Preoperative Evaluation & Risk Assessment

Objectives

- Decrease preoperative morbidity and mortality.
- Implement measures to prepare higher risk patients for surgery if necessary.
- Decrease the length of hospital stay.
- Minimize postponed or cancelled surgeries.
- Enhance quality of care.

1-Establishment of a relationship with the patient.

2-Preoperative evaluation.

3-Informed consent.

4-Preoperative patient preparation.

5-Premedication.

Preoperative Evaluation

The ultimate goals of preoperative medical assessment are to:

- Reduce the patient's surgical and anesthetic preoperative morbidity or mortality.

- Return the patient to an acceptable functioning state as quickly as possible.

The Preoperative Evaluation is divided into:

1- History

2- Physical Examination

3- Risk Assessment

4- Investigations

History

- Any other known conditions.
- Past medical history.
- Drug history.
- History of previous anesthesia and any problems or complications associated with it.
  - Post operative nausea and vomiting, jaundice
  - Allergy
  - Malignant hyperpyrexia
  - Difficult airway
  - Difficult IV access
- History of previous surgery.

- Family history.
  - Inherited conditions (Sickle cell anemia, porphyria)
  - Problems with anesthesia

    avoidance of triggering drugs in a patient with a family history of malignant hyperpyrexia.
- Review of systems.
- Time of last oral intake.
- Social history (use of tobacco, alcohol and illegal drugs)
- Pregnancy.
- History of allergies.

- Symptoms of the following problems must be sought in all patients:
  - ischemic heart disease;
  - heart failure;
  - hypertension;
  - conduction defects, arrhythmias;
  - peripheral vascular disease;
  - chronic obstructive lung disease;
  - emphysema;
  - asthma;
  - infection;
  - restrictive lung disease.

Physical Examination

- The physical examination should be done according to the history.
- A focused pre-anesthetic physical examination must include:
  - An assessment of the heart, lungs and airways.
  - Documentation of the vital signs.
  - If any unexpected abnormal findings were found they should be investigated before surgery.

Cardiovascular system

Look specifically for signs of:

- arrhythmias;
- heart failure;
- hypertension;
- valvular heart disease;
- peripheral vascular disease.

Don't forget to inspect the peripheral veins to identify any potential problems with IV access.

Respiratory system

Look specifically for signs of:

- respiratory failure;
- impaired ventilation;
- collapse, consolidation, pleural effusion;
- additional or absent breath sounds.

The airway

All patients must have an assessment made of their airway, the aim being to try and predict those patients who may be difficult to intubate.

Observation of the patient's anatomy

Look for:

- limitation of mouth opening;
- a receding mandible;
- position, number and health of teeth;
- size of the tongue;
- soft tissue swelling at the front of the neck;
- deviation of the larynx or trachea;
- limitations in flexion and extension of the cervical spine.

Special Examination

Mallampati criteria, is a classification based on what structures you can see when the mouth is opened.

Used to assess the airways and the grade given can tell us if it is easy to intubate.

According to the visualized structures we can give a class to the patient.

The patient, sitting upright, is asked to open their mouth and maximally protrude their tongue.

The view of the pharyngeal structures is noted and graded I–IV.

