

THE HONG KONG COLLEGE
OF
ANAESTHESIOLOGISTS



S Y L L A B U S

for

Intermediate Fellowship Examination

Final Fellowship Examination

October 1999

**THE FELLOWSHIP EXAMINATION
OF
THE HONG KONG COLLEGE OF ANAESTHESIOLOGISTS
SYLLABUS**

1. Introduction
 - 1.1 The education of an individual who wishes to attain the status of a specialist anaesthesiologist requires:-
 - 1.1.1 Training in a Department of Anaesthesia as part of a rotational training scheme.
 - 1.1.2 Assessment by the specialist examination which is in two parts, namely the Intermediate examination and the Final examination.
 - 1.2 It is important that the trainee acquires the skills, knowledge, attitude and practice relevant to anaesthesia and resuscitation during the training period.
2. Guide to Study
 - 2.1 The Board of Examination of the Hong Kong College of Anaesthesiologists does not restrict examiners in the choice of questions. .
 - 2.2 This document should be regarded as a guide to study . It indicates a general scope of preparation necessary for the examination. Reading of current literature is necessary.

INTERMEDIATE FELLOWSHIP EXAMINATION
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The subjects for the Intermediate Examination, which includes written and oral sections are:
Physiology (including Clinical Measurement)
Pharmacology (including Statistics)

The Examination places emphasis on those aspects of physiology and pharmacology which have **DIRECT APPLICATION** to anaesthesia, intensive care, resuscitation and pain management.

Physiology Outline

1. Cellular physiology.
2. Immune-response (physiology and pharmacology).
3. Body fluids and electrolytes.
4. Acid-base regulation.
5. Kidney.
6. Respiration.
7. Circulation.
8. Nervous system.
9. Maternal , foetal and neonatal physiology.
10. Nutrition and metabolism.
11. Endocrine.
12. Blood.
13. Alimentary System.
14. Liver.

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15. Organ transplantation.
16. Principles of clinical measurement.

Pharmacology Outline

18. General pharmacology (pharmacokinetics, pharmacodynamics).
19. Principal drugs used in anaesthesia, intensive care, resuscitation and pain management
detailed knowledge.
20. Pharmacology of Autonomic Nervous System: detailed knowledge.
21. Non-anaesthetic drugs : general knowledge.
22. Medical statistics.

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PHYSIOLOGY

Candidates should extend their knowledge to include the disturbances of physiology that may arise in anaesthesia and/or intensive care practice and the principles, mathematical concepts and techniques of their measurement.

1. Cellular Physiology

- 1.1 Microscopic anatomy:- structure/function relationships.
- 1.2 Cell membranes: membrane potentials, membrane properties and transport.
- 1.3 Subcellular respiration and oxygen utilisation.
- 1.4 Biological potentials: Electrocardiography, electroencephalography, electromyography,
- 1.5 Molecular theory, gene typing.
- 1.6 Muscle: skeletal and smooth muscles, excitation, contraction coupling, contractility.

2. Immune Response (physiology and pharmacology)

- 2.1 Basic immunology: non-specific resistance mechanisms; specific immunity; transplantation and malignancy-, auto-immunity; HLA typing; hypersensitivity; in vitro assessment of immune reactions.
- 2.2 Effects of anaesthesia and surgery on immune status.
- 2.3 Implications of depression of immune status.
- 2.4 Hypersensitivity reactions to drugs and other substances, in particular to drugs used in anaesthesia:
 - 2.4.1 Mechanisms of hypersensitivity,
 - 2.4.2 Significance of route of drug administration,
 - 2.4.3 Interference with immune control mechanisms.

3. Body Fluids and Electrolytes

- 3.1 Body water: distribution, movement and regulation.
- 3.2 Electrolyte composition of body fluids: distribution and regulation.

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- 3.3 Lymph-
- 3.4 Disturbances of body fluids and electrolytes: dehydration; overhydration; oedema; electrolyte changes; evaluation and principles of therapy.
- 3.5 Measurements of body fluids and constituents: compartment volumes and electrolytes.

4. Acid-Base Regulation

- 4.1 Buffer systems.
- 4.2 Buffer mechanisms in the body, both intracellular and extracellular.
- 4.3 Respiratory regulation.
- 4.4 Renal regulation.
- 4.5 Changes in disordered states: evaluation, principles of therapy.
- 4.6 Measurement of acid - base state should include the methods of measurement of. hydrogen ion activity, carbon dioxide in solution (direct and indirect) and bicarbonate, Henderson-Hasselbach equation - its graphic representations and methods of interpolation.

