ANAESTHESIA

1 ANAESTHESIA PART-1

- Anesthesia 00:00:49
  - An: No
  - Esthesia: sensation
  - Anaesthesia = No sensation

History of Anaesthesia

00:01:57

- **WTG MORTON:** Father of Modern Anaesthesia
- Morton gave the public demonstration of Ether Anaesthesia
- 16th Oct 1846: World Anaesthesia Day
- August Bier father of spinal Anaesthesia
- IVRA is also called as Biers block
- Horace Wells gave the clinical demonstration of N2O anesthesia

Techniques of Anaesthesia

- **Types of Anaesthesia** 00:04:17
  - Local
  - Spinal
  - Epidural
  - Nerve Block
  - General Anaesthesia
- **Local Anaesthesia**
  - A small area made numb
  - Ex: Root canal of a tooth
- **Spinal Anaesthesia**: Below umbilicus short-duration surgery
- **Epidural Anaesthesia**
  - Below umbilical long-duration surgery
  - Pain relieving techniques
  - Above umbilical surgeries
- **Nerve Block Anaesthesia**
  - Plexus of nerve
  - Can give local anaesthesia
  - Ex: Brachial, femoral plexus block

- **General Anaesthesia**
  - Different from all types of Anaesthesia
  - The patient will be unconscious

Pre Anaesthetic Check Up

- Before giving Anaesthesia need to do PAC 00:06:59
- 4 important things to look at in PAC are:
- Airway Assessment, HB (Haemoglobin), Fasting status, history of comorbidities

1. Airway Assessment

- The most important of all 4 steps in PAC
- Thorough airway Assessment - prevents many anaesthesia-related deaths
- Common cause of death during anaesthesia - Failure to intubate or failure to secure the airway

- **Things to do in Airway Assessment**
  - Tell the patient to open the mouth
    - → As he open's the mouth (look for 2 parameters)
    - → As he lift the chin (look for 2 parameters)
  - Mallampati classification and interincisor distance

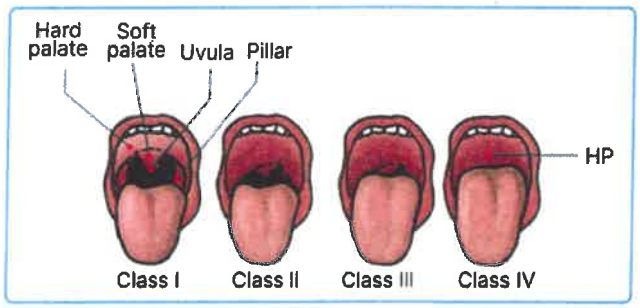
Mallampati Classification

PYQ: FMGE 2021

- Tell the patient to open the mouth
- If the doctor is able to see all the structures in the patient's mouth
- Then the patient has adequate space
- Put the laryngoscope and lift the tongue for intubation
- Visual classification of the structures - Mallampati classification

A. MP class 1

- Structures visible
  - Hard palate
  - Soft palate
  - Uvula
  - Tip of uvula
  - Tonsillar pillars visible



B. MP class 2

- Structures visible
  - Hard palate
  - Soft palate
  - Uvula
  - Tonsillar pillars
- Structure not visible: Tip of the uvula

C. MP class 3

- Structures visible
  - Hard palate
  - Soft palate
  - Patients with MP class 3 has less space to put a laryngoscope - difficult to intubate

D. MP class 4

- Structures visible
  - Hard palate
  - Patients with MP class 4 has less space to put laryngoscope -difficult to intubate

E. MP Class 0

- Structures visible
  - Hard palate
  - Soft palate

- Uvula
- Tip of uvula
- Tonsillar pillars
- Tip of Epiglottis

Inter Incisor Classification

- The distance between the upper and lower incisor is called Inter incisor distance
- Normal value : 4-5 cms <3cm: Difficult Intubation
- Low Inter-incisor Distance: The best way to secure the airway is Tracheostomy
- Lift the chin (Look for 2 parameters)
- Look for the distance between the mentum and the thyroid cartilage- Thyromental distance
- Look for the distance between the mentum and the sternal notch - sternomental distance
- Normal thyromental distance - >6.5 cm
- Normal sternomental distance - double the thyromental - >12.5 cm

