

ANESTHESIA

(1) Preoperative Anaesthetic Assessment and Premedication

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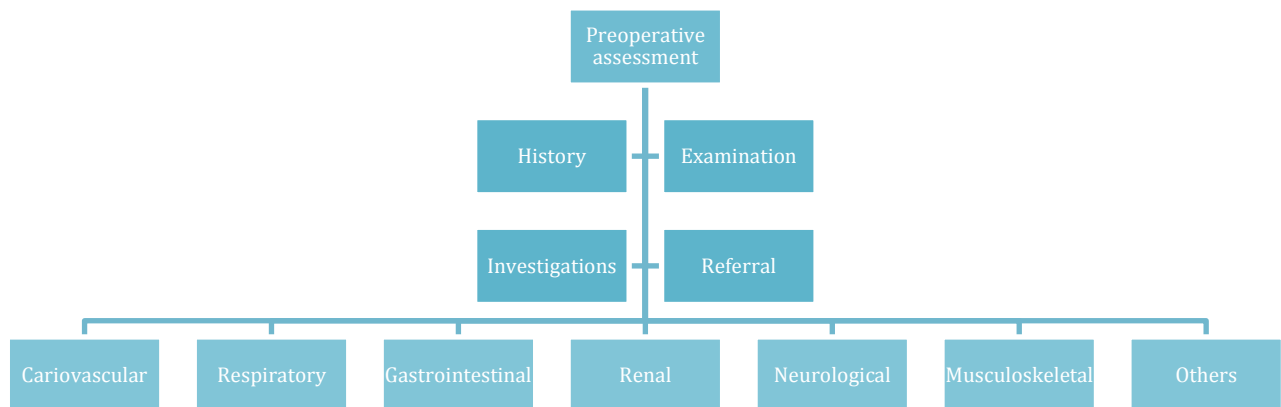
Revised by: Mody A. Almarshad

Doctor's note Team's note Not important Important **431 teamwork**

(431 teamwork do not highlight it in yellow, but put it in a yellow "box")

Objectives:

- The preoperative visit
- Anaesthetic history
- Examination
- Special investigations
- Medical referral
- Risk assessment
- Informing the patient
- Premedication



The preoperative visit

The preoperative visit of all patients by an anesthetist is an essential requirement for the safe and successful conduct of anaesthesia

The preoperative visit

- Main aim is to assess the patient's fitness for anaesthesia.
- Best to be performed by the same anaesthetist who is going to administer the anaesthetic.
- *Visit allows:*
 - Best anaesthetic technique
 - Any potential interactions between concurrent diseases
 - Anaesthesia anticipated **and its possible complications**
 - Provides an explanation
 - Reassurance for the patient
- *Coexisting Illness*
 - Improve the patient's condition prior to surgery
 - Seeking advice from other specialists
 - Optimise treatment
 - Final decision
 - **For example a sickle cells disease patient needs a hip replacement; the orthopaedic surgery department will refer the patient to the anaesthesia department to assess the patient then the anaesthesia department will consult the haematology department to check the Hb S (electrophoresis) and they will all work together to optimize the patient's condition before taking him to surgery**

Three situations where special arrangements are usually made:

- 1) Patients with complex medical or surgical problems
 - Patient is often admitted several days before surgery **and we have time to do all the investigations we need**
 - Anaesthetist is actively involved in optimising their condition prior to anaesthesia and surgery
 - **Such as a patient with a uterine fibroids who is going to undergo a hysterectomy and also has a cardiac condition, bleeding, DVT and PE. Anesthetists will help to optimize**

her condition and create a plan for pre- and post-operative management.

2) Surgical emergencies

- Only a few hours separates admission and operation in these patients urgent investigations or treatment

3) Day-case patients

- These are patients who are planned (come in the morning, do surgery, and leave at night)
- Generally 'fitter' ASA1 or ASA 2
- Assessment in anesthesia clinic before the day of the surgery
- Such as a 21 y/o patient with left inguinal hernia

Anesthetic History and Examination

Clinical Evaluation (Screening Questionnaire)

- **Cardiac:**
 - 1) Do you usually get chest pain or breathlessness when you climb up two flights of stairs at normal speed?
 - 2) Do you suffer from angina?
 - 3) Have you ever had a heart attack?
 - 4) Have you ever been diagnosed with an irregular heartbeat?
 - 5) Have you ever been diagnosed with heart failure?
- **Respiratory:**
 - 6) Do you suffer from asthma?
 - 7) Do you suffer from bronchitis?
- **Renal**
 - 8) Do you have kidney disease?
- **Gastrointestinal**
 - 9) Do you have liver disease?

