Anaesthesia

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Instructions

- Notes are to be used in conjunction with Marrow videos.

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- The notes contain blank spaces primarily for labelling diagrams, completing cycles and more to promote active engagement and reinforce learning.

- Red icons, wherever present, serve as cues to faculty-emphasised sections, intended to guide focused learning.

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Contents

Anaesthesia

PRE - ANAESTHESIA CHECKUP

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

PAC :

1. Detailed history.
2. Physical examination.
3. Complete systemic examination.
4. Airway examination.
5. Grade the patient.
6. Pre-operative orders and consent.

Co-Morbidities & their Anaesthetic Implications

00:02:00

Co-morbidities & drugs		Continued/Not
Hypertension	Antihypertensives	Continued
	ACEi, ARBs	Avoided in major surgeries (Severe hypotension)
Diabetes mellitus	• OHA • Insulin (Ultra short & short)	Stop on day of surgery (Hypoglycemia)
	SGLT-2 inhibitors	• Stop 72 hrs prior : Euglycemic Ketoacidosis • Stop 24 hrs prior (minor sx)
	Insulin (Intermediate & long acting)	Reduce to $1/3^{rd}$ (If stopped : DKA/Hyperglycemic hyperosmolar coma)
	Intra-op : • Check GRBS : Every 30 mins • Hyperglycemia → Short acting insulin	
Thyroid disorder	Hypothyroid Rx	Continue all Rx (Prevents delayed recovery)
	Hyperthyroid Rx	Continue (Prevents thyroid storm risk)
	Note : Intra-op thyroid storm : → Stop Sx → Control HR : Esmolol • Tachycardia • Hypertension • ↑Temperature • Narrow QRS complex ↓ Add Propranolol	
Epilepsy (D/t $\downarrow O_a$/ $\uparrow CO_a$/Acidosis)	AEDs	• Continue • Check LFT
Herbal medications		Check LFT $\xrightarrow{\text{Abnormal}}$ Repeat after 24 hrs
Anti-TB medications		Check LFT, continue all ATT
Psychiatric conditions	Psychiatric drugs	Continue

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

Co-morbidities & Drugs		Continued/Not
Psychiatric conditions	MAO inhibitors : Selegiline	• Interact with synthetic opioids : → Hypertensive crisis – Meperidine (Pethidine) – Ephedrine – Tramadol • Stop older MAO ⊖ : 3 weeks
	Lithium (Magnesium)	• Interact with muscle relaxants to ↑duration • Mivacurium/Atracurium → Yes → Continue Li ↓ No Stop Li 24 – 48 hrs before
OCP	Estrogen pills : DVT	• High risk : → Stop 4 weeks before – Old age – Long bone fracture – Bed ridden – Major Sx • Low risk or only on progesterone only pills → Continue
Steroid		Continue
Diuretics	Non-thiazides	Stop
	Thiazides	• Continue (Low potency) • Check serum electrolytes
• PAH • Erectile dysfunction	Sildenafil	• S/e : Vasodilation → Severe hypotension • Stop 24 – 48 hrs prior
Coronary artery disease	All cardiac Rx	Continued
	Aspirin	• Continue if low dose + alone • Stop 3 days prior for major Sx
	Clopidogrel/ Warfarin	• Stop 5 – 7 days prior • Topical anaesthesia : Continue

Bridging :

5 – 7 days

Stop Clopidogrel / Warfarin → MI prophylaxis by bridging with : → Regional anesthesia (Spinal, peribulbar, epidural)

- Prophylactic LMWH : Stop 12 hrs prior
- Regular heparin : Stop 6 hrs prior
- Therapeutic LMWH : Stop 24 hrs prior

Personal, Family and Allergy History

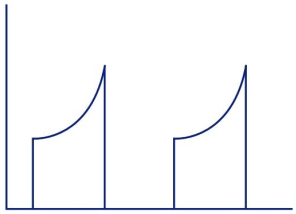
00:26:48 ----- Active space -----

Personal History :

Smoking :

- Stop 3 – 4 weeks prior.
- Complications :

	Intra-op bronchospasm	Intra-op laryngospasm
Presentation	Sudden unexplained : • Tachycardia • HTN • ↑Airway resistance, wheeze ⊕ • Sharkfin pattern on $EtCO_2$	End of surgery : • Stridor • Rapid desaturation • Paradoxical chest wall movements • No air entry • Tachycardia → Bradycardia
Rx	Bronchodilators	• 100% O_2 • AOC : Propofol • Severe : Succinylcholine


Sharkfin pattern on $EtCO_2$

Alcohol :

Stop 24 – 48 hrs prior.

Tobacco chewing :

Submucosal fibrosis → Restricted mouth opening → Difficult intubation.

Family history : Malignant Hyperthermia

Etiology :

Family h/o muscular dystrophy :
(mutation in ryanodine receptor)
+
inhalational agents/
succinylcholine

→

Pathophysiology :

↑Calcium
↓
↑Muscle contraction
↓
↑K^+

→

C/f :

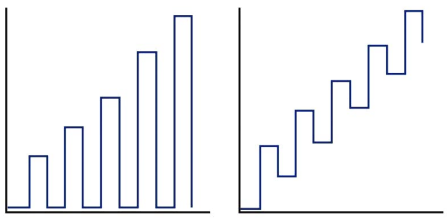
- Sudden unexplained tachycardia
- HTN
- ↑Temperature
- $EtCO_2$ (most sensitive) : Step ladder pattern↑
- ECG : Wide QRS complex
- VF → Sudden cardiac arrest

Mx :

- 100% O_2.
- DOC : Dantrolene sodium 2.5 mg/kg diluted in distilled water.