***Grades III and IV* suggest difficult intubation.**

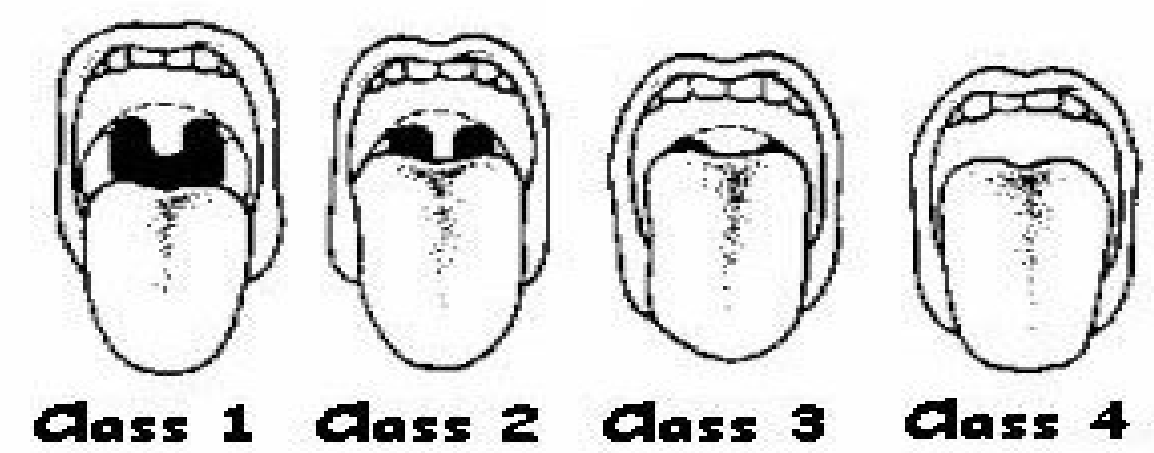
Mainly a person should be able to place 2 fingers in the mouth of the patient when it is maximally opened.

Class I: hard palate, soft palate, fauces, uvula, pillars

Class II: hard palate, soft palate, fauces, portion of uvula

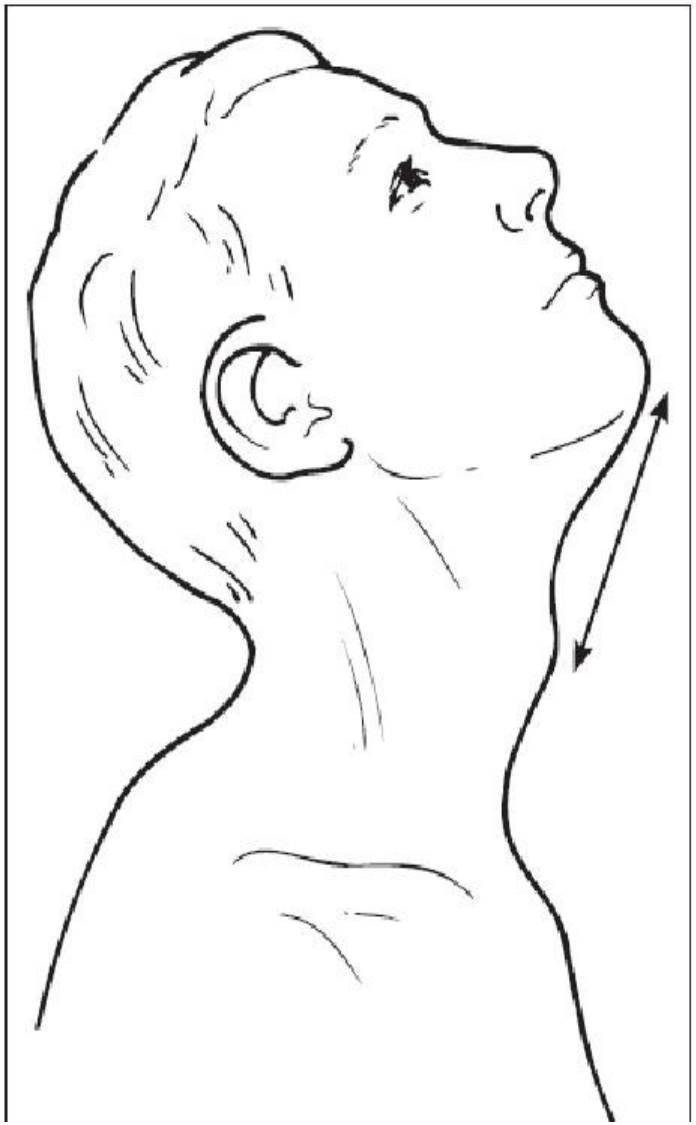
Class III: hard palate, soft palate, base of uvula

Class I



Thyromental distance

With the head fully extended on the neck, the distance betwee the bony point of the chin and the prominence of the thyroi cartilage is measured. A distance ***less than 7 cm*** suggests difficul intubation.