2. Fasting status

- Important to be in a fasting state before anaesthesia
- To prevent the risk of aspiration
- Applied for all anaesthesia
- Adults:
  - Solid food: 8 hrs
  - Semi-solid food: 6 hrs
  - Liquid: 2 hrs
- Children on liquid water: 2 hrs
- Children on mother's milk: 4 hrs
- Children on formula feed: 6 hrs

3. History of comorbidities

- Asking about the diseases the patient is suffering
- **Medications given:**
  - Most of the A's medications can be given before surgery
  - Aspirin 75 mg - can be continued
  - Only stop Aspirin - Neurosurgery and retinal surgery
  - Anti-anginal drugs can be continued
  - Anti-epileptic medications - continued
  - Anti-thyroid can be continued
  - Anti-lipidemic or dyslipidemic can be continued
- **Medication Stopped before surgery**
  - **Mnemonic:** Hot MLC women
  - H - Heparin: before 6 hrs to surgery
  - Herbal Medication: before 6 weeks to surgery
  - O - oral hypoglycemic drugs stopped on the day of Surgery
  - OC pills - 3 to 4 weeks to surgery
  - T - TCA: before 3 weeks to surgery
  - T- Ticlopidine: 14 days before surgery
  - M- monoamine oxidase inhibitor : 3 to 4 weeks before surgery
  - L- lithium: 24 to 48 hrs before surgery
  - C - clopidogrel: 8 days before surgery
  - W- warfarin: 3 to 5 days before surgery

Certificate

- After PAC, can provide a certificate (ASA) to patients
- ASA - American Society of Anesthesiology

ASA Classification

00:27:13

PYQ: INICET 2021

- **ASA class 1**
  - The patient is free from systemic illness
  - Diabetes, BP, hypertension, heart disease
  - No comorbidities
- **ASA class 2**
  - Having systemic illness- well under control
  - Ex: diabetic - FBL-90, pbs- 120
- **ASA class 3**
  - Having systemic illness- not under control
  - Ex: Diabetic: FBL-200, pbs 380
- **ASA class 4**
  - Having systemic illness - a constant threat to his life
  - EX: having a history of recent stroke or coronary artery disease
- **ASA class 5**
  - Moribund patient - multiple comorbidities
  - EX: ruptured abdominal aortic aneurysm
- **ASA class 6**
  - Brain dead patient
- Add suffix' E' depends on the emergency
- EX: A lady has a ruptured ectopic pregnancy management having no comorbidities - class '1E'

2 ANAESTHESIA PART-2

Local Anesthetics

PYQ: NICET 2021

00:00:51

- Local anesthetics are the drugs that can be given in
  - Local anaesthesia
  - Spinal anaesthesia
    - → Below umbilical region small duration surgeries
  - Epidural anaesthesia
    - → Below umbilical region long-duration surgeries
  - Nerve blocks
    - → Brachial plexus
- Except: General anaesthesia
- These agents cause reversible loss of pain sensation
- They block "Na+ channels"
  - The non-ionized form of Local Anaesthetics enter into Nerve Terminals.
  - Ionized forms block Na channels
- Classified as
  - Aminoesters
  - Aminoamides

PYQ: FMGE 2020

PYQ: NICET 2021

A. Aminoesters (one 'I')

00:03:34

- Examples
  - Cocaine
    - → First introduced local anaesthesia for eye surgery and spinal anaesthesia
    - → Never used as i.v
      - Severe vasoconstriction
  - Procaine
    - → Safest LA in malignant hyperthermia
  - Tetracaine
  - Benzocaine
  - Chloroprocaine
    - → Shortest acting LA
- These aminoester's drugs cause allergic reaction in patients
- Normally metabolized in plasma by Plasma pseudocholinesterase
- Some are metabolized to PABA (Para amino benzoic acid)
  - Procaine
  - Benzocaine

