

## **Master of Medicine (Anaesthesiology) Part B Syllabus**

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## **C1 Airway, Oxygenation and Ventilation**

<b>Airway Management:</b>
Anatomy
Anatomy of the Airway and Respiratory System (including Applied Anatomy) in adults and paediatrics
Anatomy of structures within the neck and chest including radiological interpretations of X-ray, CT scan and MRI correlations
Airway Assessment: History and Physical Examination (Bedside tests)
Clinical indications and limitations of non-radiological airway tests e.g. flexible nasendoscopy and spirometry (flow-volume loops)
Patients requiring airway protection: Assessment and Management
Potential difficult airway: Features, management and guidelines
<b>Airway Management: Equipment</b>
Required for basic or routine airway management: including those available on airway trolley, suction, laryngoscopes etc
Devices to facilitate ventilation including nasal, oral airway, supraglottic airways etc
Available endotracheal tube types including their characteristics, indications and contraindications, advantages and disadvantages
Intubation and tube change adjuncts including bougie, tube exchangers, intubating LMAs
Difficult airway management: Available devices on difficult airway trolley and to assist maintaining ventilation and/or oxygenation
<b>Airway Management: Guideline and Techniques</b>
Routine or Basic Management: including confirmation of appropriate airway (including supraglottic airway device and endotracheal tube) placement.
Difficult airway management: Elective condition including known difficult airway, unstable cervical spine, awake intubation, airway anaesthesia, gaseous induction etc
Difficult airway management: Emergent or unexpected or suboptimal condition: bleeding or combative patient etc
Management of a 'can't intubate, can't oxygenate' situation
Management of oxygenation of the patient with an unexpected difficult airway
Indication, risks, advantages, disadvantages and technique of 'Front of neck access': Surgical airway or cricothyroidotomy
Management of the the acutely obstructed airway at various location/levels
Management of shared airway
<b>Oxygenation:</b>
Oxygen supply
Measurement of oxygen concentration: principles and equipment
Measurement of oxygenation: principles and equipment
Hypoxaemia and different types of respiratory failure
Methods of improving oxygenation with or without oxygenation including Continuous Positive Airway Pressure (CPAP) and Positive End-expiratory Pressure (PEEP)
Preoxygenation: Basis; changes with physiology and pathology; and clinical uses
Adverse effects of oxygen and oxygen therapy

ECMO: Principles, Indications and Complications
<b>Ventilation</b>
Spontaneous ventilation: at rest, changes in activity and environment.
Spontaneous ventilation: changes with age, pregnancy and obesity
Indications and effects of positive pressure ventilation and positive end-expiratory pressure.
Classifications of ventilators: flow generation verses pressure generation
Classifications of ventilation modes: including invasive and non-invasive
Alternative ventilation modes including jet ventilation, high frequency ventilation
Ventilation strategies: modifications for physiological changes and pathological conditions.
Measurement and interpretation of ventilation parameters including pressure, volume, flow etc
Other assessment of ventilation: including arterial blood gas, lung/pleural ultrasound etc
Nebulizers, Humidifiers, Drug Delivery Systems (Nitric Oxide, Others)
<b>Respiratory failure</b>
Pathophysiology, Classification
Management: Non ventilatory and Ventilatory management
Other management adjuncts: nitric oxide, steroids, Veno-venous Extracorporeal membrane oxygenation (VV ECMO)
<b>Extubation</b>
Clinical features that indicate a patient can be extubated safely
Optimisation of the patient for extubation
Extubation strategies for 'high risk' extubation situations
Handover of 'high risk' extubation patient
<b>Complications involving airway, oxygenation and ventilation: e.g.</b>
<ol style="list-style-type: none"> <li>1. Bronchospasm,</li> <li>2. Laryngospasm,</li> <li>3. Post obstructive (negative pressure) pulmonary oedema,</li> <li>4. Aspiration (including risk factors and measures to reduce these).</li> <li>5. Respiratory Failure</li> <li>6. Complications at extubation</li> <li>7. Complications of mechanical ventilation: volutrauma, barotrauma</li> </ol>

## **C2 Sedation and General Anaesthesia**

Premedication: role and pharmacology
Agents used to induce and/or maintain state of sedation or anaesthesia: pharmacology and use in different physiological and pathological conditions
Balanced anaesthesia: concepts and components
Physiological changes associated with anaesthesia
Physiological changes in perioperative period including the effects of fasting, surgery, trauma, bleeding etc
Physiological changes due to positioning or conditions induced for/during surgery (e.g. pneumoperitoneum, hypothermia)
Monitoring of physiological changes under anaesthesia/ during surgery (refer Part A syllabus on Clinical Monitoring)
Management of physiological changes induced by anaesthesia and surgery
Equipment for maintenance of state of anaesthesia (refer to Part A syllabus on Equipment)
Safety considerations in operating theatre (refer to Part A syllabus on Safety)
Procedures necessary for induction of anaesthesia: Airway, invasive lines for monitoring etc (covered in respective chapters)
Complications of anaesthesia: 1. Trauma; Pressure effects; Burns 2. Awareness 3. Neurologic: Confusion, delirium, cognitive dysfunction, failure to awaken 4. Chronic Environmental Exposure; Fertility, Teratogenicity, Carcinogenicity 5. Temperature: hypothermia 6. Hyperthermia: Malignant and Non-malignant 7. Anaphylaxis: including latex 8. Nausea and vomiting 9. Neuromuscular consequences: residual paralysis, muscle soreness
Special Techniques/Issues: Controlled hypotension, hypothermia, high altitudes etc

### **C3 Local and Regional Anesthesia**

<b>General Considerations for Regional Anaesthesia</b>
Indications/Contra-indications and Risks vs Benefits
Consent – Fundamentals, Principles and Considerations specific for RA
Operating room preparation
Patient safety issues: e.g. time out check, correct site confirmation, injection site preparation
Monitoring Standards
Applied Anatomy (Reference Part A Syllabus on Anatomy)
Applied Pharmacology (Reference Part A Syllabus on Pharmacology)
Role of Sedation
Physiological consequence of RA
Medications affecting the outcome of regional anaesthesia (bleeding, physiological response, additives)
Complications associated with regional anaesthesia: Early and Late
Post-procedural follow-up
Role of RA in Evidence based Enhanced recovery after surgery (ERAS) Programmes
<b>Equipment (Reference to Part A Equipment)</b>
Equipment for delivery of local anaesthetic: e.g. regional block needles
Equipment for safe and accurate delivery of local anaesthetics
<b>Specific Techniques</b>
Single shot versus Continuous catheter techniques
Central neuraxial blocks
Major nerve plexus (brachial, lumbosacral, cervical plexus) blocks
Peripheral nerve blocks of specific nerves: ilioinguinal, penile, wrist, ankle blocks etc
Intra-venous regional anaesthesia (Bier's block)

