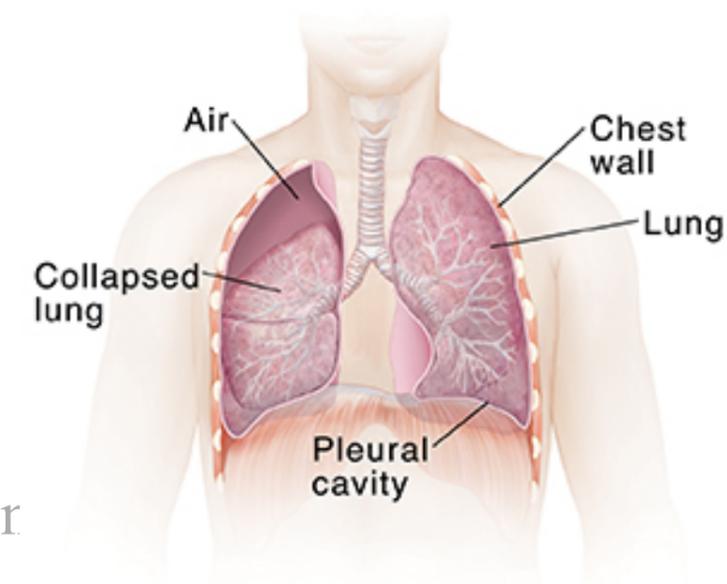
- It is a peri- and post-operative major complication of G.A.
- Hypoventilation can be caused by : fluid overload, pulmonary embolism, cardiac arrest, pulmonary atelectasis, asthma, COPD and breathing machine error
- The patient can develop hypoxemia (oxygen deficiency in arterial blood) or hypoxia (impaired tissue oxygenation).

Managed by: oxygen therapy and taking care of the underlying condition



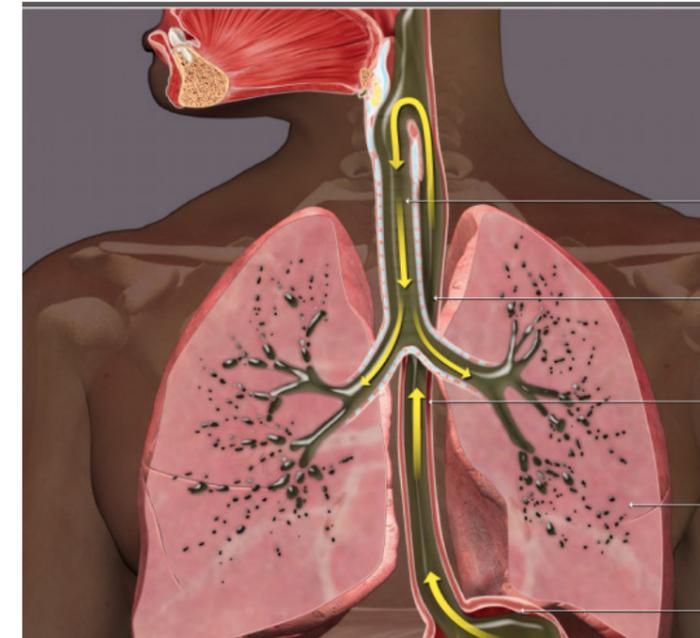
2- Atelectasis:

- complete or partial collapse of the entire lung or area (lobe) of the lung.
- **Causes:**
 1. Impaired Surfactant
 2. Bronchial obstruction
 3. Pneumothorax
- **Managed by:** removal of obstruction, chest tube and PEEP in case of hypoxia



3- Aspiration:

- The contents of the patient's stomach rise up from the esophagus and end up in the trachea. It occurs peri- or post-operatively.
- Causes: Sedative patient cannot control swallowing and cough.
- Bronchospasm may be the first sign of pulmonary aspiration during general anesthesia.
- The severity of symptoms depends on the type and volume of material aspirated.
- Aspiration pneumonitis (Mendelson syndrome) is a chemical injury to the lungs caused by inhalation of sterile acidic gastric contents, whereas aspiration pneumonia refers to inhalation of contents colonized by pathogenic bacteria.

