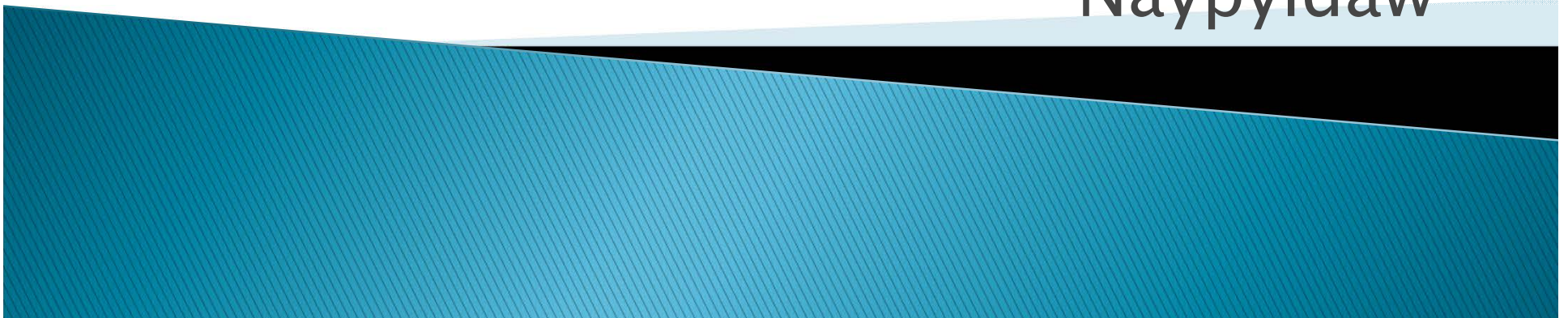


# Operation Theatre and Anesthesia Management

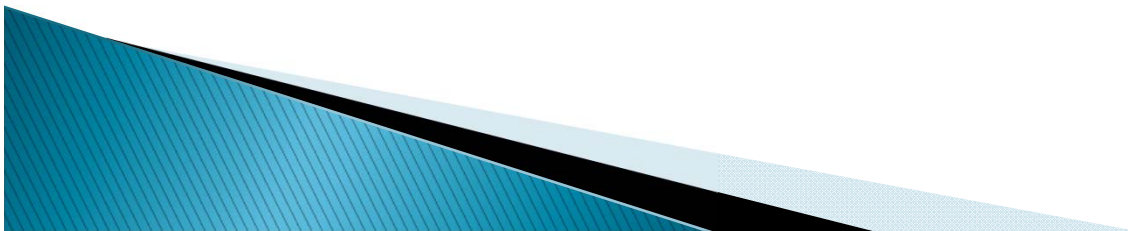
Dr Nu Nu May  
Anesthesiologist  
1 000 bedded hospital  
Naypyidaw





# OPERATING THEATRE

- ▶ An operating theater (also known as an operating room, operating suite, operation theatre or operation suite) is a facility within a hospital where surgical operations are carried out in a sterile environment.



# Asepsis in Operation Theatre

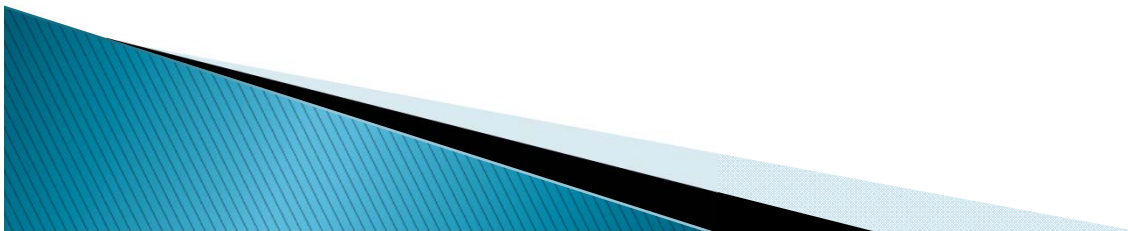
- ▶ Cleanliness of the hospital environment is the best starting point to achieve the highest patient safety mandate.
- ▶ Florence Nightingale and Joseph Lister realize the importance of sterilization.
- ▶ Joseph Lister(1827–1912) introduced carbolic acid (phenol) to sterilize surgical instruments and to clean wounds.





# Operating Rooms

- ▶ Spacious
- ▶ Easy to clean
- ▶ Well-lit, typically with overhead surgical lights
- ▶ Windowless,
- ▶ Controlled temperature and humidity
- ▶ Special air handlers filter the air and maintain a slightly elevated pressure. AHU system
- ▶ Electricity support
- ▶ Wall suction, oxygen, anesthetic gases,



# Cont:

- ▶ Key equipment–
- ▶ the operating table and anesthesia cart.
- ▶ Table to set up instruments
- ▶ Containers for disposables
- ▶ Storage space for common surgical supplies
- ▶ Scrubbing area
- ▶ Rooms for personnel to change, wash and rest, preparation rooms , storage and cleaning facilities, offices, dedicated corridors, other supportive units, PACU.



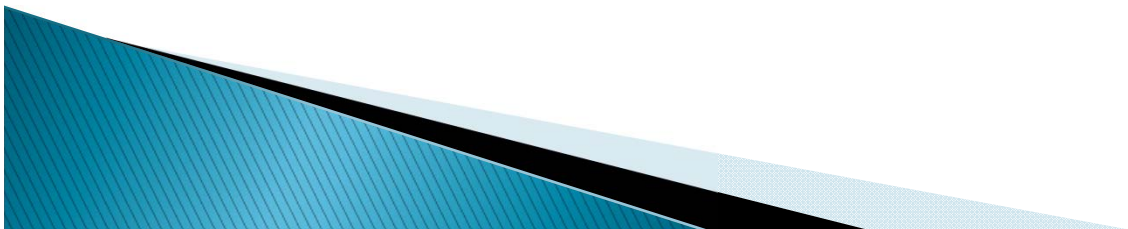
# Operating room equipment

- ▶ Operating table (in the center of the room) , can be raised ,lowered and tilted in any direction.
- ▶ Ceiling Lamp (over the table), to provide bright light, without shadows, during surgery.
- ▶ Anesthesia machine (at the head of the operating table) and monitors.
- ▶ Anesthesia cart.
- ▶ Stainless steel table ( instrument trolley)
- ▶ Electronic monitor.(NIBP, Pulse oximeter, HR, ECG, Temperature.)



# Cont:

- ▶ Electrocautery machine.
- ▶ Other specialized equipment
- ▶ Advances in technology “ Hybrid Operating Rooms” ( MRI and Cardiac Catheterization)

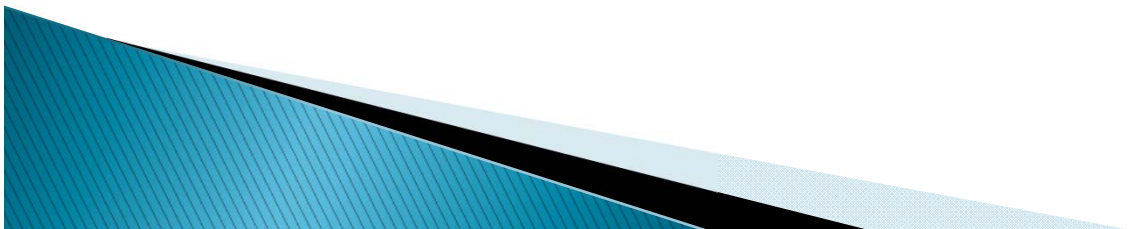




# PPE

## (personal protective equipment)

- ▶ To help prevent germs from infecting the surgical incision.
- ▶ A protective cap
- ▶ Mask
- ▶ Shades or glasses
- ▶ Gloves
- ▶ Long gowns, with the bottom of the gown no closer than six inches to the ground.
- ▶ Protective shoes covers
- ▶ Lead aprons/ neck covers



# Basic Architecture

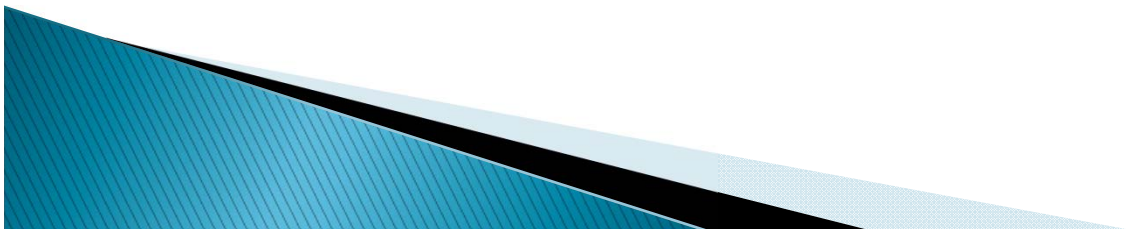
OT complex is located away from the inpatient area, often in a blind wing or on the top or bottom floor.

**It consists of 4 zones.**

- Outer Zone
- Restricted Zone
- Aseptic Zone
- Disposal Zone



- A. Outer zone** – Areas for receiving patients relatives, toilets, administrative function.
- B. Restricted zone** – Changing room, Patient transfer area, Stores room, Nursing staff room, Anesthetist room, Recovery room.
- C. Aseptic zone** – Scrub area, Preparation room, Operation theatre, Area used for instrument packing and sterilization.
- D. Disposal zone** – Area where used equipments are cleaned and bio-hazardous waste is disposed.

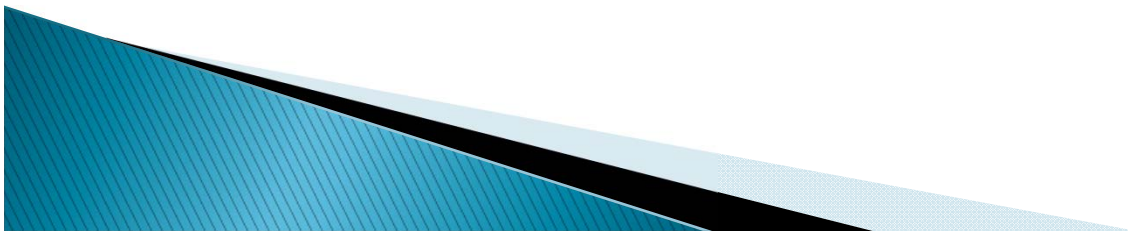


- ▶ OT needs to be well ventilated
- ▶ Air circulation with a laminar air flow system through High efficiency particular air filter(HEPA)(0.3 $\mu$ m)
- ▶ Air are 25 changes per hour, positive pressure compared with corridors.
- ▶ Temperature- between 18 to 24°C
- ▶ Humidity - 50 to 55%

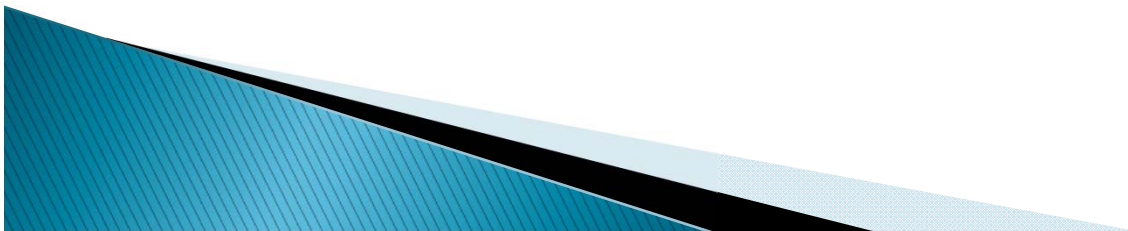




- ▶ The circulating nurse and anesthesiologist must keep a distance of 12–16 inches from any sterile object, person, or field.



- ▶ Cleaning, disinfection and sterilization are the cornerstones in OT asepsis.



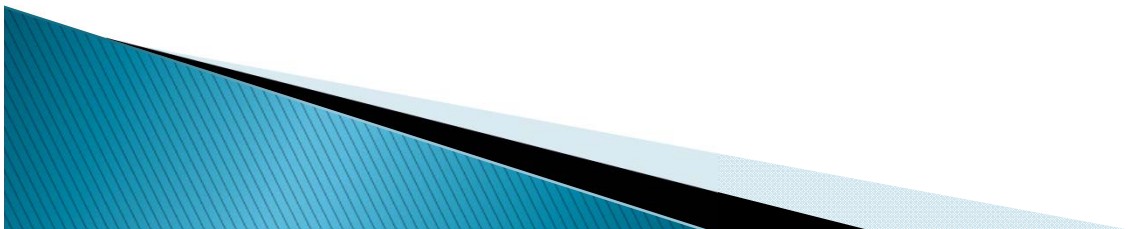
# Sterilization and asepsis

## **Sterilization:**

The process by which an article is made free of living organisms either in vegetative or in spore state.