5. Kidney

- 5.1 Regulation of renal circulation.
- 5.2 Glomerular filtration.
- 5.3 Tubular function.
- 5.4 Control of urine volume.
- 5.5 Renal response to fluid, electrolyte and acid-base abnormalities.
- 5.6 Endocrine function of the kidney.
- 5.7 Renal failure and its evaluation.

6. Respiration

- 6.1 Control of respiration.
- 6.2 Structure and functions of airways and alveoli.
- 6.3 Respiratory reflexes.

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- 6.5 Humidification and heat exchange.
- 6.6 Alveolar ventilation.
- 6.7 Changes with exercise, anaesthesia, disease, posture, age.
- 6.8 Respiration at high and low barometric pressures: adaptation.
- 6.9 Ventilation - blood flow relationships - effects of posture, respiratory and circulatory changes.
- 6.10 Blood-tissue gas exchange.
- 6.11 Oxygen transport.
- 6.12 Carbon dioxide transport.
- 6.13 Hypoxia and asphyxia.
- 6.14 Hypoventilation and hyperventilation.
- 6.15 Pulmonary circulation.
- 6.16 Pulmonary interstitial space and lymphatic function.
- 6.17 Physics of gas flow, solution and diffusion.
- 6.18 Mechanics of breathing: pressure, flow, work, compliance, muscles, etc
- 6.19 Lung volumes and capacities.
- 6.20 Dead space: anatomical and physiological.
- 6.21 Respiratory inadequacy and failure; principles of therapy.
- 6.22 Artificial ventilation.
- 6.23 Evaluation of respiratory function; gas flow, ventilation, blood flow, diffusion, compliance, resistance, gas transport, gas concentrations and pressures in ventilating gas mixtures and body fluids.
- 6.24 Principles of instrumentation including tonometry, volumetric and manometric analysis, spectrophotometry, gas chromatography, paramagnetic analysis, electrode systems and mass spectrometry.
- 6.25 Non-respiratory functions of lung, e.g. filtration, release or modification of hormones and enzymes.

7. **Circulation**

- 7.1 Properties of cardiac muscle, nodal and conductive tissue.

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- 7.2 Contraction of the heart - mechanical and electrical changes.
- 7.3 Concept of cardiac and vascular compliance.
- 7.4 E.C.G. and electrophysiological control of the heart.
- 7.5 Arrangements of specific vascular beds, e.g. renal, pulmonary.
- 7.6 Physics of blood flow.
- 7.7 Control of circulation: overall and regional (including that of individual organs).
- 7.7 Myocardial oxygen balance.
- 7.8 Physiology of embolism, ischaemia and infarction.
- 7.9 Capillary circulation.
- 7.10 Lymphatic circulation.
- 7.11 Fluid exchange in tissues and control of blood volume: changes with common circulatory derangements.
- 7.12 Effects of posture and artificial ventilation.
- 7.13 Effects of age, exercise and altitude.
- 7.14 Blood loss.
- 7.15 Shock.
- 7.16 Cardiac failure.
- 7.17 Measurement of cardiovascular function
 - 7.17.1 Arterial and venous blood pressure.
 - 7.17.2 Cardiac output.
 - 7.17.3 Regional flow.
 - 7.17.4 Blood volume.

8. Nervous System

- 8.1 Metabolism of nervous tissue.
- 8.2 Transmission of nerve impulse.
- 8.3 Synaptic transmission,
- 8.4 Neuromuscular transmission.

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- 8.5 Muscle contraction.
- 8.6 Principles of reflex activity.
- 8.7 Muscle tone, control of posture and movement.
- 8.8 Somatic and visceral sensation.
- 8.9 Pain and Analgesia:
 - 8.9.1 Definition of pain,
 - 8.9.2 Mechanisms of peripheral nociception,
 - 8.9.3 Spinal cord modulation,
 - 8.9.4 Role of chemical mediators,
 - 8.9.5 Central processing of the noxious impulse and inhibitory pathways,
 - 8.9.6 Classification of opioid receptors.
- 8.10 Cerebrospinal fluid, formation, drainage, function (Monroe-Kelly doctrine).
- 8.11 Regulation of cerebral and spinal cord circulation.
- 8.12 Consciousness and sleep.
- 8.13 Reticular formation and medulla.
- 8.14 Electroencephalogram
- 8.15 Hypothalamus, thalamus, basal centres, pituitary.
- 8.16 Autonomic nervous system.
- 8.17 Emotion; particularly anxiety and fear.
- 8.18 Temperature regulation including regional variations.
- 8.19 Temperature sensing devices and measurement.