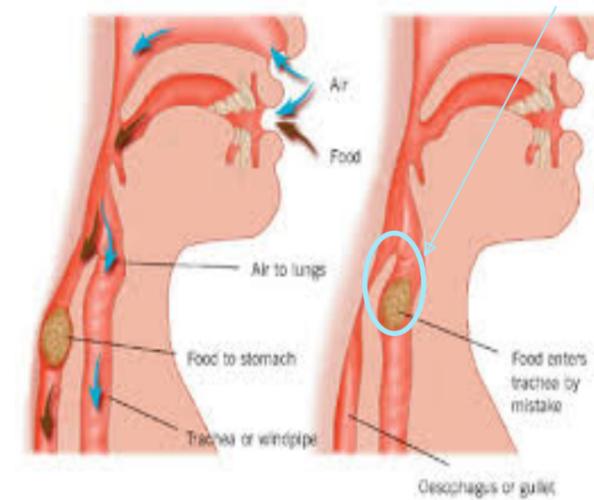


3- Aspiration:

- **Risk factors:**
 - Emergency surgery
 - Lack of fasting
 - Delayed gastric emptying

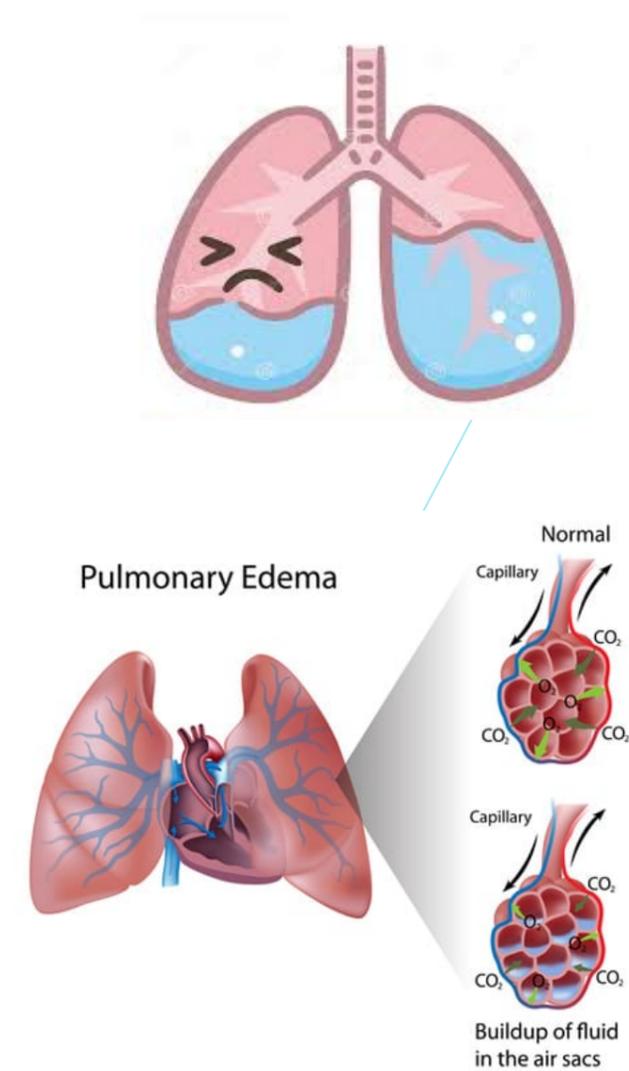
The consequences: acute lung damage or pneumonia that may cause death

