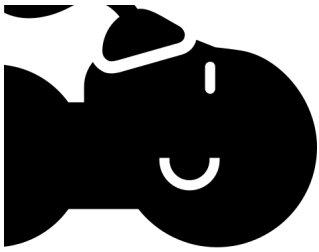


ANESTHESIA MANUAL FOR HOSPITAL

DONE BY: HUSSAH ALMANDEEL

- DOSES
- ECG
- PRESSURES
- LAB VALUES
- RESPIRATORY VALUES

2020

DOSES

SEDATIVES

MIDAZOLAM: 0.01 to 0.05 mg/kg

INDUCTION

PROPOFOL: 2-3 mg\kg
KETAMINE: 1-2mg\kg
ETOMEDATE: 0.2-0.6 mg/kg

MUSCLE RELAXANT (INTUBATION)	ONSET
CISATRACURUIM: 0.15–0.2 mg/kg	2-3 min
ATRACURUM: 0.5 mg\kg	2-3 min
ROCURONIUM: 0.6 mg\kg	1-2 min
SUXAMETHONUM: 1-1.5 mg\kg	30-60 sec

REVERSAL OF MUSCLE RELAXANTS

NEOSTIGMINE: 2.5 mg
GLYCOPYRROLATE: 400 mcg
SUGAMMADEX: 16 mg\kg

OPIOIDS

FENTANYL: 1-3 mcg\kg
MORPHINE: 0.1 mg\kg
REMIFENTNYL: 0.5-1 mcg\kg
PETHIDINE: 1 mg\kg

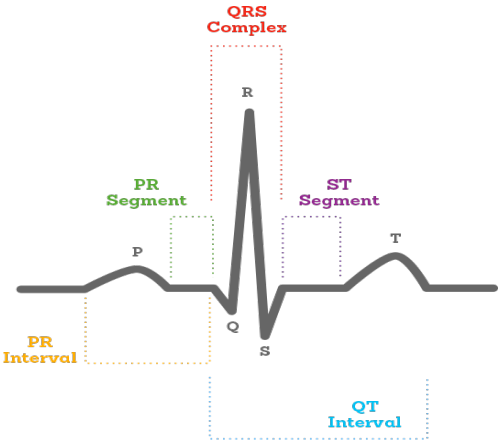
OTHERS

EPHEDRINE: 5-10 mg IV bolus
PHENYLEPHRINE: 2-10 mcg\kg
ATROPINE: 0.5-1 mg or 0.04 mg/kg
LEBETALOL: 0.25 mg\kg
DEXAMETHASONE: 4-5 mg
ONDANSETRON: 0.05 mg\kg or 4 mg
KYTRIL: 1 mg

RANITIDINE: 50 mg
PARACETAMOL: 15 mg\kg
SYNTOCIN: 40 unit
METHERGIN: 0.2 mg IM
HEPARIN: 300-400 unit/kg
PROTAMINE: 1-1.3 mg protamine for each 100 units (1 mg) of heparin.
HYDROCORTISONE: 100 mg

ECG

- P wave = atrial depolarization.
- PR Interval = impulse from atria to ventricles to ventricles. 3-5 small squares
- QRS complex = ventricular depolarization. 1-3 small squares
- ST segment = isoelectric - part of repolarization.
- T wave = usually same direction as QRS - ventricular repolarization.
- QT Interval = This interval spans the onset of depolarization to the completion of repolarization of the ventricles of the ventricles.
  *each small square is 1mm = 0.04 sec



PRESSURES

Arterial Blood Pressure: 120\80 mmHg
Mean Arterial Pressure: 70-100 mmHg
Pulmonary Artery Pressure (PAP): Systolic (PASP)15 – 25 mmHg
Diastolic (PADP): 8 – 15 mmHg
Pulmonary Artery Wedge Pressure (PAWP): 6-12 mmHg
Central Venous Pressure (CVP): 3-10 mmHg

