Preoperative Anesthetic Assessment and Premedication

433

ANAESTHESIA

Objectives:

- learn pre-anesthetic patient evaluation and risk stratification.
- Obtain a full history and physical examination including allergies, current medications, past anesthetic history, family anesthetic history
- The medical student will understand how patient co-morbidities can affect the anesthetic plan.
- The medical student will be able to understand potential anesthetic options for a given surgical procedure.
- The medical student will be able to plan an anesthetic for a basic surgical procedure.
- The student will understand risk stratification of a patient undergoing anesthesia
- The perioperative patient journey

NCEPOD classification of intervention
(National Confidential Enquiry into Patient Outcome and Death)

	Description	Example
Immediate	Life/limb/organ saving • Resuscitation occurs simultaneously with surgery • Surgery within minutes	Rapid bleeding, e.g. trauma, aneurysm Intraabdominal bleeding or intrathoracic bleeding
Urgent	Life/limb/organ threatening • Surgery within hours	Perforated bowel or less urgent bleeding
Expedited	Early surgery (within a day or two)	Large bowel obstruction, closed long bone fracture
elective	Timing to suit patient and hospital	Joint replacement, unobstructed hernia repair, cataract

Most complications and increase mortality and morbidity
cause by lack of preoperative assessment

The preoperative visit:

- The preoperative visit of all patients by anesthetist is an essential requirement for the safe and successful conduct of anesthesia
- Main aim is to assess the patient's fitness for anesthesia
- The Best to be performed by an anesthetist, preferably the one who is going to administer the anesthetic.
  - ***The Goal of Preoperative visit:***
- To educate about anesthesia , perioperative care and pain management to reduce anxiety.
- To obtain patient's medical history and physical examination .
- To determine which lab test or further medical consultation are needed .
- To choose care plan guided by patient's choice and risk factors

visit allows	Coexisting Illness
Best anaesthetic technique Any potential interactions between concurrent diseases Anaesthesia anticipated and its possible complications Provides an explanation Reassurance for the patient	Improve the patients condition prior to surgery Seeking advice from other specialists Optimise treatment Final decision .

Should improve pt condition and which drugs should continue and which should stop the make referral

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 in anesthetic clinic
- anesthetist is actively involved in optimizing their condition prior to anesthesia and surgery

2-Surgical emergencies:

- only a few hours separates admission and operation in these patients urgent investigations or treatment. Manage the pt in the OR

3-Day-case patients:

- These are patients who are planned come in the morning(6), do surgery, and leave at night(4)
- Generally ‘fitter’ ASA1 or ASA 2
- Assessment in anesthesia clinic preoperative anesthesia clinic
- Such as a 21 y/o patient with left inguinal hernia

Anesthetic history And Examination:

- Anesthetist should take a full history & Examine each patient.
  - ***PREVIOUS ANAESTHETICS AND OPERATIONS:***
- Hospitals
- Enquire about inherited or 'family' diseases
  - *sickle-cell disease*
  - *porphyria*
  - *Malignant hyperthermia*
- Difficulties with previous anesthetics
  - *nausea*
  - *vomiting*
  - *dreams*

  Nausea and vomiting are common in females so if she has history of such a complication you should hydrate the pt and use multimodal antiemetics (good intraoperative fluid resuscitation to maintain perfusion)
- Awareness: they will say they could hear the surgeons and anesthetists during the surgery but were completely paralyzed
  - *postoperative jaundice*
- Present & past medical history
  - *all the aspects of the patient's medical history*
  - *relating to the cardiovascular and respiratory systems and its severity*

Cardiovascular system :