Managed by: suction air way, intubation with o2 therapy and lavage



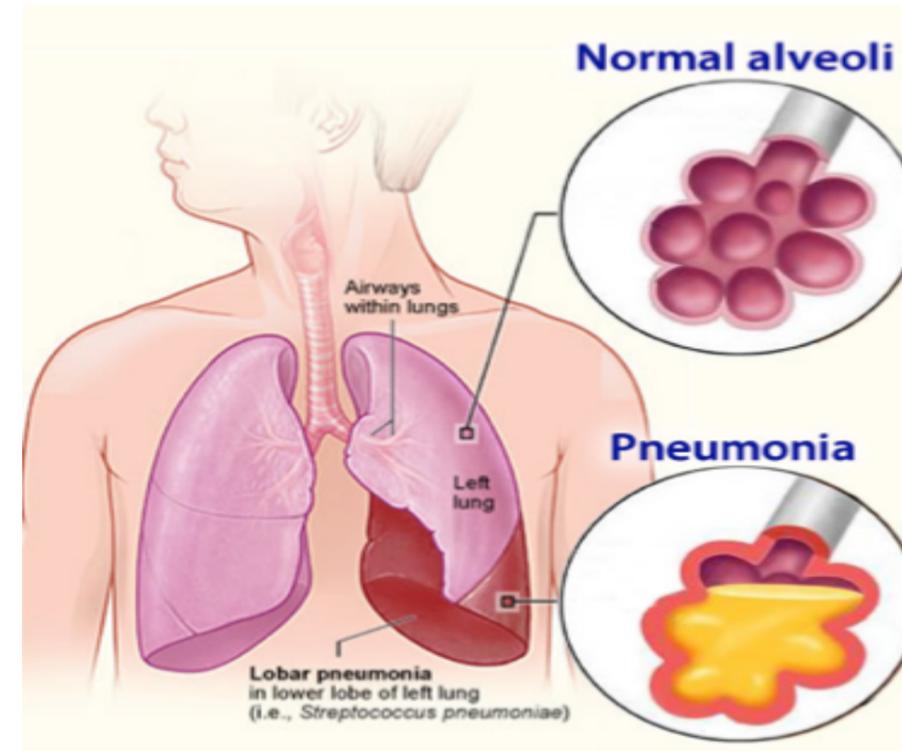
4- Pulmonary edema:

- Fluid accumulation in the lung
- **Causes:**
 1. Acute changes in blood pressure
 2. Vascular tissue damage
 3. Heart failure
 4. Aspiration
- **Managed by:** Mechanical ventilation and treatment of the underlying problem (HF diuretics)



5- Pneumonia:

- Lung infection , in which the air sacs fill with pus and may become solid. Which interferes with ventilation. (serious condition)
- **mechanism:** Low resistance to infection due to impaired cough, ciliary movement and alveolar macrophages.
- **Causes:**
 1. Aspiration
 2. Contaminated endotracheal tube
- **Managed by:**
IV antibiotics and fluids + oxygen therapy



6- Bronchospasm:

- Contraction of smooth muscle in the bronchus (narrowing of the air way)

7- Laryngospasm:

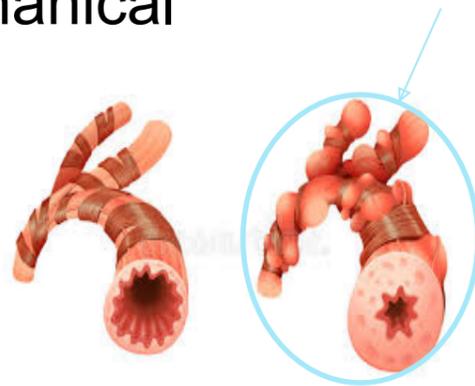
- prolonged closure of the vocal cords in response to a trigger during light anesthesia
- commonly during induction phase



Premature intubation, extubation, foreign body irritation and or presence of secretions and blood

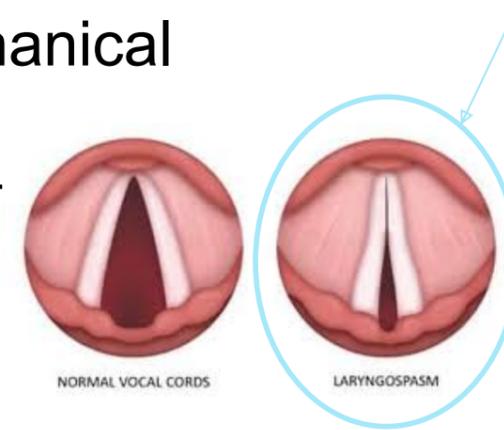
Management:

1. 100% O2 mechanical ventilator
2. Brochodilators



Management:

1. 100% O2 mechanical ventilator
2. Muscle relaxant



8- Scoline apnea :

