POSTGRADUATE INSTITUTE OF MEDICINE
UNIVERSITY OF COLOMBO

PROSPECTUS

BOARD CERTIFICATION IN CRITICAL CARE MEDICINE

CONDUCTED BY THE SPECIALTY BOARD IN CRITICAL CARE MEDICINE

OF THE BOARD OF STUDY IN ANAESTHESIOLOGY

2013

"This prospectus is made under the provisions of the Universities Act, the Postgraduate Institute of Medicine Ordinance, and the General By-Laws No. 1 of 2016 and By-Laws No. 2 of 2016 for Degree of Doctor of Medicine(MD) and Board Certification as a Specialist"

Table of Contents

1. Description, Nomenclature and Associated Boards of the Programme

1.1 Name of the Programme

Board Certification in Critical Care Medicine

1.2 University

University of Colombo, Sri Lanka

1.3 Faculties and Institutes

Postgraduate Institute of Medicine, Colombo

1.4 Departments and Associated Boards

The Specialty Board in Critical Care Medicine under the Board of Study in Anaesthesiology will conduct the training programme leading to Board Certification in Critical Care for post MD trainees in Anaesthesiology or Medicine. The chairperson and the secretary of the Specialty Board will be the coordinators and will function under the Board of Study in Anaesthesiology.

2. Mission and Proposed Outcomes

2.1 Mission

The mission of the programme is to fulfill the need for fulltime specialists in critical care.

2.2 Proposed outcome

1. To enable the trainee to achieve comprehensive training in diagnosis and management of critically ill patients needing intensive care
2. To be able to successfully support patients with system failures
3. To be skillful in invasive procedures that is required for monitoring and support of systems
4. To be able to monitor and interpret results from monitoring systems
5. To be able to detect failures in monitors and support systems by a thorough understanding of the underlying principles
6. To be able to detect problems and plan out treatment protocols

3. Selection Process and Training

3.1 Entry Criteria

- MD (Anaesthesiology) or MD (Medicine)

The candidates should not be already board certified or have already applied to be board certified in any other specialty.

3.2 Selection process

Applications will be invited by the PGIM by public circular following the conclusion of the MD examinations in Anaesthesiology and Medicine. The number of candidates will be pre-determined by the Specialty Board each year. Out of the total number 50% will be selected from trainees holding MD in Anaesthesialogy and the other 50% from trainees holding MD in Medicine. Order of merit in the respective MD exams will be taken into consideration when selecting candidates.

3.3 Duration of Training

Three years of training after the MD (Anaesthesiology/ MD (Medicine) examinations.

1st year -

For trainees completed MD (Anaesthesiology) -

6 months General medicine

6 months of subspecialties in medicine

- 1 month each – Cardiology and Neurology
- 2 months in Renal medicine
- 2 months in Respiratory medicine

For trainees completed MD (Medicine) -

6 months of General Anaesthesia

6 months of subspecialties in Anaesthesia

- 1 month each in Neurosurgical, Obstetrics, Vascular and Cardiothoracic Anaesthesia
- 2 Months in Trauma

2nd year –

Common intensive care pathway (For trainees from Anaesthesiology & Medicine programmes)

2 months each in the following intensive care units

Surgical, Medical and Obstetrics & Gynaecology

1 month each in the following intensive care units

CCU, Cardiothoracic, Neurosurgical, Neurology, Trauma and Paediatric surgical

3rd year -

An overseas placement approved by the Specialty Board of which at least 6 months should be in intensive care training.

4. Training Programme

The training programme will consist of the following components

4.1 Clinical training programme

This will be 3 years as stated above. It will be hospital based hands on training under direct supervision of consultants of the units.

4.2 Research Project

Successfully carrying out a research project, directly relevant to Critical Care Medicine, is a mandatory requirement that needs to be fulfilled to be eligible to appear for the Pre-Board Certification Assessment (PBCA).

The Research Project could be undertaken at any time, either in Sri Lanka or abroad. It should be a prospective study, observational or interventional.

All aspects of the study have to be assessed and deemed to be satisfactory by the Specialty Board in Critical Care Medicine before embarking on the proposed study. Towards that end, a comprehensive project proposal has to be submitted to the Specialty Board in Critical Care Medicine and approval obtained, prior to commencing the study including recruitment of patients and data collection.