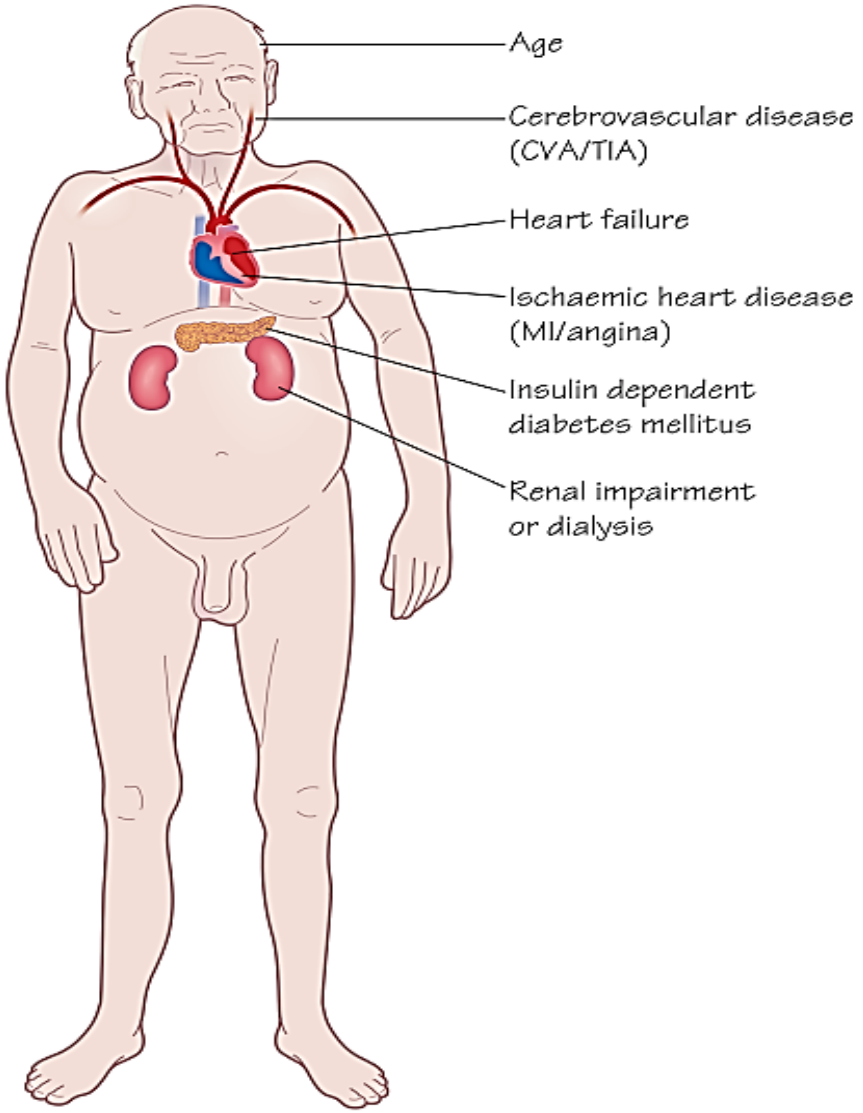
- Specific enquiries must be made about:
  - *Angina*
  - *incidence*
  - *precipitating factors*
  - *duration*

Patients on anticoagulants:
Warfarin must be stopped 5 days before surgery and switched to heparin and heparin must be stopped 4 hours before surgery . Give pt antibiotic prophylaxis

- use of anti-anginal medications, e.g. glyceryl trinitrate (GTN) oral or sublingual
- Previous myocardial infarction and subsequent symptoms
- Symptoms indicating heart failure, we should refer the pt and treat him before OR
- 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, may lead to intracerebral hemorrhage
- Both hypertension and hypotension can be precipitated which increase the risk of myocardial ischemia
- Heart failure will be worsened by the depressant effects impairing the perfusion of vital organs
- valvular heart disease:

Patient factors associated with cardiac risk:

- Age
- Heart failure
- Ischaemic heart disease
- (MI/angina)
- Cerebrovascular disease
- (CVA/TIA)
- Insulin dependent
- diabetes mellitus
- Renal impairment
- or dialysis



-We should do echo for cardiac patents

-Renal impairment patients we should check (urea, creatinine, potassium level)

-if pt have pulmonary hypertension and give him anesthesia and medication, will lead to severe hypotension and vasodilation. When doing intubation will lead to severe hypertension and increase risk of MI

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Active Cardiac Conditions:

- Unstable coronary syndromes
  - Unstable or severe angina
  - Recent MI
- Decompensated HF
- Significant arrhythmias
- Severe valvar disease

Minor Cardiac Predictors:

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

Surgical factors in assessment of risk of significant cardiac event

Low risk <1%	Minor orthopaedic and urology • Gynaecology • Breast • Dental
Intermediate 1–5%	Major orthopaedic and urology • Abdominal • Head and neck
High risk >5%	Aortic, major vascular • Peripheral vascular • Intraperitoneal/intrathoracic

Respiratory system :

Any patent with BA or COPD should have chest physiotherapy before surgery. Pt with Bronchiectasis should take antibiotics

- Patients with pre-existing lung disease
- prone to postoperative chest infections if they are obese or undergoing upper abdominal or thoracic surgery
- chronic obstructive lung disease production of sputum (volume and color)
- Dyspnea
- Asthma(ask about last attack and admission to SICU) , including precipitating factor
- upper respiratory tract infection
- anaesthesia and surgery should be postponed unless it is for a life-threatening condition