Blood Pressure Categories

American Heart Association | American Stroke Association

BLOOD PRESSURE CATEGORY	SYSTOLIC mm Hg (upper number)		DIASTOLIC mm Hg (lower number)
NORMAL	LESS THAN 120	and	LESS THAN 80
ELEVATED	120 – 129	and	LESS THAN 80
HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 1	130 – 139	or	80 – 89
HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 2	140 OR HIGHER	or	90 OR HIGHER
HYPERTENSIVE CRISIS (consult your doctor immediately)	HIGHER THAN 180	and/or	HIGHER THAN 120

heart.org/bplevels

LAB VALUES

UREA AND ELECTROLYTES

Na: 133–146 mmol/L
K: 3.5–5.3 mmol/L
Ca: 2.2-2.6 mmol/L
Mg2: 0.7–1.0 mmol/L
Urea: 2.5 – 7.8 mmol/L
Creatinine: ♂ 59–104 µmol/L ♀ 45–84 µmol/ L
Urine Out-put: 1ml\kg\hr

BLOOD GLUCOSE

Fasting blood glucose – 4.0 to 6.0 mmol/L
Postprandial (2 hours after eating) – up to 7.8 mmol/L
HbA1c – < 42 mmol/mol (6.0%)

LIVER FUNCTION TESTS (LFTS)

Alkaline phosphatase (ALP): 30–130 U/L
Alanine aminotransferase (ALT): ♂ <41 U/L ♀<33 U/L
Bilirubin: <21 µmol/L
Albumin: 35–50 g/L

Lipids

Cholesterol < 5 mmol/L
Triglyceride 0.55–1.90 mmol/L
LDL < 3mmol/L
HDL > 1 mmol/L

ARTERIAL BLOOD GAS (ABG)

PH: 7.35-7.45
Po2: 80-100 mmHg
Pco2: 35-45 mmHg
HCO3: 22-28 mEq\L

HEMATOLOGY

Hemoglobin: ♂ 13.5 to 17.5 g\dl ♀12.0 to 15.5 g\dl
Hematocrit: ♂38.3% - 48.6% ♀35.5% - 44.9%
White Blood Cells: 4000 - 11000 microliter of blood.
platelet count: 150,000 - 450,000 platelets per microliter of blood.

RESPIRATORY SYSTEM VALUES

- Oxygen saturation detected by pulse oximeter **(SpO2)**:94% - 99%
- Oxygen saturation detected by blood analysis **(SaO2)**:95%-100%
- Partial Pressure of oxygen **(Po2):** 80-100 mmHg
- Partial Pressure of carbon dioxide **(Pco2):** 35-45 mmHg
- Respiratory Rate **(RR):** 12-20 breath\minute
- Tidal Volume **(Vt)** is volume of air moved into or out of the lungs during quiet breathing: 6-8 ml\kg *normally around 500 ml
- Minute ventilation **(MV)** is the amount of air the patient moves in one minute: RR x Vt
- Fraction of inspired oxygen **(Fio2)**: 1.0 in case of high oxygen needs, inside OR it should be around 0.4
- End tidal CO2 **(ETCO2)** is partial pressure or maximal concentration of carbon dioxide at the end of an exhaled breath: 35-45 mmHg
- **I:E** ratio normally is 1:2
- Positive End Expiratory Pressure **(PEEP):** start with 5 cm h2o
- Mixed Venous Saturation **(SvO2)**: 60 – 80%

- Peak Inspiratory Pressure **(PIP)** is the highest level of pressure applied to the lungs during inhalation: 15cmH_2O above PEEP and less than 35 cmH_2O

- Platue Pressure which reflects the lung and chest wall compliance: 15-25cmH_2O, the aim is always to maintain it bellow 30cmH_2O

- Vital capacity **(VC)** is the maximum amount of air a person can expel from the lungs after a maximum inhalation: Inspiratory reserve volume + Tidal volume + Expiratory reserve volume.
- The inspiratory reserve volume **(IRV)** is the additional amount of air that can be inhaled after a normal inspiration (tidal volume): ♂ 3000 mL ♀2100 mL