Help from the members of the Specialty Board in Critical Care Medicine may be obtained before submitting the finalised project proposal to the Specialty Board of Critical Care Medicine. The draft proposal should be all-inclusive and detailed with all relevant particulars including ethical clearance. The trainer could be any of the tutors or recognised specialists appointed by the Specialty Board in Critical Care Medicine.

All projects would need informed written consent and interventional studies have to be registered with the Sri Lanka Clinical Trials Registry.

The project, once completed, should be accepted by a two member panel of examiners appointed by the Specialty Board in Critical Care Medicine. The examiners would assess the project based on the following marking scheme:

Title, Introduction and Literature Survey	10 marks
Objectives	10 marks
Method	20 marks
Results	20 marks
Discussion	20 marks
Conclusions	05 marks
References	05 marks
Overall presentation of the project.	10 marks
TOTAL	100 marks

A minimum mark of 50 per cent is necessary for the project to be accepted as 'complete' by the Specialty Board in Critical Care Medicine. Any paper or publication could have more than one author and several trainees may be co-authors. However, only one trainee could submit the paper as his or her own research project. (Annexure 4)

4.3 Clinical Audit.

In addition to the research project it is a mandatory requirement for the trainee to do a comprehensive Clinical Audit and formally present it at the hospital where he or she is working. Documentary evidence of such an audit presentation must be provided to the Specialty Board in Critical Care Medicine. This venture is a form of training that would be most useful when such audits have to be carried out or supervised in the Sri Lankan setting when the trainee returns to Sri Lanka.

4.4 Portfolio

This should contain the following sections with **reflective notes**

1. Log book of clinical cases managed, skills obtained and the number of procedures carried out during the appointments. The entries should be certified by the supervising consultants. Annex 1 and 2
2. Case book – Containing 10 case discussions where the trainee has been involved in the management. The cases should be certified by the supervising consultant. Annex 3
3. Record book of assessment – The assessment forms should be duly certified by the supervising consultants
4. Documentation of all other aspects of training and learning experienced by the trainee. This should include

    a. Details of Continuing Professional Development activities e.g.: Certification in Basic Life Support, Advance Life Support, Trauma resuscitation and Paediatric resuscitation

    b. Records of Scientific Presentations made. (A minimum of 5).

    c. Certificates of participation in workshops

    d. A record of individual activity-based entries on the trainee's own experience

    e. Any other relevant professional activity

Entries in the Portfolio should be made by the trainee at the time of acquiring the skill and authorized by the trainer.

The trainee is expected to keep it updated regularly. The trainers will use the portfolio to assess the progress of the trainee and to provide a feedback at regular intervals during the training period. The trainers are expected to assess the level of competencies in different areas of training as detailed in the log book and provide advice and assistance to the trainee to achieve the expected levels of skills empowerment.

It is the responsibility of the trainees, to ensure that the entries in the Portfolio are authentic and made regularly. The portfolio should be kept as a ring binder document which will allow easy insertions by the Trainee.

The completed portfolio should be submitted at least 8 weeks before the pre board certification assessment (PBCA). It will be assessed by a panel of two examiners appointed by the Specialty Board in Critical Care Medicine. The panel will sit at a formal discussion with the trainee and evaluate the portfolio as part of the pre board certification assessment (PBCA). At this portfolio viva voce the performance of the trainee will be marked by examiners using the following rating scale:

Rating Scale

Grading	Closed Mark	Equivalent mark
Failure	7	30%
Borderline failure	8	40%
Pass	9	50%
Good pass	10	60%
Excellent pass	11	70%

The onus of ensuring that the trainer reports are sent in time to the PGIM is entirely on the trainee. He or she should liaise with the trainers and make sure that the reports are received by the PGIM in time. This includes local as well as foreign training.

Suitable and appropriate action will be taken by the according to the General Regulations and Disciplinary Code of the PGIM in the event of the receipt of an unsatisfactory or adverse progress report at any stage of training.

Satisfactory Progress Reports are a mandatory requirement to qualify for the pre board certification assessment.