GI:

•Indigestion
•GER reflux
•Hurt burn
may indicate the possibility of a hiatus hernia(increase aspiration)

Rheumatoid disease:

chronically anaemic
severely limited movement of their joints
makes positioning for surgery and airway maintenance difficult.
Tendency for dislocation of atalnto-occiptal joint, rheumatoid patients are at a high risk of atlantooccipital subluxation

- *Diabetes: should ask about complications, medications, fasting*
  - Patients have an increased incidence of
    - *ischaemic heart disease*
    - *renal dysfunction*
    - *autonomic and peripheral neuropathy*
  - intra- and postoperative complications
- *Neuromuscular disorders*
  - Care with muscle relaxants
  - Coexisting heart disease
  - restrictive pulmonary disease
- *Chronic renal failure*
  - Anemia
  - Electrolyte abnormalities
  - Atered drug excretion
  - Restricts the choice of anaesthetic agents
- *Jaundice*
  - Infection or obstructive liver disease, we should role out hepatitis
  - Drug metabolism altered
  - Coagulation must be checked
- *Epilepsy*
  - well controlled or not , years that mean control if last attack before moth refer to neurologist
  - avoid anaesthetic agents potentially epileptogenic (e.g. enflurane)
  - Predict convulsions which induced by withdrawal effects of anesthesia drugs

- Identify all medications
  - *Prescribed*
  - *self-administered*
  - *Allergies to drugs*
    - topical preparations (e.g. iodine)
    - adhesive dressings
    - foodstuffs
- Smoking: exaggerated during intubation lead to increase cough
  - *number of cigarettes*
  - *amount of tobacco*

  nicotine stimulates the sympathetic nervous system
    - causing tachycardia
    - hypertension
    - coronary artery narrowing
- Alcohol
  - *induction of liver enzymes*
  - *tolerance*
- Difficulty with venous access
- Thrombosis of veins
- Withdrawal syndromes
- Look for tattooing also

Pregnancy:

- *increased risk of regurgitation and aspiration*
- *Elective surgery is best postponed until after delivery.*

Obesity:

- Cardiovascular
- Respiratory
- Sleep apnea
- Diabetics
- Fatty liver
- Technical problem
  - *Airway , aspiration*
  - *Intravenous access*
  - *Positioning*

The Examination:

Cardiovascular system

- ✓ dysrhythmias
- ✓ atrial fibrillation
- ✓ heart failure
- ✓ heart murmur
- ✓ valvular heart disease
- ✓ blood pressure is best measured at the end of the examination after patient relax

Respiratory system

- ✓ cyanosis
- ✓ pattern of ventilation
- ✓ respiratory rate
- ✓ Dyspnoea
- ✓ Wheeziness
- ✓ signs of collapse
- ✓ consolidation and effusion

Nervous system

- ✓ Chronic disease of the peripheral and central nervous systems
- ✓ evidence of motor or sensory impairment recorded
- ✓ dystrophic myotonica

Musculoskeletal

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

Examination: The Airway

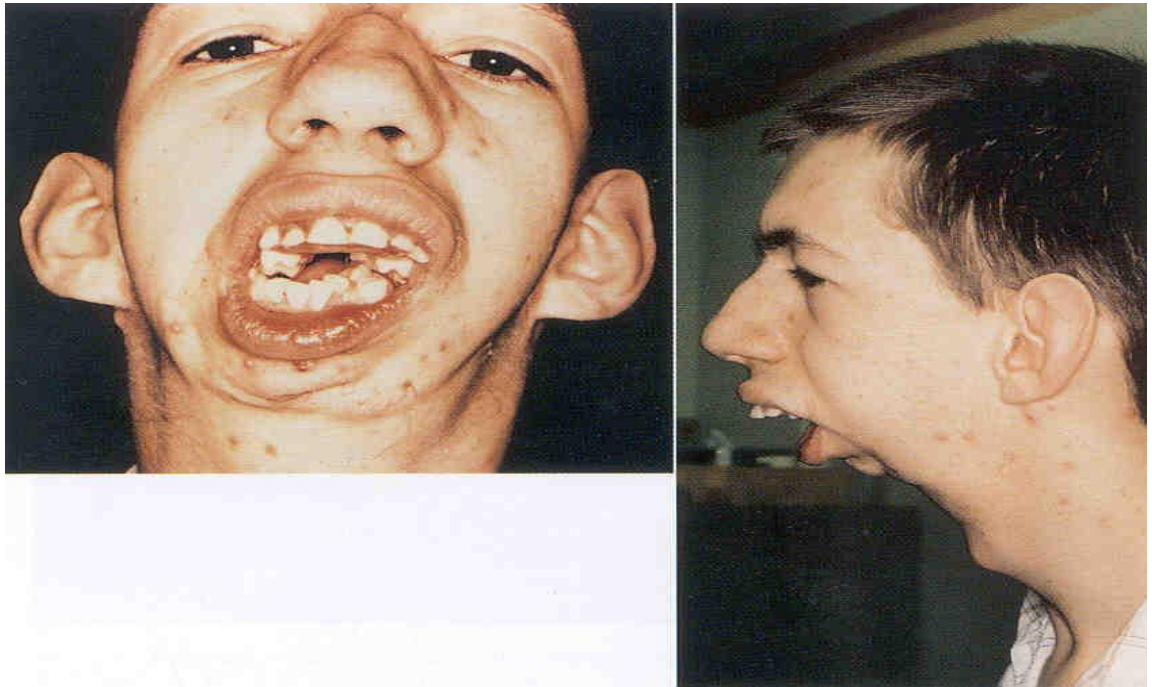
- Try and predict difficult intubation
- Assessment is often made in three stages