- **Neurological**
 - 10) Do you suffer from epilepsy or seizures?
 - 11) Have you ever had a stroke?

- **Endocrine**
 - 12) Do you have thyroid disease?
 - 13) Do you have diabetes that requires insulin?
 - 14) Do you have diabetes that requires tablets only?

- **Musculoskeletal**
 - 15) Do you have any problems with pain, stiffness or arthritis in your neck or jaw?

- **Anaesthesia**
 - 16) If you have been put to sleep for an operation were there any anaesthetic problems?
 - 17) Has anyone in your family (blood relatives) had a problem following an anaesthetic?

Note: Sometimes you have to ask in a different way for example diabetics might not have chest pain when they have a myocardial infarction so you should ask: Did you ever have very heavy sweating and had to go to the ER and have cardiac catheterization done for you? Then the patient will answer yes even though he denied a heart attack before. Or for example you ask a patient if he has renal disease and he answers no then you find an AV fistula and that he goes for regular dialysis.

General Factors That Affect Anesthesia

1. Age:

Mortality risk increased linearly with age for most surgical procedures

Common issues in geriatric patients:

- **Dehydration:** They are more likely to be dehydrated because they avoid drinking water so that they don't have to go to the bathroom a lot or because urinating with benign prostatic hypertrophy is difficult for them.

- **Chronic pain:** they are more likely to be accommodate with pain and not report its severity accurately
- **Hypertension**
- **Undiagnosed diabetes**
- **Neglected**
- **Polypharmacy (many medications)**
- **Strong response to medication** so always prepare antidotes

2. Exercise capacity

All patients should be asked about their exercise capacity as part of the preoperative evaluation.

Patients with good exercise tolerance generally have low risk

3. Medication use

At least 50 percent of patients undergoing surgery take medications on a regular basis **over-the-counter or prescribed or herbal**

Clinicians often must decide if chronic medications should be continued in the perioperative period.

PRINCIPLES OF MEDICATION MANAGEMENT **will be discussed later.**

Note: For example if a patient takes 15 mg prednisone for 3 weeks or more the patient will have hypothalamic-pituitary-adrenal axis suppression and will not be able to compensate during surgery by increasing cortisol in the body (up to 15 times normal) so we must supply it.

4. Personal or family history of anesthetic complications:

Malignant hyperthermia is a rare complication of anesthetic administration that is inherited in an **autosomal dominant** fashion. Due to the morbidity and potential mortality associated with this condition **should never be given Suxamethonium (succinylcholine)**, the preoperative history should include questioning about either a personal or family history of complications from anesthesia.

Or patients with **porphyria** for example should not be given **barbiturates.**

Anaesthetist should take a full history & examine each patient.

5. Previous anaesthetics and operations

- Hospitals
- Enquire about inherited or 'family' diseases
 - sickle-cell disease
 - porphyria
- Difficulties with previous anaesthetics
 - Nausea
 - Vomiting
 - Nausea and vomiting are common in females so if she has history of such a complication you should use multimodal antiemetics (good intraoperative fluid resuscitation to maintain perfusion, antiemetic such as metoclopramide and proton pump inhibitor or H2 blocker and intraoperative 5-HT antagonist such as Ondansetron)
 - dreams
 - awareness they will say they could hear the surgeons and anaesthetists during the surgery but were completely paralyzed
 - postoperative jaundice when halothane used to be used
- Present & past medical history
 - all the aspects of the patient's medical history
 - relating to the cardiovascular and respiratory systems and its severity

Medical History

1. Review the chart
2. Demographic Data
 - a. Height / weight
 - b. Vital signs
 - c. Diagnosis
3. History and Physical Exam
 - a. Note any abnormalities
 - b. Don't assume that all problems are listed
4. Review previous records
 - a. Available in same institution
 - b. Previous diagnosis
 - c. Previous treatment
5. Interview the patient

(A) Cardiovascular System

Specific enquiries must be made about:

- Angina
 - Incidence
 - Precipitating factors
 - Duration
 - Use of anti-anginal medications (e.g. glyceryl trinitrate (GTN) oral or sublingual).

