ANAETHESIA

RR-8.0

Contents

ANAESTHESIA REVISION - 1

----- Active space -----

PAC : Past Medical & Personal History

00:03:28

Pre Anaesthesia check-up (PAC).

Past Medical History :

Co-morbid conditions	Treatment plan prior to surgery
Hypertension	Continue antihypertensives till day of Sx. • Exceptions : ACE-I & ARBs (Cause severe hypotension). • Minor surgeries (Minimal blood loss) : Continue ACEI & ARBs.
Diabetes mellitus	• Discontinued : – OHA & Insulin : On surgery day (Risk of hypoglycemia). – SGLT-2 inhibitors : 24 hrs prior (Risk of euglycemic ketoacidosis). • Intra-op ⟶ Start regular short acting insulin.
Epilepsy	• Continue antiepileptics till day of Sx. (Triggers : hypoxia, hypercarbia, acidosis, can precipitate seizures). • Obtain baseline LFT.
Thyroid disorder	Continue medications till day of Sx. • Hypothyroidism : May cause delayed recovery d/t ↓BMR. • Hyperthyroidism : To prevent thyroid storm (Tachycardia, SVT).
Psychiatric problems	Continue antipsychotics. Exceptions : • MAO inhibitors : Stopped 3 weeks prior. Interacts with Synthetic opioids (Meperidine) ⟶ Hypertensive crisis. • Lithium/Mg^{2+} : – Stop 24-48 hours prior if used along with long acting muscle relaxants (Prolong their action). – Can be continued with short acting muscle relaxants like Mivacurium & Atracurium.

Medications	Treatment plan prior to surgery
Oral contraceptive pills	• Estrogen : ↑DVT risk. – Low risk (Young/immediate mobilization) : Continue. – High risk (Old/long bone fractures/↑bed-rest) : Stop. • Progesterone : No risk.
Herbal medicine	• Check LFT : If abnormal ⟶ Delay by 1-2 weeks.
Anti-tubercular therapy (ATT)	• Continue ATT (Stopping drug ⟶ ↑MDR TB). • Check LFT (ATT : Enzyme inducers).
Sildenafil	• Stop 24-48 hours prior (Risk of hypotension).

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Medications	Treatment plan prior to surgery
Diuretics	• Stop (may cause electrolyte imbalance/hypotension) – Exception : Thiazides.
Anticoagulants	• During regional anaesthesia (RA) → Bleeding in closed cavities → Nerve compression (Permanent damage). • Anticoagulants discontinued prior to RA : – Aspirin : Continued/stopped 3 days prior if ↑risk of bleeding. – Clopidogrel, Warfarin } 5–7 days prior. • Bridging with LMWH to prevent re-infarction : – LMWH → Prophylactic dose : Stop 12 hours prior. → Therapeutic dose : Stop 24 hours prior. – Regular heparin : Stop 6 hours prior. • Topical anesthesia : Continue anticoagulants.

Personal History :

Condition	Features
Smoking	• Stopped 3–4 weeks prior (Ideally 6–8 weeks). • ↑ Risk of bronchospasm : – Clinical features : Sudden tachycardia, HTN, ↑airway resistance, wheeze (+).. – $EtCO_2$: Shark fin pattern. – Rx : Bronchodilators. • ↑Risk of laryngospasm (On extubation) : – Clinical features : Stridor, ↓rapid SpO_2, paradoxical chest movements/ no air entry into lungs. – Rx : 100% O_2 → f/b → Propofol → If uncontrolled → Add succinylcholine.
Alcohol	24–48 hours prior.
Tobacco chewing	Chances of difficult intubation (D/t restricted mouth opening).

PAC : Family & Allergy History

00:33:32

Family History :

Malignant hyperthermia :

- Etiology : All inhalational agents & Succinyl choline.
- Risk factor : Strong family h/o muscular dystrophies.
- Pathophysiology : Ryanodine receptor mutation (Sarcoplasmic reticulum) → Vigorous muscular contractions.