CANNULAS COLOR CODING

Cannula Size	
14 G	ORANGE
16 G	GRAY
18 G	GREEN
20 G	PINK
22 G	BLUE
24 G	YELLOW
26 G	PURPLE

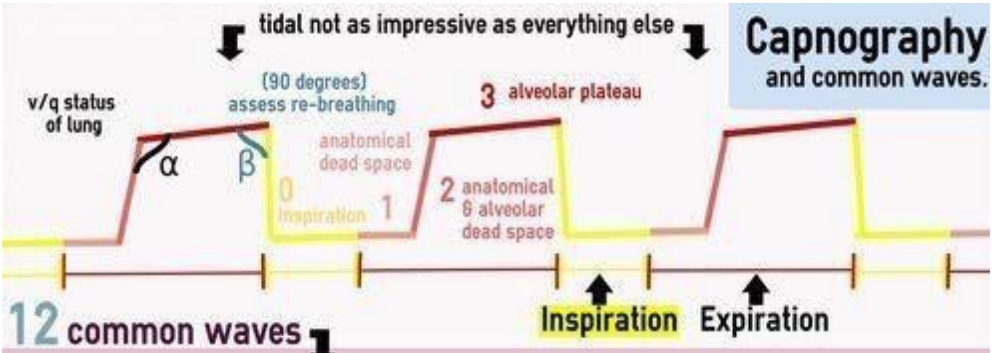
SUCTION CATHETER COLOR CODING

A COLLECTION OF CHARTS YOU WILL NEED

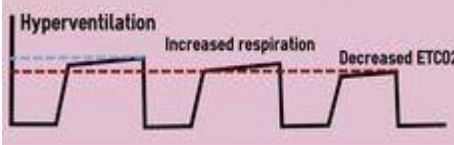
DONE BY: JUMANAH ALZAHRANI

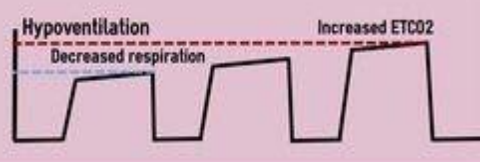
- CAPNOGRAPHY
- ECG RHYTHMS
- IV SOLUTION CHEAT SHEET
- MEDICATION CLASSES

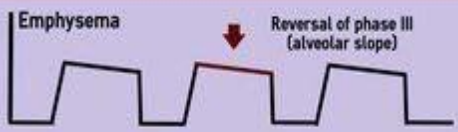
Capnography and common waves.