## C4 Trauma, resuscitation and crisis management

<b>Resuscitation and Crisis Management</b>
<b>Generic immediate management</b>
<b>Generic after crisis management: family, patient (disclosure and follow-up) and team</b>
<b>Responding to and managing Patients with Specific Acute Physiological Derangements:</b> <ol style="list-style-type: none"><li>1. Dyspnoea</li><li>2. Hypoxaemia</li><li>3. Hypocapnoea/hypocarbica</li><li>4. Hypercapnoea/hypercarbica</li><li>5. Laryngospasm</li><li>6. Bronchospasm</li><li>7. Respiratory arrest</li><li>8. Tachycardia or Bradycardia</li><li>9. Hypotension or Hypertension</li><li>10. Cardiac arrest</li><li>11. Hyperthermia</li><li>12. High airway pressures during positive pressure ventilation</li><li>13. Oliguria/anuria</li><li>14. Failure to wake from anaesthesia</li><li>15. Perioperative confusion, delirium and cognitive dysfunction</li></ol>
<b>Responding to and Managing Patients with Specific Pathological Presentations:</b> <ol style="list-style-type: none"><li>a. Tension pneumothorax</li><li>b. Aspiration of gastric contents</li><li>c. Severe bronchospasm/ Asthma /exacerbation of COPD</li><li>d. Pulmonary embolism</li><li>e. Shock: Hypovolaemic</li><li>f. Shock: Distributive including neurogenic shock</li><li>g. Shock: Cardiogenic</li><li>h. Shock: Obstructive</li><li>i. Cardiac tamponade</li><li>j. Acute myocardial ischaemia and/or infarction</li><li>l. Arrhythmias causing haemodynamic compromise</li><li>m. Acute pulmonary oedema</li><li>n. Aortic dissection</li><li>o. Massive haemorrhage, including haemoptysis</li><li>p. Local anaesthetic toxicity</li><li>q. Anaphylaxis</li><li>r. Malignant hyperthermia</li><li>s. Gas embolism</li><li>t. Fat embolism</li><li>u. Coma</li><li>v. Raised intracranial pressure</li><li>w. Ischaemic and haemorrhagic stroke</li><li>x. Prolonged seizures</li><li>y. Coagulopathy in association with surgery or trauma</li><li>z. Electrolyte abnormalities: e.g. Hyperkalemia and hypokalemia</li></ol>

<b>Specific Knowledge and Skills Set by Systems</b>
<b>Cardiovascular related conditions:</b> Placement of invasive lines: Central Venous and Arterial Catheterization Pericardiocentesis Using Defibrillation and Cardioversion Using Cardiac Pacemakers
<b>Respiratory related conditions (reference Airway, Oxygenation and Ventilation):</b> Establishing artificial airway and ventilatory control Managing patients with respiratory failure and life-threatening hypoxaemia Acute management of tension pneumothorax Acute management of pleural effusion
<b>Neurological Conditions:</b> Assessment and evaluation of altered mental state including neurological examination and scoring of the Glasgow Coma Scale Assessment and evaluation of acute neurological deficits
<b>Metabolic and electrolyte disturbances</b> a. Hyper/hypokalemia b. Hyper/hyponatremia c. Hyper/hypoglycemia d. Hyper/hypocalcemia e. Hyper/hypophosphataemia f. Hyper/hypomagnesmia g. Severe acid base disturbance including metabolic acidosis h. Thyroid storm i. Addisonian crisis j. Diabetic ketoacidosis k. Hyperosmolar, hyperglycaemic state l. Hypo-osmolar states m. Rhabdomyolysis n. Acute drug intoxication / poisoning, including the following: Alcoholic; Paracetamol; Organophosphate; Opioid; Antidepressants; Benzodiazapines (Reference Part A)
<b>Environmental and equipment factors:</b> a. An operating room fire b. Electrical power failure in the operating suite c. Failure of pipeline gas supply d. Anaesthesia machine and ventilator malfunction e. Breathing circuit malfunctions such as stuck valves and massive leaks.
<b>Management of Major Trauma, Burns, Mass Casualty and Warfare</b>
Assessment and management of trauma patient according to Advanced Trauma Life Support (ATLS), or equivalent protocols
Perform a Primary and Secondary survey
Adept to the influence of age, body mass index (BMI), pregnancy, concurrent medical conditions and medications
Preparation prior to the arrival of the trauma patient to the hospital
Assessment and management of the patient with severe burn injury
Preparation and management of equipment and personnel in event of a mass casualty, biological and/or chemical warfare

**Assessment and initial management of injuries associated with the following accidents/trauma.**

- a. Electrocution
- b. Drowning and near drowning
- c. Severe hypothermia
- d. Envenomation

**Management of Massive Haemorrhage**

- a. Assessment, classification and management of haemorrhage.
- b. Complications and consequence of haemorrhage
- c. Coagulopathy associated with trauma and haemorrhage
- d. Principles of fluid replacement therapy
- e. Use of blood products, including red blood cell concentrate, plasma, platelets and coagulation factors.
- f. Use of various coagulation adjunctive medications

**Management of Blood and Blood Products Transfusions:** including preservation and storage of blood and blood products, process of transfusion, reactions and management of reactions of transfusions

**Transfer of Patients:**

Transfer of critically ill patients within institution, between different institutions and between different countries  
Process for arranging a patient transfer  
Challenges, difficulties and limitations of transferring critically ill patients by road or air



## C5 Perioperative Medicine

<b>Preoperative Management</b>
Assessment: Routine medical/surgical history, physical findings and investigations
Assessment: Routine Airway
Assessment: Specific to different physiological states and/or acute or chronic disease states (refer below)
Assessment: Specific to surgical pathology or surgical techniques
Risk assessment
Factors improving surgical and long-term outcomes
Strategies for prehabilitation and patient optimisation and the limits of such strategies
Strategies to minimise the use of blood products
Premedication, Fasting and management of chronic drug therapy (refer to Part A syllabus)
Medical-legal considerations including consent, risk counselling, refusal of treatment and resuscitation status
Strategies to minimise post-operative cognitive dysfunction
Principles of enhanced recovery pathways
<b>Postoperative Management</b>
Requirements and set-up of the post-anaesthesia care unit
Acute Pain Management
Consequences of and its management of Anaesthesia and Surgical Incisions:
a. Respiratory
b. Cardiovascular
c. Neurologic and Neuromuscular
d. Gastrointestinal: Nausea and Vomiting
Role of a multidisciplinary team approach to improve patient recovery and discharge
<b>Different Physiological States:</b>
1. Obstetrics patients (Reference to obstetrics anaesthesia)
2. Paediatric patients (Reference to paediatric anaesthesia)
3. Overweight and obese patient
4. Geriatrics patients
<b>Common or important medical conditions:</b>
<b>Respiratory System</b>
a. Obstructive disease
b. Restrictive disease
c. Pulmonary hypertension
d. Infection: e.g. Upper respiratory tract infection
e. Patient with respiratory disease for non-thoracic surgery versus thoracic surgery.
f. Tobacco Usage

**Cardiovascular system:**

- a. Ischemic Heart Disease
- b. Valvular Heart Disease
- c. Rhythm Disorders and Conduction Defects
- e. Pacemaker and/or Automated Implantable Cardioverter/Defibrillator (AICD)
- f. Heart Failure and Cardiomyopathy
- g. Cardiac Tamponade and Constrictive Pericarditis
- h. Pulmonary Embolism: subacute and/or history of
- i. Hypertension

**Shock states****Vascular Diseases**

- a. Cerebral circulation: TIAs; risks of CVAs; cerebral aneurysms
- b. Peripheral arteriosclerotic disease
- c. Aneurysms of ascending, descending and arch of aorta

**Nutrition:** Malnutrition and optimisation

**Gastro-intestinal and Hepatic conditions:**

Hepatic dysfunction

Intestinal Obstruction

Gastro-oesophageal reflux disease and hiatus hernia; gastro-oesophageal sphincter incompetency