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.*

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

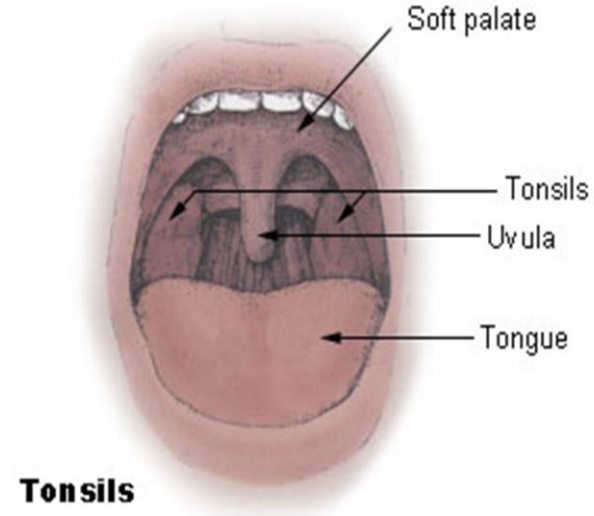
Restricted mouth opening



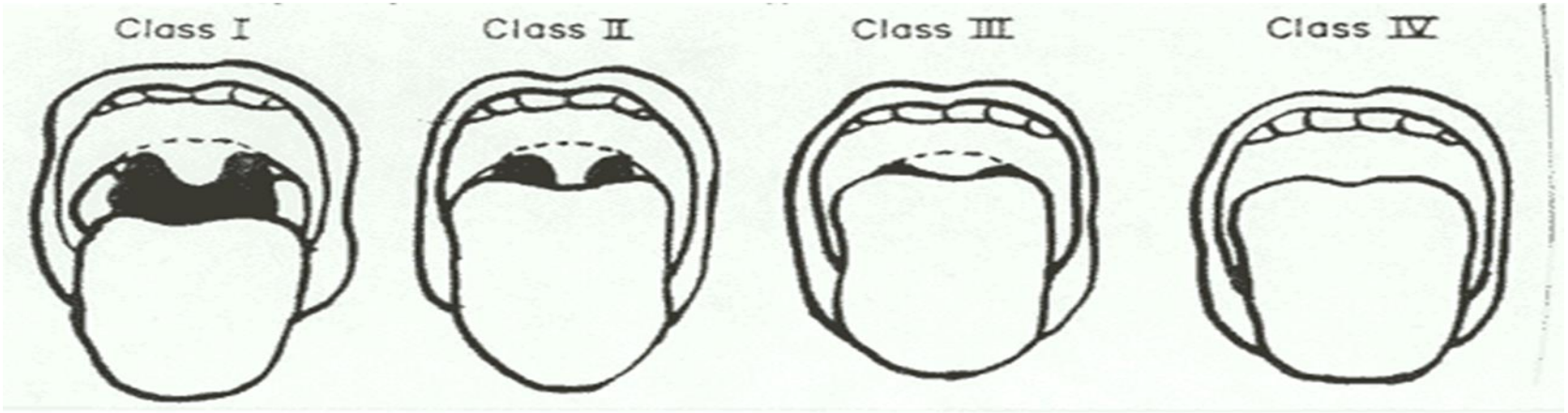
Examination: The Airway

2. Simple bedside tests:

- ✓ *Wilson score (weight , head and neck movement, jaw movement, receding mandible , buccal teeth)*
- ✓ *Mallampati criteria*
- ✓ *Thyromental distance - < 7 cm suggests difficult intubation*