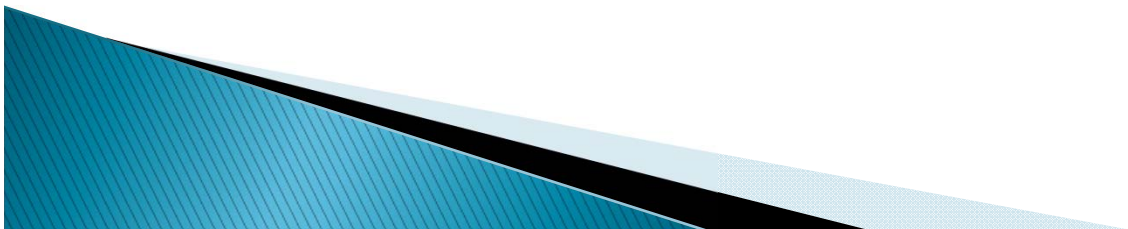
## **Disinfection:**

The destruction or removal of all pathogenic organism/organisms capable of giving rise to infection.



# Spaulding's classification

- ▶ Depending on the intended use of an item, medical and surgical equipment may be required to undergo the following processes between uses on different patients:
  - ▶ 1. Cleaning, followed by sterilization
  - ▶ 2. Cleaning, followed by high, or intermediate level disinfection
  - ▶ 3. Cleaning alone





# Three Items

- ▶ ***Critical items*** –eg. Surgical instruments
- ▶ **Sterilization**
- ▶ \*steam sterilization
- ▶ \*low temperature method( EO)
- ▶ ***Semi-critical items*** – eg. Endoscopes, anesthetic equipment
- ▶ **HLD**–
- ▶ \* Thermal disinfection
- \*chemical disinfection (glutaraldehyde)
- ▶ ***Non-critical items*** – eg. Crutches, BP cuffs, tabletops
- ▶ **LLD**–
- \* Cleaning ( manual or mechanical)

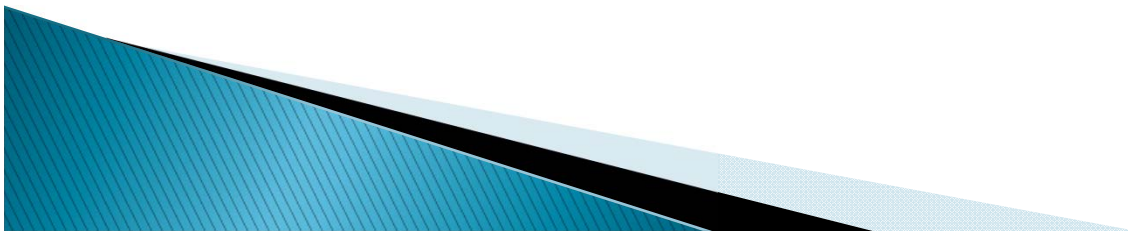
# Cleaning

- ▶ General cleaning
- ▶ Spot cleaning of walls and ceiling --- everyday.
- ▶ Open shelves ----daily
- ▶ Closed cabinets—once a week
- ▶ Furniture, surgical lights and equipment ---the end of each case and at the end of the day.
- ▶ Anesthesia equipment needs to be cleaned



## Cont:

- ▶ The outside of autoclaves should be cleaned daily, inside surface is cleaned weekly.
- ▶ Soiled linen should never be left on the floor or transported on a trolley used for other purposes.
- ▶ Cleaning before subsequent surgery
- ▶ Terminal Cleaning

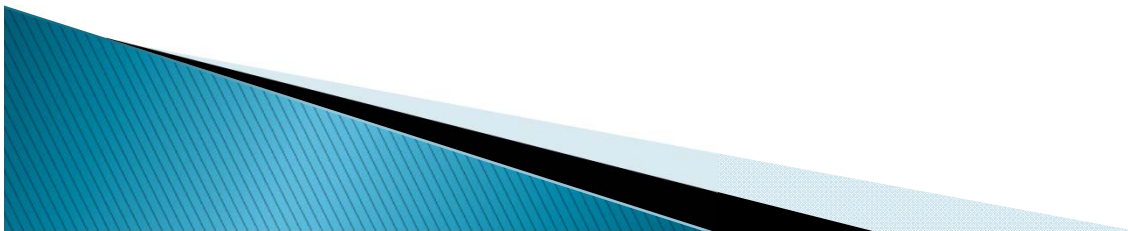


# Disinfection of the OT

Three levels of disinfection:

1. High level disinfection
2. Intermediate level disinfection
3. Low level disinfection

- I. Chemical Disinfection
- II. Disinfection by Radiation



# Methods of HLD

## Physical methods

- . HLD by Boiling
- . HLD by Steaming( moist heat)

## Chemical method

- . Four disinfectants–
  - \*Chlorine
  - \*Glutaraldehyde
  - \*Formaldehyde
  - \*Peroxide



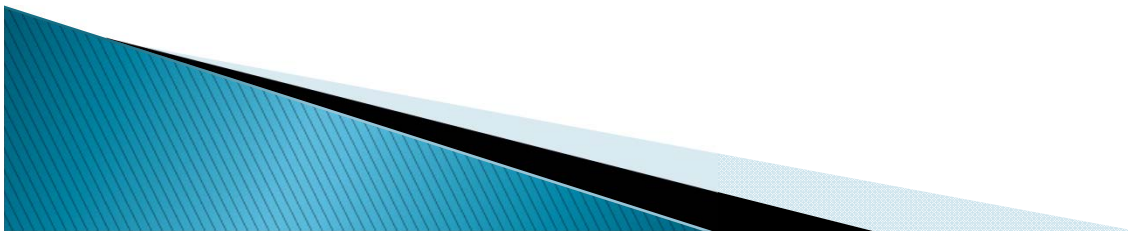
# Chemical Disinfection

- ▶ **A. Formaldehyde Fumigation**
- ▶ Requirement( for an area of 1000 cubic feet)—
  - ▶ –500 ml of 40% formaldehyde in one liter of water.
  - ▶ –Stove or hot plate for heating formalin
  - ▶ –300 ml of 10% Ammonia



# procedure

- ▶ Close all doors and windows air tight and switch off fans and A.C.
- ▶ Heat formalin solution till boiling dry.
- ▶ Leave the OT unentered over night
- ▶ Enter the OT next day morning with 300ml of ammonia.
- ▶ Keep the ammonia solution for 2–3 hrs to neutralize formalin vapours.
- ▶ Open the OT to start surgery.





# Cold Method

- ▶ 250 ml of 40% formalin and  $\text{KMnO}_4$  (150 gm)(5 oz) are sufficient to cover a space of 1000 cu ft.
- ▶ The room is kept sealed for 6 hr.
- ▶ Keep the ammonia solution 250 ml to 1000 ml of 40% formalin.



- ▶ B. Commercially available disinfectant
- ▶ ***ASEPTANIOS TERMINAL SPORE***
- ▶ ..Bacterial and Yeast– 8ml/m<sup>3</sup> in 30 mins.
- ▶ ..Fungi and Spore– 8ml/ m<sup>3</sup> in 120 mins.
- ▶ ***Baccilocid rasant***
- ▶ ..A Formaldehyde free disinfectant



# Microbiological Monitoring

- ▶ **The areas swabbed include**
- ▶ 1. Operation table at the head end
- ▶ 2. Over head lamp
- ▶ 3. Four Walls
- ▶ 4. Floor below the head end of the table.
- ▶ 5. Instrument trolley
- ▶ 6. AC duct
- ▶ 7. Microscope handles





# Sterilization

- ▶ Steam Sterilization (Autoclaving)
- ▶ Chemical Sterilization( liquids)
- ▶ Chemical Sterilization( Gas)(EO)
- ▶ Sterilization by radiation
  - ▶ .Gamma irradiation

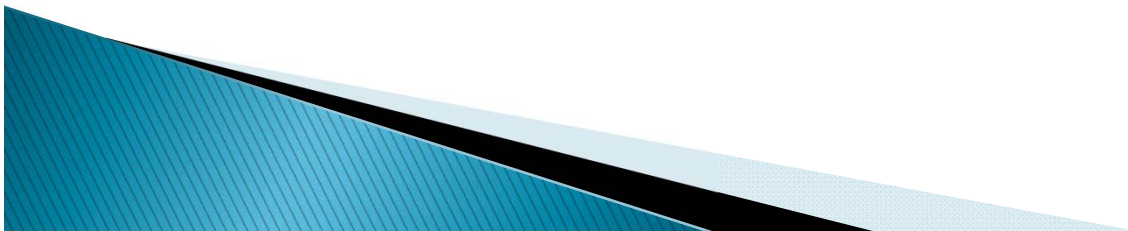






# Modular Operation Theatre

- ▶ Modular—consisting of separate modules
- ▶ The team identified the unique features required to meet the current and emerging surgical techniques.
- ▶ Clean Room Environment System





# Modular OT

- ▶ 1. The room walls are formed by stainless steel, glass or impact prefabricated panels with a coat of antibacterial paint.
- ▶ 2. The outer shell panels can maintain a controlled internal environment.
- ▶ 3. Central Filtration System effectively generates laminar flow.









LASER  
IN USE

THEATRE  
IN USE

X-RAYS  
IN USE

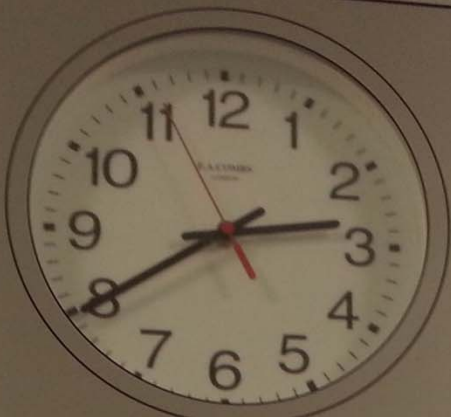
1



Fire  
exit







TIME OF DAY CLOCK



ELAPSED TIME CLOCK



Touch screen interface for a ventilation system. The top row contains various status icons: Ventilation, UV, ABB, and Temperature (19.4). The middle row shows a large temperature display of 25.0 with a plus sign, and several alarm icons. The main section is titled 'VENTILATION' and features a central 3D diagram of a room with green arrows indicating air flow. To the left of the diagram are several control buttons: 'NORMAL Mode Active', 'NORMAL Balanced', 'Press to Return Backlog', 'Air Flow Healthy', 'Filter Healthy', 'Humidity Healthy', and 'Flow Healthy'. At the bottom of the screen, there are two small icons and the text 'Fridge, 08 October 2010 14:01:00'.

