# Preoperative Assessment
# &
# Preparation for Anesthesia

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# General Considerations

# Safer anesthesia and surgery

- Globally it is estimated that 234 million surgical procedures are performed each year
- Of these, 7 million patients suffer harm and 1 million die
- Up to 50% of this harm may be preventable
- Major complications are estimated to occur in 3–17% of in-patient surgical procedures

# Why do complications occur?

- Some adverse outcomes are unavoidable, such as those resulting from complex surgery performed in high-risk patients, but many arise from preventable errors

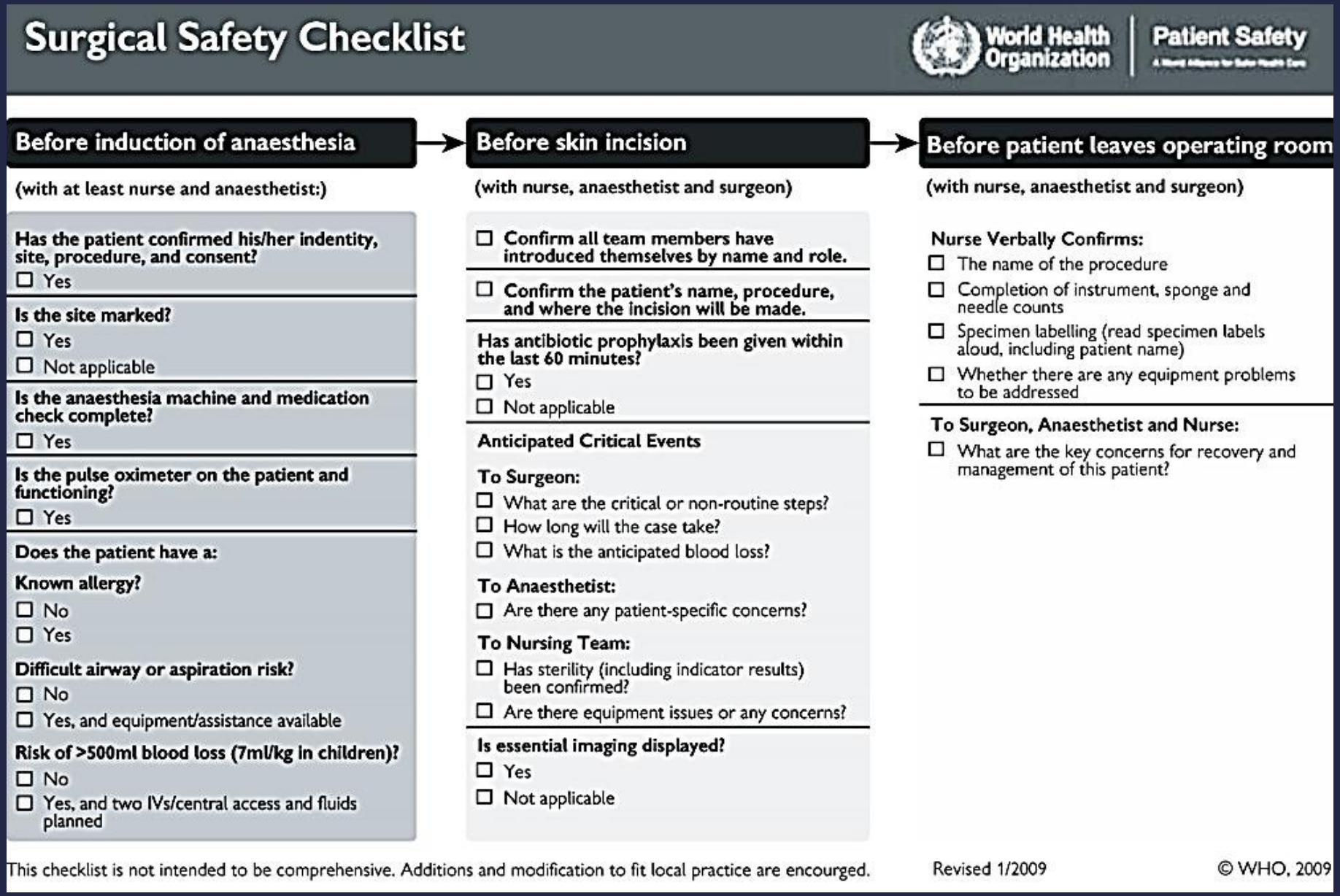
- Common underlying human factors include deficiencies in communication, leadership, team-working, decision-making and situational awareness

