



# NEET-PG

PART-C

VOLUME IV

Anesthesia, Dermatology  
and ENT





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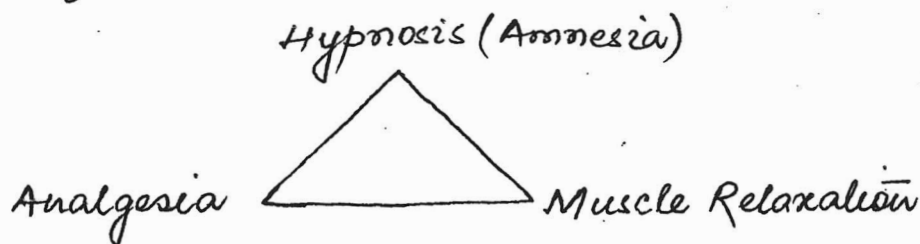
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## ANESTHESIA

Triad of Anesthesia:



H/O Anesthesia:

Oliver Wendell Holmes - Coined the term "Anesthesia".

John Snow - Father of Anesthesia.

W.T.G. Morton - Father of Modern Anesthesia.

$O_2$  &  $N_2O$  - Synthesised by "Priestly".

↳ provide analgesia

↳ Properly was 1st demonstrated by "Hor<sup>a</sup>ce Wells".

↳ used for Dental anesthesia.

-  $N_2O$  1st used on 1844.

- Ether: K/A Sweet oil of Vitrol.

↳ First demonstrated by W.T.G. Morton on 16th Oct. 1846.

∴ 16 October = World Anesthesia Day.

- First local anesthesia used = cocaine.

↓  
cause vasoconstriction.

- First spinal anesthesia given by - August Bier.

- Harold G<sup>ffi</sup>rieth - 1st person to use curare product for muscle relaxation.

- First Endotracheal intubation by - William M<sup>a</sup>cCewen  
↳ Made popular by - Evan Magill.

ASA (American Society of Anesthesiology) Grading:

↳ Determine the physical status of pt.

- Divides into 6 grades:

GRADE 1: Normal pt.  $\bar{c}$  no systemic disease.

eg: Non-HTN, Non-DM, Non-Smoker,  
Mild or Non-alcoholic.

GRADE 2: Pt.  $\bar{c}$  mild systemic ds.  $\bar{c}$  is well controlled  
 $\bar{c}$  no functional limitation.

eg: Well controlled DM & HTN, pregnancy,  
Current Smoker, Social drinker,  
Pt.  $\bar{c}$  mild lung disease.

GRADE 3: Pt.  $\bar{c}$  severe systemic ds.  $\bar{c}$  functional  
limitation.

eg: Uncontrolled DM & HTN, Stable Angina,  
Moderate reduction of Ejection fraction (40%)  
End stage Renal ds on regular dialysis,  
Alcohol dependence & >3 months H/O  
MI/CVA/TIA/Stroke.

GRADE 4: Pt.  $\bar{c}$  severe systemic ds  $\bar{c}$  is a constant  
threat to life of the pt.

eg: Unstable angina, DKA, ESRD on  
irregular dialysis, severe reduction  
of Ejection fraction (20-25%), <3 months  
H/O MI/CVA/TIA/Stroke.



GRADE 5: Moribound pt. who is likely to survive  
out sx.

eg: Intra cranial bleed & midline shift,  
Massive trauma, Rupture thoracic/  
abdominal aneurysm.

GRADE 6: Brain dead pt. for organ transplantation.

Drawbacks of ASA grading:

- It doesn't include the surgical risk factor.

eg: Blood loss during sx.

Various test to access ease of intubation:

① MPG = Mallampatti Grading:

↳ use to access the size of tongue for laryngoscopy.

GRADE 1: Faucial pillars, Uvula & tip & Soft palate.

GRADE 2: Uvula & tip & Soft palate.

GRADE 3: Only soft palate

GRADE 4: Only Hard palate

} Difficult intubation.

② Thyromental distance:  $> 6.5 \text{ cm}$

③ Sternomental distance:  $> 12.5 \text{ cm}$

④ Adequate mouth opening:

↳ Gap b/w the upper & lower incisors.

⑤  $\text{N}$  -  $> 2 \text{ cm}$  or 3 fingers breadth.

⑤ Movement of cervical spine.

Mx of pre-existing drug therapy:

① MAO inhibitor:

- Older MAO inhibitor should be stopped before 3 weeks of Sx.
- Newer drug like Selegiline can be continued uptill one day before Sx.

② Anticonvulsants:

- These are continued & morning dose to be given.

③ Levodopa:

- Continued & morning dose to be given.