Wilson score

- Increasing weight
- Reduction in head and neck movement
- Reduced mouth opening,
- Presence of a receding mandible
- Buck-teeth

Calder test

The patient is asked to protrude the mandible as far as possible.

The lower incisors will lie either anterior to, aligned with or posterior to the upper incisors.

The latter two suggest reduced view at laryngoscopy.

Risk assessment

Pre-operative risk assessment is multi-factorial and depends on:

- The pre-operative medical condition of the patient
- The invasiveness of the surgical procedure
- The type of anesthetic administered

American Society of Anesthesiologists' Classification of Physical Status

The ASA grading system was introduced originally as a simple description of the physical state of a patient.

It is one of the few prospective descriptions of the **patient general health which correlates with the risk of anesthesia and surgery**. It is extremely useful and should applied to all patients who present for surgery. **Increasing** physical status is associated with **increasing** mortality. Emergency surgery increases risk dramatically, especially in patients in ASA class 4 and 5.

Classification of Physical Status

Status	***Disease State***
ASA class 1	No organic, physiologic, biochemical, or psychiatric disturbance
ASA class 2	Mild to moderate systemic disturbance that may or may not be related to the reason for surgery *Examples*: Heart disease that only slightly limits physical activity, essential hypertension, diabetes mellitus, anemia, extremes of age, morbid obesity, chronic bronchitis
ASA class 3	Severe systemic disturbance that may or may not be related to the reason for surgery, *(does limit activity)* *Examples*: Heart disease that limits activity, poorly controlled essential hypertension, diabetes mellitus with vascular complications, chronic pulmonary disease that limits activity, angina pectoris, history of prior myocardial infarction
ASA class 4	Severe systemic disturbance that is life-threatening with or without surgery *Examples*: Congestive heart failure, persistent angina pectoris, advanced pulmonary, renal, or hepatic dysfunction
ASA class 5	Moribund patient who has little chance of survival but is submitted to surgery as a last resort (resuscitative effort) *Examples*: Uncontrolled hemorrhage as from a ruptured abdominal aneurysm, cerebral trauma, pulmonary embolus.
ASA class 6	A declared brain-dead patient whose organs are being removed for donor purposes
E	An "E" is added to the status number to designate an emergency operation

Assessing cardiovascular risk

The factors which guide decision making include **the patient's cardiovascular risk** and **functional capacity** and the **surgery specific risk.**

Cardiovascular risk

- **Major:** Patients with major predictors have a five times greater preoperative risk.
- **Intermediate:** Proof of well established but controlled coronary artery disease. Diabetes mellitus is included in this category because it is frequently associated with silent ischemia and represents an independent risk factor for preoperative mortality
- **Minor:** Markers of an increased probability of coronary artery disease, but not of an increased preoperative risk.

Major clinical predictors (markers of unstable coronary artery disease)

- Myocardial infarction <6 weeks
- Unstable or severe angina (class III-IV)
- Decompensated congestive heart failure
- Significant arrhythmias (e.g., causing hemodynamic instability)
- Severe valvular disease (e.g., aortic or mitral stenosis with valve area <1.0 cm^2)
- CABG or PTCA <6 weeks

Intermediate clinical predictors (markers of stable coronary artery disease)

- Previous myocardial infarction >6 weeks and <3 months (>3 months if complicated) based on the history or the presence of pathologic Q waves
- Mild angina (class I-II)
- Silent ischemia (Holter monitoring)
- Compensated congestive heart failure, ejection fraction <0.35
- Post CABG or PTCA >6 weeks and <3 months, or >6 yr, or with anti-anginal therapy
- Diabetes mellitus
- Renal insufficiency