# Why do complications occur?

- During the journey from referral to surgery and discharge, multiple healthcare professionals interface with a patient

- If one step in care is omitted (e.g. comprehensive assessment, administration of prophylactic antibiotics or administration of DVT prophylaxis) serious consequences may follow

# WHO Guidelines for Safe Surgery ( 2009 )



## Surgical Safety Checklist

World Health Organization | Patient Safety

### Before induction of anaesthesia

(with at least nurse and anaesthetist:)

**Has the patient confirmed his/her indentity, site, procedure, and consent?**
- ☐ Yes

**Is the site marked?**
- ☐ Yes
- ☐ Not applicable

**Is the anaesthesia machine and medication check complete?**
- ☐ Yes

**Is the pulse oximeter on the patient and functioning?**
- ☐ Yes

**Does the patient have a:**

**Known allergy?**
- ☐ No
- ☐ Yes

**Difficult airway or aspiration risk?**
- ☐ No
- ☐ Yes, and equipment/assistance available

**Risk of >500ml blood loss (7ml/kg in children)?**
- ☐ No
- ☐ Yes, and two IVs/central access and fluids planned

### Before skin incision

(with nurse, anaesthetist and surgeon)

- ☐ **Confirm all team members have introduced themselves by name and role.**
- ☐ **Confirm the patient's name, procedure, and where the incision will be made.**

**Has antibiotic prophylaxis been given within the last 60 minutes?**
- ☐ Yes
- ☐ Not applicable

**Anticipated Critical Events**

**To Surgeon:**
- ☐ What are the critical or non-routine steps?
- ☐ How long will the case take?
- ☐ What is the anticipated blood loss?

**To Anaesthetist:**
- ☐ Are there any patient-specific concerns?

**To Nursing Team:**
- ☐ Has sterility (including indicator results) been confirmed?
- ☐ Are there equipment issues or any concerns?

**Is essential imaging displayed?**
- ☐ Yes
- ☐ Not applicable

### Before patient leaves operating room

(with nurse, anaesthetist and surgeon)

**Nurse Verbally Confirms:**
- ☐ The name of the procedure
- ☐ Completion of instrument, sponge and needle counts
- ☐ Specimen labelling (read specimen labels aloud, including patient name)
- ☐ Whether there are any equipment problems to be addressed

**To Surgeon, Anaesthetist and Nurse:**
- ☐ What are the key concerns for recovery and management of this patient?

This checklist is not intended to be comprehensive. Additions and modification to fit local practice are encourged.

Revised 1/2009

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# Briefing& Debriefing

| | |
|---|---|
| Briefing | Introduction of team members and roles<br>Patients and procedures planned<br>Confirmation of order of list<br>Specific equipment (anaesthesia and surgery) required<br>Any concerns relevant to the day |
| Debriefing | Thanks to team members for specific actions<br>Factors that went well that were useful lessons<br>Factors that could be improved for next time |

# Preoperative Assessment

# Objectives of Preoperative Evaluation

- To take history and perform physical examination of the patient
- To review medical records including past anesthetic records
- To get laboratory studies
- To determine physical status and anticipate difficulties
- To plan anesthetic management
- To explain risks and obtain consent
- To develop anesthetist-patient rapport
- To make advanced preparation as regard facilities, equipment and expertise, to enhance patient safety and minimize the chance of errors

# History

- Patient’s medications:
  - Aspirin, insulin, antihypertensives, MAO inhibitors, lithium, anticoagulants, etc.
- Any allergy
- Past hospitalization, any anesthesia/operation
- Family history
- Any addiction: Smoking, alcohol, drugs
- Any associated illness:
  - Metabolic, endocrinal, renal, hepatic, cardiac, pulmonary disease, sexually transmitted disease, hepatitis, HIV
- Menstrual history in case of females

# Associated illness needing further investigations

- Central nervous system:
  - Cerebrovascular insufficiency, convulsion.
- Cardiovascular system:
  - Chest pain, myocardial infarction, hypertension, rheumatic fever, palpitations, dysrhythmias
- Respiratory system:
  - Dyspnea, cough, bronchospasm, pneumonia, smoking, upper respiratory infection

# Associated illness needing further investigations

- Liver:
  - Alcoholism, hepatitis, jaundice
- Kidney:
  - Polyuria, pyuria
- Endocrine system:
  - Diabetes mellitus, adrenal dysfunction, thyroid dysfunction
- Miscellaneous:
  - Allergy, bleeding tendency, myalgia, arthritis, osteoporosis, strabismus, etc.