TOUCH SCREEN

**Operation Theatre Safety  
is  
Responsibility  
Of**



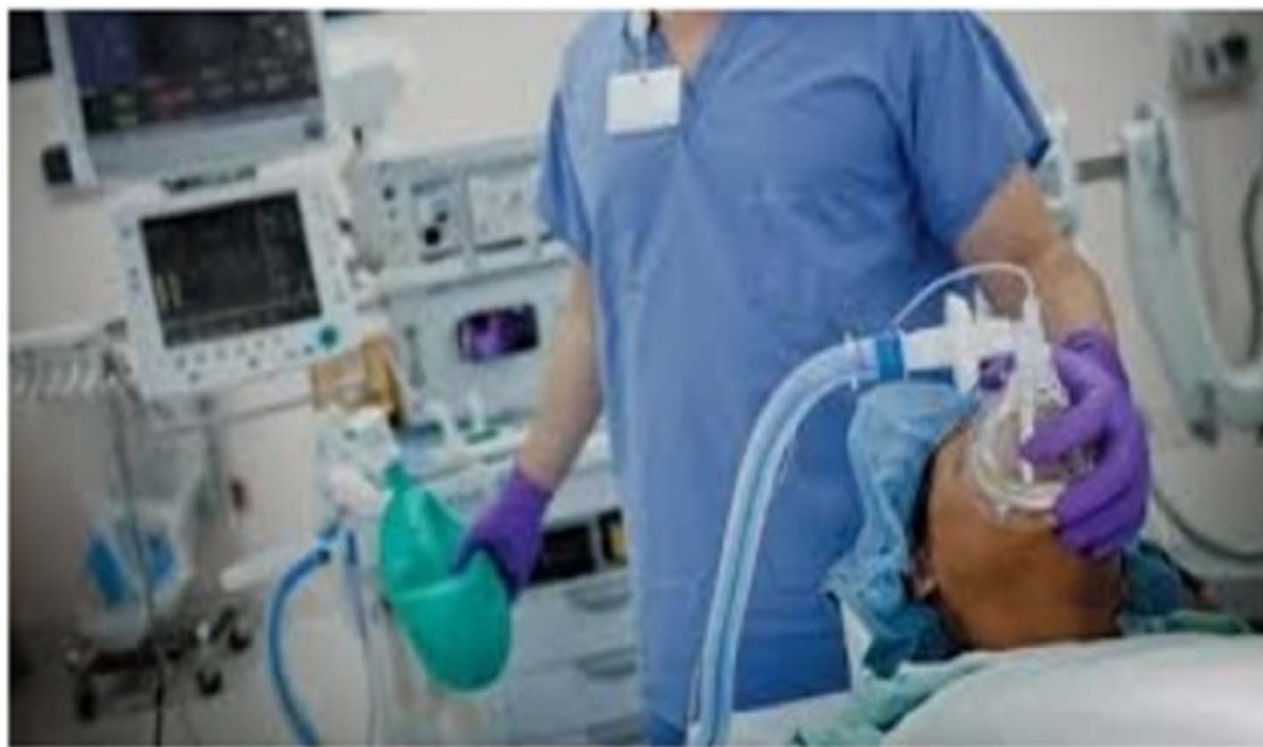


# SAFE ANESTHESIA PRACTICE

Dr Nu Nu May  
Anesthesiologist  
(1000) Bedded Hospital  
Nay Pyi Taw



# Anaesthesiology: A High risk Speciality



Anaesthesiology is a high-risk speciality as compared with other specialities in medicine



# EVOLUTION OF ANAESTHETIST



2000 BC



1846



1950



2000

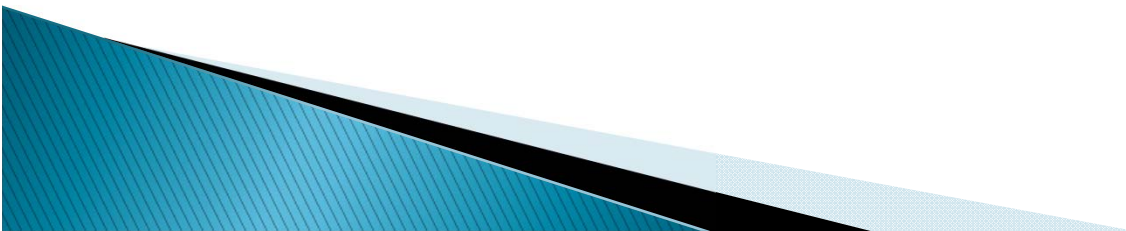


2014

## Changing definition of Anaesthesia

- Word anaesthesia was coined from two greek words: “an” meaning without and “aesthesia” meaning sensation.
- Traditionally the goal of anaesthesia were described as **Amnesia, analgesia, and muscle relaxant.**
- More recently, Anaesthesia can be considered as a science of **reflex management.**

▶ **First,**  
**Do no harm**



# Anesthesia-associated morbidity / mortality

At the end of the 19<sup>th</sup> century, 1/900 patients died as a result of their anaesthesia.

Late 1950s – 3.1/10,000 to 6.4/10,000

During the last three decades – 0.04 – 7/10,000

***Best Practice and Research Clinical Anaesthesiology***  
***25 ( 2011 ) 123–132***

- ▶ *Avoidable anesthesia-associated mortality in developing countries is 100–1000 times the rate reported in developed countries*
- ▶ Anesthesia related deaths.....*obstetric patients* (50% in developing countries) \*





## **Mandatory standard**

- **Pre-anaesthesia checks/ Care**
- **Safe Conduct of anaesthesia**
- **Monitoring during anaesthesia**
- **Post Anaesthesia Care**

# The Process of A Surgical Procedure

Decision of a surgical procedure

OR Booking (OR manager/Anaesthesiologists/Nurse)

Planned procedure timing depending on urgency  
(Emergency/ Urgent or Expedited/ Scheduled/ Elective)

Preparing the patient for Anaesthesia and Surgery

Perform a proposed procedure under appropriate  
anaesthetic care

PACU

Ward/ HDU/ ICU



# The Conduct of Anaesthesia

Preoperative  
Assessment

Premedication

Induction

Maintenance

Emergence/Recovery

PACU care

# 10 common causes of cardiac arrest under anaesthesia

1. Drug overdose/ adverse reaction
2. Rhythm disturbances
3. Peri-op MI
4. Airway obstruction
5. High spinal
6. Lack of vigilance
7. Bleeding
8. Over-dosage of inhalation agent
9. Aspiration
10. Technical problem in anaesthesia system



# Preoperative Assessment

The process of screening the patients through the questionnaires to get the information for planning a safe anaesthesia.



# Which information ???

**Chief complaint  
(Decision for urgency of  
surgery)**

**Comorbidities  
(CVS, Respiratory,  
CNS, Renal etc)**

**Previous anaesthetic  
experience**

**Drug Allergy**

**Preoperative Assessment**

**Current  
Medication**

**Smoking  
Alcohol  
Consumption**

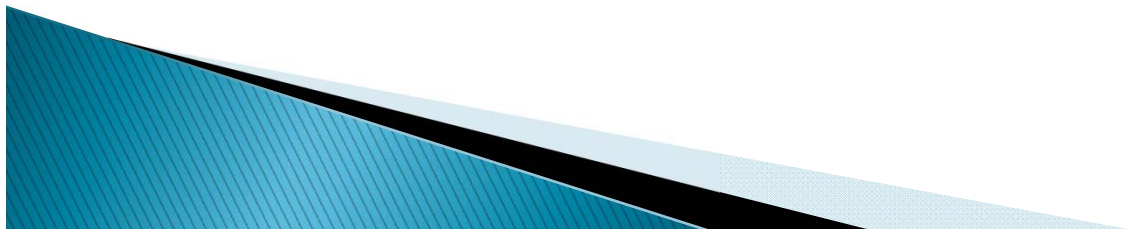
**Sudden Death of Immediate  
Family Member During  
Anaesthesia**

**Preoperative  
Fasting**

**Systematic Evaluation of CVS, Respiratory, CNS**



| ASA Class | Patient description – Classification criteria   |
|-----------|---|
| I         | Normal, <i>healthy</i> patient <i>without</i> systemic disease  |
| II        | Patient with <i>mild</i> systemic disease   |
| III       | Patient with <i>severe</i> systemic disease, which limits her/his activity but is not life-threatening                      |
| IV        | Patient with a <i>severe</i> systemic disease that is constantly life-threatening   |
| V         | <i>Moribund</i> patient, who is not expected to live beyond 24 hours with or without operation                              |
| VI        | <i>Brain-dead</i> patient whose organs may be harvested for transplant  |
| E         | Emergency patient – This category is re-defined, according to the clinical condition, in Grades I – IV (e. g., ASA III – E) |





# Airway Assessment

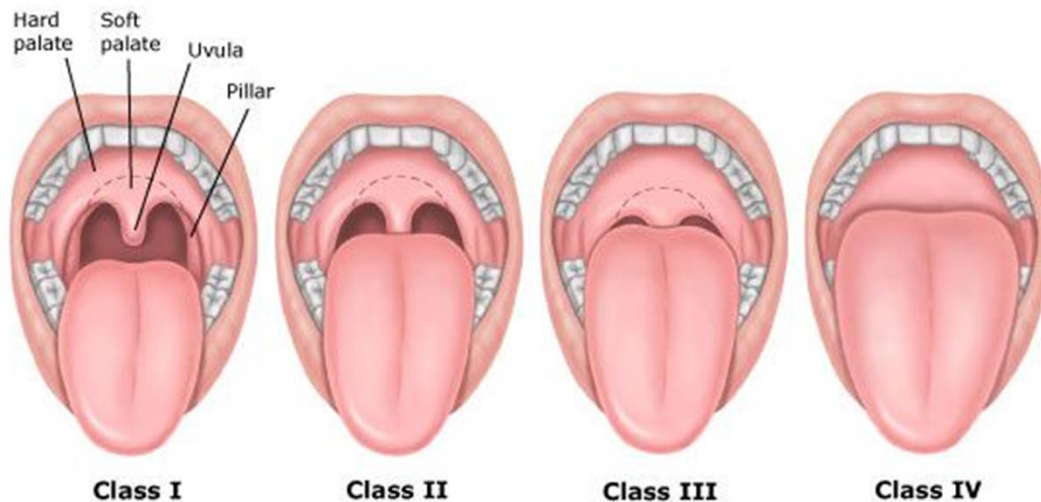
## Mallampati Classification

Class 1: Faucial pillars, soft palate and uvula visible

Class 2: Faucial pillars and soft palate visible, uvula masked by base of tongue

Class 3: Only soft palate visible

Class 4: Soft palate not visible

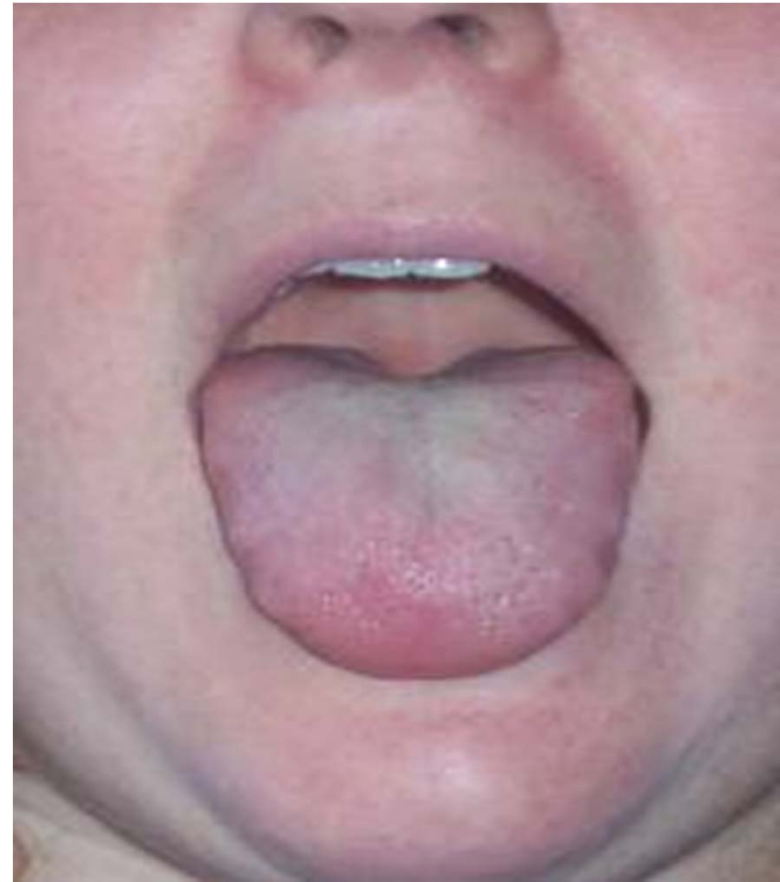


## Thyromental Distance

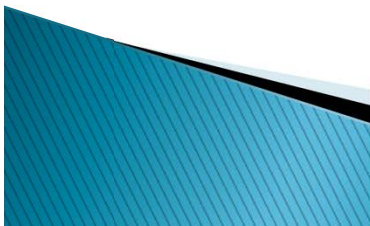
Normal > 6.5 cm




# Mallampati' airway assessment



# Difficult airway



# Preoperative Investigations

- ▶ Every preoperative investigation should be carefully considered, and potential benefits balanced against inherent risk.
  - ▶ **Hb and Blood group**
  - ▶ **Chest radiography** ( child with cardiac, respiratory and malignant diseases.)
  - ▶ **Coagulation studies** (if necessary)
  - ▶ **Urea, Creatinine and Electrolytes** ( if necessary)
  - ▶ **ECG** (if necessary )
- 





# fasting

- × To reduce the risk of gastric regurgitation and pulmonary aspiration by minimizing the volume of fluid and particulate matter in the stomach.
- × Pulmonary aspiration is uncommon, but it can result in serious morbidity and rarely mortality.
- × Dehydration, hypoglycemia, patient discomfort.

| Ingested material | Minimum fasting period (hours) |
|-------------------|--------------------------------|
| Clear fluids      | 2                              |
| Breast milk       | 4                              |
| Infant formula    | 6                              |
| Non-human milk    | 6                              |
| Light meal        | 6                              |

A Report by the American Society of Anesthesiologists Task Force on Preoperative Fasting.  
Anesthesiology 90:896, 1999.