**Renal Impairment****Endocrine Conditions:**

- a. Pituitary Disease
- b. Thyroid Disease
- c. Parathyroid
- d. Adrenal Disease
- e. Pheochromocytoma
- f. Carcinoid Syndrome
- g. Diabetes Mellitus

**Haematological Disorders**

- a. Anemias
- b. Polycythemias;
- c. Clotting disorders
- d. Antiplatelets and anticoagulants medications

**Neuromuscular Disease (classified based on level of lesion)**

- a. Epilepsy, old CVA, prev head injury/ICH/SAH/SDH etc
- b. Parkinson's disease / cerebellar disease
- c. Spinal cord injury
- d. Peripheral nerves: e.g. demyelinating diseases (multiple sclerosis, Guillain-Barre Syndrome), Charcot-Marie-Tooth Disease; motor neuron diseases: amyotrophic lateral sclerosis, spinobulbar muscular atrophy, hereditary spastic paraplegia
- e. Primary muscle diseases
  - i. muscular dystrophies: Duchenne's, Becker's, limb-girdle, congenital, myotonic
  - ii. mitochondrial myopathies c) Channelopathies
  - iii. Myasthenic syndromes
  - iv. myasthenia gravis
  - v. Lambert-Eaton myasthenic syndrome
  - vi. Congenital myasthenic syndromes
  - vii. Ion channel myotonias
  - viii. acquired neuromyotonia
  - ix. myotonia congenita`
  - x. hyperkalemic periodic paralysis, paramyotonia congenita, postassium-aggravated myotonia
  - xi. hypokalemic periodic paralysis

**Rheumatological/autoimmune disorders**

- a. Rheumatoid arthritis
- b. Scleroderma
- c. Ankylosis spondylitis
- d. SLE and other conditions

## C6 Ethical, Medical-Legal issues, Safety, Quality improvement and Evidence Based Medicine

### **Ethical and Medical-Legal issues**

1. Informed consent
2. Professionalism
3. Credentialing and privilege to practice
4. Advance Directives/Do Not Resuscitate (DNR)
5. Patient Privacy Issues.
6. Medical errors
7. Open disclosures
8. Costs of Medical/Anaesthesia Care, Operating Room Management
9. End of life decision making.
10. HOTA and related issues
11. Research ethics.

### **Patient and Staff Safety**

1. Definitions:
2. Medication Errors, Reporting, Root cause analysis and Disclosures
3. Safety Practices: Guidelines,
4. Non-technical skills
5. Staff impairment or disability

Infection control

Quality improvement

Biostatistics and Evidence based Medicine/Practice - paper critic (Reference Part A Syllabus)

Research: Clinical trial (Reference Part A Syllabus)

## S1 Critical Care Medicine

Applied Pharmacology:(Reference Part A Syllabus)
Applied Physiology:(Reference Part A Syllabus)
Clinical Monitoring:(Reference Part A Syllabus)
<b>General Care:</b>
Indication and goals for admission
Scoring systems to assess severity
Universal precautions and infection control
Nutrition
Analgesia and sedation
Effect of critical illness on the pharmacokinetics and pharmacodynamics of sedative and analgesic agents
Weaning of sedative and analgesics agents
Use of muscle relaxants
Nosocomial infections
Complications of prolonged intensive care
Transfer of critically ill patients
Communication: inter-disciplinary and patient/relatives
<b>Sepsis and multi-organ dysfunction:</b>
Sepsis, severe sepsis and systemic inflammatory response syndrome (SIRS)
Mechanisms of organ dysfunction
Goal directed therapy of sepsis
Antimicrobial agents
Preventing infection in intensive care
<b>Acute circulatory failure and cardiovascular disorders</b>
Shock
Monitoring: Cardiac output, Tissue perfusion, Arterial blood gases (Reference Part A)
Heart Failure
CVS support: Pharmacological (Reference Part A)
Cardiac arrhythmias
Pulmonary embolic disorders
Cardiac arrest
<b>Respiratory failure and intensive care of respiratory disorders (Reference Airway Oxygenation and Ventilation)</b>
Respiratory failure
Principles of management of respiratory failure (Refer to C1: Airway Oxygenation, Ventilation)
Conditions that lead to respiratory failure
Complications of intubation and ventilation
Strategies for weaning patients off ventilatory support
Upper airway obstruction
Tracheostomy
<b>Renal and fluid and electrolyte disorders</b>

Acute renal failure in the critically ill patient
Conditions which can lead to acute renal failure
Renal replacement therapy
Fluid and electrolyte, and acid-base disturbances in the critically ill patient
Postoperative care of the renal transplant recipient
<b>Metabolic and endocrine disorders</b>
Metabolic response to trauma, surgery and critical illness
Acute metabolic and endocrine conditions
<b>Neurological and neuromuscular disorders</b>
Determinants, control and monitoring of:
a. Intracranial and intraspinal pressure,
b. Cerebral blood flow,
c. Spinal cord perfusion.
Pathophysiology, assessment and management of specific conditions:
a. Acute traumatic brain injury,
b. Raised intracranial pressure
c. Prolonged seizures,
d. Acute spinal cord injury
e. Hemiplegia, paraplegia, quadriplegia.
f. Delirium
g. New neurological impairment
h. Neurological deterioration (due to various vascular causes)
i. Cerebral vasospasm
j. Diabetes insipidus,
k. Cerebral salt wasting
l. Neurosurgical patients postoperatively,
m. Encephalitis and meningitis
n. Persistent vegetative state
Confirmation of brain death, issues with communication to family and medico-legal considerations
Management of the brain-dead patient/ potential organ donors
<b>Gastrointestinal disorders</b>
Assessment and management of the following intra-abdominal conditions:
a. Oesophageal perforation
b. Gastrointestinal haemorrhage
c. Acute pancreatitis
d. Acute and acute on chronic liver failure
e. Abdominal sepsis;
f. Ischemic bowel
g. Bowel perforation
h. Intestinal obstruction
i. Major abdominal trauma
j. Post-major abdominal surgery
<b>Haematological and oncological disorders (reference Trauma)</b>

Coagulopathy due to:
a. Trauma
b. Medications
c. Disseminated intravascular coagulation
Use of anti-coagulants for prevention and management of venous and arterial thrombosis and thromboembolism
Management of anaemia and thrombocytopaenia
Blood products and transfusion reactions
<b>Obstetric patient (Reference Obstetrics Anaesthesia)</b>
Consideration and requirements
Resuscitation
Specific conditions:
a. Severe pre- eclampsia and eclampsia
b. Post-partum haemorrhage
c. Amniotic fluid embolism

## S2 Pain Medicine

Pain Physiology and Anatomy (Reference Part A Syllabus)
Pain Pharmacology (Reference Part A syllabus)
Consideration with use of controlled medications
<b>Clinical Approach: General Principles</b>
Biopsychosocial model
Differentiate: a. Acute versus Chronic pain b. Nociceptive versus Neuropathic pain c. Somatic versus Visceral pain d. Background versus breakthrough pain
Acute pain progressing to chronic pain
Impact of psychological and social factors e.g.: a. Mood: depression and anxiety b. Placebo effect c. Active and passive coping strategies d. Illness behaviour e. Compensation and third-party issues
Multimodal and multidisciplinary pain management
Complications of pain management modalities
<b>Clinical Approach: Specific Conditions</b>
Specific to Acute Pain Conditions: a. Traumatic, post-operative and acute and acute on chronic medical conditions: inflammatory, neurological, haematological, immunological, iatrogenic. b. Multimodal and multidisciplinary management plan c. Considerations: Type of procedure, fast track surgery and enhanced recovery d. Organisation of perioperative pain management services
Specific to Chronic Pain Conditions: a. Multimodal and multidisciplinary management plan of: i. Nociceptive pain: ii. Neuropathic pain iii. Inflammatory conditions iv. Central sensitization conditions b. Describe the basis of, indications and contra-indications of, effects of and evidence for: i. pharmacological therapy of neuropathic pain ii. pharmacological therapy of chronic visceral and somatic pain iii. opioid usage in chronic pain iv. interventional pain therapy
<b>Clinical Approach: Specific Patient groups</b>