# Common medications and anesthetic implications

- Aspirin:
  - Bleeding tendency, platelet dysfunction
- Alcohol abuse:
  - Resistance to anesthetic drugs
- Antibiotics:
  - Potentiation of muscle relaxants
- Antihypertensives:
  - Impaired sympathetic nervous system activity, hypertensive crisis

# Common medications and anesthetic implications

- Beta blockers:
  - Bradycardia, bronchospasm
- Benzodiazepines:
  - Potentiation of muscle relaxants, resistance to anesthetic drugs
- Calcium channel blockers:
  - Interaction with muscle relaxants, hypotension

# Common medications and anesthetic implications

- MAO inhibitors:
  - Increased response to sympathomimetic drugs
- Lithium:
  - Potentiation of muscle relaxants, impaired thyroid function
- Digitalis:
  - Dysrhythmias
- Diuretics:
  - Hypotension, hypovolemia, hypokalemia
- Anticoagulant therapy:
  - Excessive bleeding

# Physical Examination

- Vital signs:
  - Pulse, respiration, blood pressure, body temperature
- General:
  - Weight, weakness
- Airway examination:
  - Cervical spine:
    - Head mobility, mobility of temporomandibular joint
  - Teeth :
    - Central incisor prominence, artificial teeth, if any, loose teeth, attempt of visualize uvula, any lesion in mouth

# Physical Examination

- Airway examination:
  - Thyromental distance:
    - (Normal more than 6.5 cm)
  - Nose and throat:
    - Sore throat, sinusitis, epistaxis, deviated nasal septum, dysphagia, sunken
    - Patency of nares
  - Opening of mouth
  - Appearance of neck (long or short)

# Physical Examination

- Respiratory:
  - Breathing rate and pattern, any moist sound, wheezing, cough, sputum, emphysema, pneumonia, tuberculosis, bronchitis
- Cardiac:
  - Heart rate, rhythm, murmur, blood pressure, pulse, peripheral edema, dyspnea, orthopnea, veins, heart failure
- Central nervous system:
  - Level of consciousness, numbness, paralysis, skeletal muscle dysfunction, convulsion

# Physical Examination

- Gastrointestinal system:
  - Nausea/vomiting, constipation, diarrhea, jaundice, hepatitis
- Hematologic:
  - Bruising, anemia, bleeding
- Endocrine system:
  - Diabetes, thyroid dysfunction
- Urinary system:
  - Nocturia, dysuria, hematuria, incontinence
- Prosthesis, if any:
  - Eye glasses, contact lens, hearing aid, ornaments, ring

# Physical Examination

- Miscellaneous:
  - Examination of eye; examination of ear, extremities:
    - Claudication, thrombophlebitis, arthritis
  - skin examination:
    - Rashes, wounds, infection; psychiatric problems, anxiety
  - Breath holding test:
    - It is the time to hold his breath after full inspiration
    - Normal more than 25 seconds. Less than 15 seconds indicates severely diminished cardiorespiratory reserve
  - Match test:
    - Patient is asked to blow off the lighted match stick with his open mouth at a distance 15 cm
    - Failure indicates low maximum breathing capacity

# Preoperative investigations

- Blood examination
  - TC, DC, hemoglobin, hematocrit
- Blood biochemistry
  - Glucose, urea, nitrogen, creatinine, electrolytes, liver enzymes
- Urine analysis
- Coagulation studies
  - Prothrombin time, platelet count, partial thromboplastin time

# Preoperative investigations

- Chest X-ray
- Electrocardiogram
- Pulmonary function tests
  - FEV1, vital capacity, peak expiratory flow rate Arterial blood gas study, pH
  - Normal Values :
    - Vital capacity 5 liters
    - FEV1 4 liters
    - PEFR 600 liters/min
    - PaO2 75 to 100 mm Hg
    - PaCO2 36 to 46 mm Hg

# ASA physical status index

- Grade 1: Normal healthy patient
- Grade 2: Patient with mild/moderate systemic disease
- Grade 3: Patient with severe systemic disease that causes functional limitation
- Grade 4: Patient with incapacitating systemic disease that causes a constant threat to life
- Grade 5: Moribund patient not expected to survive 24 hours without operation
- Emergency Operation E: Any patient in whom emergency operation is required. Here the suffix E is added