- Previous myocardial infarction and subsequent symptoms
 - myocardial infarction are at a greater risk of perioperative reinfarction **must maintain good analgesia postoperatively to prevent tachycardia due to pain which might cause another MI.**
 - Elective surgery postponed until at least **6 months after the event no matter what kind of anesthesia**

- Untreated or poorly controlled hypertension (diastolic consistently > 110 mmHg) may lead to exaggerated cardiovascular responses
 - **Must wait at least 2 weeks after controlling it (to allow SVR to go back down and consequently return CO back to normal 5L/min) (because if we put him under anesthesia it will cause vasodilation and result in ischemia due to low CO and if we intubate the patient it will cause hypertension and could lead to stroke)**
 - Both hypertension and hypotension can be precipitated which increase the risk of myocardial ischemia
 - **If emergency surgery for hypertensive patient then we must assess him in the ward**
 - ⇒ **If in pain give analgesics**

- ⇒ Cardiac consultation
- ⇒ ECG
- ⇒ Echo would be a good extra (for valvular and wall motion status)
- ⇒ Put invasive monitor in OR (
 - Arterial line for arterial pressure
 - Central venous catheter for CVP and intravascular volume status (if low give fluids, if high be cautious and give digoxin)

- Symptoms indicating heart failure
 - Heart failure will be worsened by the depressant effects impairing the perfusion of vital organs so better to use peripheral nerve block when we can
 - Must differentiate between compensated and decompensated and keep in mind that the compensated HF can decompensate at any time
 - If patient on ACE Inhibitors don't stop it but if the patient is on Lasix must stop it 1 day before or on the same day of surgery and take ACE Inhibitors instead
 - Invasive cardiac monitoring (Arterial line and Central line)
 - Don't use a large dose of a single drug; use small doses of multiple drugs instead

- Valvular heart disease
 - Check most recent echo for the valve affected and whether stenosis or regurgitation
 - If Stenosis never give regional; always go for general anaesthesia; if regurgitation you can do both
 - Prosthetic valves may be on anticoagulants -- need to be stopped or changed prior to surgery Warfarin must be stopped 5 days before surgery and switched to heparin and heparin must be stopped 4 hours before surgery
 - Antibiotic prophylaxis

Active Cardiac Conditions **Important for MCQs**

- Unstable coronary syndromes
 - Unstable or severe angina
 - Recent MI
- Decompensated CHF
- Significant arrhythmias
- Severe valvular disease

We never perform surgery unless it is a life-threatening case.

Minor Cardiac Predictors

- Advanced age (>70)
- Abnormal ECG
 - LV hypertrophy
 - LBBB
 - ST-T abnormalities
 - Rhythm other than sinus
- Uncontrolled systemic hypertension

Active Cardiac Conditions
 Unstable coronary syndromes (severe or unstable angina; recent MI)
 Decompensated CHF
 Significant Arrhythmia or Heart Block
 Severe aortic or mitral valvular disease (AS < 1.0cm²; mean gradient 40mmHg; symptomatic mitral or aortic dz)

Surgical Risk Stratification
High Risk: Vascular Surgery
Intermediate Risk: Intraperitoneal; Intrathoracic; Carotid; Head & Neck; Orthopedic; Prostate
Low Risk: Endoscopy; Superficial Procedures; Cataract; Breast; Other Ambulatory Surgery

Cardiovascular MET Estimations

METs	Exercise	Recreation	Work / Household Activities
1.5-2.0 METs	Slow walk 40-60 min mile	Watching TV Playing Cards	Desk work Light Housework Making Bed Brushing hair/teeth
2.0-3.0 METs	Walking 24-30 min mile Cycling level 5 mph	Golf with power cart Play musical instrument	Driving Car Cooking Washing Dishes Ironing Sweeping Showering
3.0-4.0 METs	Walking 20 min mile Cycling 5.5 mph	Bowling Billiards Golf with pull cart Shopping	Janitorial Work Vacuuming Kneeling Climbing stairs slowly Sexual intercourse
4.0-5.0 METs	Walking 15-17 min mile Cycling 8 mph	Dancing Gardening Golf carrying clubs	Painting House Carrying 20-40 lbs Raking Leaves Shoveling Snow
5.0-6.0 METs	Walking 13-15 min mile Cycling 10 mph	Canoeing Stream Fishing Baseball	Carpentry Shoveling heavier snow

Cardiovascular MET Estimation was not discussed
Surgical Risk Stratification

High Risk	Intermediate Risk	Low Risk
<ul style="list-style-type: none"> • Vascular (aortic and major vascular) 	<ul style="list-style-type: none"> • Intraoperative • Intrathoracic • Carotid • Head and neck • Orthopedic • Prostate • Cesarean section 	<ul style="list-style-type: none"> • Endoscopic • Superficial procedures • Cataract • Breast • Ambulatory surgery