■ Mallampati score:



Class I: uvula, faucial pillars, soft and hard palate visible
Class II: faucial pillars, soft and hard palate visible
Class III: soft and hard palate visible
Class IV: hard palate visible

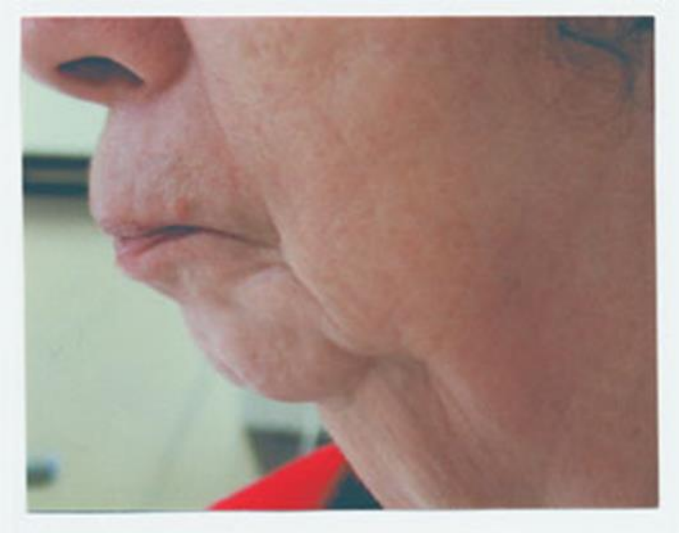
Class III and IV: **difficult intubation**

Examination: The Airway

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)*

- Airway evaluation:
  - ✓ *Oropharyngeal visualization*
  - ✓ *Mallampati Score*
  - ✓ *Sitting position, protrude tongue, don't say "AHH"*
  - ✓ *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)*



Investigations:

- If no concurrent disease, investigations can be limited as:

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

Urea and electrolytes	Liver function tests	Blood sugar	Electrocardiogram (ECG)
• in patients taking digoxin • diuretics • diabetes, renal disease • vomiting • diarrhoea	• hepatic disease • high alcohol • metastatic disease • evidence of malnutrition • jaundiced patient	• Diabetes • peripheral arterial disease • taking long-term steroids	• hypertensive • With symptoms or signs of heart disease

- **Chest X-ray**
- **Pulmonary function tests: (BA, COPD)**
- **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 or
  - have a FEV1 % 60% predicted

Medical referral:

- 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
- thrombocytopenia
- Therapeutic anticoagulation
- Haemoglobinopathies
- Polycythaemia
- Haemolytic anaemias
- Leukaemias

Increased 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:**
  - ✓ *inadequate patient preparation*
  - ✓ *inadequate postoperative management*
  - ✓ *wrong choice of anesthetic technique*
  - ✓ *inadequate crisis management*

Anesthetic 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

ASA grading:

ASA grade	Definition	Example
I	A patient normal healthy	
II	A patient with mild systemic disease	Well-controlled hypertension, asthma
III	A patient with severe systemic disease	Controlled CHF, stable angina
IV	A patient with severe systemic disease , that is a constant threat to life	Unstable angina, symptomatic COPD symptomatic CHF that is a constant threat to life
V	A moribund patient who is not expected survive without the operation	Multiorgan failure, sepsis syndrome hemodynamic
VI	A declared brain-dead patient whose organs are being removed for donor purposes	