# Factors for selection of anesthetic technique

- Safety of the patient
- Coexisting systemic disorders
- Site of operation
- Elective or emergency procedure
- Age of the patient
- Preference of the patient, if any
- Ability of the anesthetist concerned
- Convenience of the surgeon

# Preanesthetic routine preparation

- Psychological support, reassurance
- No food/drink for at least 6 hours before anesthesia
- Urinary bladder should be emptied before taken to OR
- False teeth, artificial limbs, artificial eyes, contact lenses, shoes, ornaments, etc. should be taken off
- No tight clothing, no lipstick, no nail varnish
- Adequate oral hygiene
- Identification label should be checked
- Consent for anesthesia/surgery is mandatory
- Resuscitative drugs, fluids, etc.
- Preanesthetic medication. It should be given in adequate dose and at proper time

# Common causes of postponement of operation

- Acute respiratory infection
- Coexisting systemic illness not under optimal control
- Lack of adequate resuscitation facilities
- Full stomach
- Non-availability of written consent
- Failure to obtain recent investigation reports

# Fasting (NPO)

- Pulmonary aspiration of gastric contents, even 30–40ml, is associated with significant morbidity and mortality
- Factors predisposing to regurgitation and pulmonary aspiration include:
  - inadequate anesthesia (Light anesthesia)
  - Pregnancy
  - Obesity
  - Difficult airway
  - Emergency surgery
  - Full stomach
  - Altered gastrointestinal motility

# Fasting (NPO)

- Gastric physiology:
  - Clear fluids (water, fruit juices without pulp, clear tea, and black coffee) are emptied from the stomach in an exponential manner with a half-life of 10–20min
  - This results in complete clearance within 2hr of ingestion
  - Gastric emptying of solids is much slower than for fluids and is more variable
  - Foods with a high fat or meat content require 8hr or longer to be emptied from the stomach, whereas a light meal such as toast is usually cleared in 4hr
  - Milk is considered a solid because when mixed with gastric juice, it thickens and congeals
  - Cows' milk takes up to 5hr to empty from the stomach
  - Human breast milk has a lower fat and protein content and is emptied at a faster rate

# Fasting (NPO)

- Fasting before anesthesia aims to reduce the volume of gastric contents and hence the risk should aspiration occur

# Fasting Guidelines

- Recommendations on preoperative fasting in elective, healthy patients were issued by the American Society of Anesthesiologists (ASA) in 1999

| Ingested material | Minimum fast |
|---|---|
| Clear liquids | 2hr |
| Breast milk | 4hr |
| Light meal, infant formula, and other milk | 6hr |

# Fasting Guidelines

- Delayed gastric emptying should be expected in:
  - DM, renal failure, sepsis, trauma and pain
  - Decreased gastric motility e.g. head injury
  - Pyloric obstruction, G-E reflux
  - Increased intra-abdominal pressure e.g. pregnancy& obesity
  - Opioids causes marked delays in gastric emptying

# Chemical control of gastric acidity and volume

- Sodium citrate solution (non-particulate antacid) administered shortly before induction is the agent of choice in high-risk cases (e.g. pregnancy)
- $H_2$ blockers/proton pump inhibitors (e.g. ranitidine) decrease secretion of acid in the stomach and should be used for high-risk patients

# Chemical control of gastric acidity and volume

- Gastric motility enhancing agents (prokinetic drugs) such as metoclopramide increase gastric emptying in healthy patients
- For emergency cases, metoclopramide 10 mg& ranitidine 50mg IV should be given at the earliest opportunity in addition to oral Na citrate (30 mL 0.3 molar solution)
- Pregnant patients should be given ranitidine 150mg on the evening before elective surgery and again 2hr preoperatively
- During labour, high-risk patients should be given oral ranitidine, 150mg 6-hourly
- For emergency cases, ranitidine 50mg IV should be given at the earliest opportunity
- In addition, 30ml of 0.3M sodium citrate should be given to neutralize any residual gastric acid

# Prophylaxis of Venous Thromboembolism

- DVT and PE are referred to as venous thromboembolism (VTE)
- Pulmonary embolism (PE) is responsible for 10% of all hospital deaths
- Without prophylaxis, 40–80% of high-risk patients develop detectable DVT and up to 10% die from PE
- Most PEs result from DVTs which start in the venous plexuses of the legs and which then extend proximally
- Calf vein DVT is detectable in up to 10% of low-risk patients but seldom extends into proximal veins