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- Clinical presentation :
  - Initial : Locked jaw (masseter spasm).
  - Sudden tachycardia, HTN, ↑body temperature.
  - ↑$EtCO_2$ (most sensitive).
  - Ventricular arrhythmias (Hyperkalemia) & cardiac arrest.
- Mx :
  - 100% O_2 (1st step).
  - DOC : Dantrolene sodium (2.5 mg/kg diluted in distilled water).
  - Hyperkalemia Mx : Calcium gluconate ⟶ Insulin + dextrose or Salbutamol.
  - Hyperventilation & acidosis Mx : Sodium bicarbonate.
  - Post-operative complication :
    Acute tubular necrosis (myoglobin release) : Monitor urine output.

Allergy History :

Causes anaphylactic shock (Histamine : vasodilator & bronchoconstrictor).

Etiology :

Antibiotics > latex > muscle relaxants > local anaesthetics.

Clinical presentation :

- Sudden tachycardia, hypotension.
- Wheeze (D/t ↑airway resistance).
- Edema (Lips/face/airway).

Mx :

- Adrenaline (DOC) : Dosage based on route (1 mL = 1 mg = 1 : 1000).
  - IV dose : 1 mL of 1 : 10000.
  - Im / SC dose : 0.5 mL of 1 : 1000.
- Hydrocortisone.
- Adequate fluids.

Airway Examination

00:46:24

Risk Factors :

- H/o difficult intubation.
- Airway anomalies.

Finger breadth technique

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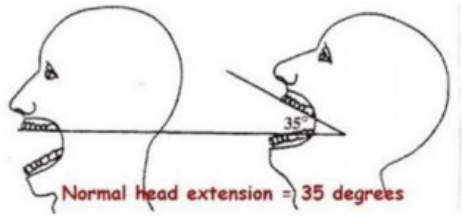
Assessment :

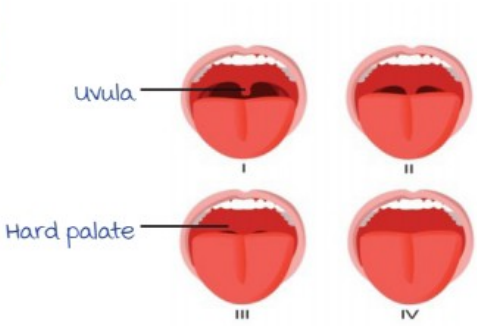
Examination	Inference
Predictors for difficult intubation (DI)	• Mnemonic : OBESE – Obesity – Bearded – Elderly – Short – Edentulous • Pregnancy • Long upper incisors • Inability to protrude lower jaw • Small mouth opening • High arched palate
Mouth opening	Finger breadth technique (Normal = 3 fingers)
Atlanto-occipital/C-spine mobility	• Normal : 12–35° • Neck circumference (>43 cm) ⟶ DI
Thyromental distance	Normal : >6.5 cm (<6 cm ⟶ DI)
Sternomental distance	Normal : 13 cm (<12 cm ⟶ DI)



Mallampati scoring :

Mallampati scoring	
Grades	Structure seen
Grade I	Uvula hanging freely
Grade II	Tip of uvula not visible
Grade III	Half of uvula not visible
Grade IV (Introduced by Sampson Young)	Only hard palate visible
Grade 0	Clear glottic opening with large epiglottis

Difficult intubation (DI)



Mallampati scoring

ASA Grading & Pre-operative Investigations 00:55:08

ASA Grading :

Based on functional capacity.

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Grade	Characteristics	Examples
I	Healthy patient	• Normal BMI, non-smoker, occasional alcohol use
II	Mild disease with no functional limitation	• Medical disease under control (HTN, DM,epilepsy) • Smoker, BMI = 30-40 • Pregnancy • Mild - moderate obesity
III	Severe disease with functional limitation	• Medical diseases with poor control (HTN, DM, epilepsy) • CKD, CLD, COPD • Morbid obesity (BMI >40)
IV	Severe disease with threat to life	• Recent MI, CVA, unstable angina
V	Moribund patient	• Death <24 hours
VI	Brain dead patient	-

Investigations :

Minimum laboratory parameters for various scenarios :

Parameters	Value
Minimum acceptable Hb before elective surgery	8 g/dL
Minimum acceptable Hb before elective surgery with comorbid conditions	10 g/dL
Minimum acceptable Hb before elective surgery in critically ill patients	12 g/dL
Minimum acceptable platelet count for invasive procedure (Central line/liver biopsy)	50,000
Minimum acceptable platelet count for central neuraxial block	1 lakh
Minimum acceptable platelet count for peripheral neuraxial block	80,000

Indications for ECHO vs ECG :

	ECHO	ECG
Mandatory	• Dyspnoea of unknown origin. • Heart failure patients with worsening dyspnoea.	• K/c/o IHD. • Significant arrythmia PAD, CVD. • Significant structural heart disease.
May be done	• Past h/o LV dysfunction not evaluated since 1 yr.	• Major Sx in asymptomatic patients without h/o coronary heart disease
Not performed	• As routine investigation.	• Asymptomatic patients. • Low risk surgical procedures.