Cardiovascular medications

• **Beta blockers**

- ⇒ Reduce ischemia by decreasing myocardial oxygen demand due to increased catecholamine release.
- ⇒ Prevent or control arrhythmias.
- ⇒ Acute withdrawal of a beta blocker pre- or postoperatively can lead to substantial morbidity and even mortality, patients who take beta blockers chronically for management of angina are at risk of ischemia with withdrawal of beta blockade.
- ⇒ **beta blockers should be continued in the perioperative period and throughout the hospital stay.**
- ⇒ The dose of the beta blocker regulated throughout the perioperative period to maintain the blood pressure and heart rate
- ⇒ Intravenous forms of beta blockade, such as selective [metoprolol](#), and [labetalol](#) and non-selective [propranolol](#), should be given if the patient cannot take oral medications [Esmolol](#) (selective) is also available to be used intraoperatively or in an intensive care unit

• **Alpha 2 agonists**

- ⇒ Drugs centrally-acting sympatholytic drugs such as [clonidine](#) abrupt withdrawal of clonidine can precipitate rebound hypertension
- ⇒ Continue/discontinue : **we recommend that alpha 2 agonist drugs be continued in the perioperative period, but not initiated**

- **Calcium channel blockers**
 - ⇒ calcium channel blockers should be continued in patients who are already taking them preoperatively on the morning of surgery
- **ACE inhibitors and angiotensin II receptor blockers**
 - ⇒ Continuing ACE inhibitors up to the time of surgery increases perioperative hypotension, but possibly reduces the incidence of postoperative hypertension.
 - ⇒ As per the 2014 American College of Cardiology/American Heart Association guidelines, it is reasonable to continue ACE inhibitors perioperatively, particularly in patients who have congestive heart failure or hypertension
 - ⇒ Some anesthesiologists may prefer to withhold these medications on the morning of surgery based on concerns about possible hypotension
 - ⇒ So stop on the day of surgery for everyone except heart failure patients
- **Diuretics**
 - ⇒ Benefit/risk – The two major physiologic effects of loop and thiazide-type diuretics of concern are hypokalemia and hypovolemia
 - ⇒ Should be held on the morning of surgery
- **Digoxin**
 - ⇒ We recommend continuing digoxin perioperatively. Obtaining a drug level preoperatively is not usually required.
 - ⇒ Be careful of electrolyte imbalance such as hyperkalemia or hypokalemia
- **Statins**
 - ⇒ Evidence has become convincing that HMG CoA reductase inhibitors (statins) may prevent vascular events through mechanisms other than cholesterol lowering
 - ⇒ we recommend continuing statin therapy in patients undergoing surgery, particularly in patients at high risk for cardiovascular events.

(B) Respiratory System

Patients with pre-existing lung disease

- Prone to postoperative chest infections if they are:
 - a) obese
 - b) undergoing upper abdominal
 - c) undergoing thoracic surgery
- Chronic obstructive lung disease production of sputum (volume and color)
- Dyspnoea
- Asthma, including:
 - a) precipitating factor
 - b) Last episode
 - c) How is it treated? **If steroids we need to give it to him preoperatively**
 - d) Ever hospitalized?
- upper respiratory tract infection
- **Preoperative preparation:**
 - ⇒ **Aggressive chest physiotherapy**
 - ⇒ **Antibiotics**
 - ⇒ **Incentive spirometry**

Anaesthesia and surgery should be postponed unless it is for a life-threatening condition

(C) Gastrointestinal System

- Indigestion
- heartburn
- reflux
 - ⇒ may indicate the possibility of a hiatus hernia (**increases the risk of aspiration**)
 - ⇒ we have to consider rapid sequence induction

Normal Induction	Rapid Sequence Induction
1. Oxygenate	1. Oxygen
2. IV anaesthesia drugs	2. IV anesthesia drugs
3. Patient is asleep	3. Cricoid pressure
4. Oxygen mask	4. Rapid acting muscle relaxants
5. Chest moving up and down	5. Wait 5 minutes
6. Give muscle relaxants	6. Intubate
7. Intubate	(no packing (oxygen mask))