Multimodal and multidisciplinary management plan for situations:

- a. Opioid tolerant, opioid dependent or addicted patients presenting with acute pain
- b. Altered physiology: Extremes of age (young and old), Pregnancy and breastfeeding,
- c. Co-morbidities such as obstructive sleep apnoea, renal or hepatic impairment.
- d. Patients with cancer

### S3 Obstetrics Anaesthesia and Analgesia

Peri-partum changes in maternal anatomy and physiology (Reference Part A)
Implications for anaesthesia
Changes in physiological and biochemical reference ranges in pregnancy (Reference Part A)
Pharmacological impact of pregnancy (Reference Part A)
Maternal-Fetal and Fetal physiology (Reference Part A)
Perioperative management of a pregnant patient: General Principles
Perioperative management of a pregnant patient: Caesarean Section
Analgesia techniques for labour and delivery: Options, Risks, Consent, Complication management
<b>Complications during Pregnancy</b>
<b>Problems presenting during pregnancy and delivery</b>
a. Anaesthesia for cervical cerclage or non-obstetric surgery
b. Ectopic pregnancy
c. Spontaneous abortion
d. Gestational trophoblastic disease (hydatid mole)
e. Heart disease (valvular disorders, pulmonary hypertension, congenital heart disease, arrhythmias, cardiomyopathy)
f. Hypertension (chronic, pregnancy-induced, pre-eclampsia)
g. Neurologic (seizures, myasthenia, spinal cord injury, multiple sclerosis, subarachnoid hemorrhage)
h. Respiratory conditions (asthma, respiratory failure)
i. Renal impairment
j. Acute fatty liver of pregnancy, cholestasis associated with pregnancy
k. Endocrine (thyroid, diabetes - preexisting and gestational, pheochromocytoma)
l. Haematological (sickle cell anemia, idiopathic thrombocytopenic purpura, von Willebrand disease, disseminated intravascular coagulation (DIC), anticoagulant therapy, Rh and ABO incompatibility)
m. Autoimmune disorders (lupus, anti-phospholipid syndrome)
n. Human immunodeficiency virus infection
o. Morbid obesity
p. Substance abuse
q. Trauma in pregnant patient

**Problems of term and delivery**

- a. Intrapartum fetal assessment (fetal heart rate monitoring such as cardiotocography and basic interpretation of assuring and non-assuring traces, fetal scalp blood gases, fetal pulse oximetry)
- b. Preeclampsia, HELLP syndrome and eclampsia
- c. Supine hypotensive syndrome
- d. Aspiration of gastric contents
- e. Embolic disorders (amniotic fluid embolism, pulmonary thromboembolism)
- f. Antepartum haemorrhage (placenta previa, abruptio placenta, uterine rupture)
- g. Postpartum haemorrhage (e.g. uterine atony, placenta accreta)
- h. Cord prolapse
- i. Uterine rupture
- j. Retained placenta
- k. Dystocia, malposition, and malpresentation (breech, transverse lie)
- l. Fever and infection
- m. Preterm labor
- n. Vaginal birth after cesarean section (VBAC)
- o. Multiple gestation
- p. Assisted vaginal birth
- q. Foetal death in utero

**Maternal collapse and resuscitation:**

- a. General principles
- b. Diagnosis and specific management:
  - i. Thromboembolism
  - ii. Amniotic fluid embolism
  - iii. Air embolism
  - iv. Anaphylaxis
  - v. Local anaesthetic toxicity
  - vi. High spinal
  - vii. Massive haemorrhage
  - viii. Eclampsia
  - ix. Maternal sepsis

**Resuscitation of Newborn**

- a. Apgar scoring
- b. Umbilical cord blood gas measurements
- c. Techniques and pharmacology of resuscitation

## S4 Paediatric Anaesthesia

### Normal anatomy and physiology of neonates, infants and children (Reference Part A for neonatal aspects)

- a. Cardiovascular:
  - i. Transitional circulation
  - ii. Normal parameters across the different age range
- b. Respiratory and airway
  - i. Development, anatomy, surfactant
  - ii. Pulmonary function/lung volumes in children vs adults and implications
  - iii. Airway differences that occur as a child develops from infancy to adulthood
  - iv. Normal respiratory parameters
- c. Neurological
  - i. Normal developmental milestones
  - ii. Assessment of GCS in children
- d. Thermoregulation
  - i. Thermogenesis and heat loss in children
  - ii. Thermoneutral zone
- e. Renal function development and implications on
  - i. Fluid and electrolyte requirements
  - ii. Drug handling
- f. Hepatic function development and implications on
  - i. Glucose metabolism
  - ii. Drug handling
- g. Nutritional requirements
- h. Haematological
  - i. Physiological anemia
  - ii. Fetal haemoglobin versus adult hemoglobin
  - iii. Coagulation
- i. Immunological development
  - i. Vaccination

### Pharmacological differences from adults:

- a. pharmacodynamic and pharmacokinetic profiles
- b. Drug toxicities preferentially occurring in children
- c. Effects of anaesthetics on neurodevelopment

### Psychological aspects

### Perioperative Management of neonatal and paediatric patient:

#### Specific Medical Issues

- a. The premature neonate and problems related to prematurity
- b. The ex-premature infant
- c. The sick neonate/ critically ill child/ assessment of the circulatory system: e.g. degree of dehydration
- d. The syndromic/ dysmorphic child: e.g. Trisomy 21

- e. Paediatric medical problems and implications for anaesthesia
  - i. Atopy: Asthma; Allergic rhinitis; Eczema
  - ii. Congenital heart disease
  - iii. Obstructive sleep apnoea
  - iv. Stridor and causes
  - v. Neuromuscular disease: Cerebral palsy; Epilepsy; Muscle disease e.g. Duchenne's/ Becker's muscular dystrophy, myotonias, Spinal muscular atrophy etc
  - vi. Developmental delays/ autism/ learning difficulties
  - vii. Gastrointestinal disease
  - viii. Endocrine/metabolic
  - ix. Oncology: Ca & Tx, Immuno-compromised, Anterior mediastinal mass
  - x. Rheumatology
  - xi. Haematological
  - xii. Primary immune deficiency in childhood (SCID severe combined immune deficiency)
  - xiii. Skeletal abnormalities

### **Specific Preoperative Issues**

Medical legal issues relating to paediatric practice in respect of Consent, Assent, Restraint and Research and the concept of 'Gillick competence'

Fasting guidelines; Preop instructions and Premedication

Child with the potentially full stomach: Rapid sequence induction/ modification

Management of patients and parents and carers in patients with cognitive, communication or behavioural problems

### **General Intra-operative Issues**

Anaesthetic Agents and Techniques: Induction & induction agents; neuromuscular blockade and RA

Fluid therapy and blood replacement

Management of difficult paediatric airway

Recognition and management of airway obstruction in children

Equipment for neonatal/paediatrics patients:

- a. Breathing circuits
- b. Airway equipment
- c. Mechanical ventilation:
- d. Thermal Control:

Clinical Monitoring in Paediatrics

### **Specific Anaesthetic Intraoperative Issues**

Congenital Heart and Major Vascular Disease: impact on and of anaesthesia

Neonatal Emergencies: types and implications

Anaesthetic implications and requirements for Common Non-neonatal Paediatric Subspecialty Surgery

Drowning and near-drowning

Burns: difference in paediatrics

**Paediatric Resuscitation (Reference Crisis Management)****a. Basic life support****b. Specific management**

Cardiac arrest

Respiratory arrest

Laryngospasm

Bronchospasm

Aspiration of gastric contents

Tension pneumothorax

Shock

Anaphylaxis

Latex allergy

Sepsis

Post-tonsillectomy haemorrhage

Gas embolism

Fat embolism

Raised intracranial pressure

Local anaesthetic systemic toxicity

Malignant hyperthermia

Coagulopathy

Life threatening glucose, electrolyte or acid-base disturbances

Electrocution

Poisoning

**Specific Post-operative Issues**

Postoperative agitation

Postoperative Nausea and Vomiting

**Other Issues**

Paediatric sedation

Paediatric Pain management

Outpatient Paediatric Anaesthesia: indications/contraindications; selection; anaesthesia considerations and techniques; postoperative issues and management

Paediatric Anaesthesia Outside the Operating Theatre

## S5 Neurosurgery and Neuroradiology

Basic Sciences: Anatomy, Pathophysiology, Pharmacology, Clinical and Radiological features: (Reference Part A)
Clinical Grading of subarachnoid haemorrhage (WFNS, Hunt and Hess)
Radiological features of common acute neurosurgical conditions
<b>Neurosurgical procedures: anaesthetic considerations and management plan</b>
<b>Elective Procedures</b>
Craniotomy for tumor surgery: location of tumor; role of anaesthesia technique; positioning; complications
Craniotomy for neurovascular surgery: variety and implications of pathology; management of occulsions or rupture/bleeding
Spine surgery: unstable spine or spinal injury; airway management; monitoring
Spinal fluid shunt surgery
Craniotomy for movement disorders/epilepsy: awake craniotomy
<b>Emergency Procedures</b>
Craniotomy/Craniectomy for Traumatic Brain Injury (TBI): ICP management; monitoring of CBF and perfusion; secondary brain injury/ cerebral protection; fluid management;
Craniotomy for intracerebral haemorrhage
Prioritisation of surgery in a polytrauma patient
<b>Neuro-radiological procedures: implication of location and set-up</b>
<b>Elective</b>
Interventional radiology for intracranial vascular pathology
<b>Emergency</b>
Interventional radiology for emergency clot retrieval
<b>Neurosurgical specific emergency or crisis</b>
Venous Air Embolism
Intraoperative Aneurysm rupture
Refractory intracranial hypertension in traumatic brain injury

## S6 Cardiac surgery and interventional cardiology

<b>Preoperative Issues:</b>
Perioperative assessment of: a. Myocardial ischaemia b. Cardiac rhythm c. Preload d. Left ventricular systolic and diastolic function e. Right ventricular function and pulmonary artery pressure f. Valve pathologies g. Intra-cardiac and extra-cardiac shunts h. Congenital heart disease in adult patients
Initial medical management of specific conditions: a. acute thoracic aortic dissection b. acute myocardial infarction c. cardiogenic shock d. cardiac tamponade
Anxiety management in patients presenting for cardiac surgery.
Management of chronic medications e.g. antiplatelets, anti-coagulation, anti-hypertensive etc
Cardiac Risk Assessment
Management: patients with cardiac disease requiring non cardiac surgery
<b>Intraoperative:</b>
Monitoring: specific issues a. Cardiac output estimation. b. Invasive lines e.g. Pulmonary artery catheter, interpretation data / waveforms c. Echocardiography
Surgical Aspects of commonly encountered cardiac procedures e.g.: Coronary artery bypass both on and off pump; Aortic and mitral valve replacement; Repair of aortic dissection including principles of spinal cord protection
Indications for cardiopulmonary bypass and ECMO in non-cardiac surgery procedures
Anaesthesia considerations/technique for the following cardiac surgical procedures including haemodynamic goals: a. Coronary artery bypass b. Aortic and mitral valve replacement c. Cardiac tamponade d. Minimally invasive techniques
Cardiopulmonary bypass techniques a. Components (pump, oxygenator, heat exchanger, filters) b. Mechanisms of gas exchange c. Priming solutions, haemodilution d. Maintenance of anaesthesia during this period e. Cooling and warming, deep hypothermic circulatory arrest f. Intraoperative myocardial protection: physiology, pharmacologic, techniques, complications g. Potential neurocognitive effects and cerebral protection h. Renal protection i. Implications of aortic disease for aortic cannulation j. Reperfusion injury, ischaemic and pharmacologic preconditioning k. Haematological and inflammatory effects of cardiopulmonary bypass



Circulatory Assist:
a. Principles, rationale, indications, limitations of intra-aortic balloon counterpulsation
b. Ventricular assist devices and artificial heart: internal and external
c. Veno-Arterial Extracorporeal membrane oxygenation (VA-ECMO)
d. Indications and rationale of circulatory arrest.
Haematological issues: Anticoagulation, monitoring, management; Antifibrinolytics; heparin/protamine and issues; blood products and transfusion issues
Defibrillation and Pacing: external/internal; programming of pacemakers
<b>Postoperative Issues:</b>
Routine and emergent postoperative management
Recognition and management of common complications including reopening for bleeding
Ventricular assist devices: management and resuscitation
'Fast-track' cardiac surgery
Postoperative ventilation
<b>Interventional cardiology</b>
Anaesthesia for acute and elective cardiac revascularisation
Anaesthesia for other interventional cardiology procedures: including electrophysiological studies, radiofrequency and cryoablation for arrhythmias, pacemaker and defibrillator insertion, insertion of percutaneous closure devices, percutaneous valve repair and replacement and valvuloplasty
Major complications associated with interventional cardiology procedures
Anaesthesia for cardioversion.

## S7 Thoracic surgery

Anatomy (Reference Part A) <ol style="list-style-type: none"><li>Tracheobronchial tree including endoscopic anatomy</li><li>Lung lobes and segments</li><li>Thorax: surface anatomy, intra-thoracic structures and relations</li><li>Innervation of the chest wall and intra-thoracic structures</li></ol>
Physiology (Reference Part A) <ol style="list-style-type: none"><li>Change with positioning, effect of open thorax, positive-pressure ventilation and one-lung ventilation</li><li>Mechanism and effect of hypoxic pulmonary vasoconstriction and the influence of medications, including anaesthetic agents.</li></ol>
<b>Preoperative Issues:</b>
Assessment of the patients with thoracic pathology presenting for thoracic or non-thoracic surgery (Reference Periop Medicine)
Assessment of the patients for lobectomy and pneumonectomy
Specific medical pathologies: <ol style="list-style-type: none"><li>Pulmonary hypertension: factors affecting/ management of pulmonary pressures</li><li>Chronic obstructive pulmonary disease and effects of artificial ventilation</li></ol>
Specific conditions associated with thoracic trauma: <ol style="list-style-type: none"><li>Pneumothorax/tension pneumothorax Haemothorax</li><li>Flail chest</li><li>Rib/sternal fractures</li><li>Pulmonary contusion</li><li>Traumatic aortic disruption</li><li>Tracheobronchial injury, bronchopleural fistula</li><li>Respiratory failure and artificial ventilation.</li></ol>
<b>Intraoperative: Issues and interventions specific to thoracic surgery</b>
Positioning
Lung isolation
One-lung ventilation: Indications and contraindications; management of issues
Intermittent apnoea verses spontaneous verses jet ventilation
Analgesia options: for thoracic surgery and thoracic trauma
Fluid management following lung resection and thoracic trauma
Management of chest drains and pleural drainage system
<b>Specific procedures: endobronchial procedures</b> <ol style="list-style-type: none"><li>Flexible bronchoscopy</li><li>Diagnostic bronchoscopy</li><li>Bronchoalveolar lavage</li><li>Bronchoscopic ultrasound and biopsy</li><li>Placement of endobronchial stent</li><li>Rigid bronchoscopy</li><li>Removal of foreign body in airway</li><li>Laser of endobronchial tumour</li></ol>