# Why there is increased risk of VTE in perioperative period?

- Hypercoagulability caused by surgery, cancer, or hormone therapy
- Stasis of blood in the venous plexuses of the legs during surgery and postoperatively
- Any patient confined to bed is at risk of venous thromboembolism
- Interference with venous return (pregnancy, pelvic surgery, pneumoperitoneum)
- Dehydration
- Poor cardiac output

# How to assess the risk of VTE?

- Risk of VTE is influenced by:
  - The type of operation,
  - Patient factors, and
  - Associated diseases
- Type and duration of operation:
  - Major joint replacements (hip and knee) and surgery to the abdomen and pelvis
  - Operations with total surgery and anesthesia time >90min are high risk (or >60min for operations on the pelvis or lower limbs)

# How to assess the risk of VTE?

- Patient factors:
  - Previous history of DVT or PE, thrombophilia (or family history)
  - Pregnancy, puerperium, estrogen therapy (contraceptive pill, HRT)
  - Age >60yr (risk increases with age)
  - Obesity and immobility
  - Varicose veins

# How to assess the risk of VTE?

- Associated diseases:
  - Malignancy
  - Trauma (especially spinal cord injury and lower limb fractures)
  - Heart failure, recent myocardial infarction
  - Systemic infection
  - Lower limb paralysis (e.g. after stroke)
  - Hematological diseases (polycythemia, leukemia, paraproteinemia)
  - Nephrotic syndrome
  - Inflammatory bowel disease

# Methods of prophylaxis against VTE

- General measures:
  - Avoidance of prolonged immobility (encourage early mobilization)
  - Avoidance of dehydration

# Methods of prophylaxis against VTE

- Subcutaneous (SC) heparin:
  - SC heparin reduces the incidence of DVT and fatal PE by about two-thirds
  - Unfractionated (ordinary) heparin has been largely replaced by the newer (LMWHs), which may be more effective and cause fewer bleeding complications
  - They have the added advantage of less frequent administration but are more expensive