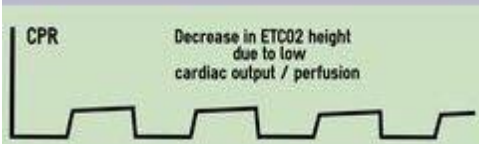


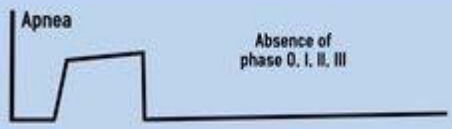
12 common waves

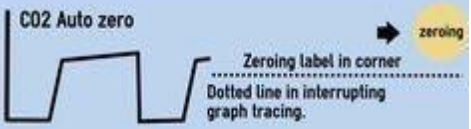


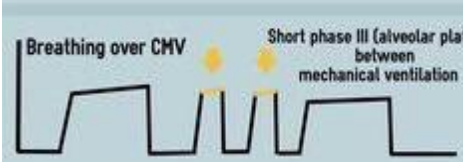


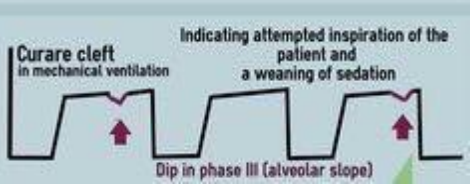






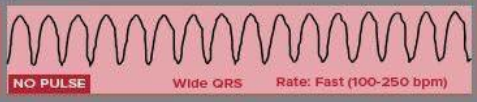
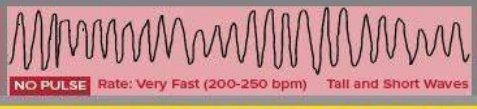
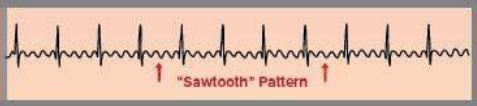
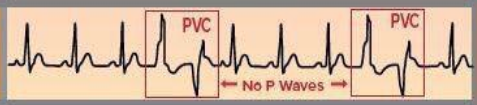
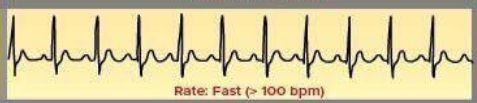
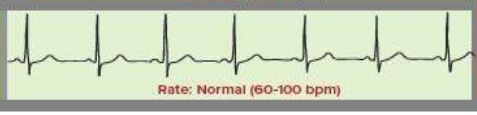






11 Rhythms Nurses Need to Know

Basic EKG/ECG Rhythms

	Common & Formal Rhythm Names	6 Second Rhythm Strip	Identifiers
SHOCKABLE	**V-Fib** Ventricular Fibrillation		Irregular, No P Wave, No QRS
SHOCKABLE	**V-Tach** Ventricular Tachycardia		Regular, No P Wave, Wide QRS
SHOCKABLE	**Torsade de Pointes** Type Of Ventricular Tachycardia		Irregular, No P Wave, Wide QRS
	*Synchronized Cardioversion possible for SVT if medication ineffective.		
	SVT* Supraventricular Tachycardia		Regular, P Wave Hidden, Normal QRS
	STEMI ST Elevation Myocardial Infarction		Reg or Irreg, P Wave, ST Elevated
	A-Fib Atrial Fibrillation		Irregular, No P Wave, Normal QRS*
	A-Flutter Atrial Flutter		Reg or Irreg, No P Wave, Normal QRS
	PVC Premature Ventricular Contraction		Irregular, No P Wave, Wide QRS
	Sinus Brady Sinus Bradycardia		Regular, P Wave, Normal QRS
	Sinus Tach Sinus Tachycardia		Regular, P Wave, Normal QRS
	NSR Normal Sinus Rhythm		Regular, P Wave, Normal QRS

IV Solution Cheat Sheet

A quick reference guide on the different intravenous solutions.

IVF	Content	Tonicity	Osmolality (mOsm/L)	Uses
D5W	-50 g/L glucose -170 kcals/L -no electrolytes	Isotonic	252	-treat hypernatremia, replace water loss -free water (helps renal excretion of solutes) -used to administer medications
D10W	-100 g/L glucose -340 kcals/L -no electrolytes	hypertonic	505	-free water only
½NS	-0.45% saline -77 mMol/L of Na+ and Cl⊠ -no calories	hypotonic	154	-maintenance solution, but doesn't replace other daily electrolytes -free water and NaCl -replace hypotonic fluid loss -can cause IVF overload if infused too rapidly
NS	-0.9% saline -154 mMol/L of Na+ and Cl⊠ -no calories	Isotonic	308	-used for postoperative fluids -increase IVF and replace ECF fluid losses -NaCl in higher concentration then blood levels -no free water -can cause IVF overload -only solution that can be administered with blood products
3%NS	-3.0% saline -513 mMol/L of Na+ and Cl⊠	hypertonic	1026	- administer cautiously, slowly - treatment for symptomatic hyponatremia -cerebral edema
D5- ¼ NS	-0.225% saline -50 g/L glucose -170 kcals/L -38.5 mMol/L of Na+ and Cl⊠	Isotonic	330	-Provides NaCl and free water -treatment for hypernatremia -replace hypotonic fluid loss
D5-½NS	-0.45% saline -50 g/L glucose -170 kcals/L	Hypertonic	406	-maintenance solution, but doesn't replace other daily electrolytes -free water and NaCl

Parasympathomimetics

Direct Acting

1- Acetylcholine (M & N)
2- Carbachol (M & N)
3- **Metha**choline (M)
4- **Betha**necol (M)
5- Pilocarpine (M)

Indirect Acting (Anti-cholinesterases)

Reversible

1- Physo**stigmine** (eserine)
2- Neo**stigmine**
3- Edrophonium

Irreversible

1- Echothiopate
2- Isoflurophate
3- Parathione

Parasympatholytics

1- Atropine
2- Eucatropine
3- **H**omatropine
4- **H**yoscine
5- Scoplamine
6- Tropicamide
7- Ipratropium (bronchial asthma)
8- Cyclopentolate

Ganglion blockers

Nicotinic anatgoinsts on both Symp. & Parasymp.