**Specific procedures: open or thoracoscopic procedures**

- a. Excision or biopsy of mediastinal mass
- b. Thymectomy, with or without myasthenia gravis
- c. Mediastinoscopy
- d. Thoracoscopy and thoracotomy for:
- e. Pleurodesis
- f. Bleeding
- g. Bronchopleural fistula
- h. Lobectomy
- i. Pneumonectomy
- j. Drainage of lung abscess
- k. Drainage of empyema and decortication of lung
- l. Lung volume reduction surgery
- m. Giant bullous emphysema resection
- n. Thoracoscopic sympathectomy
- o. Mediastinal masses.
- p. Pectus excavatum surgery

**Complications associated with thoracic surgery:**

- a. Bleeding (airway, lung or pleural cavity)
- b. Pneumothorax
- c. Arrhythmias
- d. Bronchopleural fistulae
- e. Nerve damage (phrenic, recurrent laryngeal)
- f. Respiratory failure

## S8 General Surgical, Urological, Gynaecological and Endoscopic procedures

### **Anaesthesia considerations of conditions seen in surgical patients (Reference Periop Medicine):**

1. Poor nutrition
2. Morbid obesity
3. Disease of the oesophagus including oesophageal carcinoma, gastro-oesophageal reflux disease, hiatus hernia and gastro-oesophageal sphincter abnormalities.
4. Disease of the stomach including cancer
5. Gastrointestinal haemorrhage: upper and lower
6. Acute abdomen
7. Abdominal compartment syndrome
8. Intestinal obstruction, malabsorption, diarrhoea, vomiting, ileus
9. Gallbladder and Hepatic Disease: including hepatocellular disease, ascites, portal hypertension
10. Disease of the spleen
11. Renal and urinary tract disease
12. Pancreatic disease
13. Adrenal disease
14. Gynaecological disorders
15. Breast disease

### **Anaesthetic considerations for endocrine conditions:**

1. hypopituitarism,
2. hyperpituitarism
3. hyperthyroidism
4. hypothyroidism
5. hyperparathyroidism;
6. hypoparathyroidism;
7. Adrenal Disease
8. Cushing's syndrome
9. primary aldosteronism
10. Addison's disease
11. pheochromocytoma
12. Carcinoid Syndrome
13. Diabetes Mellitus

**Considerations and requirements for specific surgery:**

1. Bowel preparation
2. Laparoscopic: pneumo-peritoneum
3. Positioning required for surgical access.
4. Hepatectomy
5. Surgery for major liver trauma
6. Oesophagectomy
7. Pancreatectomy
8. Adrenalectomy, including phaeochromocytoma
9. Resection of carcinoid tumour
10. Bariatric surgery
11. Breast reconstruction
12. Surgery for gynaecological and urological malignancy
13. Major bowel resection, pelvic exenteration etc
14. Urologic procedures including lithotripsy, transurethral resection of prostate (TURP)/irrigating Fluids/hyponatraemia, robotic surgery in prostatectomy
15. Principles and evidence for Enhance Recovery programmes and Fast Track Surgery.
16. Endoscopic procedures including ERCP, PEG insertion, and emergency gastroscopy for upper gastrointestinal bleeding
17. Transplant surgery: renal, hepatic, pancreatic
18. Organ donation in a brain-dead patient

**Complications of surgical procedures including:**

1. Venous air embolus
2. Bleeding, including management of severe coagulopathy
3. Aspiration
4. Cardiovascular responses to insufflation of the peritoneal cavity
5. Sepsis
6. Hypo-osmolar syndromes
7. Reperfusion of ischaemic organs
8. Acid base imbalance, temperature control, positioning injuries

## S9 Vascular surgery and interventional radiology

Pathophysiology, assessment and perioperative management of patients presenting for vascular surgery including the following medical conditions:

- a. Peripheral vascular disease
- b. Ischaemic heart disease
- c. Cardiac failure
- d. Arrhythmia
- e. Hypertension
- f. Diabetes mellitus
- g. Chronic obstructive airways disease
- h. Renal failure
- i. Recent cerebrovascular accident
- j. Concurrent antiplatelet and anticoagulation treatment

Influence of vascular disease on outcome including:

- a. Wound dehiscence and infection
- b. Positioning injury
- c. Perioperative myocardial ischaemia
- d. Perioperative stroke
- e. Perioperative renal failure

Considerations and perioperative management for patients presenting for elective surgery for:

- a. Peripheral arterial occlusive disease
- b. Carotid artery stenosis/ carotid endarterectomy (GA or RA)
- c. Aortic and aorto-iliac disease
- d. Vascular access for haemodialysis
- e. Thorascopic sympathectomy

Considerations and perioperative management for patients presenting for emergent surgery for:

- a. Ruptured aortic aneurysm
- b. Aortic dissection
- c. Major vessel occlusion
- d. Limb ischaemia
- e. Limb amputation
- f. Arterial laceration

Pathophysiology and implications of:

- a. Aortic cross clamping and unclamping at various levels
- b. Prolonged limb or gut ischaemia
- c. Carotid clamping and unclamping, and post-op effects of carotid endarterectomy

Complications seen during vascular surgery:

- a. Major haemorrhage; including strategies to minimize blood loss and transfusion.
- b. Bradycardia associated with carotid artery surgery
- c. Cerebral ischaemia associated with carotid artery clamping including monitoring of cerebral perfusion
- d. Reperfusion syndromes
- e. Spinal cord ischaemia
- f. Acute renal impairment
- g. Myocardial ischaemia
- h. Acute arrhythmia
- i. Stroke
- j. Thromboembolism
- k. Limb ischaemia
- l. Rhabdomyolysis
- m. Post-amputation pain (Refer Pain Medicine)

Implications of vascular interventional procedures in remote locations; e.g. interventional radiological suite including:

- a. Impact of patient and staff safety
- b. Requirements for provision of anaesthetic service
- c. Awareness of space and equipment limitations (e.g. DDI bed not being able to tilt, access to head obstructed by head holder/C-arm)

Considerations and management of patients presenting in the radiological suite for:

- a. Vascular embolisation
- b. Insertion of intravascular devices including aortic grafts, e.g. TEVAR (thoracic endovascular stent) etc
- c. Radiological-guided biopsy under anaesthesia
- d. Radiofrequency ablation of lesions in lung and liver

Complications in the context of a radiological based interventional procedures such as:

- a. Reaction to intravenous iodine contrast
- b. Aortic occlusion
- c. Acute renal impairment
- d. Spinal cord ischaemia
- e. Radiation
- f. Haemorrhage
- g. Airway compromise