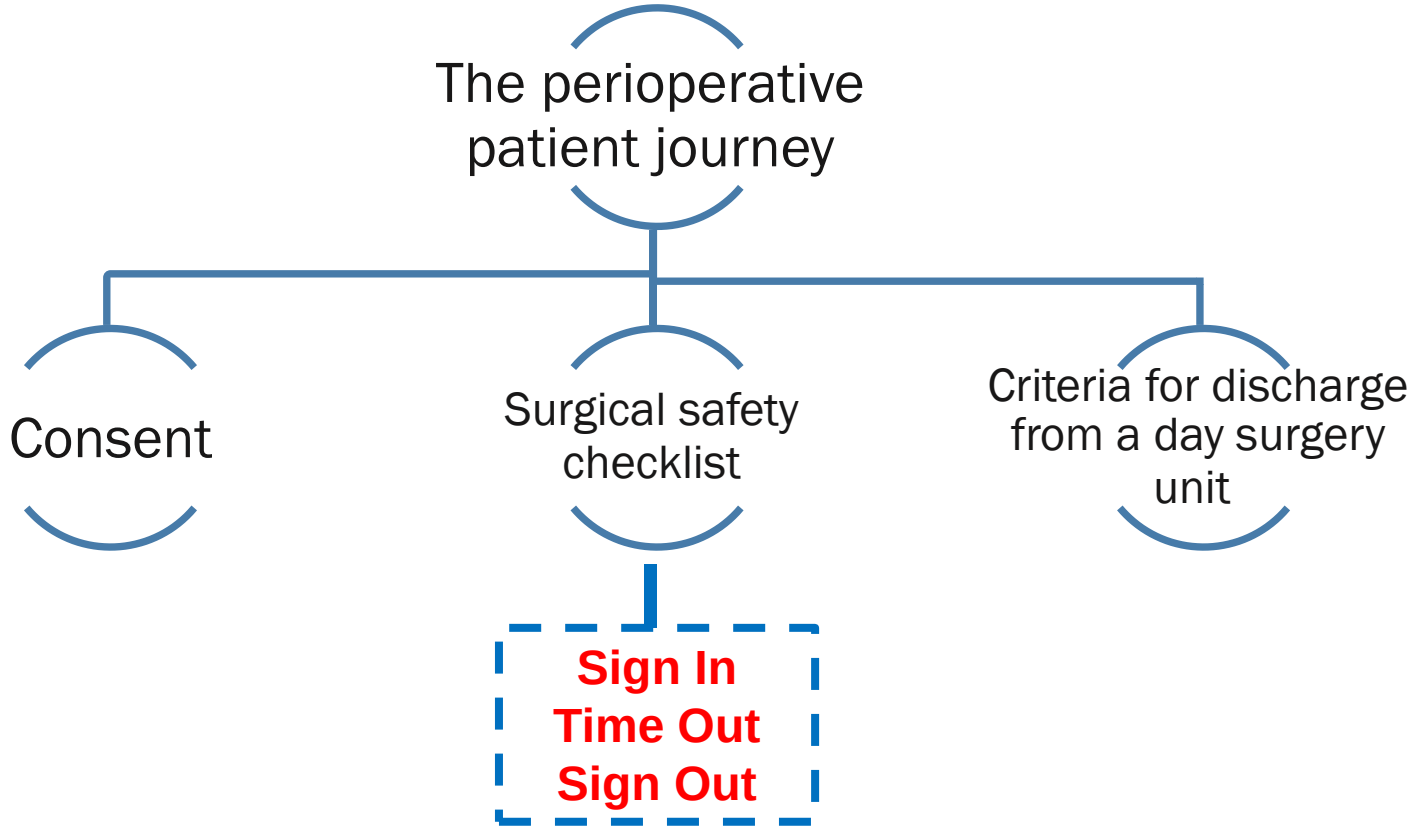
E" – added to the classifications indicates emergency surgery.

ASA status and postoperative mortality

ASA class	Absolute mortality (I)	Crude mortality per 10 000 anaesthetics
I	0.1	7.2
II	0.2	19.7
III	1.8	115.1
IV	7.8	766.2
V	9.4	3358.0

Informing the patient :

- The choice of anesthetic technique rests with the anesthetist, but most patients appreciate some details of what to expect
- patients will ask about their immediate recovery
- Finally
  - *reassure patients about postoperative pain control*
  - *informed of the technique*
- Consent for anesthesia



consent:

- Anesthetic consent is an important aspect of operative consent.
- All patients should have received written information in advance as well as an explanation of side effects:
    1. Common side effects, e.g. postoperative nausea and vomiting
    2. Rare side effects, e.g. nerve damage after spinal or epidural anesthesia
    3. Risks specific to that patient – this can relate to a career (e.g. an opera singer and the risk of vocal cord injury) or the risk of perioperative myocardial infarction in a patient with a significant history of cardiac disease.
- Consent must be obtained before any sedating , premedication is given.