9- Nicotine & Lobeline (large dose)
10- **Mecamylamine**
11- **Chlorisondamine**
12- Hexamethonium
13- Trimthaphan
14- TetraAthylAmmonium chloride

Sympathomimetics

Catecholamine

α & β Agonists	β1,β2 non-selective Agonists
1- Epinephrine	1- **Iso**prenaline
α & β1 only Agonists	2- **Iso**proterenol
2-Nore-epinephrine	
Others	β2 Agonists
3-Dopamine (α1 - β1 - D1)	Short acting:
4-Dobutamine (α1 - β1)	1- Sal**but**amol
5- Methoxamine (α1)	2- Al**but**erol
	3- Ter**but**aline
	4- Hexoprenaline
	5- Feno**terol**
	6- Rimi**terol**
	7- pirbuterol.
	Long acting:
	1- Salme**terol**
	2- Formo**terol**

Non-Catecholamine

1- **Phenylephrine** (α1)
2- **Metaproterenol** (β1)
3- Ephedrine (α1 β1 (Stimulates) - CNS stimulant)
4- Orciprenaline (β)
5- Amphetamine (α, β - CNS stimulant)

Sympatholytics

α - Blockers

Non-selective blockers	selective competitive blockers	
	α1- blockers	α2 - blockers
Phen**oxy**benz**amine**	Praz**osin**	Yohimbine
Phen**tol**a**mine**	Tera**zosin**	
	Tamsulo**sin**	
	..... any drug **zosin**	

β - Blockers

Non-selective blockers	selective competitive blockers		
	β1 - blockers	β2 - blockers	Antagonist with partial agonist
Propran**olol**	Acebut**olol**	Butoxamine	Pindo**lol**
Timo**lol**	Aten**olol**		Acebut**olol**
nado**lo**	Metopr**olol**		
	Esm**olol**		

Antagonist of both α & β

Labeta**lol** - Carvedi**lol**

Histamine

Agonist

Histamine

Antagonists

H 1	H 2
Chlorpheniramine	Cime**tidine**
Diphenhydramine	Rani**tidine**
Loratidine	Famo**tidine**
Mepyramine	Niza**tidine**
Pheneramine maleate	
Antazoline	

Serotonin 5-HT2

Agonist	Agonist 5-HT
Serotonin	**Buspirone** → anxiolytic **Sumatriptan** → in migrane
5-HT2 Antagonist	**5-HT3 Antagonist**
Cyproheptadine Methysergide Ketanserin	**Ondan**setrone "anti-emetic action"

Angiotensin II

Agonist	Antagonist
Angiotensin	**Saralasin**

Vasopressin

Agonist	Antagonist
Vasopressin	----------

Anti-Arrhythmics

Quinidine - Verapamil - Disopyramide

Slow Ca++ channels blockers

Verapamil - Diltiazem - **Nifedipine** - Nitren**dipine**

General anesthetics

Halothane - Chloroform

Surface anesthetics

Cocaine

Heart

Direct myocardial depressants	Direct Myocardial Stimulants
1- Anti-Arrhythmic drugs	1- Cardiac Glycosides .
2- Anti-Histaminics(H1)	2- Phosphodiitrase inhibitors (Amrinone)
3- General anesthetics	3- Xanthine (Aminophylline).
4- Emetine Hydrochoride	4- Caffeine.