Risk Stratification 01:03:43

Cardiac risk stratification :

ACC/AHA guidelines.

High risk surgery :

- Surgery above umbilicus/emergency surgery.
- Proceed with surgery.

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Elective surgery : Thoroughly evaluate for the following & then do Sx

- ACS.
- Decompensated HF.
- Significant arrhythmias.
- Valvular heart disease.

Risk assessment for developing MI :

Parameter	Score
High risk surgery	1
H/o ischemic heart disease	1
H/o congestive cardiac failure	1
H/o cerebrovascular accident	1
H/o diabetes mellitus requiring insulin	1
Serum creatinine >2.0	1

Score	Risk of cardiac complication
0	0.4 %
1	1.0 %
2	2.4 %
≥3	5.4 %

Stress testing : Perform if functional capacity <4 METS.

Criteria for performing Sx after coronary stenting :

- Bare metal stent : Wait for 1 month.
- Drug eluting stent (m/c) : Wait for 6 months.

Criteria for giving infective endocarditis prophylaxis :

- Previous history.
- Prosthetic valves.
- Unrepaired/repaired (Residual defect) CHD.
- Cardiac transplant.

Pulmonary risk stratification :

Patient related	Procedure related	Laboratory test
• Old age • Cigarette smoker • Abnormal findings on CXR	• Aortic aneurysm repair • Upper abdominal Sx • Emergency Sx	• Albumin concentration <3.5 g/dL • Chest radiograph abnormalities

Pre-operative Instructions

01:09:53

Pre-medications :

- Anxiolytic : Short acting benzodiazepines (Midazolam).
- Anti-emetic (Ondansetron).
- Anti-sialogogues :
  - Atropine/Glycopyrrolate.
  - Indication : Children, intellectual disability, head & neck Sx.
- Analgesia :
  Short acting opioids (Fentanyl).
- Antibiotics :
  Cephalosporin for cardiac Sx.

Fasting guidelines before Sx :

- Adult : 6-8 hours.
- Children :
  - 2 hours : Clear liquids.
  - 4 hours : Breast milk.
  - 6 hours : Non-human milk, solids
  - 8 hours : Heavy fatty meal.

ANESTHESIA REVISION - 2

----- Active space -----

Monitoring of Patient : CNS, CVS, RS

00:01:48

CNS Monitoring

Depth of anesthesia (Absence of awareness) is monitored.

Bispectral Index :

- Analyzes EEG waveforms.
- 40 to 60 : Recommended range for GA.

Bispectral Index

CVS Monitoring :

- HR
- BP
  - Non-Invasive : Sphygmomanometer
    - Palpation.
    - Auscultatory.
    - Oscillatory. (Automatic)
  - Invasive (m/c : Radial) :
    - Major Sx.
    - Allens test : Ensures adequate collateral circulation
      - Allens Test (AT) :
        - Compress B/L radial A. with 2 hands.
        - Negative : Normal.
      - Modified AT :
        - Compress both radial & ulnar A.
        - Positive : Normal.
- ECG
  - Arrhythmias : Lead II
  - Ischemia
- Central venous pressure
- Pulmonary Capillary Wedge Pressure (PCWP)
- Echocardiography

Central Venous Catheter vs. Pulmonary Artery Catheter :

	Central Venous Catheter	Pulmonary Artery Catheter
Features	• Measures : Right heart functioning → CVP (Normal : 0–5 cm H_2O) • Monitor fluid status : – ↓CVP + ↓BP → Rx : Fluids. – ↑CVP + ↓BP (Pump failure) → Don't administer fluids. • Long term IV cannulation for : TPN, inotropes, cardiac medications.	• Measures : Left heart functioning → PCWP Normal : 12–16 mmHg ↑ : LV dysfunction • Redundant method