9. Maternal, Foetal and Neonatal Physiology

- 9.1 Maternal physiology; particularly of circulatory and respiratory systems, during pregnancy and parturition.
- 9.2 Metabolic changes during pregnancy and labour.
- 9.3 Foetal and neonatal physiology:-

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- 9.3.1 Body fluids and electrolyte composition,
- 9.3.2 Blood volume and haemoglobin changes,
- 9.3.3 Temperature control
- 9.3.4 Liver function and metabolism,
- 9.3.5 Renal function,
- 9.3.6 Pulmonary function; airway size, gas transfer, respiratory work and lung volume,
- 9.3.7 Pulmonary surfactant,
- 9.3.8 Changes in foetal and neonatal circulation during development and at birth,
- 9.3.9 Placental development and transport mechanisms.

10. Nutrition and Metabolism

- 10.1 Energy balance.
- 10.2 Basal metabolic rate.
- 10.3 Essential nutritional requirements.
- 10.4 Main steps in uptake, synthesis and metabolism of carbohydrates, fat and protein.
- 10.5 Principles of parenteral nutrition and enteral nutrition.
- 10.6 Common enzyme systems, evaluation of disturbances.

11. Endocrine

- 11.1 Neural control of endocrine secretions.
- 11.2 Secretions of the pituitary, thyroid, parathyroid, adrenals, pancreas.
- 11.3 Formation and control; metabolism and excretion, over-secretion and under-secretion; evaluation of function.
- 11.4 Prostaglandins and kinins.

12. Blood

- 12.1 The red cell formation, function and break down.

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- 12.2 Formation of other blood cells in outline.
- 12.3 Plasma constituents and their function.
- 12.4 Blood components and plasmapheresis.
- 12.5 Haemolysis.
- 12.6 Consequences of anaemia.
- 12.7 Blood grouping and cross-matching, immunological basis of blood groups.
- 12.8 Blood transfusion and its hazards.
- 12.9 Blood clotting factors, mechanisms, altered function and its evaluation.

13. Alimentary System

- 13.1 Secretory function: salivary glands, stomach, small intestine, pancreas (external secretion) bile, volumes and composition, regulation.
- 13.2 Digestion: carbohydrate, fat and protein.
- 13.3 Absorption.
- 13.4 Deglutition.
- 13.5 Vomiting.
- 13.6 Peristalsis and sphincteric action.
- 13.7 Splanchnic circulation and its regulation.
- 13.8 Gastro-intestinal fluid losses: effects and principles of treatment.

14. Liver

- 14.1 Regulation of the hepatic circulation.
- 14.2 Functions of the liver,
- 14.3 Evaluation of function.

15. Organ Transplantation

- 15.1 Principles of the denervated organ.

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15.2 Immunology of rejection.

16. Physical Principles and Mathematical Concepts

16.1 Candidates should have a general knowledge of those physical terms, principles and mathematical concepts, which are necessary for an understanding of physiological functions and their measurements in clinical practice. Eg: exponential function, time constants, half life.

17. Principles of Clinical Measurement

17.1 Candidates should understand the basic principles of measurement and equipment used in clinical practice. The measurement, recording and presentation and mathematical concepts of various physiological variables should be understood.

17.2 A general knowledge is required of:-

17.2.1 The availability and basis of methods of measurement,

17.2.2 The general features and problems of performance of measurements,

17.2.3 Calibration and the evaluation of measurements.

17.3 The following are some examples of the clinical measurements and physical principles which are of importance:

17.3.1 Principles of the measurement and mathematical derivation of respiratory dead space, gas laws, compliance, and ventilation-perfusion relationships,

17.3.2 Blood gas analysis; pulse oximetry; capnography,

17.3.3 Principles of measurement of organ blood flow, cardiac output, hydrostatic pressure, arterial blood pressure, central venous pressure and pulmonary wedge pressure,

17.3.4 The basis of electrocardiography and the significance of the use of its various forms in clinical medicine,

17.3.5 The physical principles of heat transfer. The principles of devices used for sensing heat and measuring temperature, the effect of temperature on physical and biological processes,

17.3.6 The relationship of density and viscosity to flow of liquids, gases and vapours,

17.3.7 Comparison of available methods of gas analysis,

17.3.8 The principles of electron transfer, of potential, and the significance of electric fields in biology,

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- 17.3.9 The physico-chemical basis of the measurement of osmotic forces,
- 17.3.10 A knowledge of SI units and other units of importance to the anaesthetist and intensivist.