Advantages and disadvantages of radiological based procedures compared to open procedures for the management of:

- a. Aortic aneurysm
- b. Aortic dissection
- c. Carotid artery stenosis

## S10 Orthopaedic Surgery

### Orthopaedic Trauma

Assessment, diagnosis and management of patient following trauma including the following injuries:

- a. Suspected cervical spine injury
- b. Unstable spinal injury
- c. Acute spinal cord injury and 'neurogenic' shock
- d. Pelvic fractures
- e. Long bone fractures
- f. Geriatric patients with fractures

Anaesthetic considerations and management of patient presenting for orthopaedic trauma surgery including the following conditions:

- a. Pelvic fractures
- b. Shoulder girdle fractures
- c. Long bone fractures
- d. Distal limb fractures
- e. Reduction and fixation of spinal fractures
- f. Fractures associated with neurovascular compromise
- g. Compound fractures
- h. Open fractures
- i. Geriatric patients with hip fractures:

Diagnosis and management of complications associated with orthopaedic surgery:

- a. Bone cement implantation syndrome (BCIS)
- b. Haemorrhage
- c. Massive transfusion
- d. Crush injury
- e. Compartment syndrome
- f. Re-perfusion injury
- g. Fat embolism syndrome

Considerations specific to orthopaedics surgery:

- a. Issues and management of non-accidental injuries
- b. Use of preventive therapies such as thrombo-prophylaxis and antibiotic prophylaxis in orthopaedic trauma surgery
- c. Regional versus general anaesthesia

### Elective and non-traumatic emergency orthopaedic surgery

Assessment and perioperative management of comorbidity and patient factors commonly found in patients presenting for orthopaedic surgery:

- a. Geriatrics patient
- b. Sepsis
- c. Cerebral palsy
- d. Obesity
- e. Arthritis (osteoarthritis, rheumatoid arthritis or ankylosing spondylitis)
- f. Therapeutic anticoagulation



Anaesthetic considerations, assessment and perioperative management of patients presenting for elective orthopaedic surgery such as:

- a. Joint replacement
- b. Joint arthroscopy
- c. Shoulder surgery
- d. Ligament, peripheral nerve and/or artery repair,
- e. Tendon lengthening or transfer
- f. Compartment syndrome
- g. Dislocated joint, including prosthesis Joint infections
- h. Joint infections
- i. Pathological fractures
- j. Spine/ Scoliosis correction surgery

Anaesthetic considerations, assessment and perioperative management of patients presenting for emergency non-traumatic orthopaedic surgery such as:

- a. Necrotising fasciitis
- b. Amputations and removal of septic foci

Diagnosis and management of the possible complications of orthopaedic surgery:

- a. Bone cement implantation syndrome (BCIS)
- b. Fat embolism syndrome
- c. Pulmonary embolism
- d. Compartment syndrome
- e. Major blood loss
- f. Neurological injury
- g. Chronic and persistent pain

Considerations specific to orthopaedics surgery:

- a. Safe use of tourniquet
- b. Regional versus general anaesthesia
- c. Choice and timing of antibiotic prophylaxis
- d. Use of thrombo-prophylaxis
- e. Techniques to reduce blood loss and minimize transfusion of blood products
- f. Methods of spinal cord monitoring and anaesthetic considerations
- g. Use of beach chair positioning
- h. Management of acute and acute-on-chronic pain including the use of NSAIDs, use of regional anaesthesia/analgesia, use of adjuvant agents and prevention of chronic post-surgical pain.

## S11 Plastic, reconstructive and burns surgery

### Plastics and Reconstructive Surgery

Type of surgery that candidates should be familiar with:

- a. Removal of multiple skin lesions
- b. Cosmetic surgery, including flap surgery and paediatric conditions such as cleft lip/palate,
- c. Split skin graft
- d. Full thickness graft
- e. Resection or debridement of tissue (minor and major)
- f. Liposuction

Specific knowledge and skills required of this subspecialty:

- a. Different types of tissue flaps and the implications for flap survival
- b. Factors affecting blood flow to tissue flaps
- c. The physiological mechanisms controlling and regulating body temperature and the effects of anaesthesia
- d. Various techniques of liposuction including the tumescent technique

Specific anaesthetic considerations:

- a. Methods of optimising conditions for flap survival
- b. Issues with prolonged anaesthesia
- c. Limited access to the patient
- d. Assessment and management of major occult blood loss
- e. Safety, risks and management required providing induced hypotension
- f. Fat embolism, fluid assessment and blood loss during liposuction.
- g. Local anaesthetic toxicity with tumescent technique

### Burns:

Type of surgery that candidates should be familiar with:

- a. Debridement of burns injuries
- b. Escharotomy
- c. Scar revision following burns: especially for facial and neck scarring

Specific knowledge and skills required:

- a. Pathophysiology of burns and the multisystem effects
- b. Temperature homeostasis in burns patients and the implications of hypothermia
- c. Fluid status and requirement of patients with burns injuries
- d. Infection control in burns patients and the prevention of secondary sepsis
- e. Methods and materials used to provide temporary and long-term coverage of burns

Specific anaesthetic considerations and management:

- a. Airway management for patients with facial and neck scarring.
- b. Problems associated with monitoring and venous cannulation
- c. Blood loss during debridement of burns
- d. Prevention and management of hypothermia, including monitoring techniques and warming.
- e. Pain issues encountered in the burns patient and their management

Assessment and management of specific medical conditions candidates should be familiar with:

- a. Airway and facial burns
- b. Respiratory burns
- c. Electrical burns
- d. Chemical burns
- e. Carbon monoxide poisoning
- f. Metabolic effects of burns – including electrolyte emergencies such as hyperkalaemia.
- g. Associated trauma
- h. Management of fluid status and blood transfusion requirements

## S12 Head and neck, ear nose and throat, dental surgery and electro-convulsive therapy

<b>Head and neck, Ear, Nose and Throat Surgery</b>
<b>Specific Knowledge and Skills required:</b>
Anatomy and innervation of the face, external ear, neck, nasal passages, pharynx and larynx
Regional or topical anaesthesia for head, neck or ear nose and throat procedures: including awake intubation
<b>Surgeries that candidate should be familiar with:</b>
<p>Elective surgery:</p> <ul style="list-style-type: none"> <li>i. Septo-rhinoplasty</li> <li>ii. Functional endoscopic sinus surgery (FESS)</li> <li>iii. Tonsillectomy and/ or adenoidectomy</li> <li>iv. Microlaryngoscopy</li> <li>v. Panendoscopy</li> <li>vi. Insertion of grommets</li> <li>vii. Myringoplasty or other middle ear surgery</li> <li>viii. Mastoidectomy</li> <li>ix. Laryngectomy or pharyngo-laryngectomy</li> <li>x. Parotidectomy</li> <li>xi. Neck dissection</li> <li>xii. Tracheostomy</li> </ul>
<p>Emergent surgeries:</p> <ul style="list-style-type: none"> <li>i. Reduction of fractured nose</li> <li>ii. Removal of inhaled foreign body</li> <li>iii. Removal of foreign body from the oesophagus or pharynx</li> <li>iv. Surgical management for obstructing laryngeal and tracheal lesions (also refer to the Airway management clinical fundamental)</li> <li>v. Drainage of oro-pharyngeal cysts or abscess, including quinsy</li> <li>vi. Awake tracheostomy</li> </ul>
<b>Specific equipment candidates should be familiar with:</b>
Special tracheal tubes for these surgeries including:
<ul style="list-style-type: none"> <li>i. Microlaryngeal surgery</li> <li>ii. Laser surgery</li> <li>iii. Laryngectomy</li> </ul>
Jet ventilation: low and high frequency, mode of delivery (supraglottic, subglottic and transtracheal), manual and automatic jet ventilators, and understanding the parameter settings for automatic jet ventilators
Medical lasers: nature, biological effects, risks and implications
<b>Anaesthesia considerations:</b>
<ul style="list-style-type: none"> <li>a. Airway: effects of previous surgery or radiation</li> <li>b. Airway: impact of goitre and large, symptomatic retrosternal goitre</li> <li>c. Positioning for head and neck surgery</li> <li>d. Use of induced hypotension</li> <li>e. Use of local anaesthetic with vasoconstrictive agents</li> <li>f. Methods for the smooth emergence and/or extubation of patients to minimise bleeding following ear nose and throat and head and neck procedures</li> <li>g. Monitoring of nerve function (facial, recurrent laryngeal nerve) during surgery</li> </ul>