Consent requires

1.Capacity necessitates:

- *Ability to understand and retain information about the treatment*
- *Ability to weigh up the information*
- *Ability to make a free choice*

2.Voluntariness

3.Enough relevant information

Sign in(Before induction of anesthesia):

- Patient has confirmed:• Identity • Site • Procedure • Consent
- Site marked/not applicable
- Anesthesia safety check completed, Pulse oximeter on patient and functioning
- Does patient have a:
- Known allergy?
- Difficult airway/aspiration risk? No Yes (equipment/assistance available)
- Risk of >500mL blood loss (7mL/kg in children)? If yes , and adequate intravenous access and fluids planned

Intraoperative stage::

✓ The patient arrives in the operating room, sign in
✓ Apply monitoring(ASA standard monitors , invasive monitor)
✓ Large IV cannula
✓ Invasive monitors neuroaxial intervention (spinal epidural) or general anesthesia with endotracheal intubation or LMA insertion
✓ Peripheral nerve block should be in block area before general anesthesia

Time out (Before skin incision):

- occurs in the operating theatre before the start of the operation.
- The team all introduce themselves
- identify the patient and the planned operation and site (including anticipated blood loss),
- any medical concerns about the patient. A check of availability of all equipment and imaging for the proposed operation is also established.
- Confirm all team members have introduced themselves by name, role
- Surgeon, Anesthesia professional and nurse verbally confirm (Patient, Site, Procedure)

Anticipated critical events:

- ✓ Surgeon reviews: what are the critical or unexpected steps, operative duration, anticipated blood loss?
- ✓ Anesthesia team reviews: are there any patient specific concerns?
- ✓ Nursing team reviews: has sterility (including indicator results) been confirmed? Are the equipment, issues or any concerns? Has antibiotic prophylaxis been given within the last 60 minutes? Yes, Not applicable

Sign out (Before patient leaves operating room):

- Nurse verbally confirms with the team:
  I. The name of the procedure recorded That instrument, sponge and needles counts are correct (or not applicable)
  II. How the specimen is labelled (including patient name)
  III. Whether there are any equipment problems to be addressed
- Surgeon, anesthesia professional and nurse review the key concerns for recovery and management of this patient post operatively

Postoperative stage:

- At the end of the operation, the patient is either extubated in the operating theatre (and an oropharyngeal airway inserted if needed) or transferred to the recovery room with an LMA still in situ.
- All patients receive supplemental oxygen during transfer.
- Many patients who do not have a general anesthesia/sedation bypass the recovery room and go straight from the operating theatre to stage 2 recovery in the day surgery unit. Examples include local anesthesia cases (e.g. minor surface surgery, cataract removal, some regional anesthesia cases).

Once in the recovery room:

a handover occurs between the anaesthetist and a recovery nurse. Important information passed on includes:

- patients name and age
- operation details;
- blood loss;
- anaesthetic technique with emphasis on:
  - analgesia given;
  - regional/nerve blocks;
  - antiemetics given;
  - antibiotics;
  - the use of local anaesthetic infiltration;
  - thromboprophylaxis.

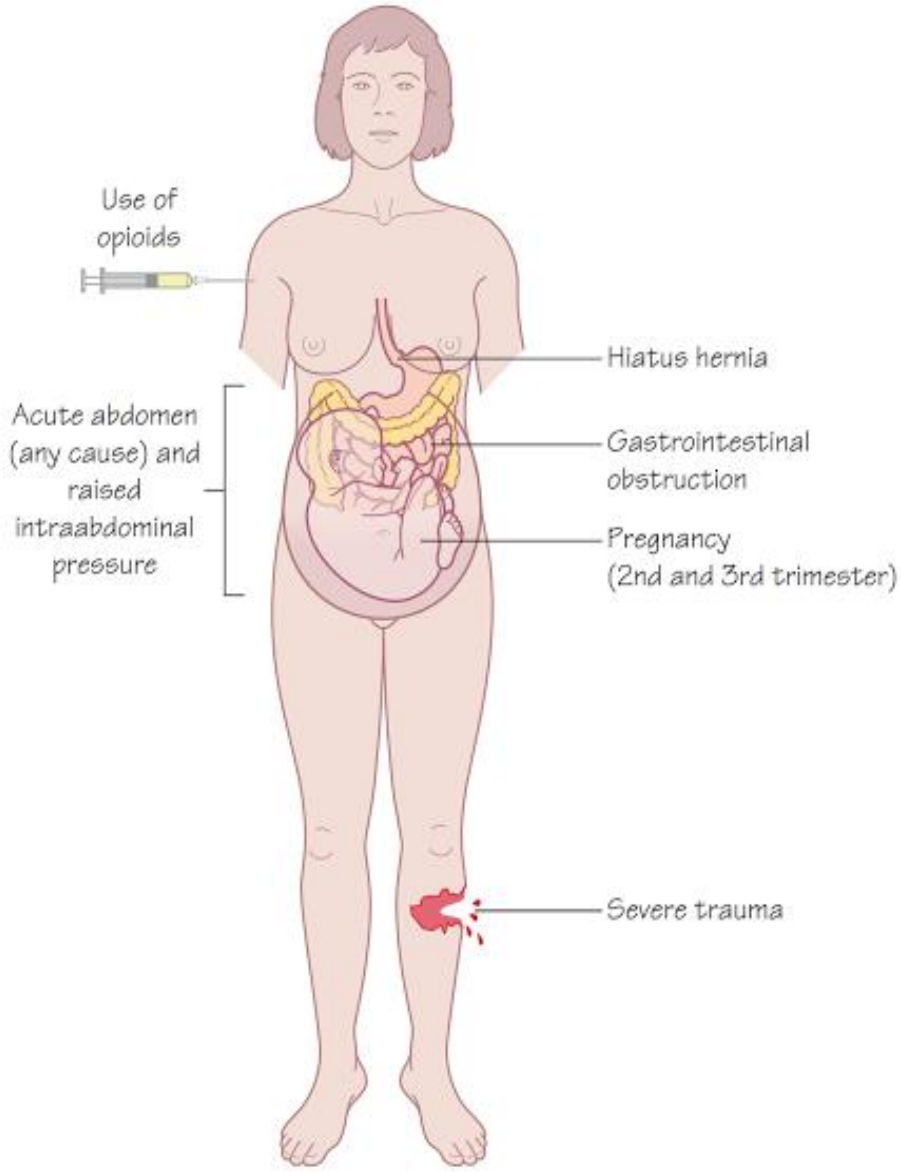
Premedication:

- Patients at risk of gastric aspiration even after fastin
- Gastrointestinal obstruction
- Hiatus hernia
- Pregnancy
- (2nd and 3rd trimester)
- Severe trauma
- Use of opioids
- Acute abdomen (any cause)
- Raised intraabdominal pressure

The 6 As of premedication :

1. Anxiolysis
2. Amnesia
3. Anti-emetic
4. Antacid
5. Anti-autonomic
6. Analgesic

Figure 6.2 Patients at risk of gastric aspiration even after fasting



1. **Anxiolysis :** the best anxiolytic is the anesthetist who visits the patient and listens to the patient
   - benzodiazepines
   - phenothiazines
   - B-blockers
2. **Amnesia:**
   - Lorazepam_ anterograde amnesia
3. **Anti-emetic:**
   - dopamine antagonists
   - antihistamines
   - anticholinergics
   - phenothiazines
   - 5-hydroxytryptamine antagonists
   - a_2- agonists: clonidine, Dexmeditomidine
4. **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
5. **Anti-autonomic:**

Parasympathetic reflexes

   - Excessive vagal activity causing profound bradycardia
   - halothane
   - suxamethonium
   - surgery
   - traction on the extraocular muscles
   - handling of the viscera
   - during elevation of a fractured zygoma
6. **Analgesic**

Note from text book:

- There are various classifications of the urgency of surgery; the most common is the NCEPOD classification: The anesthetist has to ensure that the patient is made as well as they can be made prior to surgery. In immediate cases, there will be no time to effect improvement in the patient's condition beforehand, as resuscitation takes place simultaneously during surgery. emergencies' there are a few hours which can be well spent to reduce risk and improve outcome by careful treatment (vascular access, urinary catheter, nasogastric tube, i.v. fluids). With elective patients there is plenty of time to make the patient as well as they can be (e.g. treatment of hypertension or angina).
- The airway: in order to undertake tracheal intubation (which may be required in any patient) you will need to take a history and examine the airway. From the history, documented difficulties with airway management, cervical spine problems (e.g. previous surgery or ankylosis), trauma or infection to the airway, previous scarring of the head and neck (e.g. radiotherapy or burns) and temporomandibular joint dysfunction all suggest potential problems with tracheal intubation.
- On examination, poor mouth opening, obesity, a receding mandible and inability to protrude the mandible also suggest that tracheal intubation may be difficult.
- cervical spine X ray may be required in those with suspected cervical spine degeneration, surgery and trauma as neck mobility is a key determinant of ease of tracheal intubation.
- Generally, all medication is continued perioperatively except:

• drugs that affect coagulation (warfarin, heparin, aspirin, clopidogrel);

• hypoglycaemics;

• some hypotensive drugs, e.g. ACE inhibitors are stopped only on the day of surgery.

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Color reference:

Black-slids

Green-Notes

Blue-Book

Red-important

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