5. Eligibility to appear for Pre Board certification Assessment (PBCA)

The trainee will be eligible to appear for a PBCA after having satisfactorily completed the following

1. The 2 year local training programme with a minimum of 80% attendance. All appointments must be duly signed up as having been completed satisfactorily by the supervising consultant
2. The overseas training programme of 1 year in critical care medicine and satisfactory assessment from overseas supervisors
3. Successful completion and acceptance of an audit approved by the specialty board in critical care medicine
4. Successful completion and acceptance of a research project approved by the specialty board in critical care medicine.

6. Pre Board Certification Assessment (PBCA)

This will constitute (a) **Portfolio viva** of 20 minutes duration by a 2 member examiner panel covering the 3 years of training including the 1 year abroad. This will carry 50% of the marks allocated for the PBCA.

(b) **Knowledge Based Assessment (KBA) -** A MCQ paper consisting of 10 (best response answer type) questions. This will carry 25% of the total marks. An OSCE consisting of 4 stations with at least 1 examiner at each station. This will carry 25% of the marks allocated for the PBCA. The trainee needs to obtain a minimum pass mark of 60% at the PBCA.

Candidates failing this component will be required to follow a further period of training as prescribed by the Specialty Board in Critical Care Medicine and re appear for a PBCA.

7. Requirements to be eligible for Board Certification

Successful completion of the pre-board certification assessment

Annex 1

Log Book of Manual Skills

Skill	Date	Name BHT	ICU	Indication	Success	Complications

Annex 2

Log Book of Cases Managed

Date	Case	Name BHT	Age	Complications/ System Failure	Elective/ Emergency	Supervised Unsupervised

Annex 3

GUIDELINES FOR PREPARATION OF THE CASE BOOK

1. Guidelines for the Preparation of casebook for Board Certification in Critical Care Medicine

   Post Graduate Institute of Medicine, Colombo.

The casebook shall assess your involvement in critical care management issues in the context of your ability to (a) present it in writing (b) recognize the importance of various techniques and maneuvers adopted (c) understand the weaknesses and the risks undertaken (d) critically analyze the management in relation to standard practice and (e) appropriately adduce evidence to justify or criticize methods adopted. The selected cases should highlight problems, complications, system failure, uncommon scenarios, risks, precautions etc and their management.

1. There should be 10 cases presented.

2. The trainee should have been personally involved in the management of the cases mentioned.

3. The cases discussed should represent the breadth of the trainee experience in the specialty. Thus, it is prudent that the cases selected represent medical, surgical, anesthetic, obstetric, pediatric, neuro, cardiac, thoracic, renal and trauma.

4. It is advisable that the trainees discuss his/her case with the supervisor and carry out corrections and obtain the supervisor signature on the final print out before incorporating it in the casebook.

5. The patient confidentiality should be maintained at all times. Therefore the case reports should not contain any information that will expose patient identity.

6. The format of presentation should be

   (a) Title: This should be a concise description of the problem presented (maximum 75 characters)

   (b) Supervisor details: Name, Designation, Place of work and Signature

   (c) Abstract: A summary of the problem presented in the case report and its implications to the anesthetic management. (maximum 250 words)

(d) Case history: The relevant aspects of the case-history should be presented in order to emphasize the envisaged management issues. Supplementary notes such as monitoring records, photographs, electronic material etc., may be submitted to illustrate arguments and evidence.

(e) Discussion: This should be a critical analysis of the management of the case with appropriate reference to evidence where necessary. Why? , Why I did not?, Why I couldn't?, Why I didn't? and Shouldn't I have done it better? are useful questions that could be raised in the mind when formulating this section. This section is not an essay or a chapter on the subject matter but a critical retrospective look on the management of the presented case in relation to standard practice, current evidence and reasoning for deviation from the norm.

(f) *References* : These should be in Vancouver style, i.e. numbered consecutively, superscripted in the order in which they are cited in the text. Each reference must have an individual reference number. Figure legends should not exceed 50 words. Tables should be titled.

7. Style

(a) Nonstandard abbreviations should not be used. Spelling mistakes, grammatical errors should be eliminated.