# Choice of Anaesthesia

- Judged by type of patient / procedure/ facility
- Chose the Simplest and safest technique
- Variety of options available
  - LA
  - LA + Sedation
  - Regional +/- sedation
  - GA with LMA/i-gel
  - GA with ETT
  - GA + Regional combination
- Try to minimise the multiple combinations



# Check resources? Before starting Anaesthesia



# Check list

- Check Resources...
  - ▶ *Airway (masks, airways, laryngoscopes, tubes),*
  - ▶ *Breathing (any leaks, sodalime),*
  - ▶ *suCtion,*
  - ▶ *Drugs & Devices*  
*(O2 cylinders, monitors, secure iv line, labelled drugs )*
  - ▶ *Emergency*  
*(assistant, adrenaline, Suxamethonium, Ambu bag)*



# Gas supplies

- ▶ O2 must be readily available for delivery of GA.
- ▶ In OT – either cylinders or pipeline
- ▶ Whichever supply is used, there must be a method for confirming that ***O2 supplies are adequate before starting anaesthesia***









# Monitoring

Essential for providing sedation for dentistry procedures

- ▶ NIBP
- ▶ EKG
- ▶ SpO<sub>2</sub>
- ▶ EtCO<sub>2</sub> (to assess respiration)



*Oxygen therapy* via Nasal Cannulae

# Standard monitoring recommended by ASA





# Induction

## IV Induction

### Advantages

- Rapid onset
- Dose titratable
- Depression of pharyngeal reflexes allows early insertion of LMA
- Anti-emetic and anti-convulsive properties

### Disadvantages

- Venous access required
- Risk of hypotension
- Apnoea common
- Loss of airway control
- Anaphylaxis

VS

## Inhalational Induction

### Advantages

- Avoids venepuncture
- Respiration is maintained
- Slow loss of protective reflexes
- End-tidal concentration can be measured
- Rapid recovery if induction is abandoned
- Upper oesophageal sphincter tone maintained

### Disadvantages

- Slow process
- Potential excitement phase
- Irritant and unpleasant, may induce coughing
- Pollution
- May cause a rise in ICP/IOP



| Drug              | Induction and Recovery  | Main Unwanted Effects  | Notes  |
|-------------------|---|--|--|
| <b>thiopental</b> | Fast onset (accumulation occurs, giving slow recovery) Hangover | Cardiovascular and respiratory depression  | Used as induction agent declining. ↓ CBF and O <sub>2</sub> consumption<br>Injection pain                            |
| <b>etomidate</b>  | Fast onset, fairly fast recovery                                | Excitatory effects during induction<br><b>Adrenocortical suppression</b>               | Less cvs and resp depression than with thiopental, Injection site pain   |
| <b>propofol</b>   | Fast onset, very fast recovery                                  | cvs and resp depression<br>Pain at injection site.                                     | Most common induction agent. Rapidly metabolized; possible to use as continuous infusion. Injection pain. Antiemetic |
| <b>ketamine</b>   | Slow onset, after-effects common during recovery                | <b>Psychotomimetic effects</b> following recovery, Postop nausea, vomiting, salivation | Produces good <b>analgesia</b> and amnesia. No injection site pain   |
| <b>midazolam</b>  | Slower onset than other agents                                  | Minimal CV and resp effects.   | Little resp or cvs depression<br>No pain. Good amnesia.  |



# Medication

- Human error: most common
- All drugs should be clearly labelled; cross check before administering

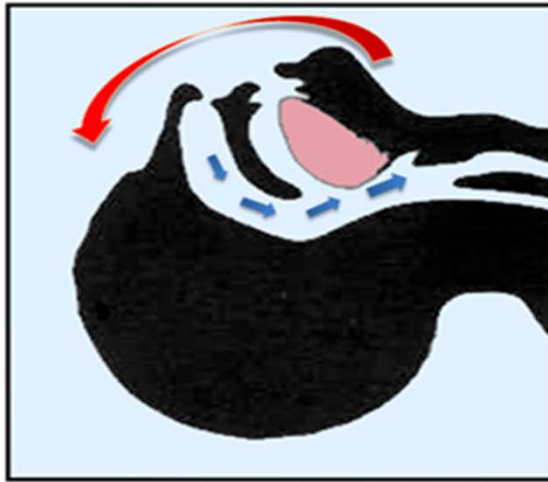
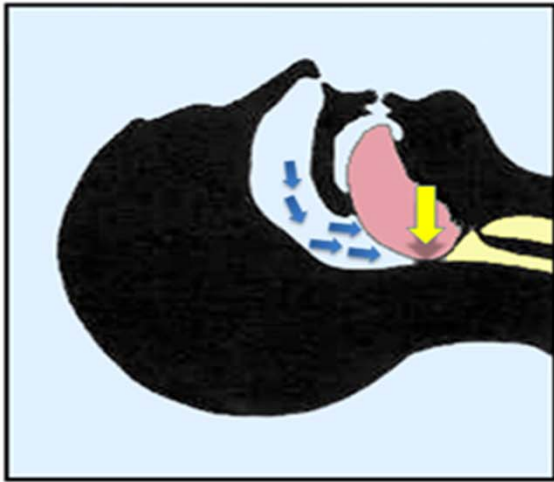


| ANESTHESIA LABELS<br><small>A Division of Bova-Price</small>      |  | RE-ORDER! AL 200<br>1-800-657-8095<br>FAX 605-322-8666 |  |
|---|--|--|--|
| <b>VECURONIUM</b><br><small>CONC. _____ DATE _____</small>        | <b>GLYCOPYRROLATE</b><br><small>CONC. _____ DATE _____</small> |  |  |
| <b>FENTANYL</b><br><small>CONC. 50mg/ml DATE _____</small>        | <b>NEOSTIGMINE</b><br><small>CONC. 5mg/ml DATE _____</small>   |  |  |
| <b>PROPOFOL</b><br><small>CONC. 50mg/ml DATE _____</small>        | <small>CONC. _____ DATE _____</small>                          |  |  |
| <b>LIDOCAINE</b><br><small>CONC. _____ DATE _____</small>         | <b>EPHEDRINE</b><br><small>CONC. _____ DATE _____</small>      |  |  |
| <b>ROCURONIUM</b><br><small>CONC. 50mg/ml DATE _____</small>      | <b>MIDAZOLAM</b><br><small>CONC. 5mg/ml DATE _____</small>     |  |  |
| <b>ATROPINE</b><br><small>CONC. _____ DATE _____</small>          | <b>SUFENTANIL</b><br><small>CONC. _____ DATE _____</small>     |  |  |
| <b>SUCCINYLCHOLINE</b><br><small>CONC. 50mg/ml DATE _____</small> | <b>NEOSYNEPHRINE</b><br><small>CONC. _____ DATE _____</small>  |  |  |
| <small>CONC. _____ DATE _____</small>                             | <b>PANCURONIUM</b><br><small>CONC. 5mg/ml DATE _____</small>   |  |  |

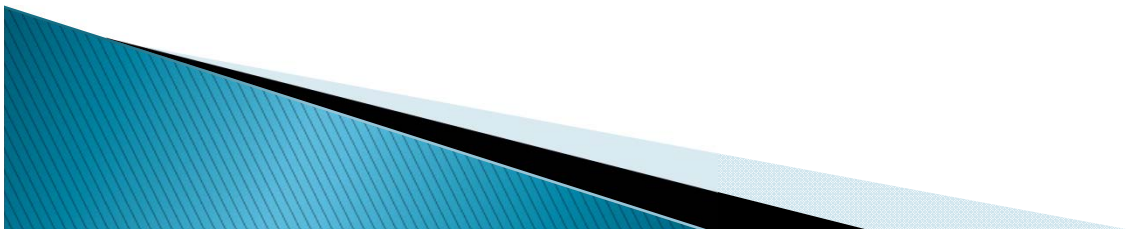
# Inhalational Agents

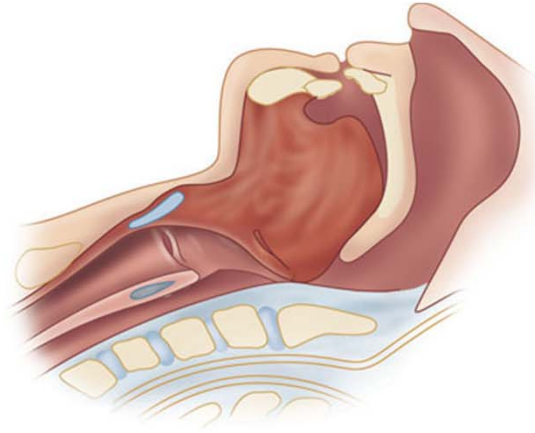


# Opening of the airway\*



- ..Neck flexion,
- .. head extension,
- .. chin lift,
- .. jaw thrust,
- .. oropharyngeal airway( correct size)