Minor clinical predictors (increased probability of coronary artery disease)

- Familial history of coronary artery disease
- Age >70 yr
- ECG abnormalities (arrhythmia, LVH, left bundle branch block)
- Low functional capacity
- History of stroke
- Uncontrolled systemic hypertension
- Hypercholesterolemia
- Smoking
- Post infarction (>3 months), asymptomatic without treatment
- Post CABG or PTCA >3 months and <6 yr, and no symptoms of angina nor anti-anginal therapy

CABG= coronary artery bypass grafting, PTCA= percutaneous transluminal coronary angioplasty, LVH=left ventricular hypertrophy

Functional Capacity:

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An example of functional capacity is ***exercise tolerance*** which is a major determinant of preoperative risk .

Assessment of exercise tolerance

An indication of cardiac and respiratory reserves can be obtained by asking the patient about their ability to perform everyday physical activities before having to stop because of symptoms of chest pain, shortness of breath, etc.

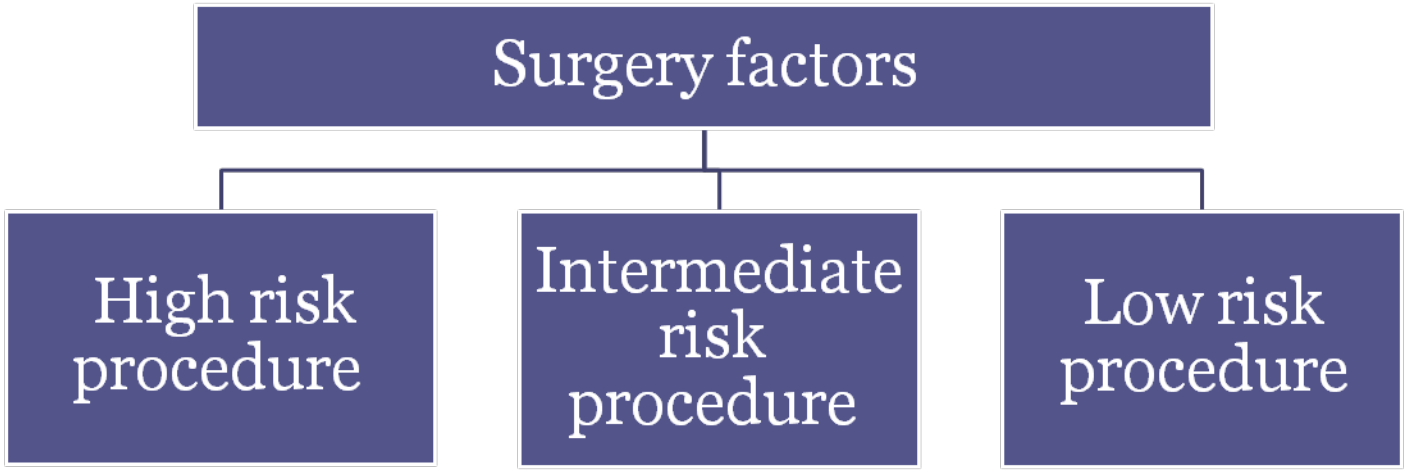
Exercise tolerance

- How far can you walk on the flat?
- How far can you walk uphill?
- How many stairs can you climb before stopping?
- Could you run for a bus?
- Are you able to do the shopping?
- Are you able to do housework?
- Are you able to care for yourself?

The problem with such questions is that they are very subjective and patients often tend to overestimate their abilities!

Surgery specific risk

Can be stratified into three categories, according to their level of preoperative physiological stress.