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PHARMACOLOGY

Candidates should have knowledge of the principles of general pharmacology, detailed knowledge of the pharmacology of drugs used in the practice of anaesthesia, intensive care, resuscitation and pain management; therapeutic substances interacting and complicating anaesthesia; particular attention should be paid to the principles of pharmacokinetics.

An appreciation of the statistical and mathematical methods commonly employed in clinical research is required.

18. General Pharmacology

- 18.1 Knowledge of the biochemistry, physical chemistry of cellular membranes and intracellular elements for understanding drug actions and metabolism.
- 18.2 Modes of action of drugs.
- 18.3 Concept of Receptors.
- 18.4 Theories of narcosis.
- 18.5 Modification of action by factors such as hypothermia, electrolyte composition, acid-base state.
- 18.6 Absorption of drugs: physico-chemical principles; routes of administration; dosage in relation to age, sex, weight, surface area.
- 18.7 Distribution of drugs: plasma and other binding; tissue blood flows, redistribution; clearance; cumulation; therapeutic drug monitoring.
- 18.8 Uptake and distribution of anaesthetic agents: solubility and partition coefficients; physico-chemical factors.
- 18.9 Metabolism of drugs involving microsomal, mitochondrial, cytoplasmic, plasma and other enzymes.
- 18.10 Excretion of drugs.
- 18.11 Anaphylaxis and anaphylactoid reaction.
- 18.12 Unwanted effects.
- 18.13 Toxic effects.
- 18.14 Tolerance, addiction, habituation, sensitivity, resistance and tachyphylaxis.
- 18.15 Drug interactions with special emphasis on antagonism.
- 18.16 Drug evaluation and clinical trials.

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19. Principal drugs used in anaesthesia, intensive care, resuscitation and pain management : detailed knowledge.

- 19.1 Sedative and hypnotic drugs.
- 19.2 Tranquillizer drugs.
- 19.3 Analgesic drugs (including NSAIDs) and their antagonists.
- 19.4 General anaesthetic drugs.
- 19.5 Neuromuscular blocking drugs and their antagonists, including effects of common cations - Na, K, Ca, Mg..
- 19.6 Local anaesthetic drugs.
- 19.7 Anti-emetic drugs.

20. Pharmacology of Autonomic Nervous System: detailed knowledge.

- 20.1. Drugs that decrease blood pressure including anti-hypertensives and drugs for induced hypotension
- 20.2. Drugs used in cardiovascular support including sympathomimetics
- 20.3. Adrenoceptor blocking agents
- 20.4. Anti-arrhythmic agents
- 20.5. Anticholinergic agents
- 20.6. Anti-cholinesterases
- 20.7. Drugs used for treatment of asthma

Detailed Knowledge indicates knowledge of.

- 20.8 History.
- 20.9 General idea of chemical nature and source.
- 20.10 General idea of preparation, purity, stability.
- 20.11 Structure activity relationship.
- 20.12 Absorption and distribution.
- 20.13 Site or sites, and nature of action.

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- 20.14 Modification of action (see section on general pharmacology).
- 20.15 Metabolism and/or excretion.
- 20.16 Effects on other systems.
- 20.17 Unwanted and toxic effects.
- 20.18 Routes of administration.
- 20.19 Dosage, strengths of solution, inhaled concentrations.
- 20.20 Contraindications.

21. Non-anaesthetic drugs : general knowledge.

- 21.1 Antithyroid agents.
- 21.2 ACTH and corticosteroid agents.
- 21.3 Autocoids.
- 21.4 Diuretic drugs.
- 21.5 Anticoagulant drugs.
- 21.6 Drugs used in the treatment of diabetes mellitus.
- 21.7 Antimicrobial drugs.
- 21.9 Psychotherapeutic drugs.
- 21.10 Anticonvulsant drugs.
- 21.12 Drugs acting on the uterus.
- 21.13 Cytotoxic drugs.
- 21.14 Agents used in hormonal replacement therapy.

General knowledge indicates knowledge of :

- 21.15 General idea of preparation.
- 21.16 Absorption and distribution.
- 21.17 Site or sites, and nature of action.

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- 21.18 Modification of action (see section on general pharmacology).
- 21.19 Metabolism and/or excretion.
- 21.20 Effects on other systems.
- 21.21 Unwanted and toxic effects.
- 21.22 Routes of administration.
- 21.23 Dosage, strengths of solution.
- 21.24 Contraindications.