④ Oral hypoglycemic (O.H.) / Insulin:

- Morning dose of O.H. / Insulin is omitted. becoz pt. is fasting before Sx.

- Ideal fasting period (Adults)

→ 6 hrs of solids / light meal.

→ 2 hrs of clear fluid



water, Black tea, juices without pulp.

→ 8 hrs for fatty meal & heavy meals.

- In infants → 2 hrs for clear liquid.  
4 hrs for breast feed.

- If infant is on formula feed /  
Non-human milk — then 6 hrs.

For Major Sx: Pt. is shifted from O.H.  $\xrightarrow{to}$  Insulin.  
48 hrs before Sx.

- ⑤ Oral anticoagulant / warfarin:
- Stopped 4-5 days before Sx.
  - INR is kept b/w 2 to 3.
  - In Emergency FFP is given to reverse the effect of warfarin.
  - For LMWH  $\rightarrow$  Last dose is given 12-14 hrs before Sx.
  - For unfractionated Heparin
    - last dose is given upto 6 hrs before Sx.
- ⑥ Combined OCP:
- Stopped 4 wks before Sx.
  - Only progesteron pills can be continued.
- ⑦ Anti Hypertensive:
- All Anti HTN should be continued  $\bar{c}$  possible exception of ACEi & ARBs  $\underline{c}$  can cause Refractory Hypotension during anesthesia.
  - $\beta$ -blockers are the preferred drug on the morning of Sx.
- ⑧ Nitrates:
- Should be continued & morning dose is given.

- ⑨ Thyroid drugs:
  - Should be continued & morning dose is given.
- ⑩ Lithium:
  - Should be stopped 2 days before Sx.
  - It prolongs non-depolarizing muscle relaxation.
- ⑪ Steroids:
  - Should be continued & morning dose to be given.
- ⑫ Smoking:
  - Should ideally stopped 6-8 wks before Sx.
  - Even a smoking stopped 12-24 hrs will shift  $O_2$ -dissociation curve to right side.
  - Smoking also decreases the surfactant level & aminosteroid potency level.
- ⑬ NSAIDs:
  - Discontinued 48hrs before Sx.
- ⑭ Sildenafil:
  - Discontinued 24hrs before Sx.
- ⑮ Diuretics:
  - Except Thiazide, other diuretics are discontinued on the day of Sx.

①⑥ Topical Medication:

- Discontinued on the day of Sx.

①⑦ Antiplatelet agent:

a) Low dose Aspirin:

- Continued except for closed space Sx.

↓  
eg: Sx of brain, spinal cord, eye.

High dose Aspirin: Stopped 3-5 days before Sx.

b) Clopidogrel:

- Stopped 7 days before Sx.

c) Ticlopidine:

- Stopped 14 days before Sx.

d) Abciximab:

- Stopped 2 days before Sx.

①⑧ Herbal medication:

- Stopped 6-8 wks before Sx.

①⑨ ATT:

- Should be continued
- LFT should be done.

PREMEDICATION:

AIM: ① Relieve Anxiety

- Do proper counselling followed by Lorazepam.

② Induce Sedation  
③ Amnesia } BZD

# For Day care Sx → Use Midazolam.

④ Promote hemodynamically stability  
↳ Cardioselective  $\beta$ -blocker.

⑤ ↓ Chances of Aspiration:  
↳ PPI / H<sub>2</sub> blocker.

Aspiration in pregnancy

A/K/A Mendelson Syndrome

or, Acid aspiration Syndrome



Criteria: pH < 2.5

Volume > 25ml.

⑥ Provide analgesia

↳ Morphine / Pethidine.

- Pethidine should not be used in Renal failure pt. as its metabolite Nor-pethidine accumulates & causes convulsion.

⑦ Prevent post op. Nausea & Vomiting:

↳ Ondansetron

↳ M/C S/E → Headache.

⑧ Control infection:

↳ Broad spectrum antibiotics.

- 1st dose of Antibiotic is given 1 hour before the Sx skin incision.

- If Sx prolongs for  $>4$  hrs, the antibiotic should be repeated.

⑨ Control of Secretions:

↳ Atropine / Glycopyrrolate

- Glycopyrrolate has potent antisialagogue action & not cross BBB.

- Atropine can cross BBB, cause Anticholinergic action causes tachycardia.

## ANESTHESIA MACHINE

- Used 1st time in 1917 by Edmund Gaskin Boyle.
- Continuous flow type of Anesthetic machine.
  - ↳ Fresh gases flow both during inspiration as well as expiration.

- The machine has 3 parts:

① High pressure system:

Consists of:

- ① Cylinders
- ② Yoke assembly.
- ③ Pressure Gauge.
- ④ Pressure Reducing Valve.