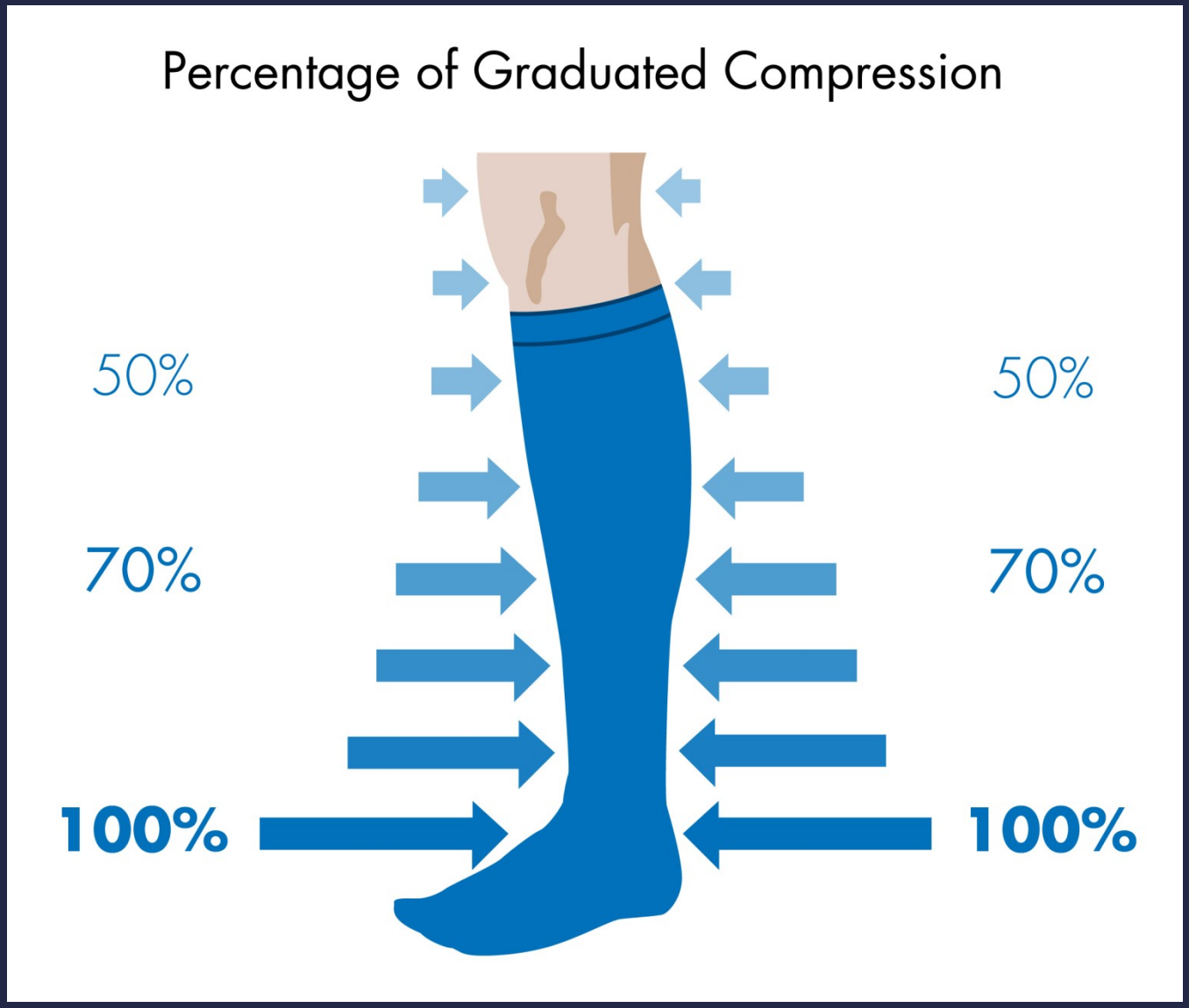
# Methods of prophylaxis against VTE

- Synthetic anticoagulants:
  - Fondaparinux sodium
  - Rivaroxaban and dabigatran

# Methods of prophylaxis against VTE

- Graduated compression stockings (antiembolism stockings)
  - These reduce the risk of DVT but are not proven to reduce PE
  - Better protection when used in combination with pharmacological prophylaxis
  - Stockings are advisable for all patients having laparoscopic procedures
  - Stockings should be avoided in patients with severe arterial disease of the legs (check ankle systolic pressure if in doubt) and used with special care in diabetics, who may have neuropathy and arterial disease

# Graduated compression stockings



# Methods of prophylaxis against VTE

- Intermittent pneumatic compression devices:
  - These devices compress the leg (35–40mmHg) for about 10s every minute, promoting venous flow
  - They are as effective as heparin in reducing the incidence of DVT
  - They are used particularly in orthopedic practice to avoid the bleeding risks of heparin, or in combination with heparin

# Methods of prophylaxis against VTE

- Intermittent pneumatic compression device



# Methods of prophylaxis against VTE

- Warfarin, dextran and aspirin:
  - Warfarin is used most often in orthopedic practice
  - Dextran (Dextran 40) is as effective as SC heparin in preventing DVT and PE but is not often used because it requires IV infusion. Fluid overload is a risk and anaphylaxis can occasionally occur
  - Aspirin and other antiplatelet agents should not be regarded as adequate prophylaxis against VTE
  - They may increase the risk of bleeding and are sometimes stopped for a week before surgery particularly clopidogrel (Plavix)

# Methods of prophylaxis against VTE

- Choice of anesthetic:
  - Local anesthesia eliminates lower limb immobility associated with general anesthesia
  - Regional anesthesia (spinal/epidural) appears to be protective in certain kinds of surgery, especially hip/knee replacement

# Oral contraceptive pills (OCPs) and VTE

- The risk of spontaneous venous thrombosis is increased in women taking combined OCPs, particularly third-generation pills containing desogestrel or gestodene
- OCPs may increase the risk of perioperative thromboembolism by up to 3–4 times
- The risk may decrease the longer an individual takes a combined OCP
- Progestogen-only OCPs (and injectable progestogens) do not increase the risk of DVT or PE

# Hormone replacement therapy (HRT) and VTE

- HRT increases the incidence of spontaneous VTE, but there are no good data on perioperative risk
- Stopping HRT may cause recurrence of troublesome menopausal symptoms
- It is prudent to consider stopping HRT 4 weeks before major surgery, but it is common practice to continue HRT and to use prophylaxis (pharmacological and stockings)

# Consent and anesthetic risk

# Consent

- It is a legal and ethical principle that valid consent must be obtained before starting treatment, physical investigation, or providing personal care for a patient
- Health professionals who carry out procedures without valid consent are liable to legal action by the patient and investigation by the General Medical Council or equivalent professional bodies
- Valid consent implies it is given voluntarily by a competent and informed person not under duress