(D) Rheumatoid Disease

- chronically anaemic
- severely limited movement of their joints
- **Difficult intubation. Joints needed for intubation:**
 - ⇒ Temporomandibular joint
 - ⇒ **Atlanto-occipital joint** (rheumatoid patients are at a **high risk of atlantooccipital subluxation**)
 - ⇒ Cervical spine
- Makes positioning for surgery and airway maintenance difficult.
- Tendency for dislocation of atlanto-occipital joint

(E) Diabetes

- Patients have an increased incidence of
 - a) ischaemic heart disease
 - b) renal dysfunction
 - c) autonomic and peripheral neuropathy
 - d) intra- and postoperative complications

(F) Neuromuscular Disorders

- Care with muscle relaxants (**a small dose can have a strong effect in cases such as myasthenia gravis**)
- Coexisting heart disease
- restrictive pulmonary disease

(G) Chronic renal failure

- anaemic
- electrolyte abnormalities
- altered drug excretion (**don't give too much**)
- **Avoid nephrotoxic drugs**
- restricts the choice of anaesthetic agents
- **Restrict fluid intake**

(H) Jaundice

- Infective or obstructive liver disease
- **Must rule-out hepatitis A,B,C**
- Drug metabolism altered
- Coagulation must be checked

(I) Epilepsy

- well controlled or not
- In case of controlled epilepsy ask about the last attack, check blood level of the antiepileptic drug and continue medication
- Since childhood/Recent (if recent must rule out space-occupying lesion)
- avoid anaesthetic agents potentially epileptogenic (e.g. enflurane) no longer used anyway

Family History

All patients should be asked

- inherited conditions in the family
- history of prolonged apnoea
- unexplained death
- malignant hyperpyrexia
- Surgery postponed

Drug History and Allergies

Identify all medications

- Prescribed
- Self-administered
- Allergies to drugs
 - ⇒ topical preparations (e.g. iodine)
 - ⇒ adhesive dressings
 - ⇒ foodstuffs

Principles of Medication Management

- A complete medication history should be obtained, include all over-the-counter and herbal/complementary medications, as well as prescription drugs. In addition, substance use information (including alcohol, nicotine, and illicit drugs) should be elicited.

- Medications associated with known medical morbidity if withdrawn abruptly should be continued in the perioperative period or tapered if feasible. **Those that affect hemodynamics and outcome.**
- Intravenous, transdermal, or transmucosal medicines should be substituted when absorption will be impaired because of loss of gastrointestinal function or restrictions on oral intake. .
- The metabolism and elimination of medications and their metabolites may be altered during the perioperative period.

Specific Drugs

- Oral Hypoglycemic
 - ⇒ **Usually held on day of surgery**
 - ⇒ Compete for plasma binding sites
 - ⇒ **If glucose is high then start human regular insulin infusion and dextrose to maintain normal range of blood glucose (sliding scale insulin therapy)**
- Insulin
 - ⇒ No insulin / start IV / check glucose
 - ⇒ Start human regular insulin
 - ⇒ **Stop long-acting insulin**
- Corticosteroids
 - ⇒ Take detailed history of steroid use
 - ⇒ **(>=15mg) for 3 weeks or more in the past year the HPA axis must be checked because they May need “stress dose” Hydrocortisone 100mg 1h pre-op then give intraoperatively and early post-op then 50mg 1 day after surgery and 15mg the day after (every 8hrs) then stop**
- Anticoagulants
 - ⇒ Surgeon will regulate
 - ⇒ Switch to heparin **stop warfarin 5 days before surgery**
 - ⇒ Stop 3-4 hours pre-op **and repeat coagulation profile**

Social History

- **Smoking** cause retardation of recovery
 - ⇒ number of cigarettes - packs per day times number of years patient has smoked
 - ⇒ amount of tobacco
 - ⇒ Signs of COPD
 - ⇒ Productive cough
 - ⇒ Note pack-years

Nicotine stimulates the sympathetic nervous system

 - ⇒ *causing tachycardia*
 - ⇒ *hypertension*
 - ⇒ *coronary artery narrowing*
- **Alcohol**
 - ⇒ induction of liver enzymes
 - ⇒ tolerance
- **Addictions:**
 - ⇒ Difficulty with venous access
 - ⇒ Thrombosis of veins
 - ⇒ Withdrawal syndromes
 - ⇒ Look for tattooing also **if you find check for HIV**
- **Pregnancy**
 - ⇒ increased risk of regurgitation and aspiration
 - ⇒ Elective surgery is best postponed until after delivery.
 - ⇒ Avoid teratogenic medications