22. Medical Statistics.

- 22.1 A knowledge of principles is required, sufficient to allow the understanding of trial or investigation design, sampling and selection, size of sample, power of a test, confidence limits and statistical significance consistent with usage in current medical literature. Eg:
 - 22.1.1 The use of descriptive statistics such as mean, standard deviation, standard error of the mean and range,
 - 22.1.2 Trial design; sampling and selection,
 - 22.1.4 Linear regression analysis and correlation,
 - 22.1.5 The t-test and simple analysis of variance for parametric data.
 - 22.1.6 Rank order and chi square testing for non-parametric data.

RECOMMENDED SOURCES FOR PHYSIOLOGY AND PHARMACOLOGY

The following is a list of suggested texts in your preparation for the Intermediate examination. They are by no means comprehensive or exclusive of other texts. Since some fields change rapidly, candidates are advised to search in the peer-reviewed journals and medline for selection of review articles and symposia.

The Annual Refresher Course Booklet of the American Society of Anesthesiologists regularly contains some excellent brief updates on areas of physiology and pharmacology. This is obtainable from the Hong Kong College of Anaesthesiologists free to members and fellows of the College or you can obtain from American Society of Anesthesiologists, 515 Busse Highway, Park Ridge, Illinois, 60068. U.S.A. after paying a fee.

The Current Opinion in Anaesthesiology, Current Opinion in Critical Care, and Current Anaesthesia and Critical Care (all six issues a year) are excellent sources to reviews of all advances in basic sciences and clinical topics. They also contain comprehensive listings of papers and references.

Anaesthesia Review Series- (Editor - Leon Kaufman) Excellent reviews on basic sciences and clinical topics.

International Anesthetic Research Society. Review course lectures are available from 3645 Wassensville Center Road, Cleveland, Ohio 44122.

The most recent edition of all listed texts including references should be used,

1. Useful texts - PHYSIOLOGY

1.1 General

Ganong, WF. Review of Medical Physiology. Lange Medical Publications.

Guyton, AC. Textbook of Medical Physiology. W B Saunders.

West, JB. Physiological Basis of Medical Practice. Williams and Wilkins.

Stoelting, RK. Pharmacology and Physiology in Anesthetic Practice. J.B. Lippincott.

1.2 Respiratory

West, JB. Respiratory Physiology - The Essentials. Williams and Wilkins.

West, JB. Pulmonary Pathophysiology. Williams and Wilkins.

Nunn, JF. Applied Respiratory Physiology. Butterworths.

13 Cardiovascular

Prys-Roberts, C. The Circulation in Anaesthesia. Blackwell.

Berne, RM & Levy, MN. Cardiovascular Physiology. Mosby-Year Book.

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1.4 Renal, Fluid and Electrolytes

Koeppen BM, Stanton BA. Renal Physiology. Mosby-Year Book

1.5 Immunology

Roitt, I. Essential Immunology. Blackwell.

1.6 Examination Papers

Previous examination papers are published by HKCA and ANZCA.

Supporting Texts

Useful information is to be found in the following texts:

(a) Miller, RD. Anesthesia. Churchill Livingstone. Chapters on applied physiology, pharmacology and statistics are useful.

(b) Prys-Roberts C, Brown BR Jr, Nunn JF. International Practice of Anaesthesia. Butterworth Heinemann (Oxford). Chapters on physiology and pharmacology.

2. Useful Texts - PHARMACOLOGY

Wood, M and Wood, AJJ. Drugs and Anesthesia. Pharmacology for Anesthesiologists, Williams and Wilkins.

Stoelting, RK. Pharmacology and Physiology in Anesthetic Practice. J.B. Lippincott.

Eger, EI. Anesthetic Uptake and Action. Williams and Wilkins.

Hull, CJ. Pharmacokinetics for Anaesthesia. Butterworths-Heinemann Ltd.

Reference Texts

Miller, RD. Anesthesia. Churchill Livingstone. Chapters on applied physiology, pharmacology and statistics are useful.

Prys-Roberts C, Brown BR Jr, Nunn JF. International Practice of Anaesthesia. Butterworth Heinemann (Oxford). Chapters on physiology and pharmacology.

Hardman JG, Limbird LE. Goodman & Gilman's The Pharmacological Basis of Therapeutics. McGraw-Hill (New York).

Sumner, E, Hatch, DJ. Textbook of Paediatric Anaesthetic Practice. Bailliere Tindall (chapter on paediatric physiology and pharmacology)

Hatch DJ, Sumner E. Neonatal Anaesthesia. Arnold. (The chapter on perinatal physiology is useful).