(b) All pharmaceutical names should be in generic form.

(c) The case book should be type written with double spacing in A4 paper with a minimum of 2 cm margin all round. The body text of each case-report (excluding references) should not exceed 4000 words. A font size of 12 in Time New Roman would be preferred in body text.

8. Submission

The book should be bound and forwarded to the Director, Post Graduate Institute of Medicine, Colombo, at least 2 months before applying for board certification.

Annex 4

GUIDELINES FOR THE SCIENTIFIC PAPER

The scientific paper is a requirement for Board Certification and needs to be accepted by the Board of Study prior to Board Certification.

Before commencing the study the protocol should be presented for approval to the consultant supervising the study. Ethical approval and the advice of a statistician should also be sought at this stage. The Board may appoint supervisors to monitor the progress of the study.

Guidelines for writing the study protocol

(1) Aim
State the aim of the study with an explanatory introduction and a brief review of the relevant literature.
(2) Method
Selection of cases with inclusion and exclusion criteria of randomisation
Details of interventions, techniques, measurements, etc.
(3) Duration of study or number of subjects / observations
(4) Names of Co-workers and Advisors (credit will be given to the chief author)
(5) Method of statistical analysis
(6) References (photocopies may need to be provided)

Guidelines for writing the scientific paper

(1) Aim : State the aim or object of the study clearly and specifically

(2) Introduction
(a) State the importance of the subject and why it was chosen
(b) Define the problem with a concise account of the background. (c) Review briefly the relevant literature
(d) State the method of investigation

(3) Patients and methods
(a) Selection of cases with inclusion and exclusion criteria
(b) Method of randomisation
(c) Duration of study and number of patients /observations
(d) Method of statistical analysis

(4) Results
Summarise the results
Give an overall description of the major findings of the study. Present the data
State briefly what you did not find if it is relevant. Statistically analyse the data sensibly
Strive for clarity and avoid redundancy (repetition of data)

(5) Discussion
Challenge the validity and interpretation of evidence
Summarise the major findings
Discuss uncertainties about methodology
Compare with previously published work
Discuss implications both theoretical and practical

(6) Conclusion
State the principle conclusions and the significance of the work
Implications of study
What question have you tried to answer? What message do you wish to convey?

Do the data and your interpretation of it justify the message?

(7) References

Cite only the relevant references and present them as in the British Journal of Anaesthesia.

- *Journals.* Names and initials of six authors (if more than six, list three followed by *et al.*), title of paper, abbreviated title of journal, year of publication, volume number, first and any change in last page numbers:

  Myles PS, Chan MTV, Leslie K, Peyton P, Paesch M, Forbes A. Effect of nitrous oxide on plasma homocysteine and folate in patients undergoing major surgery. *Br J Anaesth* 2008; **100**: 780-6
- *Chapter in a book.* The reference for an article forming part of a book should take the form: Wildsmith JAW. Local anaesthetic agents. In: Aitkenhead AR, Smith G, Rowbotham DJ, eds. *Textbook of Anaesthesia.* Edinburgh: Churchill Livingstone Elsevier, 2007; 52-63

  Electronic source (web site/web page):
  Department of Health. Monthly Creutzfeldt-Jakob disease statistics 2002/0341 2002. Available from http://www.doh.gov.uk/cjd/stats/aug02.htm (accessed 30 March 2010)

  Online journal article:
  Lander JA, Weltman BJ, So SS. EMLA and amethocaine for reduction of children's pain associated with needle insertion. *Cochrane Database Syst Rev* 2006; **3**: CD004236

  Proceedings:
  O'Rourke K. Mixed means and medians: a unified approach to deal with disparate outcome summaries. *Proceedings of the Symposium on Systematic Reviews: Pushing the Boundaries*. Oxford: 2002; 49

  Report:
  Royal College of Anaesthetists and Royal College of Radiologists. *Sedation and Anaesthesia in Radiology*. Report of a joint working party, London, 1992

  Advance access article:

  Qiao D, Chen W, Stratagoules E, Martinez J. Bile acid-induced activation of activator protein-1 requires both extracellular signal-regulated kinase and protein kinase C signaling. *J Biol Chem* Advance Access published on May 19, 2000, doi:10.1074/jbc.M908890199

It is a serious error to include in the list of references items which are not accurate. It is essential, therefore, that authors check the accuracy of all references which have been listed. It is important also to check that the references listed do indeed appear in the text and *vice versa*.