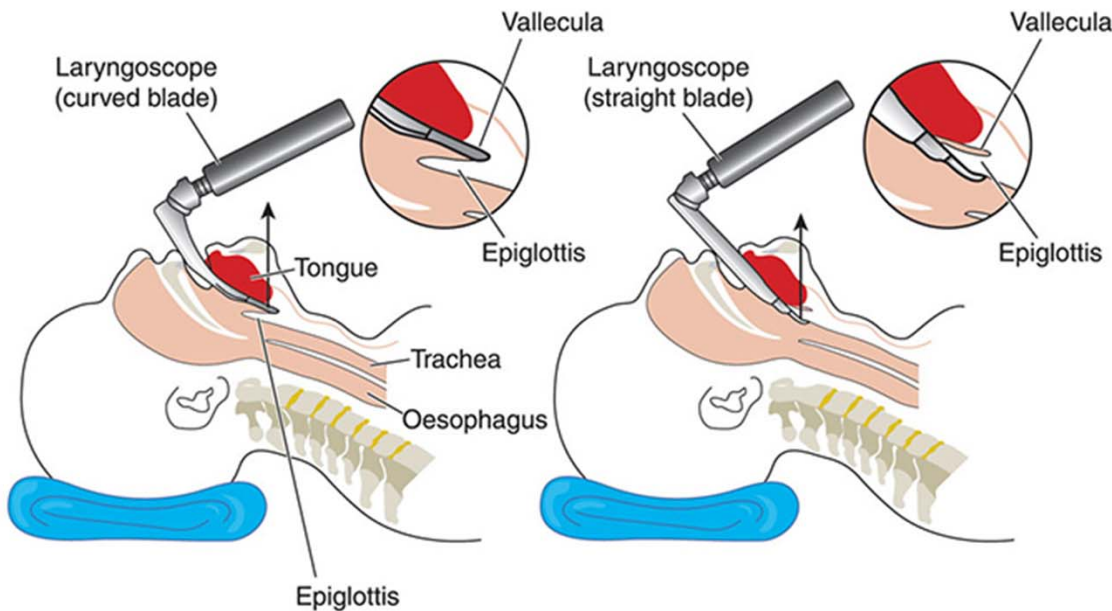




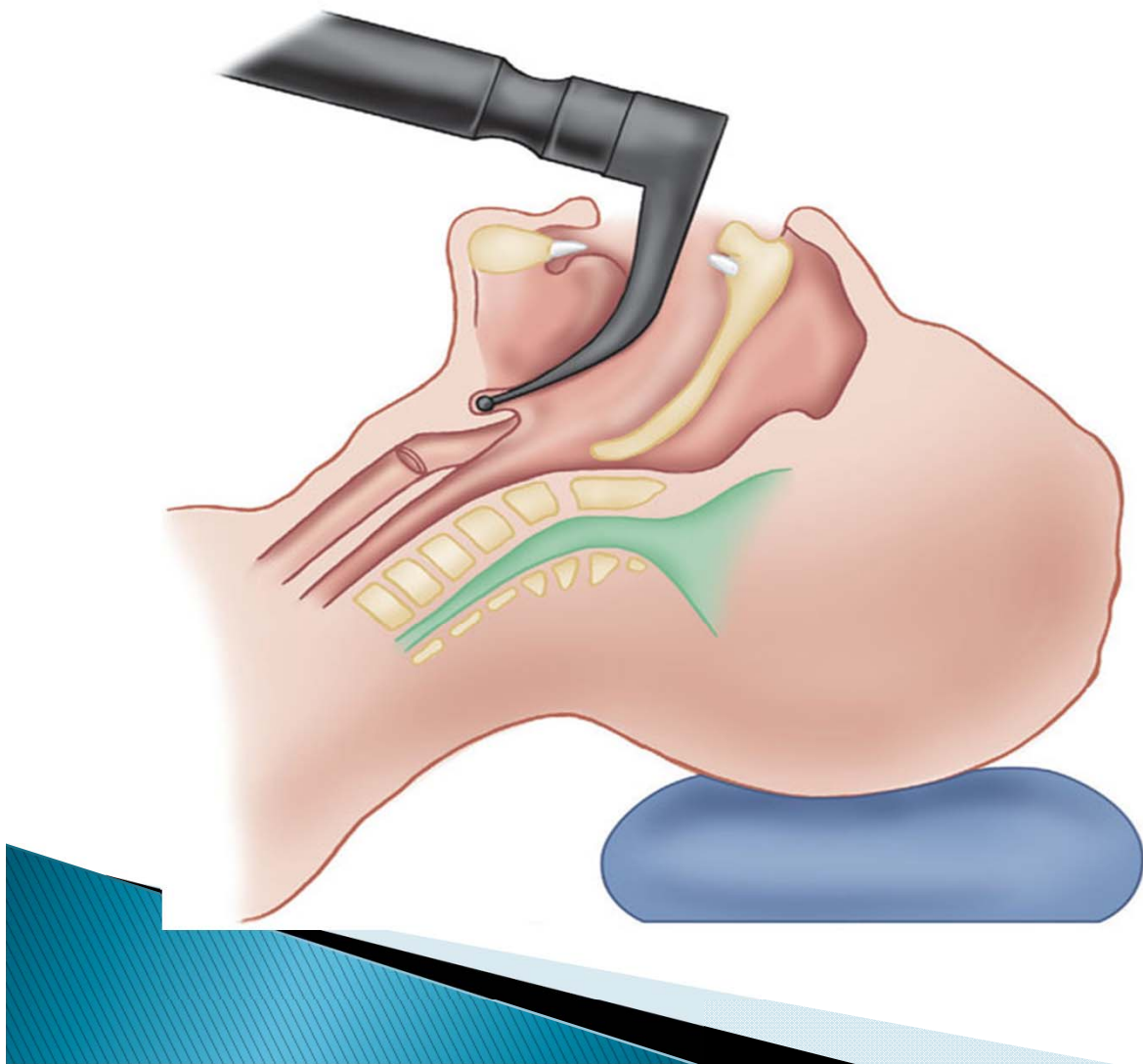


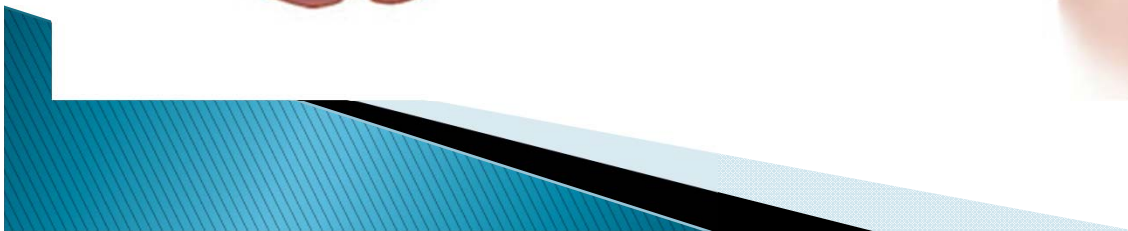
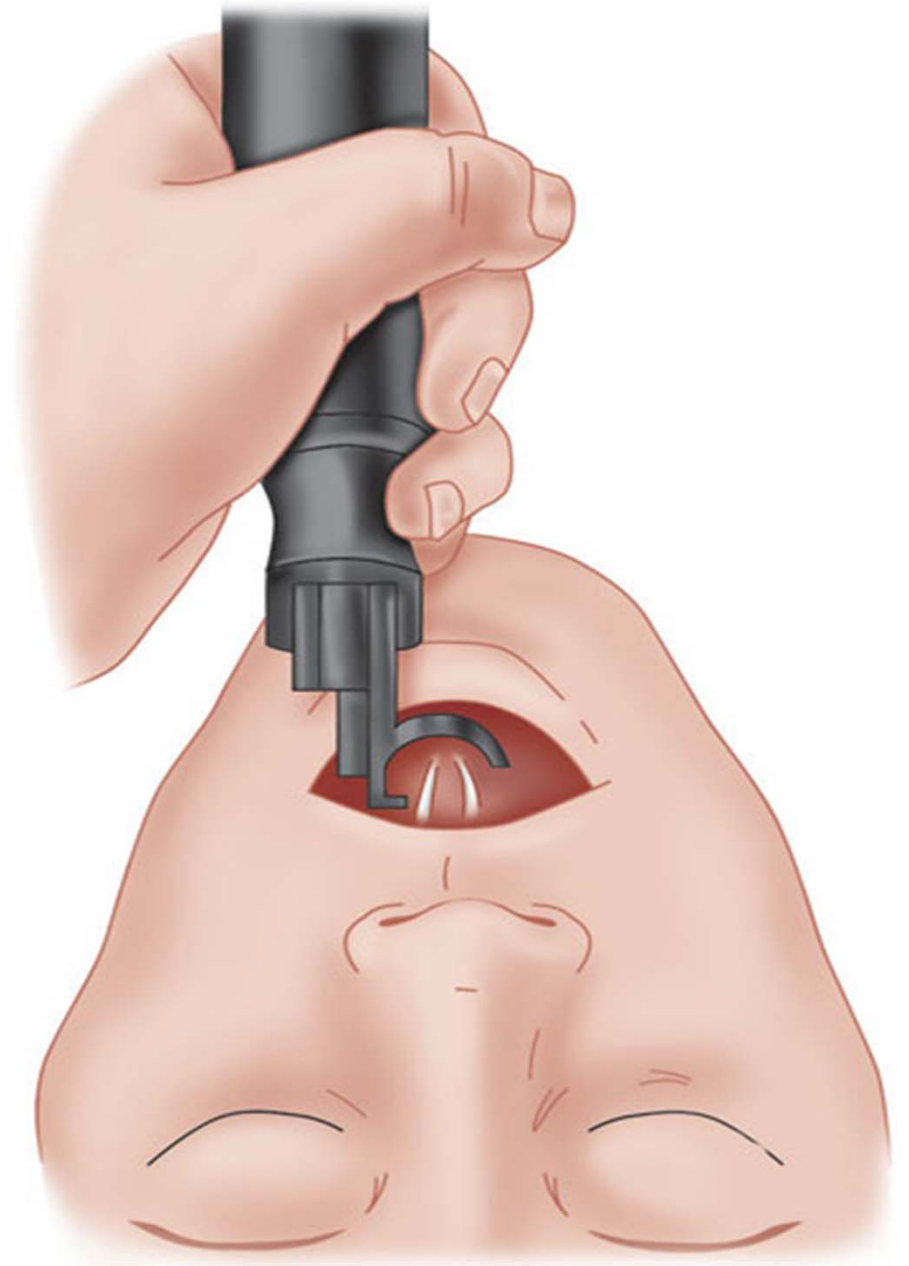
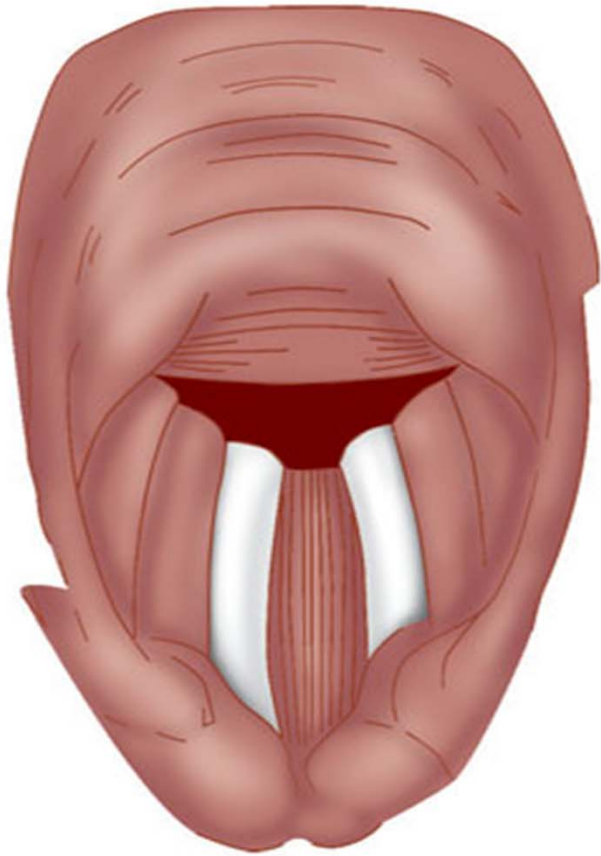
# Intubation

- ▶ By using non-depolarizing (Vecuronium, Atracurium) or depolarizing (Succinylcholine) muscle relaxant
- ▶ Direct laryngoscope Vs Videolaryngoscope
- ▶ Oral Vs Nasal Intubation



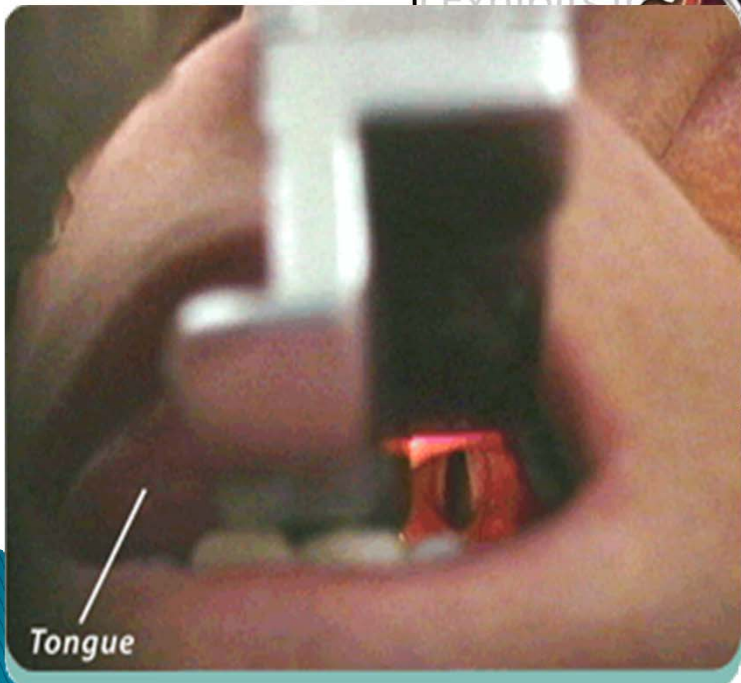




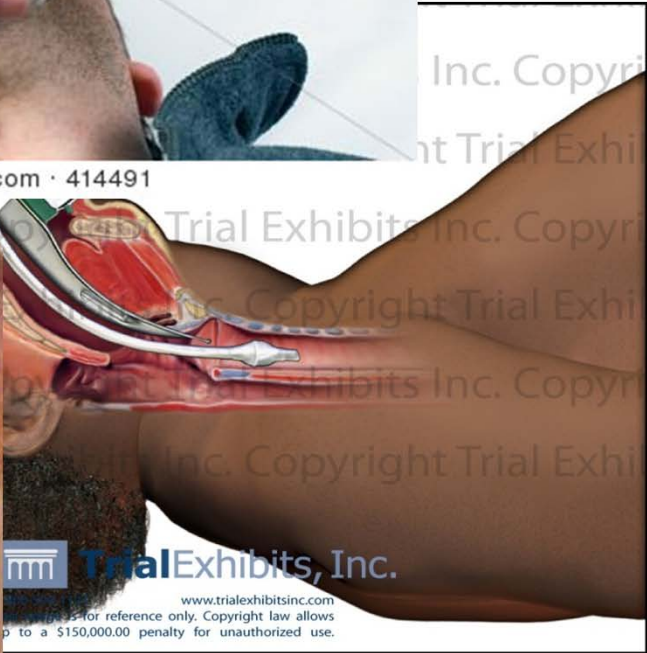




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# Airway management



# Complications of anesthesia

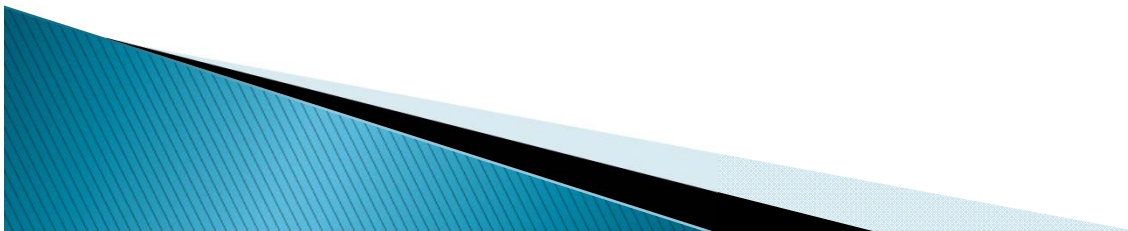
- ▶ **Major complications**
- ▶ Cardiac arrest
- ▶ Airway obstruction, Laryngospasm
- ▶ Perioperative MI
- ▶ Aspiration
- ▶ Haemodynamic instability
- ▶ Anaphylaxis
- ▶ Drug overdose, toxicity