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Cousins, MJ & Bridenbaugh, PO. Neural Blockade in Clinical Anesthesia and Pain Management. J.B. Lippincott. (For local anaesthetic pharmacology. Also useful for pain physiology and physiological changes associated with spinal and epidural block).

3. **Physics and clinical measurement**

Parbrook, GD, Davis, PD & Parbrook EO Basic Physics and Measurement in Anaesthesia. William Heinemann.

Sykes, MY, Vickers, MD & Hull CJ. Principles of Clinical Measurement. Blackwell.

Adams AP & Hahn, CE. Principles and Practice of Blood Gas Analysis. Churchill Livingstone.

4. **Statistics**

Dawson-Saunders B, Trapp RG. Basic and Clinical Biostatistics. 2nd ed. Norwalk: Appleton and Lange 1994. ISBN 0838505422.

Myles PS, Gin T. Statistics for Anaesthesia. Oxford: Butterworth Heinemann 2000. ISBN 0750640650.

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The trainee should be conversant with:-

1. Pre-operative assessment and management.
2. Selection of anaesthetic techniques.
3. Preparation for anaesthesia.
4. General anaesthesia and recent advances.
5. Regional anaesthesia.
6. Sub-specialties in anaesthesia.
7. Post-operative care.
8. Resuscitation and emergency care.
9. Respiratory care.
10. Management of cardiovascular problems
11. Management of trauma including retrieval and transport.
12. Neurological injury.
13. Management of haematological problems.
14. Management of renal problems.
15. Management of liver problems.
16. Poisoning and envenomation.
17. Management of other medical emergencies
18. Prevention and treatment of infections.
19. Nutrition.
20. Management of acute and chronic pain.
21. Research

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22. Medico-legal aspects of anaesthesia
23. Ethical considerations in anaesthesia.
24. Management
25. History of anaesthesia.

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1. Pre-operative Assessment and management

- 1.1 History-,
 - 1.1.1 Present illness,
 - 1.1.2 Past history - medical, social, surgical and anaesthetic (including family history),
 - 1.1.3 Drugs, allergies,
 - 1.1.4 Airway,
 - 1.1.5 Food and fluids.
- 1.2 Clinical examination;
 - 1.2.1 Age, size, nutrition state, and racial characteristics,
 - 1.2.2 Airway,
 - 1.2.3 Respiratory system,
 - 1.2.4 Cardiovascular and other relevant systems.
- 1.3 Investigations - relevant investigations and interpretation of results.
- 1.4 Optimization for surgery.

2. Selection of Technique

Following understanding of clinical problems associated with--

- 2.1 Anaesthesia,
 - 2.2 Surgery,
 - 2.3 Primary illness,
 - 2.4 Drug therapy and drug interactions,
 - 2.5 Intercurrent disease.
 - 2.6 Depending whether an operation is:-
 - 2.6.1 Emergency, or
 - 2.6.2 Elective,
- Selection of most compatible technique for:
- 2.6.3 Patient,
 - 2.6.4 Surgeon

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2.3.5 Place,

2.3.6 Anaesthesiologist

3. Preparation for anaesthesia

3.1 Preparation of patients, technique and postoperative care.

3.2 Patient:-

3.2.1 Explanation,

3.2.2 Instructions,

(1) pre-operative,

(2) post-operative,

3.2.3 Consent,

3.2.4 Improvement,

3.2.5 Special needs,

3.2.6 Special investigations,

3.2.7 Pre-operative visit,

3.2.8 Premedication.

3.3 Technique

3.3.1 Drugs,

(1) resuscitation,

(2) anaesthetic.

3.3.2 Equipment,

(1) resuscitation,

(2) anaesthetic,

(3) monitoring.

3.4 Post Operative Care

Anticipatory planning for:-

3.4.1 I.C.U.,

3.4.2 Pain relief

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3.4.3 Physiotherapy.

4. General anaesthesia and recent advances

- 4.1 Mechanisms of anaesthesia, analgesia and muscle relaxation.
- 4.2 Anatomy relevant to anaesthetic practice.
- 4.3 Pharmacology of drugs used in anaesthetic practice.
- 4.4 Physiological and pharmacological effects of anaesthesia.
- 4.5 Understanding of the design of the operating room, the induction room and the recovery room.
- 4.6 Equipment; principles, indications, limitations and hazards;
 - 4.6.1 Anaesthetic equipment,
 - 4.6.2 Resuscitation equipment,
 - 4.6.3 Monitoring equipment.
- 4.7 Electrical and equipment safety.
- 4.8 Methods of administration.
- 4.9 Patient care during anaesthesia and surgery;
 - 4.9.1 Prevention of injury,
 - 4.9.2 Monitoring,
 - 4.9.3 Fluids and blood.
- 4.10 Special techniques associated with anaesthesia;
 - 4.10.1 Hypotension,
 - 4.10.2 Hypothermia.
- 4.11 Special equipment used during anaesthesia such as;
 - 4.11.1 Cardiac pacemakers,
 - 4.11.2 Defibrillator, diathermy, cell saver, suction apparatus, extracorporeal pump, blood warmer.
- 4.12 Complications of anaesthesia.
- 4.13 Occupational hazards in the operating room.
- 4.14 Morbidity and mortality