The Examination

(A) Cardiovascular System

- dysrhythmias
- atrial fibrillation
- heart failure
- heart murmur
- valvular heart disease
- blood pressure is best measured at the end of the examination
- **edema, orthopnea**

(B) Respiratory System

- cyanosis (eg: smokers will have blue lips and cough a lot)
- pattern of ventilation
- respiratory rate
- Dyspnoea
- Wheeziness
- signs of collapse
- consolidation and effusion

(C) Nervous System

- Chronic disease of the peripheral and central nervous systems
- evidence of motor or sensory impairment recorded
- Dystrophy myotonia

(D) Musculoskeletal System

- restriction of movement and deformities
- reduced muscle mass
- peripheral neuropathies
- pulmonary involvement **problem with ventilation**
- Particular attention to the patient's cervical spine and temporomandibular joints

The Airway will be covered in airway lecture

Try and predict difficult intubation

Assessment is often made in three stages

1. Observation of the patient's anatomy

- Look for limitation of mouth opening, receding mandible position, number and health of teeth, size of tongue.
- Examine the front of the neck for soft tissue swellings, deviated larynx or trachea.
- Check the mobility of the cervical spine in both flexion and extension.

2. Simple bedside tests

- **Mallampati criteria**
- Thyromental distance - < 7 cm suggests difficult intubation

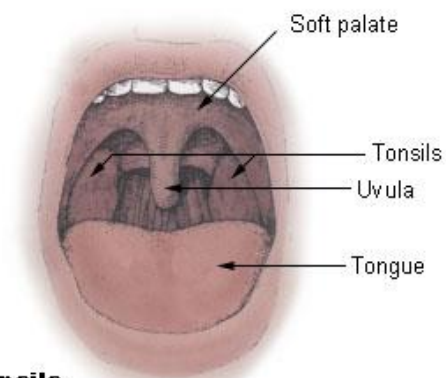
3. X-rays

- lateral X-ray of the head and neck
- reduced distance between the occiput and the spinous process of C 1 (< 5 mm) and an increase in the posterior depth of the mandible (> 2.5 cm)

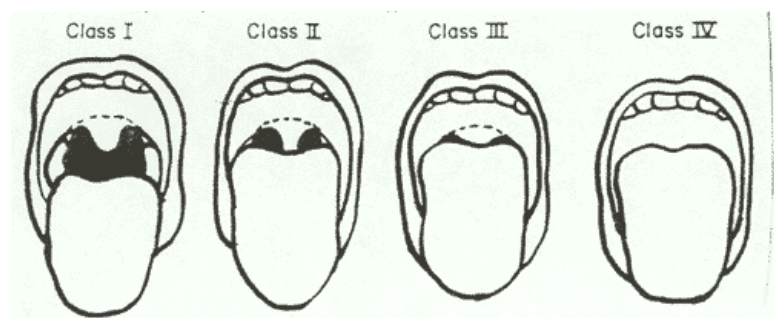
None of these tests, alone or in combination, predict all difficult intubations



Why would this man's airway be difficult to manage? Restricted mouth opening



Tonsils



Airway Evaluation

- Jaw Movement
 - Both inter-incisor gap and anterior subluxation
 - <3.5cm inter-incisor gap concerning
 - Inability to sublux lower incisors beyond upper incisors
- Receding mandible
- Protruding Maxillary Incisors (buck teeth)
- Oropharyngeal visualization
- Mallampati Score
- Sitting position, protrude tongue, don't say "AHH"

Special Investigations

If no concurrent disease, investigations can be limited as:

Baseline Investigations		
Age	Sex	Investigations
<40	Male	Nil
<40	Female	Hb
41-60	Male	ECG, Blood Sugar, Creatinine
41-60	Female	Hb, ECG, Blood Sugar, Creatinine
>61	All	Hb, ECG, Blood Sugar, Creatinine

Additional Investigations

- Urea and electrolytes
 - ⇒ in patients taking digoxin
 - ⇒ diuretics
 - ⇒ diabetes, renal disease
 - ⇒ vomiting
 - ⇒ diarrhea
- Liver function tests
 - ⇒ hepatic disease
 - ⇒ jaundiced patient
 - ⇒ high alcohol
 - ⇒ metastatic disease
 - ⇒ evidence of malnutrition
- Blood sugar
 - ⇒ Diabetes
 - ⇒ peripheral arterial disease
 - ⇒ taking long-term steroids
- Electrocardiogram (ECG)
 - ⇒ hypertensive
 - ⇒ with symptoms or signs of heart disease
- Chest X-ray
- Pulmonary function tests
- Coagulation screen
- Sickle-cell screen