- Prolonged period taken by a patient to regain the ability to breath after being given a standard dose of the muscle relaxant, scoline (succinylcholine: depolarizing muscle relaxant)

- **Etiology:** autosomal recessive mutation causes pseudochoolinesterase deficiency or atypical form

- **Managed by:**

1. Mechanical ventilation
2. Transfusion of fresh frozen plasma
3. Maintenance of the anesthesia



Post-operative Nausea and – 1 Vomiting (PONV)

**Title: Post-operative Nausea and Vomiting
(PONV)**

:Content

- Any nausea, vomiting, or retching within •
.the first 24–48 hours following surgery**
- One of the most common side effects of •
anesthesia, occurring in up to 30% of all
.post-operative patients**
- A leading cause of patient dissatisfaction •
.after anesthesia**

- **Post-operative Nausea and Vomiting (PONV)**
• the most common minor post-operative complications.

- **Risk factors:**

1. Use of volatile anesthetics
2. Long duration surgeries
3. Use of post-operative *opioids*
4. history of PONV or motion sickness

Managed by:

Anti-emetic drug (metoclopramide) and IV fluids

Air way injury: **Definition**

A peri-operative complication due to difficult intubation or mal-practice •
.during intubation

Occurs due to tracheal intubation •
involving laryngoscopy and endotracheal
.intubation

:Types of Injury

- Upper incisor injury (most common) .1**
- Temporomandibular joint (TMJ) injury .2**
- Laryngeal and tracheal injury .3**
- Esophageal perforation .4**
- Pharyngoesophageal perforation .5**

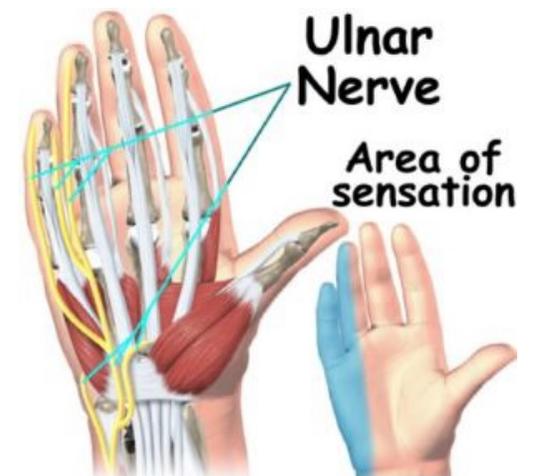
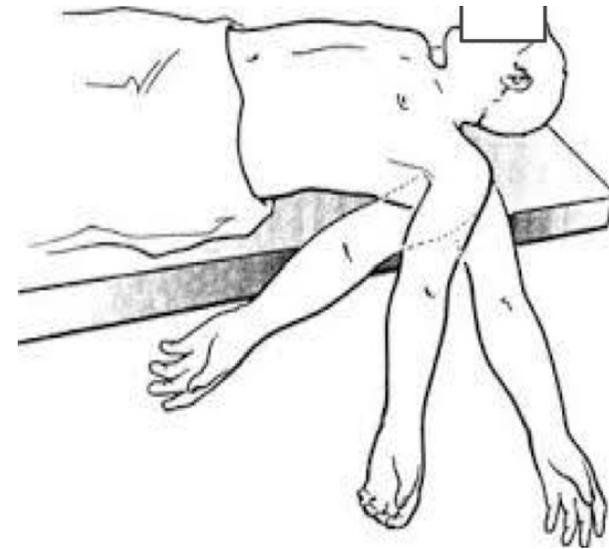
Why adhesive tape is used??



- ***In anesthetic patient there is absence of the eye lid reflexes and lacrimation lead to dryness of the cornea which lead to corneal abrasion and ulceration.***
- ***We use adhesive tape covering the eyelids to prevent it from dryness***

Nerve injury

- ***Due to prolonged compression of the nerve or inappropriate patient's position during long surgeries .***
 - ***ulnar nerve, brachial plexus, sciatic nerve and radial nerve (position problem)***
 - ***Facial nerve and supra orbital nerve (compression by face mask)***
 - ***Lingual nerve (compression by endotracheal tube)***
- ***The most common nerve injury is ulnar nerve injury***
- ***To avoid this problem the surgeon should be careful about padding of variable area and aware of patient's position***



***IMPORTANT COMPLICATIONS
OF LOCAL ANESTHESIA***

Block of the peripheral nerve

Complications of local anesthesia:

1. Nerve injury (direct injury)
2. Pain
3. Infection
4. Ischemic necrosis
5. Bleeding and hematoma formation



FIGURE 46-28 Ulnar nerve block at the elbow with region of anesthesia illustrated on the hand.