# Consent

- To have capacity for consent, the patient must be able to comprehend and remember the information provided, weigh up the risks and benefits of the proposed procedure, and consider the consequences of not having the procedure in order to make a balanced decision
- Consent may be expressed, either written or verbal, or implied, e.g. holding out one’s arm for a blood test

# Consent

- Adults are presumed to have capacity to consent unless there is contrary evidence
- Doctors must respect patient autonomy and their right to be involved in decisions that affect them
- If an adult with capacity makes a voluntary and appropriately informed decision to refuse treatment this decision must be respected
- This is the case even when this may result in death of the patient and/or the death of an unborn child, whatever the stage of the pregnancy

# Treatment without consent

- In an emergency, consent is not necessary for life-saving procedures
- Unconscious patients may be given essential treatment without consent
- Patients who are ‘incompetent’ may be given treatment provided it is in their ‘best interests’

- Documentation: after discussion with the patient , the agreed anesthetic and postoperative plan should be documented in the patient’s medical records, including a list of risks explained

# Anesthetic Risk

- At the preoperative visit discussion of risks associated with anesthesia should be easy to understand and should include all risks that a ‘reasonable patient’ considers significant
- These can range from common but minor side effects to rare but serious complications
- There’s no legal requirement to discuss every possible complication and side effect but the patient must be warned of any common or serious risks

# Anesthetic Risk

- Communication of risks is important as people vary in how they interpret words and numbers, e.g. a very common side effect of anesthesia, such as sore throat, may happen on more than one in ten occasions (1:10) whereas death due to anesthesia is very rare (<1:100 000)

| 1 in 10 | 1 in 100 | 1 in 1000 | 1 in 10 000 | 1 in 100 000 |
|---|---|---|---|---|
| Very common | Common | Uncommon | Rare | Very rare |
| Someone in a family | Someone in a street | Someone in a village | Someone in a small town | Someone in a large town |

# Anesthetic Risk

- The mnemonic BRAN offers a useful approach when assessing the risks of a course of action:
  - Benefits,
  - Risks,
  - Alternatives,
  - what would happen if Nothing were done

# Anesthetic Risk

| Risk level (ratio) | Verbal scale | Anaesthetic/medical examples |
|---|---|---|
| 1:1–9 | Very common | Pain 1:2 (day surgery) |
| Single digits | | Transient ptosis after eye block 1:2 at 24hr (1:5 at 1 month) |
| | | Sore throat 1:5 (ETT) |
| | | Delirium after #NOF 1:2 |
| | | PONV 1:3 |
| | | Transient diplopia after eye block 1:4 |
| | | Postop cognitive dysfunction (>60yr) 1:4 at 1wk |
| | | Shivering 1:4 |
| | | Dizziness 1:5 |
| | | Headache 1:5 |
| | | Backache 1:5 (surgery <1hr), 1:2 (surgery >4hr) |
| | | Transient arterial occlusion following cannulation 1:5 |
| | | Transient deafness after spinal 1:7 |
| 1:10–99 | Common | Thrombophlebitis 1:10 |
| Double digits | | Severe pain (major surgery) 1:10 |
| | | Dural puncture headache 1:10 (day surgery) |
| | | Postop cognitive dysfunction (>60yr) 1:10 at 3 months |

| | | |
|---|---|---|
| | | Pneumothorax 1:20 (supraclavicular block) |
| | | Transient blurred vision after GA 1:20 |
| | | All oral trauma following intubation 1:20 |
| | | Sore throat from LMA 1:25 |
| | | CVA or death 1:15 for carotid endarterectomy (symptomatic) |
| | | CVA or death 1:25 for carotid endarterectomy (asymptomatic) |
| | | Disabling CVA or death 1:50 for carotid endarterectomy (all) |
| | | CVA 1:50 if previous stroke |
| | | Emergency surgery death 1:40 (at 1 month) |
| | | Difficult intubation 1:50 |
| | | Brachial plexus neurapraxia 1:50 (regional block) |
| | | Urinary dysfunction 1:50 (spinal/epidural) |
| 1:100–999<br>Hundreds | Moderately common | CVA 1:100 (general surgery) |
| | | Loss of vision (cardiac surgery) 1:100 |
| | | Permanent postop cognitive dysfunction (>60yr) 1:100 |
| | | Dural puncture headache following spinal 1:100 |
| | | Permanent complications of arterial cannulation 1:100 |
| | | Arterial puncture at subclavian vein cannulation 1:200 |
| | | Periop death 1:200 (at 1 month) or 1:500 (at 2 days) |