  } Causes allergic reaction

PYQ: AIIMS 2019

B. Aminoamides (two 'I')

- Examples
  - Lignocaine
  - Bupivacaine
    - → The most commonly used LA in spinal anaesthesia
    - → Longer-acting than lignocaine
    - → Most cardiotoxic LA
    - → Cardiac arrest: Adrenaline
  - Ropivacaine

→ Enantiomer of Bupivacaine
→ Less potent
- Dibucaine
  → Longest acting LA
  → Used for Dibucaine number test
  → Not for anaesthesia
- Prilocaine
  → Commonly used for
    – Surface anaesthesia
      ▪ EMLA cream, eutectic mixture
      ▪ Pediatric cannula insertion
    – IVRA
      ▪ In addition to lignocaine
  → Contraindicated in neonates
    – Risk of Methemoglobinemia

Important Information PYQ: NEET PG 2021 PYQ: FMGE 2021 PYQ: INICET 2021

- AKA: Lidocaine/Xylocaine
- Most commonly used LA worldwide
  - IVRA
  - The most common LA to cause malignant hyperthermia
- Dose:
  - Plain: 4.5 mg/kg
  - With adrenaline: 7 mg/kg
- High dose 9 mg/kg
  - CNS neurotoxicity
  - Perioral numbness
    → First sign
  - Tremors
  - Seizures
  - Respiratory arrest
  - Cardiac arrest
- Management of Lignocaine systemic toxicity
  - Seizures: antiepileptics
  - Respiratory arrest: intubate, and ventilate the patient
  - Antidote: 20% Intralipid solution
    → Precisely used in Bupivacaine toxicity

Regional Anaesthesia

- 2 parts
  - Central neuraxial block
    → Spinal anaesthesia
    → Epidural anaesthesia
    → Caudal anaesthesia
      – Pediatric cases
      – Caudal epidural space
    → Saddle anaesthesia
      – Form of spinal anaesthesia
      – The patient is made to sit for perianal surgeries
  - Peripheral nerve block
    → Brachial plexus block
    → Stellate ganglion block
    → Femoral/Ankle plexus block

A. Central Neuraxial Block

PYQ: FMGE 2019

1. Spinal Anaesthesia

- Indication: used for below umbilical short-duration surgery
  - Appendectomy
  - LSCS
  - Hernia
  - Hydrocele
- Duration: 2-3 hours
- The patient is made to sit and choose a space for inserting the needle
  - Locate Tuffier's line
- Given below spinal cord
- Sitting or lateral position
- Clean the site, locate the site
- Site: L3-L5 space

PYQ: FMGE 2019

  - L4, L5 easy to identify
- Landmark: Tuffier's line
  - Keep hands on the highest point of the iliac crest back of the patient
- Introduce the Dura separating needle
  - A thin bore

- **Layers pierced in Spinal Anaesthesia** PYQ: NEET PG 2021 PYQ: FMGE 2019
  - Skin → Subcutaneous tissue → Supraspinous ligament → Inter/Intra/Infra spinous ligament → Ligamentum flavum (toughest ligament) → feel snap/sudden loss of resistance → Dura → Arachnoid membrane (last layer) → Subarachnoid space (CSF)
- **Barbotage**: Aspirate CSF back into syringe
  - 0.5-1 ml CSF
- Inject local anaesthetic into CSF
- The most commonly used LA in spinal anaesthesia is Bupivacaine
  - 2nd common: Lignocaine
- Additives: Opioids
  - Fentanyl
  - Morphine
  - Sufentanil
  - Alfentanil
- Avoid: Remifentanil
  - Contains neurotoxic preservatives
- Side effects of Spinal opioids
  - Respiratory depression
  - Nausea
  - Vomiting
  - Pruritus (most common)
- Prepare for complications of spinal Anaesthesia after injection
- Emergency drug tray
  - Phenylephrine
  - Atropine
  - Pethidine
  - Laryngoscopy/ET tube/Adrenaline