Blood Vessels

Direct Hypotensive effect on vascular smooth muscles (Direct vasodilators)

1- Direct Veno-dilators → Nitrites - Nitrates
2- Direct arterio-dilators → Hydralazine - Minoxidil
3- Mixed-dilators → Sodium Nitroprusside
4- Slow Ca++ channels blockers

Intestine

Direct Spasmolytic

1- Papaverine
2- Volatile oils e.g. Peppermint
3- Nitrites & nitrates
4- Aminophylline

Action of drugs on Isolated Toad's Heart

Inhibitory drugs on the heart

1- M2
2- Ganglion stimulant (Nn).
3- Direct myocardial depressants

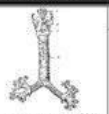
Stimulatory drugs on the heart

1- β1
2- H2
3- Direct myocardial stimulants

Action of drugs on Isolated guinea pig trachea

Bronchoconstrictors

1- M3
2- H1



Dose response curve of Ach on trachea.

Bronchodilators

β2

Effect of drugs on arterial blood pressure of anaesthetized cat

Hypertensive drugs

1- Ganglion stimulant (Nn) as NSD & NLD
2- Both α & β agonists
3- α1 agonist (without effect on β2) as: Noradrenaline , phenylphrine, methoxamine, amphetamine, ephedrine.
4- Angiotensin II
5- Vasopressin

Hypotensive drugs

7- Parasympathomimetic with M3 action only.
8- Parasympathomimetic with both M3 & N actions.
9- β2 agonist.
10- Histamine H1 mainly , H2
11- Direct vasodilators

Action of drugs on Isolated rabbit's intestine

Stimulant

1- Ganglion stimulant (Nn) as NSD & LSD
2- M3
3- H1
4- 5-HT.
5- Angiotensin II
6- Vasopressin

Inhibitory

1- Sympathomimetic

1- α only
2- β only
3- Both α & β agonists

2- Direct spasmolytics

See above

N.B.

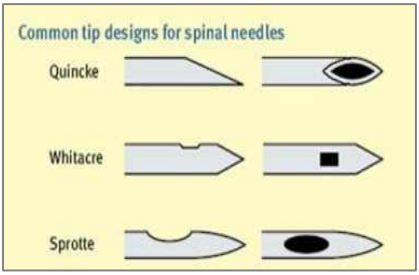
NSD → stimulation of nicotinic receptors in parasympathetic ganglia → inhibition of the heart
NLD → initial stimulation followed by blocking of the parasympathetic ganglia (depolarizing blocker) → initial inhibition of the heart then cardiac contraction become normal.

- NSD is added to test the block of the **nicotinic** receptors in the ganglia .. if the block is complete, NSD → has no effect.
- Ach is added to test the block of the **M** receptors produced by atropine .. If the block is complete, Ach → has not effect.
- Adrenaline is added to test the block of **β** receptors produced by blockers .. if block is complete, adrenaline → has no effect.

TOOLS&EQUEPMENTS

DONE BY: MUNEERAH ALMULHIM

SPINAL NEEDLE

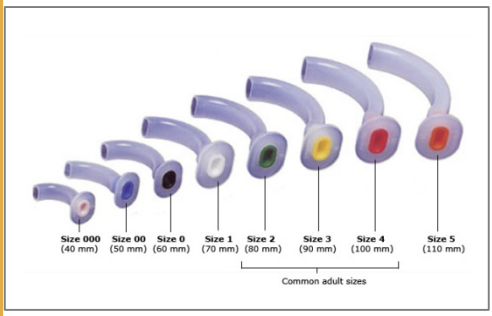


length	**10-15** cm(5 cm for pediatric)
hub	detection of CSF
sizes	**18 G to 29 G**
bevel tips	Quincke, Yale, sprotte, whitacre
stylet	to avoid tissue occluding

EPIDURAL KIT

length	**10cm** /1cm marking (**15cm** obese) (pediatric 19G / 0.5cm marking)
sizes	**16G-18G**
catheter	**90cm**
Filter	0.22mic
Low resistance syringe	To identify epidural space
stylet	to avoid tissue occluding

OPA



ETT

size :

(♂7-9.5) (♀6.5-8.5)

Pediatric(age/4+4)