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5. Regional Anaesthesia

- 5.1 Anatomy and physiology relevant to surface, infiltration and topical anaesthesia.
- 5.2 Pharmacology of local anaesthetic agents including toxicity.
- 5.3 Equipment;
 - 5.3.1 Resuscitation,
 - 5.3.2 Anaesthetic,
 - 5.3.3 Monitoring.
- 5.4 Techniques.
 - 5.4.1 Indications,
 - 5.4.2 Technique,
 - 5.4.3 Effects,
 - 5.4.4 Complications,
 - 5.4.5 Morbidity and mortality.

6. Sub-specialties in Anaesthesia

- 6.1 Trainees should be fully conversant with anaesthesia for the following specialties;
 - 6.1.1 Abdominal surgery,
 - 6.1.2 Day case surgery,
 - 6.1.3 Ear nose and throat surgery,
 - 6.1.4 Genitourinary surgery,
 - 6.1.5 Surgery in geriatric patients,
 - 6.1.6 Gynaecology,
 - 6.1.7 Head and neck surgery,
 - 6.1.8 Neurosurgery,
 - 6.1.9 Obstetric anaesthesia and analgesia,
 - 6.1.10 Ophthalmic surgery,
 - 6.1.11 Oral and maxillofacial surgery,
 - 6.1.12 Orthopaedic surgery,

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- 6.1.13 Paediatric surgery,
- 6.1.14 Plastic surgery,
- 6.1.15 Thoracic surgery,
- 6.1.16 Vascular surgery,
- 6.1.17 Cardiac surgery - only the principles of management are required to be known,
- 6.1.18 Organ transplant surgery - only principles of management are required to be known.
- 6.1.19 Special procedures such as electroconvulsive therapy, radiological investigations and radiotherapy.

7. Postoperative Care

- 7.1 Understanding the design of a room for postoperative recovery.
- 7.2 Equipment.
- 7.3 Assessment.
- 7.4 Monitoring.
- 7.5 Management of the unconscious patient.
- 7.6 Pain relief.
- 7.7 Immediate post operative complications - prevention, recognition and management.
- 7.8 Late postoperative complications - prevention, recognition and management

8. Resuscitation and Emergency Care

- 8.1 Equipment for resuscitation and transfer.
- 8.2 Cardiopulmonary resuscitation.
- 8.3 Transport of critically ill patients.
- 8.4 Preparation for mass casualties.
- 8.5 Ethical considerations.

9. Respiratory Care

- 9.1 Basic respiratory physiology - mechanism of alteration of respiratory functions and their effects on other systems.
- 9.2 Assessment - including lung function tests and interpretation of data.
- 9.3 Respiratory failure

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- 9.4 Airway management.
- 9.5 Artificial ventilation and support including intermittent positive pressure ventilation (IPPV), intermittent mandatory ventilation (IMV), high frequency positive pressure ventilation (HPPV), bronchoscopic injectors, continuous positive airway pressure (CPAP), positive end expiratory pressure (PEEP), and others,
- 9.6 Ventilators -
 - 9.6.1 Principles of function,
 - 9.6.2 Problems,
 - 9.6.3 Maintenance.
- 9.7 Oxygen therapy.
- 9.8 Clearance of secretions.
- 9.9 Physiotherapy.
- 9.10 Suction.
- 9.11 Humidification.
- 9.12 Prevention of infection.
- 9.13 Drug therapy.
- 9.14 Management of pulmonary complications.

10. Management of Cardiovascular Problems

- 10.1 Basic cardiovascular physiology, mechanisms of alteration of cardiovascular function and their effects on other systems.
- 10.2 Assessment - including electrocardiogram, and their interpretation.
- 10.3 Shock - pathophysiology and its assessment.
- 10.4 Management of cardiac failure (acute and chronic) and cardiogenic shock.
- 10.5 Management of haemorrhage.
- 10.6 Drug therapy.
- 10.7 Fluid and electrolyte balance.