Mx of hyperkalemia :

- Give calcium gluconate.
- Add insulin + dextrose/ Salbutamol.


$EtCO_2$: Step ladder patterns

Complication :

Acute renal failure (myoglobin).

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Allergy History : Anaphylactic Shock

Causes :
1. Antibiotic (m/c)
2. Muscle relaxant
3. Chlorhexidine
4. Local anaesthetics

Pathophysiology :
Histamine
↓
- Vasodilation
- Bronchoconstriction

C/f :
- Sudden unexplained tachycardia
- Hypotension
- ↑Airway resistance, wheeze ⊕
- Redness, edema of face, airways

Mx :
- DOC : Adrenaline (1 mL = 1 mg = 1 : 1000).
  - IV : 1 mL of 1 : 10,000.
  - IM : 0.5 mL of 1 : 1000.

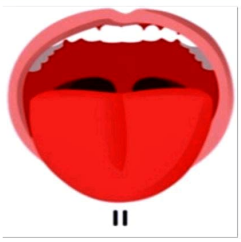
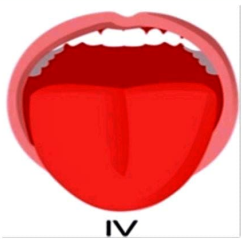
Airway Examination

00:42:34

Mouth Opening :

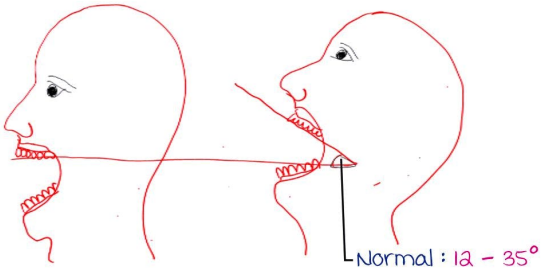
Finger breadth techniques :
- 3 fingers : Ⓝ
- < 2 fingers : Chances of difficult intubation.

Modified Mallampati classification :

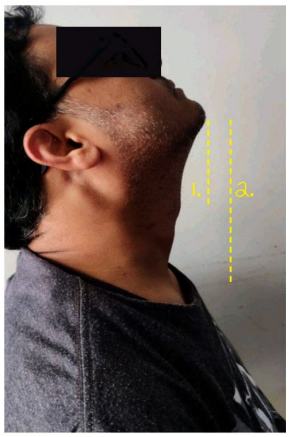
	Class I	Class II	Class III	Class IV
	 I	 II	 III	 IV
Hard palate	✓	✓	✓	✓
Soft palate	✓	✓	✓	×
Uvula	✓ Hanging freely	✓ Tip obscured	× Only base seen	×
Fauces	✓	×	×	×

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

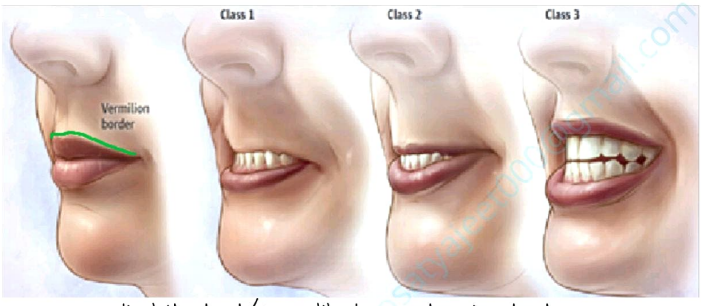
Neck mobility :



- Angle made by forehead from complete flexion-extension : > 80°.
- Neck circumference : < 43 cm.



1. Thyromental distance : 6.5 cm
2. Sternomental distance : 12.5 – 13 cm



Upper lip bite test/Mandibular protrusion test :

Cross vermilion border → Yes → (N)
→ No → Receding mandible

American Society of Anaesthesiologists (ASA) Grading 00:51:02

	Criteria	Conditions
Grade I	Normal healthy patient	• Normal BMI • Non-smoker • Occasional alcoholic
Grade II	Mild systemic disease (No functional limitation)	• Mild-moderately obese • Smoker • Regular alcoholic • Well controlled disease • Pregnancy
Grade III	Severe systemic disease (with functional limitation)	• Morbidly obese • Poorly controlled disease • Alcohol dependent • ESRD with regular dialysis • MI, CVA, stenting : > 3 months • On pacemaker

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

	Criteria	Conditions
Grade IV	Severe systemic disease : Life threatening	• Recent MI, CVA, stent : < 3 months • Unstable angina • Severe valvular disease • ESRD with no regular dialysis • ARDS • DIC
Grade V	Moribund patient : Not expected to survive > 24 hrs	• Ruptured aneurysm • Massive trauma • Ischemic bowel • MODS
Grade VI	Brain dead patient	-

Investigations

00:55:22

CBC :

Test	Procedure	Minimum acceptable counts
Hb	Elective surgery	8 g/dL
	Elective with co-morbidity	10 g/dL
	Critically ill	12 g/dL
Platelet	Invasive procedure	50 K
	Central neuraxial block	1 lakh
	Peripheral neuraxial block	80 K

Other tests : RBS, serology viral markers, creatinine etc.

ECG and ECHO :

	ECHO	ECG
Not done	As routine investigation	• Asymptomatic patients • Low risk surgeries
May be considered	H/o LV dysfunction : Not evaluated for 1 year	• Asymptomatic pts w/o known CAD • Posted for intermediate-major procedures
Reasonable to perform	• SOB of unknown origin • Heart failure patients with worsening dyspnea	• K/c/o IHD • Significant arrhythmia, PAD, CVD • Significant structural heart disease

CXR :

- Only if LRTI + green/purulent sputum.
- Suspecting bullae.