# Cont:

- ▶ Post op nausea and vomiting
- ▶ Sorethroat
- ▶ Shivering
- ▶ Awareness
- ▶ Nerve palsies
- ▶ Organ injury



# Common anesthetic problems

- ▶ Hypotension
- ▶ Hypoxemia during anesthesia
  - Airway management problems,
  - Hypoventilation
  - Laryngospasm,
  - Aspiration( although not so common)
- ▶ Problems associated with spinal anaesthesia,
- ▶ Problems associated with ketamine anaesthesia
- ▶ Local anesthetics toxicity
- ▶ Delayed recovery



# Hypoxemia during anaesthesia

- ▶ Definition– inadequate arterial oxygen content/ SpO<sub>2</sub>.. <90%
- ▶ Mainly due to
  - .. airway problems( airway obstruction, laryngospasm),
  - .. breathing problems( hypoventilation due to sedations, GA, opioids, high spinal and bronchospasm, lung disease, aspiration
  - .. Decreased cardiac output
  - .. Increased O<sub>2</sub> requirement severe infection

## Prevention

- ..always check O<sub>2</sub> supply
- .. Always use O<sub>2</sub> saturation monitor

## Managements

- .. O<sub>2</sub> supplementation
- .. correct airway obstruction
- .. Manual ventilatory with bag and mask prn

Consider lung problems.. Aspiration, pulmonary oedema



# Laryngospasm

- ▶ Reflex closure of vocal cords
- ▶ Due to irritation of the airway (e.g secretions blood, vomit) or in response to other \**stimulation* (e.g peripheral pain, OPA) *during light anesthesia*
- ▶ Mild- incomplete closure—stridor
- ▶ Severe- complete closure- completely obstructed airway- no noise- abdominal



# laryngospasm

- ▶ *If not treated- hypoxia, hypotension, bradycardia, ventricular arrhythmia- cardiac arrest*
- ▶ Prevention ....
  - Should \*ensure adequate depth of anesthesia before surgical stimuli, airway manipulations (in recovery also)





# Laryngospasm managements

- ▶ Remove the stimuli
- ▶ Deepen the anesthetics (propofol)
- ▶ Give 100% O<sub>2</sub>, tilt head back, pull the jaw forward
- ▶ Apply positive airway pressure with tight face mask
- ▶ If does not improve →
  - ▶ Give suxamethonium 0.1-0.2mg/kg(5-10mg) IV, or 0.2- 0.6mg/kg IM and continue to mask ventilation
- ▶ Intubate if necessary



# Aspiration

- ▶ Should be well fasted (Rules of fasting hours)
- ▶ Attempt to reduce the volume and acidity of stomach in risky patients,.. GI prokinetics *metoclopramide*, H2 blocker *ranitidine* etc 1-2 hr before operation
- ▶ Consider best type of anesthesia  
e.g\* LA or RA without sedation will maintain laryngeal reflexes and will protect against aspiration
- ▶ With active vomiting → avoid cricoid pressure, left lateral position, head down and suction
- ▶ When airway clean and protected → maintain SpO<sub>2</sub>% with ventilation and O<sub>2</sub>



## Reducing aspiration risk (fasting guideline)

### Infant and children:

- formula milk- 6 hrs
- Breast milk: 4 hrs
- Clear fluid: 2 hrs

### Adult

- Heavy meal: 8 hrs
- Light meal 6 hrs
- Clear fluid: 2 hrs

All Trauma patients;  
Pregnant Patient in labour:  
Considered to be full stomach

Obese  
Diabetic  
Pt with GERD  
Hiatus Hernia  
Considered to be high risk for aspiration:  
Gastroprophylaxis even in full fasted state

# Ketamine Anaesthesia

## ▶ Important advantages –

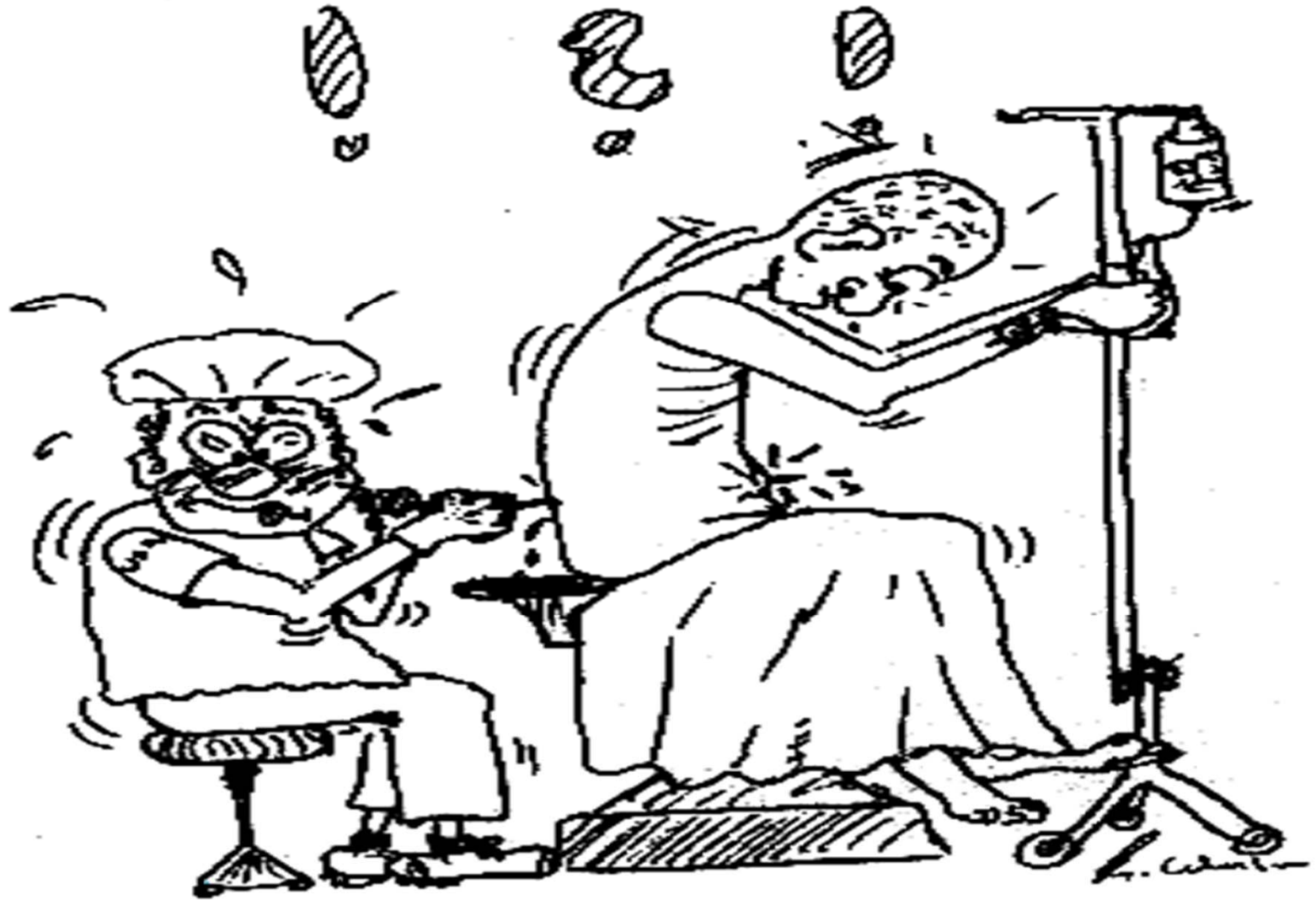
- .. can be used as sedatives, analgesics and sole anesthetic agent
- .. bronchodilatation, minimal respiratory depression, cardiovascular stimulation
- .. can be given IM, IV

## ▶ Disadvantages –

- .. \*cannot assess level of anesthesia easily (light anesthesia with laryngospasm, wrong sense of safety in recovery)
- .. increase salivation
- .. emergence delirium
- .. Increase HR and BP



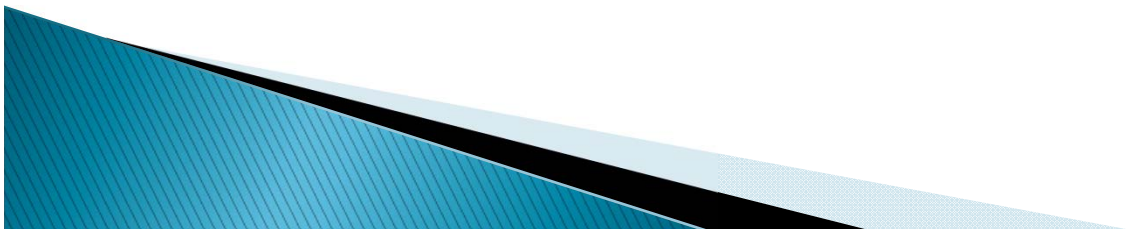
# Spinal anesthesia

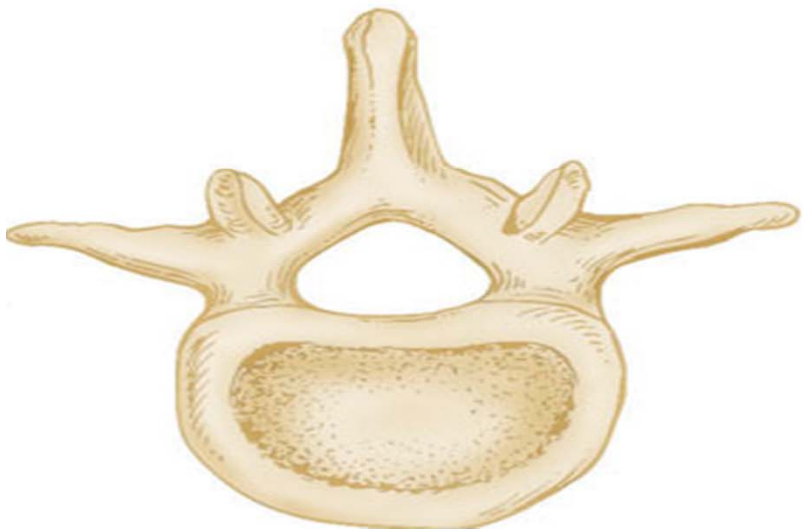
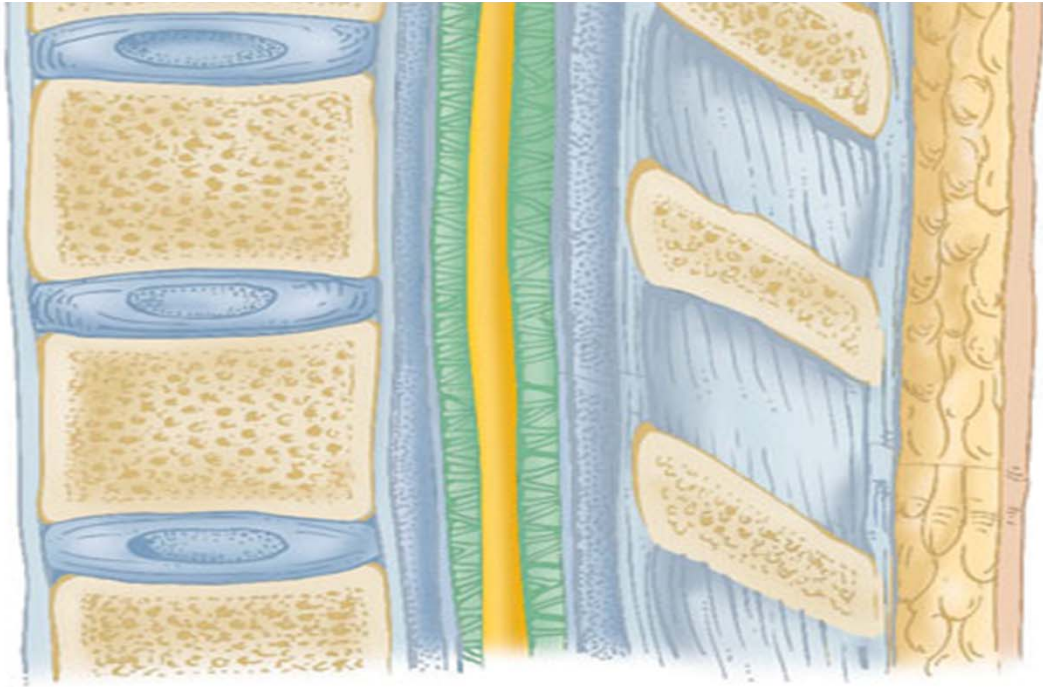