11. Management of Trauma, retrieval and transport

This requires a knowledge of the assessment, management and therapeutic complications in:-

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- 11.1 Multiple injuries.
- 11.2 Head injuries.
- 11.3 Neck and face injuries.
- 11.4 Chest injuries.
- 11.5 Spinal injuries.
- 11.6 Burns.
- 11.7 Retrieval and transport of critically ill patients

12. Neurological Injury

This requires a knowledge of:-

- 12.1 Assessment and management of intracranial, spinal cord and peripheral nerve damage
- 12.2 Assessment and management of raised intracranial pressure.
- 12.3 Brain death.

13. Management of Haematological Problems

- 13.1 Haemostasis;
 - 13.1.1. Physiology of haemostasis,
 - 13.1.2 Detection and management of problems.
- 13.2 Rheology.
- 13.3 Intravascular thrombosis - prevention detection and management.
- 13.4 Acute, chronic anaemia.

14. Management of Renal Problems

- 14.1 Physiology of the renal system:-
 - 14.1.1 Effects of anaesthesia on the renal system,
 - 14.1.2 Effects of renal problems on anaesthesia.
- 14.2 Assessment of renal function.
- 14.3 Management of acute renal failure.

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14.4 Management of chronic renal failure

15. Management of Liver Problems

15.1 Physiology of the liver: -

15.1.1 Effects of anaesthesia on the liver,

15.1.2 Effects of liver problems on anaesthesia.

15.2 Assessment of hepatic function.

15.3 Management of acute hepatic failure.

15.4 Management of chronic hepatic failure.

16. Poisoning and Envenomation

16.1 Immediate management of poisoning (ingestion and overdose).

16.2 Assessment and investigation of poisoning and envenomation.

16.3 Common specific antidotes.

17. Management of Other Medical Emergencies

17.1 Principles of diagnosis, assessment, investigation and management of:-

17.1.1 Coma

17.1.2 Acute endocrine disorders.

17.1.3 Convulsive and paralytic states.

17.1.4 Disturbance of temperature regulation.

18. Prevention and Treatment of Infections

18.1 Knowledge of transmissible diseases important to the anaesthetist e.g hepatitis and AIDS.

18.2 Prevention of cross infection.

18.3 Treatment of common infections.

18.4 Common chemotherapeutic agents, side effects and effects on anaesthesia.

19. Nutrition

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19.1 Assessment and monitoring of enteral and parenteral nutrition,

20. Management of Acute and Chronic Pain

20.1 Anatomy and physiology of pain.

20.2 Etiology, signs and symptoms of physiological, pathological and psychological pain.

20.3 Principles of management of pain.

20.4 Techniques, equipment and monitoring in pain management.

20.5 Complications and their management.

20.6 Drugs for pain management.

20.7 Concept of multidisciplinary care.

20.8 Establishing a pain clinic.

21. Research

21.1 Steps in the Organisation of a research project:-

21.1.1 Protocol,

21.1.2 Ethical approval

21.1.3 Funding,

21.1.4 Data collection,

21.1.5 Statistical analysis,

21.1.6 Submission of manuscript for publication.

22. Medico-legal Aspects of Anaesthesia

22.1 Consent.

22.2 Documentation.

22.3 Medical defense.

23. Ethical Considerations in Anaesthesia

23.1 Termination of pregnancy

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- 23.2 Brain death.
- 23.3 Organ donation.
- 23.4 Concept of "Do Not Resuscitate" and euthanasia

24. Management

- 24.1 Personnel:-
 - 24.1.1 Interpersonal relationships,
 - 24.1.2 Rostering and leave arrangements.
- 24.2 Equipment management:-
 - 24.2.1 Procurement,
 - 24.2.2 Testing,
 - 24.2.3 Asset management
 - 24.2.4 Cleansing and sterilization .
- 24.3 Buildings and Services:-
 - 24.3.1 Principles of operating suite design,
 - 24.3.2 Testing and maintenance of services.
- 24.4 Budgeting.
- 24.5 Education:-
 - 24.5.1 Undergraduate education,
 - 24.5.2 Postgraduate education,
 - 24.5.3 Paramedical education,
 - 24.5.4 Public awareness.
- 24.6 Audit
 - 24.6.1 Peer review,
 - 24.6.2 Quality control,
 - 24.6.3 Critical incident reporting,
 - 24.6.4 Mortality and morbidity

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25. History of Anaesthesia

25.1 Milestones of anaesthesia (a detailed knowledge is not required).