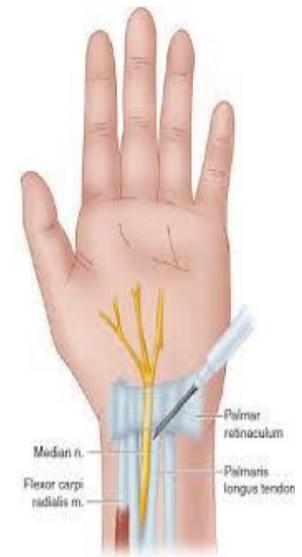
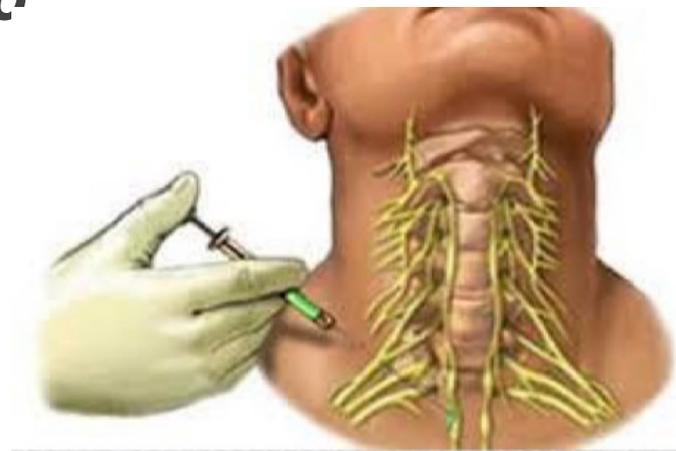


FIGURE 46-26 Median nerve block at the wrist.

Specific serious side effects of some drugs



- ❑ Post-operative halothane **hepatitis** halothane (is hepatotoxic)
- ❑ **Malignant hyperthermia** may occur in susceptible patients given inhalational anesthetics (N₂O , enflurane, sevoflurane, halothane)
- ❑ All hypnotics(anesthetics) cause hypotension except ketamine causes **hypertension** because it induces catecholamines release
- ❑ All opioids causes **respiratory depression**

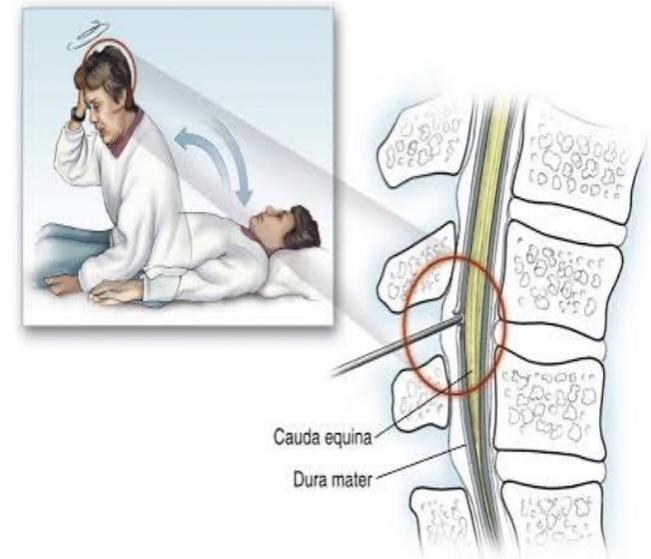
Important complications of regional anesthesia