Medical Referral

Optimization of coexisting medical (or surgical) problems may mean postponing surgery

- **Cardiovascular disease**
 - ⇒ Untreated or poorly controlled hypertension or heart failure.
 - ⇒ Symptomatic ischaemic heart disease, (unstable angina).
 - ⇒ Dysrhythmias: uncontrolled atrial fibrillation, paroxysmal supraventricular tachycardia, second and third degree heart block.
 - ⇒ congenital heart disease or symptomatic valvular heart disease
- **Respiratory disease**
 - ⇒ Chronic obstructive airways disease, if dyspnoeic at rest.
 - ⇒ Bronchiectasis
 - ⇒ Asthmatics
 - unstable
 - taking oral steroids
 - have a FEV₁ % 60% predicted
- **Endocrine disorders**
 - ⇒ Insulin and non-insulin dependent diabetics
 - ⇒ ketonuria
 - ⇒ random blood sugar > 12mmol/L
 - ⇒ Hypo- or hyperthyroidism
 - ⇒ Cushing's
 - ⇒ Addison's disease
 - ⇒ Hypopituitarism
- **Renal disease**
 - ⇒ Chronic renal failure
 - ⇒ Patients undergoing chronic dialysis
- **Haematological disorders**
 - ⇒ Bleeding diatheses (haemophilia and thrombocytopenia)
 - ⇒ Therapeutic anticoagulation
 - ⇒ Haemoglobinopathies
 - ⇒ Polycythaemia
 - ⇒ Haemolytic anaemias
 - ⇒ Leukaemias

Factors Increasing Risk of Mortality

- Inadequate preoperative preparation including resuscitation
- Lack of and inappropriate monitoring during surgery
- Poor postoperative care, including lack of intensive care beds
- Inadequate supervision of trainees

Mortality related to anaesthesia

⇒ **Approx 1:26,000 anaesthetics**

⇒ **One third of deaths are preventable**

⇒ **Causes in order of frequency**

1. inadequate patient preparation

2. inadequate postoperative management

3. wrong choice of anaesthetic technique

4. inadequate crisis management

Anaesthetic associated deaths

- Increasing age: >60 years
- Sex: male > female
- Worsening physical status
- Increasing number of concurrent medical conditions, in particular:
 - ⇒ myocardial infarction
 - ⇒ diabetes mellitus
- Renal disease
- Increasing complexity of surgery:
 - ⇒ intracranial
 - ⇒ major vascular
 - ⇒ intrathoracic
- Increasing length of surgery
- Emergency operations

American Society of Anesthesiologists (ASA) Physical Status Scale

Class	Physical Status	Absolute Mortality	Crude Mortality per 10,000 anaesthetics
I	A healthy patient with no organic or psychological disease process. The pathological process for which operation is performed is localized and causes no systemic upset	0.1	7.2
II	A patient with a mild to moderate systemic disease process caused by the condition to be treated surgically or other pathological process which <u>does not limit the patient's activities in any way</u> , e.g. treated hypertensive, stable diabetic. Patients aged >80 years are automatically placed in class II	0.2	19.7
III	A patient with severe systemic disease from any cause which imposes a <u>definite functional limitation on activity</u> , e.g. ischaemic heart disease, chronic obstructive lung disease	1.8	115.1
IV	A patient with a severe systemic disease which is a <u>constant threat to life</u> , e.g.	7.8	766.2

	unstable angina		
V	<u>A moribund patient, unlikely to survive 24 hours with or without surgery</u>	9.4	3358.0
Note: 'E' maybe added to signify an emergency operation.			