High risk procedures (cardiac complication rate >5%) Emergency surgery Aortic and major vascular surgery Prolonged surgical procedures with large fluid shifts or blood loss Unstable hemodynamic situations
Intermediate risk procedures (cardiac complication rate 1-5%) Abdominal or thoracic surgery Neurosurgery ENT procedures Minor vascular surgery, including carotid endarterectomy Orthopedic surgery Prostatectomy
Low risk procedures (cardiac complication rate <1%) Breast surgery Superficial surgery Eye surgery Endoscopic procedures Plastic and reconstructive surgery Ambulatory surgery

Previous Myocardial Infarction

- The risk after a previous infarction is less related to the age of the infarction than to the functional status of the ventricles and to the amount of myocardium at risk from further ischemia.

- The Practice Guidelines consider :

- The first **6 weeks after a infarction** are considered a time of **high risk for a preoperative cardiac event**.

- The period **from 6 weeks to 3 months** is **of intermediate risk**.

- In uncomplicated cases**, no benefit** can be demonstrated for delaying surgery **more than 3 months** after an ischemic accident

Assessing pulmonary risk

- A careful **history** taking and **physical examination** are the most important parts of preoperative pulmonary risk assessment.
- The presence of either ***obstructive*** *or* ***restrictive*** *pulmonary disease* increased the risk of developing preoperative respiratory complications.
- ***Asthma*** should be **under control** and the patient should **be free of wheezing.**
- Patients with ***obstructive sleep apnea*** (OSA) are prone to postoperative hypoxemia quickly after emergence from general anesthesia.

If an acute upper respiratory tract infection is present, anesthesia and elective surgery should be postponed unless it is for a life-threatening condition.

Diabetes Mellitus

- Preoperative morbidity and mortality are greater in diabetic than in non-diabetic patients.
- When a diabetic patient needs surgery, it is important to remember that he or she is more likely to be harmed by neglect of the long term complications of diabetes than from the short term control of blood glucose levels.

Diabetes Mellitus

- The diabetic patient who needs elective surgery should be carefully assessed preoperatively for symptoms and signs of peripheral vascular, cerebrovascular and coronary diseases.

- Co-existing pathologies must be identified and carefully managed preoperatively.

- A high index of suspicion for myocardial ischemia or infarction should be maintained throughout the pre-operative period. Unexplained hypotension, arrhythmias, hypoxemia or ECG changes develop because myocardial infarction may be clinically silent if the diabetic patient has autonomic neuropathy.

Adequate control of blood glucose concentration (< 180 mg/dL) must be established pre-operatively and maintained until oral feeding is resumed after operation.

Oral hypoglycemic agents are withheld the day of surgery for an agent with a short half-life and up to 48 hrs pre-operatively for a long acting agent such as chloropropamide.

A combination of glucose and insulin is the most satisfactory method of overcoming the metabolic consequences of starvation and surgical stress in diabetic patient.

Complications of perioperative hyperglycemia

1. Dehydration
2. Impaired wound healing.
3. Inhibition of white blood cell chemotaxis and function (associated with an increased risk of infection).
4. Worsened CNS and spinal cord injury under ischemic or hypoxic conditions.
5. Hyperosmolarity leading to hyperviscosity and thrombogenesis.

A glucose level >180 mg/dL (10 mmol/L) results in osmotic diuresis; glycosuria may lead to dehydration and increases the risk of urinary tract infection. As a general rule in a 70 kg patient, 1 unit/hr of regular insulin lowers the glucose by approximately 25-30 mg/dL (1.5 mmol/L).

Complications of perioperative hypoglycemia

- Hypoglycemia may develop post-operatively due to the residual effects of long-acting oral hypoglycemic agents or insulin preparations given preoperatively, in addition to preoperative fasting.
- Recognition of hypoglycemia in the preoperative period may be delayed because anesthetics, analgesics, sedatives and sympatholytics agents and could alter the usual presenting symptoms of hypoglycemia.
- In addition, diabetics with autonomic neuropathy have blunting of the adrenergic symptoms associated with hypoglycemia. These symptoms generally begin with ***confusion, irritability, fatigue and headache and may progress to seizures, focal neurologic deficits, coma and death.***

thank you