① Cylinders:

- Made of special alloy → Molybdenum Steel.
- Cylinder in MRI room → Made of Aluminium.
- Comes in Sizes of A to H.
  - ↓                      ↓
  - Smallest          Largest.
- M/c used in Anesthesia Machine
  - ↳ Type E → Contains 660L of O<sub>2</sub>.
- Type D contains 470L of O<sub>2</sub>.



- Cylinders are colour coded:

For  $O_2$  - Black body & white shoulder.

For  $N_2O$  - Blue

For  $CO_2$  - Grey

For Cyclopropane - Orange

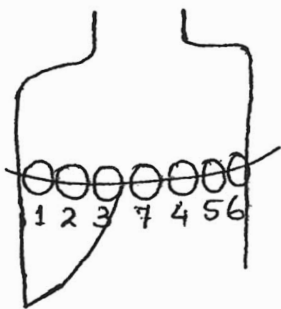
For Helium - Brown

ENTONOX - Blue body & blue-white shoulder.

↳ 50%  $O_2$  + 50%  $N_2O$ .

Pin index Safety System:

- used to prevent wrong fitting of anaesthesia cylinder.



Pins +nt in - Anaesthesia Machine

Holes +nt in - Cylinder.

$O_2$  = 2, 5 ← Holes are +nt in this place

$N_2O$  = 3, 5

$CO_2$  = 2, 6

Cyclopropane = 3, 6

Entonox = 7

Heliox = 2, 4

Air = 1, 5

- Pin index no. can fail if:
  - (i) Wrong gas is filled inside cylinder.
  - (ii) Pins of pin index system are broken.
- $N_2O$ ,  $CO_2$ , cyclopropane are filled inside cylinder in liquid form.
- $O_2$  can also be converted into liquid form.  
The critical temp<sup>r</sup> of  $O_2 = 119^\circ C$ 
  - ↳ is a temp<sup>r</sup> en  $\leq$  a gas is converted into liquid form.
- Critical temp<sup>r</sup> of  $N_2O = 36.5^\circ C$ .
- Each 1ml of liquid  $O_2$  give 840ml of gas.

TARE WEIGHT = wt. of empty cylinder.

FILLING RATIO : prevents overfilling of cylinders.

$$\text{↳ } = \frac{\% \text{ of wt. of gas}}{\text{wt. of the water } \leq \text{ the cylinder can hold at } 60^\circ F}$$

Wood's Metal :

- It is an alloy of low melting point present b/w the cylinder body & valve.
- In case of fire this alloy melts & allows controlled leak of  $O_2$ .

② Yolk assembly:

- To hold cylinder into the anesthesia machine.
- Pins of pin index system are part of yolk assembly.

③ Pressure Gauge:

- Measures the pressure inside the cylinder
- M/c used in Bourdon pressure gauge.

④ Pressure Reducing Valve:

- Press<sup>r</sup> inside O<sub>2</sub> cylinder = 2000 psig.
- " N<sub>2</sub>O " = 750 psig.
- " cyclopropane = 60 psig.
- Pressure reducing valve reduces this press<sup>r</sup> to 35-45 psig.  
 $\swarrow$  pound square inch gauge.  
 $1 \text{ atm} = 14.6 \text{ psig}$ .

# Cyclopropane doesn't require pressure reducing valve.

Q. Type E O<sub>2</sub> cylinder showing pressure 500 psig.

How much O<sub>2</sub> is left?

- Full O<sub>2</sub> cylinder press<sup>r</sup> = 2000 psig.
- So,  $\frac{1}{4}$  is left.

$$\therefore \text{O}_2 \text{ left} = \frac{660\text{L}}{4} = 165\text{L}.$$

① Intermediate pressure System:

Consists of -

- ① Flow control valves
- ②  $O_2 - N_2O$  proportionating devices.
- ③  $O_2$  flush
- ④ Central supply lines.

① Flow control valves:

- Controls flow rate of gases.

For  $O_2$  - It is white in colour; bigger  
̄ broader serration.

For  $N_2O$  - Blue in colour;  
Smaller ̄ finer serrations.

②  $O_2 - N_2O$  proportionating devices:

- Problem ̄ older machine, either give  
100%  $O_2$  or, give 100%  $N_2O$ .

- Provide a fixed percentage of total flow  
as  $O_2$ .

- Min<sup>m</sup>  $O_2$  supplied by them = 25%

- Min<sup>m</sup>  $O_2$  requirement during GA = 30%

③  $O_2$  flush:

- Delivers emergency  $O_2$  @ 35-75 L/min.