Informing the Patient

Fasting Recommendations:

- Clear liquid — should stopped **two hours** before elective.
- Clear liquids include water, juices without pulp, coffee or tea without milk, and carbohydrate drinks, milk is considered a solid.
- Solids — Patients should stopped eat solid food (or drink milk) **six hours** before elective procedures requiring anesthesia or sedation; the fasting interval should be increased to at least **eight hours** following a large or fatty meal
- Chewing gum — Chewing gum generates saliva and stimulates gastric secretion, so it may be considered equivalent to clear liquids. We instruct patient to stop chewing gum **two hours** prior to anesthesia

Anaesthetist has only a brief time Explain the events to the patient (preoperative period)

1. Most patients will want to know how long starved prior to surgery in terms of eating and drinking
2. The choice of anaesthetic technique rests with the anaesthetist, but most patients appreciate some details of what to expect
3. Patients will ask about their immediate recovery
4. Consent for anaesthesia
5. Finally:
 - ⇒ reassure patients about postoperative pain control
 - ⇒ Information about the technique

Premedication

The 6 As of premedication

- **Anxiolysis** – the best anxiolytic is the anesthetist who visits the patient and listens to the patient
 - ⇒ benzodiazepines
 - ⇒ phenothiazines
 - ⇒ B-blockers
- **Amnesia**
 - ⇒ lorazepam - anterograde amnesia
- **Anti-emetic**
 - ⇒ dopamine antagonists
 - ⇒ antihistamines
 - ⇒ anticholinergics
 - ⇒ phenothiazines
 - ⇒ 5-hydroxytryptamine antagonists
 - ⇒ α_2 - agonists: clonidine, Dexmedetomidine
- **Antacid**
 - Patients who have received opiates
 - present as emergencies
 - If in pain
 - delayed gastric emptying
 - hiatus hernia
 - ⇒ Oral sodium citrate
 - ⇒ Ranitidine , Proton inhibitors
 - ⇒ Metoclopramide
 - ⇒ naso- or orogastric tube
- **Anti-autonomic**
 - Parasympathetic reflexes used in :
 - ⇒ Excessive vagal activity causing profound bradycardia
 - ⇒ halothane
 - ⇒ suxamethonium
 - ⇒ surgery
 - ⇒ traction on the extraocular muscles
 - ⇒ handling of the viscera
 - ⇒ during elevation of a fractured zygoma
- **Analgesic**

Summary

>Always check history for:

- Malignant hyperthermia ≠ succinylcholine
- Porphyria ≠barbiturates.

>Drugs:

Continue:

- Beta blockers
- Alpha 2 agonists (but never initiated pre-op)
- Calcium channel blockers (if already taking it)
- ACE Inhibitors in CHF
- Digoxin
- Statins
- Human regular insulin

Discontinue:

- ACE Inhibitors (all patients except CHF)
- Diuretics
- Warfarin (5 days before surgery)
- Heparin (3-4 hours before surgery)
- Oral hypoglycemic
- Long acting insulin

>**Rheumatoid arthritis** is a risk for difficult intubation due to atlanto-occipital joint subluxation

>**Mallampati score** is used to predict the ease of intubation

>Most common cause of anesthesia-related mortality is **inadequate patient preparation**

>ASA physical status classes

- ASA 1: normal healthy patient
- ASA 2: patient with mild controlled systemic disease that does not affect normal activity, for example, mild diabetes, mild hypertension
- ASA 3: patient with severe systemic disease which limits activity. (for example, angina, chronic bronchitis)
- ASA 4: patient with incapacitating systemic disease that is a constant threat to life
- ASA 5: moribund patient not expected to survive 24 hours either with or without an operation
- E: Emergency procedure

>**Before surgery:** 8hrs-stop fatty food , 6hrs-stop solids, 2hrs-stop clear fluids and chewing gum

>**6 As of premedication:** Anxiolysis, Amnesia, Anti-emetics, Antacids, Anti-autonomic and Analgesic.

MCQ's :

Q1 Typically a life-threatening condition occurring when a susceptible person is exposed to triggers including most inhalation anaesthetics, succinylcholine and, rarely, stress. Characterised by hypermetabolism, muscle rigidity, muscle injury and increased sympathetic nervous system activity.

- A) Suxamethonium apnoea
- B) Malignant hyperthermia
- C) PONV
- D) Suxamethonium aspiration
- E) Suxamethonium anaphylaxis

Q2 According to the ASA Physical Status Classification System, II would represent

- A) A patient with mild systemic disease
- B) A patient with severe systemic disease
- C) A normal healthy patient
- D) A patient with severe systemic disease that is a constant threat to life
- E) A moribund patient who is not expected to survive without the operation

Q3 Before surgery for a 52 year old lady undergoing hysterectomy which of the following investigation sets will you order?

- A) Hb
- B) ECG, Blood Sugar, Creatinine
- C) Hb, ECG, Blood Sugar, Creatinine
- D) Hb, ECG, Echo, Blood Sugar, Creatinine
- E) Investigations are not needed for this patient

For mistakes or feedback

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1=B
2=A
3=C