| Risk level (ratio) | Verbal scale | Anaesthetic/medical examples |
|---|---|---|
| | | Awareness without pain 1:300 |
| | | Ulnar neuropathy 1:300 (GA) |
| | | Awareness (TIVA) 1:500 |
| | | Failure to intubate 1:500 |
| | | Cerebral seizures 1:500 (brachial plexus block) |
| | | Corneal abrasion (GA) 1:600 |
| | | Brainstem anaesthesia following ophthalmic block 1:700 |
| 1:1000–9999 | Uncommon | Neuropathy post GA (other than ulnar) 1:1000 |
| Thousands | | Systemic LA toxicity 1:1500 (regional blocks) |
| | | Cerebral seizures 1:4000 (IV regional LA) |
| | | Pulmonary artery perforation 1:2000 |
| | | Awareness with pain 1:3000 |
| | | Aspiration pneumonitis 1:3000 |
| | | Cardiac arrest 1:1500 (spinal) or 1:3000 (LA) |
| | | Damage to teeth (GA) requiring treatment 1:4500 |
| | | Permanent neuropathy at peripheral nerve block 1:5000 |
| | | Retrobulbar haemorrhage following eye block 1:5000 |

| | | |
|---|---|---|
| | | Epidural abscess after epidural catheter 1:5000 |
| | | Failure to intubate/ventilate 1:5000 |
| | | Death related to anaesthesia 1:5000 (ASA 3/4) |
| 1:10 000–99 999 | Rare | Anaphylaxis 1:10 000 |
| Tens of thousands | | Systemic LA toxicity 1:10 000 (epidural) |
| | | Spontaneous epidural abscess 1:10 000 |
| | | Globe perforation at eye block 1:10 000 |
| | | Idiopathic deafness (GA) 1:10 000 |
| | | Cardiac arrest 1:10 000 (epidural or regional block) |
| | | Spontaneous sensorineural hearing loss (no anaesthesia) 1:10 000 (GA even rarer) |
| | | Cardiac arrest 1:15 000 (GA)—with 15% death rate |
| | | Death (related to anaesthesia) 1:50 000 |
| | | Cranial nerve palsies (spinal) 1:50 000—commonest abducens |
| 1:100 000–999 999 | Very rare | Death (related to anaesthesia) 1:100 000 (ASA 1/2) |
| Hundreds of thousands | | Paraplegia (spinal/epidural) 1:100 000 |
| | | Loss of vision (GA) 1:125 000 |
| | | Epidural haematoma 1:150 000 (epidural), 1:200 000 (spinal) |
| | | Death due solely to anaesthesia 1:180 000 |
| | | Cranial subdural haematoma (after spinal) 1:500 000 |

| Risk level (ratio) | Verbal scale | Anaesthetic/medical examples |
|---|---|---|
| 1:1 000 000–9 999 999<br>Millions | Excessively rare | Spontaneous epidural haematoma (no anaesthesia) 1:1 000 000 |
| >1:10 000 000<br>Tens of millions or billions | Exceptional | |

# Summary of important factor which should minimize the risk of accidents during anesthesia and the risk of litigation against the anesthetist

- Careful preoperative assessment should be undertaken to identify risk factors such as concurrent disease, chronic medication history of allergy or other untoward reactions to anesthesia, and potential difficulties in tracheal intubation
- Anesthetic equipment must be maintained according to the manufacturers' recommendations, and checked thoroughly before every operating theatre session, or when the equipment is changed during an operating session
- The anesthetic technique should be recognized as appropriate for the individual patient and for the proposed type of surgery
- The anesthetist must be present at all times during anesthesia

# Summary of important factor which should minimize the risk of accidents during anesthesia and the risk of litigation against the anesthetist

- Appropriate monitoring, in accordance with national recommendations, should be used at all times during anesthesia and in the immediate recovery period. Alarms should be set at appropriate levels and must not be disabled
- At the end of anesthesia, the anesthetist should transfer the care of the patient only to an appropriately qualified recovery room nurse
- All anesthetists should be taught how to manage uncommon emergencies, such as failed intubation, anaphylaxis or malignant hyperthermia
- It is advisable to have protocols available in every anaesthetizing location to act as an aide-memoire for uncommon emergencies, and anesthetists and operating room staff should rehearse emergency management on a regular basis

Thank you