Regional anesthesia: epidural or spinal

Normally no loss of consciousness

Post-dural puncture headache

- ? It's severe headache worsening in the upright position and relieved with lying . It's very common after spinal anesthesia,**
- ? Etiology: CSF leakage from the puncture site**
- ? Decrease in the CSF volume may lead to compensatory vasodilatation of the cerebral vessels that causes severe headache. Also, accumulation of the CSF in the epidural space irritates the meninges**
- ? Managed by:**
 - 1. Analgesia, bed rest and adequate hydration**
 - 2. Epidural blood patch is injected at the site of the meningeal tear**
 - 3. Other medications: theophylline and hydrocortisone (vasoconstrictors)**



Total spinal block

? *Etiology: injection of large amounts of anesthetic agents into the spinal cord*

? *Consequences:*

1. 2. *Respiratory arrest (block of C3-C5 nerve roots)*

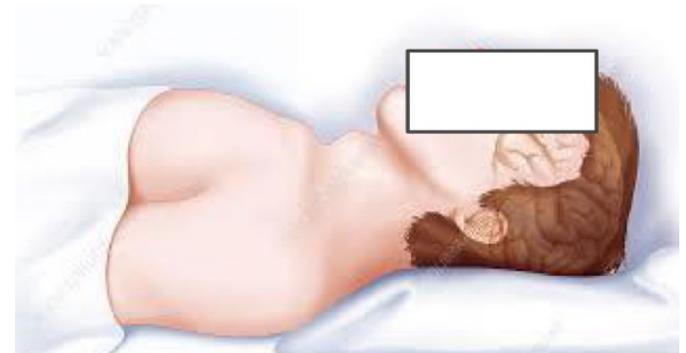
Hypotension and bradycardia (block of sympathetic fibers T1-T4)

3. *Loss of consciousness (cerebral spread of the anesthetics)*

4. *Total paralysis*

? *Managed by:*

Intubation and ventilation until the spinal block wears off



Hearing loss

[?] Permanent or transient condition after dural puncture

[?] Causes:

- 1. Altering in the CSF pressure (affects the perilymph of the inner ear)**
- 2. Embolism**



Hypotension

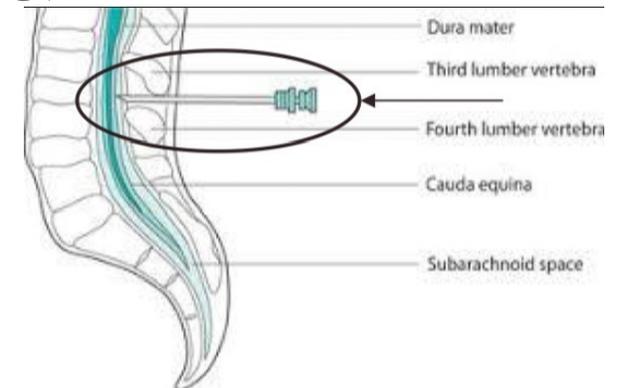
[?] Occurs normally but may be complicated by higher doses of anesthetics

[?] Etiology: partial or total block of the sympathetic nerves

Cauda equina syndrome

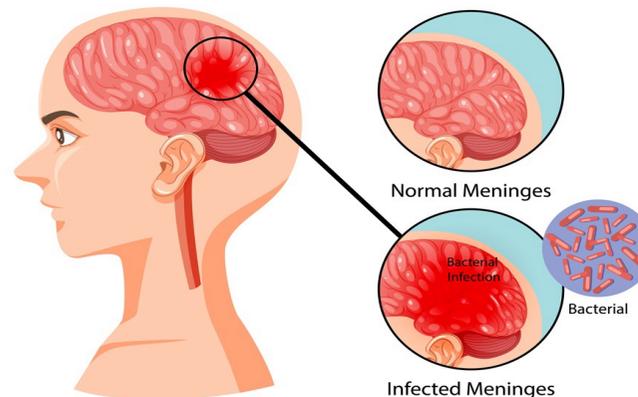
? It is a damage to the cauda equina (bundle of nerves) during needle insertion in the spinal anesthesia

? Sign and symptoms: low back pain radiates to the leg, numbness around the anus and loss of bowel or bladder control



MENINGITIS

Meningitis (septic or aseptic)



QUESTIONS _____?

any

THANK

YOU

for

LISTENING..