Important Information
Additives used in local anaesthesia is Adrenaline

Complications Of Spinal Anaesthesia

- Divided into 2 types
  - Intra OP
  - Post OP
- **Intra OP complications**
  - Hypotension
    - → Most common
    - → Sympathetic blocking due to spinal Anaesthesia
    - → Block adrenal gland
  - Bradycardia
  - Shivering
    - → Vasodilation in the lower limb
  - High spinal Anaesthesia
    - → The achieved level drug is higher than the desired level
    - → Drug to act on T6, but ascends to T4
    - → Hypotension and Bradycardia is seen
  - Total spinal Anaesthesia
    - → Drugs ascended to the intracranial segment
    - → Features of High spinal Anaesthesia, Respiratory depression, also cardiac arrest can occur
  - Respiratory depression → Cardiac arrest (least common)
- Post OP complications PYQ: AIIMS 2019
  - Acute urinary retention
    - → Most common post OP complications

→ Due to Blockage of sacral segments

- Headache
  - → Caused due to Thick bore needle
  - → Loss of CSF
  - → Traction develops in the brain
  - → Compress 6th cranial nerve
  - → Rare now
- Cranial nerve damage
  - → 6th nerve palsy

Management of Intra OP Complications of Spinal Anaesthesia

- Phenylephrine is DOC for Hypotension
  - Ephedrine is also given
    - → Contraindicated in Pregnancy
    - → Cause fetal acidosis
- Atropine is DOC for Bradycardia
- Pethidine is DOC in shivering
  - Contraindicated in MOA inhibitors users
    - → Severe Sympathomimetic reaction
- High spinal anaesthesia
  - Hypotension: Phenylephrine
  - Bradycardia: Atropine
- Total spinal anaesthesia
  - Hypotension: Phenylephrine
  - Bradycardia: Atropine
  - Respiratory depression
    - → Laryngoscopy/ET tube
      - – Airway secured
    - → if the airway not secured, cardiac arrest develops
      - – Adrenaline is given

Management of Post OP Complications of Spinal anaesthesia

- The best management of headaches in spinal anaesthesia is
  - Conservative line of management
    - → Coffee
    - → NSAIDs
    - → IV fluids
  - Definitive management
    - → Epidural blood patch

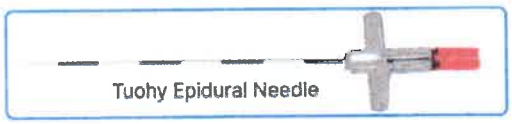
Contraindications of Spinal anaesthesia

- Even if the patient is posted for below umbilicus short-duration surgery, it is contraindicated in
  - Shock
    - → Hypotension (80/50 mmHg)
    - → Reduces to 40/20 mmHg
- Absolute contraindications
  - Raised Intracranial pressure (ICP)
    - → CSF jet out
    - → Herniation of meninges
  - Local site infection
    - → Skin infection of L3-L5 space

- Refusal from patient
- Fixed cardiac output lesions
- Low platelet count
- Coagulopathies

2. Epidural anaesthesia 00:47:00

- Indication: Most commonly used for below umbilical long-duration surgeries
  - Total hip replacement
  - Total knee replacement
- In spinal, single shot technique is used
- In epidural, the needle enters into epidural space, and a catheter is placed
- One end of the catheter is in epidural space, other end is lying outside
- Top-up doses of the drug are given through the catheter
- Length: 9-10 cm



Layers Involved: Skin → Subcutaneous tissue → Supraspinous ligament→ Inter/Intra/Infra spinous ligament → Ligamentum flavum (toughest ligament) → feel snap/sudden loss of resistance (last layer) → Dura

- Drugs: Bupivacaine, Lignocaine
- Dose is decreased
- Epidural anaesthesia is also used for painless labor
  - Catheter is placed, and Bupivacaine is given
    → 0.0625%-0.125%
  - Cause sensory block
  - Motor activity is intact

3. Caudal anaesthesia

- Given in pediatric cases
- At the level of Sacral hiatus
  - Caudal epidural space

4. Saddle anaesthesia

- After spinal Anaesthesia, the patient is made to sit for 8 mins
- Perineal surgery needs an anesthetic effect in the pelvis region
  - Fistula
  - Anal fissures
  - Hemorrhoids

B. Peripheral Nerve Block 00:53:00

1. Brachial Plexus Block