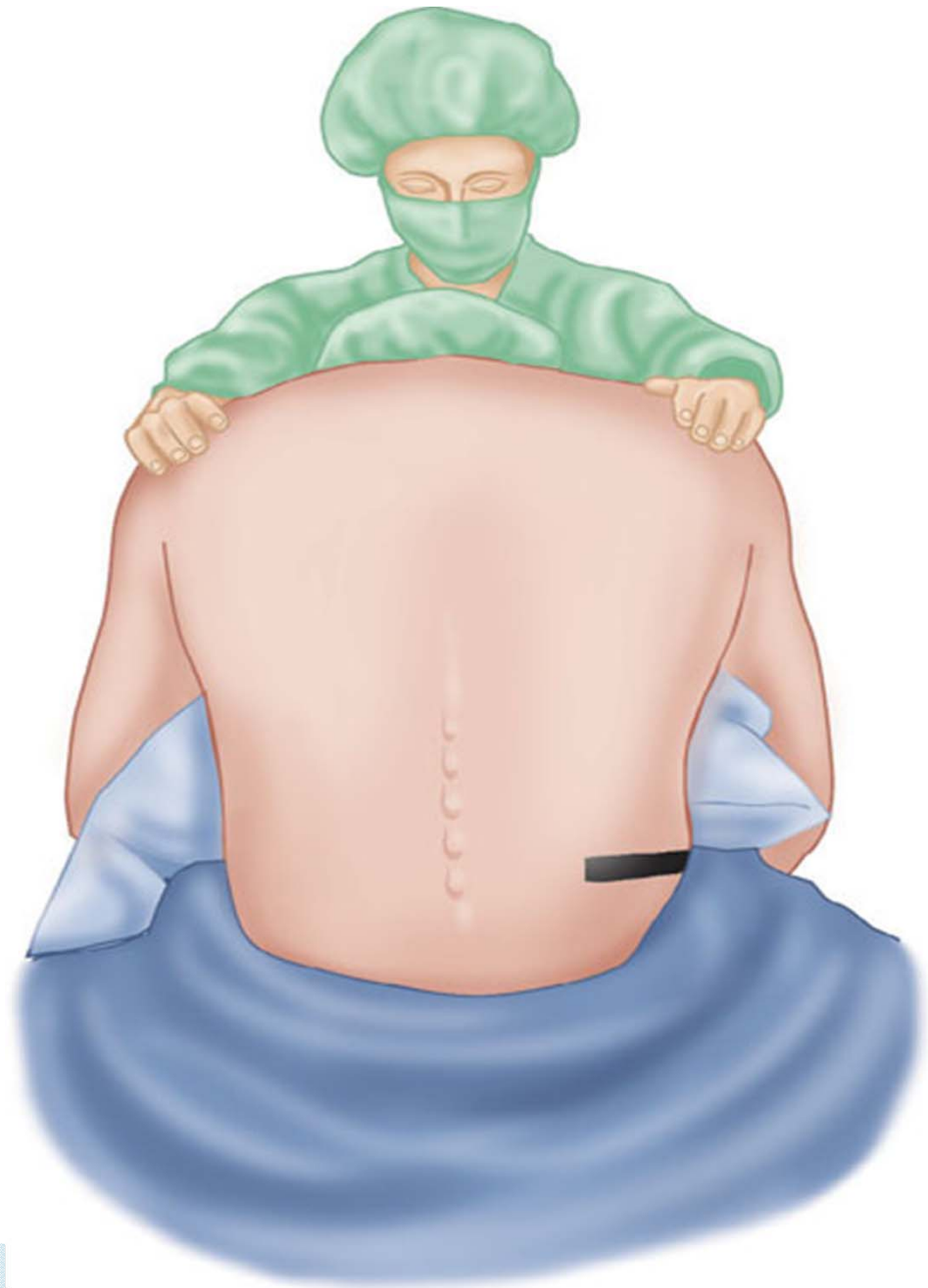
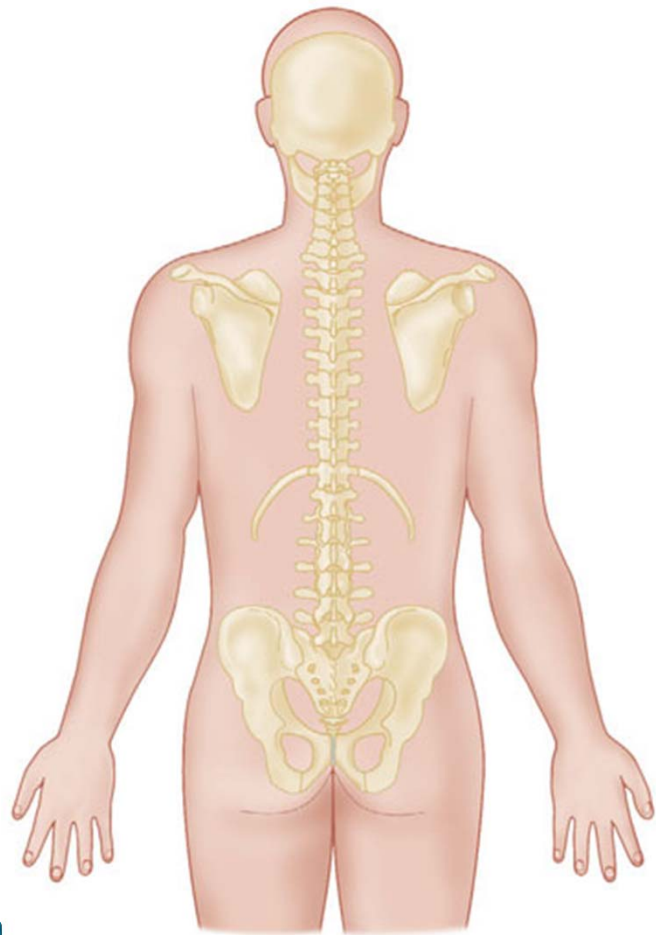
# Spinal anesthesia

- ▶ Spinal anesthesia ascending into the cervical levels causes severe hypotension, bradycardia and respiratory insufficiency.
- ▶ High spinal– High level
- ▶ Total spinal– extends to cranial nerve.

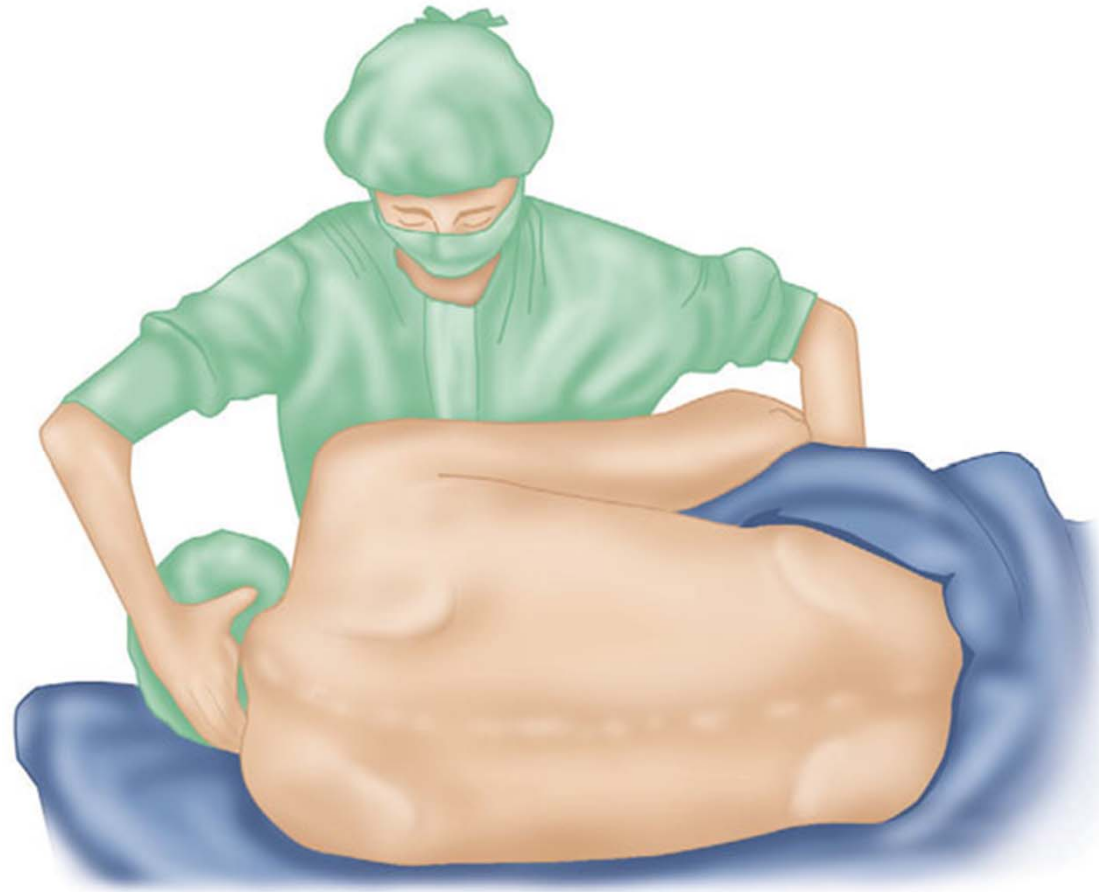




# Sitting Position



# Lateral decubitus position



# Spinal anaesthesia

- ▶ Physiological changes after spinal –

due to accompanying sympathetic block)

1. Vasodilatation → relative hypovolemia → BP drop
  2. If only involves the sacral nerves -- no drop in BP
  3. If cardiac sympathetic nerves (T1–T4) are blocked → bradycardia
- ▶ 4. High thoracic spinal anaesthesia → paralysis of the intercostal muscles





# level of sensory block

- ▶ Extent of sympathetic block -extent/level of Sensory block

## Suggested minimum skin level

| Operative site               | level |
|------------------------------|-------|
| lower legs                   | T12   |
| Hip, uterus,bladder prostate | T10   |
| Testis, ovaries              | T8    |
| Lower abdominal              | T6    |
| Other intraabdominal         | T4    |
| Perineal region              | S1    |



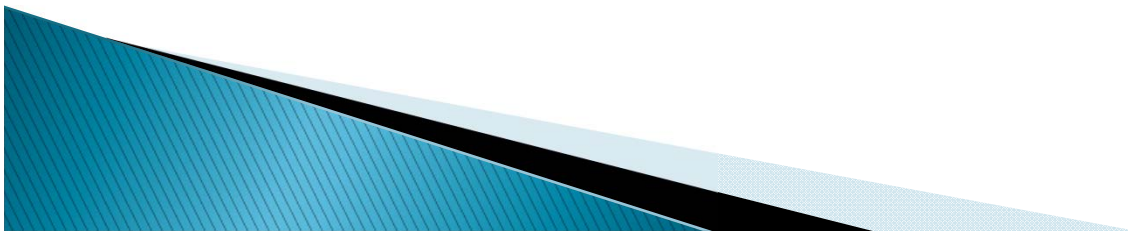
# Considerations in spinal

- ▶ *Performing spinal anaesthesia on a patient who is hypovolemic is very dangerous*
- ▶ Think suggested level of sensory block before injection  
Dose adjustment- Age, height, level of injection, position after block, \*pregnant patients
- ▶ IV cannula, Size of spinal needle -PDPH
- ▶ Prompt response to hypotension with fluid therapy, vasopressor(ephedrine), inotropes (dopamine), atropine (not to get overload in spinal recovery)
- ▶ Supply O2 and assist breathing p.r.n
- ▶ *Always \*assess level of sensory block 3min, 15min and post op*
- ▶ Unnecessary prolong bed rest with pressure sores