Pathophysiology, assessment and management of medical conditions associated with:
<ul style="list-style-type: none"> <li>a. Thyroid or parathyroid surgery</li> <li>i. Hypothyroidism and hyperthyroidism</li> <li>ii. Use, effects and complications of thyroid hormones or anti-thyroid drugs</li> <li>iii. Hypercalcaemia and hypocalcaemia</li> </ul>
Management of complications:
<ul style="list-style-type: none"> <li>a. Postoperative haemorrhage following head and neck and ear nose and throat surgery:</li> <li>b. Post tonsillectomy</li> <li>c. Post thyroidectomy</li> <li>d. Airway fire</li> <li>e. Stridor and airway obstruction</li> </ul>
<b>Dental/maxillofacial surgery</b>
<b>Specific knowledge and skills:</b>
Innervation of the teeth and regional blocks used for dental procedures (Note that performance of the regional blocks is not required)
Types of facial, maxillary and mandibular fractures and their surgical management
Indications for and method of managing the airway during maxillo-facial surgery with a nasal endotracheal tube
Surgeries that candidate should be familiar with
<ul style="list-style-type: none"> <li>a. Surgical fixation of facial, maxillary and mandibular fractures</li> <li>b. Maxillary and mandibular osteotomies</li> <li>c. Drainage of dental abscesses and Ludwig's angina</li> </ul>
Common or important comorbidities found in patients presenting with these surgeries.
<ul style="list-style-type: none"> <li>a. Intellectual impairment</li> <li>b. Disorders of haemostasis</li> <li>c. Dental sepsis, dental abscesses and Ludwig's angina</li> </ul>
<b>Electro-convulsive therapy</b>
<b>Specific knowledge and skills</b>
Indications and evidence for the use of electro-convulsive therapy
Physiological response and management of response to electro-convulsive therapy
Contra-indications for electro-convulsive therapy

## S13 Ophthalmic procedures

<b>Specific knowledge and skills</b>
Anatomy of the eye and the contents of the orbit with reference to the performance of regional eye blocks and their complications
Determinants of ocular perfusion and intra-ocular pressure
Methods used to decrease or prevent a rise in intra-ocular pressure
Eye reflexes (oculo-cardiac, oculo-respiratory, oculo-emetic)
Compare different regional blocks for eye: subtenon block, peri-bulbar block and retrobulbar block; in terms of risks and benefits (not including the technique of performing the block itself)
Considerations and surgical requirements of specific ophthalmic procedures: a. Cataracts b. Glaucoma c. Retinal detachment d. Penetrating eye injury e. Enucleation for infection or tumour f. Examination under anaesthesia g. Strabismus h. Blocked nasolacrimal duct i. Extraocular procedures j. Penetrating keratoplasty (corneal transplant) k. Miscellaneous / others (eg. oculoplastics, pterygium excision, etc.)
Common physiological and pathophysiological considerations in patients presenting for these surgeries. a. Geriatric b. Paediatrics c. Cognitive impairment d. Comorbidities requiring anticoagulation
Anaesthetic considerations and management: a. Airway management b. Perioperative use of drugs by eye surgeons; in particular topical local anaesthetic agents, vasoconstrictors, mydriatics, miotics, and intraocular pressure-reducing agents c. Eye reflexes and their management during eye procedures d. Emergency eye surgery and in particular the patient with a penetrating eye injury e. Intra-ocular injection of gas f. Influence of patient factors including: i. Anticoagulation status ii. Ability to lie flat iii. Ability to cooperate iv. Axial length of the globe g. Choice of patients for sedation and sedation techniques for eye procedures h. Conversion of regional to general anaesthesia during an eye procedure i. Use of Laser

## S14 Ambulatory Surgery

Benefits of Ambulatory surgery
Outcome measures of ambulatory surgery (eg. delayed discharge, unanticipated readmissions)
<b>Considerations for procedures in an ambulatory setting:</b>
Patient selection <ul style="list-style-type: none"><li>i. Age</li><li>ii. Implication of ASA status</li><li>iii. Specific medical conditions: Impaired organ reserves, Obesity, Obstructive sleep apnoea etc</li><li>iv. Transport and Social Support</li></ul>
Selection of type of surgery
Preoperative management: <ul style="list-style-type: none"><li>i. Fasting guidelines</li><li>ii. Implications of upper respiratory tract infection</li><li>iii. Anxiety reduction (eg. non pharmacological and pharmacological premedications, etc.)</li></ul>
Intraoperative considerations and management: <ul style="list-style-type: none"><li>i. Wake up time versus discharge time</li><li>ii. Implications of the choice of anaesthetic agents and techniques</li></ul>
Perioperative pain management plan <ul style="list-style-type: none"><li>i. Multimodal analgesia</li><li>ii. Role of regional anaesthesia</li><li>f. Perioperative prevention &amp; management of postoperative nausea and vomiting</li><li>g. Discharge criteria</li><li>h. Postoperative follow-up, including continuous nerve blocks</li><li>i. Management of cancellations and implications</li></ul>

## S15 Non-Operating Room Anaesthesia (Remote)

### Procedures outside the operating theatre within a hospital setting

Considerations for anaesthesia/sedation for adults and children for procedures outside the operating theatre, but within a hospital setting, either diagnostic or therapeutic for both elective and emergency procedures, including but not exclusively in the following settings: X-Ray, CT scan, Angiography, MRI scan, Radiotherapy:

Requirements for safe anaesthesia / sedation:

- i. Physical
- ii. Equipment: Awareness of equipment limitations (e.g. DDI bed not being able to tilt, access to head obstructed by head holder/C-arm)
- iii. Monitors
- iv. Staff
- v. Patient selection

Unique safety issues with:

- i. Radiation suite
- ii. Radiotherapy
- iii. MRI suite

Requirements for provision of safe post- anaesthetic care for patients in the out of theatre environment

Discharge criteria and follow-up

*\*: Refer to Cardiac surgery and interventional cardiology, Vascular Surgery and Interventional radiology and Neurosurgery and Neuroradiology*

### Office-based sedation

Considerations for office-based sedation:

- a. Advantages & Disadvantages
- b. Patient selection
- c. Surgeon selection (accreditation, etc.)
- e. Physical requirements and Equipment
- f. Staff
- g. Organization of staff and environment
- h. Safety considerations
- i. Anaesthetic techniques/ Patient Management
- j. Discharge criteria