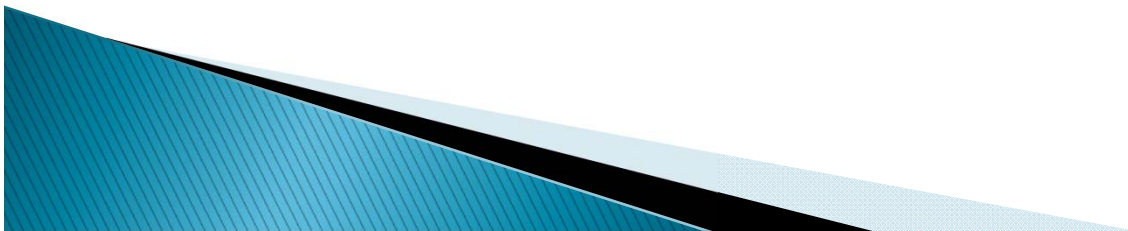
# Contraindications to SA

- ▶ 1. Absolute
  - ▶ . Infection at the site of injection
  - ▶ . Patient refusal
  - ▶ . Coagulopathy
  - ▶ . Severe hypovolemia
  - ▶ . Increased intracranial pressure
  - ▶ . Severe aortic stenosis
  - ▶ . Severe mitral stenosis



# Contraindications to SA

- ▶ 2. Relative
- ▶ .Sepsis
- ▶ .Uncooperative patient
- ▶ .Pre existing neurological deficits
- ▶ .Demyelinating lesions
- ▶ .Stenotic valvular heart lesions
- ▶ .Severe spinal deformity



# Cont:

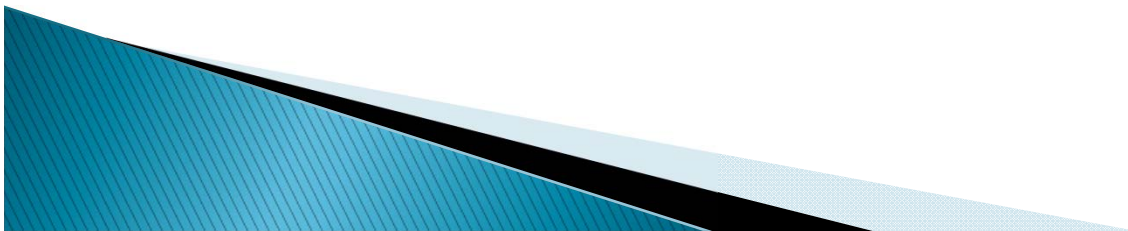
- ▶ 3. Controversial
- ▶ .Prior back surgery
- ▶ .Complicated surgery
- ▶ .Prolonged operation
- ▶ .Major blood loss
- ▶ .Maneuvers that compromise respiration





# Factors affecting the spread

- ▶ 1. Most important factors
  - ▶ .Baricity of anesthetic solution
  - ▶ .Position of the patient
  - ▶ .Drug dosage
  - ▶ .Site of injection



- ▶ 2. Other factors
- ▶ .Age
- ▶ .CSF
- ▶ .Curvature of the spine
- ▶ .Drug volume
- ▶ .Intraabdominal pressure
- ▶ .Needle direction
- ▶ .Patient height
- ▶ .Pregnancy



# Local anaesthetics toxicity

- ▶ \*Maximum dose requirement
  - Lignocaine with adrenaline ..... 6mg/kg
  - without adrenaline.... 3mg/kg
  
  - Bupivacaine without or without adrenaline ....2mg/kg
- ▶ Effects mainly on CNS and CVS .. With toxic plasma level
- ▶ Amount of LA absorbed d/on
  - ..dose, blood supply to area injected, presence of adrenaline in the solution
- ▶ Early sign.. Numbness of the tongue, circumoral, light headedness
  - Visual and auditory disturbances, muscular twitching and tremors, unconsciousness and convulsions(tonic-clonic)



# Local anaesthetics toxicity

## ▶ **CVS effects..**

- . low blood level.. No change in BP,HR
- . higher blood level.. Increase BP,HR .. related to CNS toxicity
- . higher doses .. Transient and reversible fall in BP
- . Further increase in dosage and blood level .. Marked vasodilatation, decreased in contractility, severe bradycardia, cardiac arrest

## ▶ Bupivacaine – ventricular fibrillation

## ▶ **Treatment**

- . Stop LA injection
- . Monitor conscious level, BP, HR
- . If convulsions occurs.. D/Z 5-10mg, Thiopentone 50- 100mg
- . Bag and mask ventilation
- . CPR



# LA Toxicity

## Minor (Associated With Low Plasma Levels)

- Perioral numbness
- Facial tingling
- Restlessness
- Tinnitus
- Metallic taste
- Vertigo
- Slurred speech

## Major (Associated With High Plasma Levels)

- Sudden loss of consciousness
- Tonic-clonic seizures
- Cardiovascular collapse
- Cardiac arrest



## Recognition of Severe Toxicity

- Alteration in mental status
- Cardiovascular collapse
- May occur some time after initial injection

## Immediate Management

- Call for help
- Stop LA administration
- Maintain airway
- Confirm or establish IV access
- Control seizures (benzodiazepines)
- Start IV lipid emulsion

## Circulatory Arrest Not Present

- Conventional therapy for hypotension and arrhythmias
- Continue IV lipid emulsion

## Circulatory Arrest Present

- Start CPR and ACLS (low-dose epinephrine)
- Continue IV lipid emulsion
- Avoid lidocaine for arrhythmia management
- Consider cardiopulmonary bypass

## Follow-Up

- Admission to intensive care unit
- Close monitoring until sustained recovery achieved

# Post-anaesthesia Care

- Facilities and personnels
- Monitoring
- Pain relief
- Discharged criteria

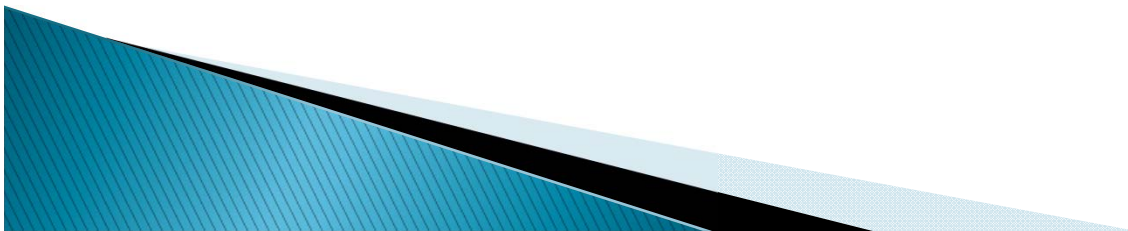


Post operative Care

**IF THE PATIENT IS**

**RESTLESS,**

**SOMETHING IS WRONG.**



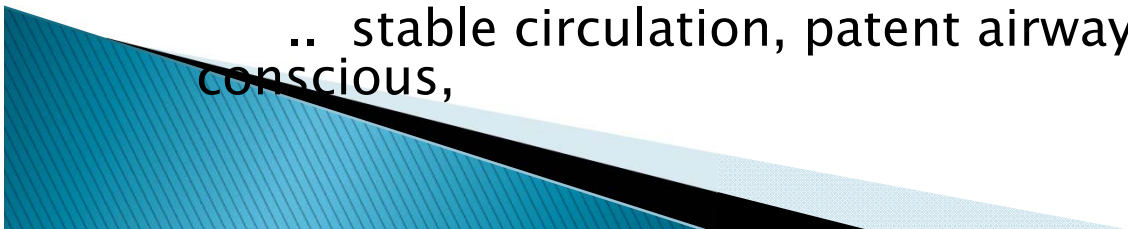
# Look for

- ▶ 1. Airway Obstruction
- ▶ 2. Hypoxia
- ▶ 3. Hemorrhage:
- ▶ 4. Hypotension or Hypertension
- ▶ 5. Postoperative pain
- ▶ 6, Hypothermia, shivering
- ▶ 7. Vomiting
- ▶ 8. Residual narcosis
- ▶ 9. Falling on the fall



# Problems in recovery

- ▶ Time from the end of surgery to when the patient is alert and physiologically stable
- ▶ *Complications in immediate post op period can be sudden and life threatening*
- ▶ *All patients should be nursed in recovery area or PACU before returning to ward*
  - .. to monitor the vital signs more closely than is possible on ward
  - .. quickly detect and treat early complications after surgery and anaesthesia
- ▶ Observations performed and recorded every 5 minutes
  - .. ABC, CNS (delayed recovery/Sedation level, delirium) Renal, PONV, Analgesia
- ▶ Discharge criteria
  - .. stable circulation, patent airway, adequate respiration, be conscious,





# PACU care

- ▶ Monitoring should be continued
- ▶ At least every 15 min using Modified Aldrete Scoring ( $\geq 9$  is adequate )

**Chart 1. The 'modified' Aldrete Scale**

|               |  |  |  |
|---------------|--|--|--|
| RESPIRATION   | 2  | 1  | 0  |
|               | Able to take deep breath and cough                   | Dyspnea/Shallow Breathing                            | Apnea  |
| O2 SATURATION | 2  | 1  | 0  |
|               | Maintains > 92% on room air                          | Needs O2 inhalation to maintain O2 saturation > 90%  | Saturation < 90% even with supplemental O2           |
| CONSCIOUSNESS | 2  | 1  | 0  |
|               | Fully awake  | Arousable on calling                                 | Not responding                                       |
| CIRCULATION   | 2  | 1  | 0  |
|               | BP $\pm$ 20mmHg pre op                               | BP $\pm$ 20-50mmHg pre op                            | BP $\pm$ 50mmHg pre op                               |
| ACTIVITY      | 2  | 1  | 0  |
|               | Able to move 4 extremities voluntarily or on command | Able to move 2 extremities voluntarily or on command | Able to move 0 extremities voluntarily or on command |

# Fit for the ward

- ▶ 1. Awake, open eyes
- ▶ 2. Extubated
- ▶ 3. Breathing spontaneously, quietly and comfortably
- ▶ 4. Can lift head on command
- ▶ 5. Not hypoxic
- ▶ 6. Blood pressure and pulse rate are satisfactory
- ▶ 7. Appropriate analgesia



## Postoperative infection: Anaesthetic role

- Antibiotic prophylaxis
- Hand hygiene
- Aseptic precaution for invasive procedure
- Glycemic control
- Avoidance of hypothermia
- Fluid and blood product
- Oxygen- avoiding hypoxia / hyperoxia
- Regional anaesthesia technique



# Infection Control

- ▶ 1. Hand Hygiene
- ▶ 2. Personal Protective Equipment
- ▶ 3. Respiratory Hygiene
- ▶ 4. Safe Injection Practices
- ▶ 5. Equipment and Environmental cleaning, Disinfection and Sterilization
  
- ▶ AANA([www.aana.com](http://www.aana.com))



# Documentation: Legal aspects





# LIST OF THINGS ANESTHESIA is Blamed for :

- 1- DELAYS or being early
- 2- Everything
- 3- Bleeding
- 4- BP too high/too low
- 5- GLOBAL WARMING
- 6- TEEN PREGNANCY
- 7- SOIL EROSION
- 8- HARD TO OPEN KETCHUP PACKAGES
- 9- Lindsey Lohan
- 10 MICHAEL JACKSON
- 11- FOX NEWS
- 12- MEMORY LOSS
- 13- PARKING PROBLEMS



**Avoid blame culture**  
**Develop Help Culture**



# Never events

- ▶ a. Foreign object left in patient after surgery
- ▶ b. Surgery on wrong patient
- ▶ c. Surgery on wrong body part
- ▶ d. Wrong surgery on a patient
- ▶ e. Death/Disability associate with – intravascular air embolism
- ▶ f. incompatible blood
- ▶ g. hypoglycemia
- ▶ h. a fall within facility
- ▶ i. Electric shock
- ▶ J. a burn incurred within facility





**PATIENT**  
**SAFETY**



# Team work and Safety for Everybody



*Mother Teresa*

"I CAN DO THINGS YOU CANNOT,  
YOU CAN DO THINGS I CANNOT;  
TOGETHER WE CAN DO GREAT  
THINGS."



**Thank You For Your Attention**