The Curriculum

1. BASIC SCIENCES

1.1. **Apply relevant anatomy to understand disease patterns and carry out invasive procedures safely**

1.1.1. .Understand relevant applied anatomy

1.1.1.1. RESPIRATORY SYSTEM

* Mouth, nose, pharynx, larynx, trachea, main bronchi, segmental bronchi, structure of bronchial tree
* Differences in the child
* Airway and respiratory tract, blood supply, innervations and lymphatic drainage
* Pleura, mediastinum and its contents
* Lungs, lobes, microstructur e of lungs
* Diaphragm, other muscles of respiration, innervations
* The thoracic inlet and 1st rib
* Interpretation of a chest x-ray
* Physiological basis of respiratory support

1.1.1.2. CARDIOVASCULAR SYSTEM

* Heart, chambers, conducting system, blood and nerve supply
* Congenital deviations from normal anatomy
* Pericardium
* Great vessels, main peripheral arteries and veins
* Foetal and materno-foetal circulation
* Placental circulation

1.1.1.3. NERVOUS SYSTEM

* Brain and its subdivisions
* Spinal cord, structure of spinal cord, major ascending and descending pathways
* Spinal meninges, subarachnoid and extradural space, contents of extradural space.
* Cerebral blood supply
* CSF and its circulation
* Spinal nerves, dermatomes
* Brachial plexus, nerves of arm
* Intercostal nerves
* Nerves of abdominal wall
* Nerves of leg and foot
* Autonomic nervous system
* Sympathetic innervations, sympathetic chain, ganglia and plexuses
* Parasympathetic innervations.
* Stellate ganglion
* Cranial nerves: base of skull: trigeminal ganglion
* Innervation of the larynx

* Eye and orbit

1.1.1.4. VERTEBRAL COLUMN

* Cervical, thoracic, and lumbar vertebrae
* Interpretation of cervical spinal imaging
* Sacrum, sacral hiatus
* Ligaments of vertebral column
* Surface anatomy of vertebral spaces, length of cord in child and adult

1.1.1.5. SURFACE ANATOMY

* Structures in antecubital fossa
* Structures in axilla: identifying the brachial plexus
* Large veins and anterior triangle of neck
* Large veins of leg and femoral triangle
* Arteries of arm and leg
* Landmarks for tracheotomy, cricothyrotomy
* Abdominal wall (including the inguinal region): landmarks for suprapubic urinary and peritoneal lavage catheters
* Landmarks for intrapleural drains and emergency pleurocentesis
* Landmarks for pericardiocentesis

1.1.1.6. ABDOMEN

* Gross anatomy of intra-abdominal organs
* Blood supply to abdominal organs and lower body

1.2. Apply relevant physiology and biochemistry in the diagnostic process, monitoring and in achieving the therapeutic goals

1.2.1. *Understand the basic principles*

1.2.1.1. ORGANISATION OF THE HUMAN BODY AND HOMEOSTASIS

* Variations with age
* Function of cells; genes and their expression
* Mechanisms of cellular and humoral defence
* Cell membrane characteristics; receptors
* Protective mechanisms of the body
* Genetics & disease processes

1.2.1.2. BIOCHEMISTRY

* Acid base balance and buffers Ions e.g. Na + , K+, Ca++ , Cl-, HCO3-, Mg++, PO4-
* Cellular and intermediary metabolism
* Variations between organs
* Enzymes

1.2.1.3. BODY FLUIDS

* Capillary dynamics and interstitial fluid
* Oncotic pressure: osmolarity vs osmolality, partition of fluids across membranes
* Lymphatic system
* Special fluids: cerebrospinal, pleural, pericardial and peritoneal fluids

1.2.1.4. HAEMATOLOGY & IMMUNOLOGY

* Red blood cells: haemoglobin and its variants
* Blood groups
* Haemostasis and coagulation; pathological variations
* White blood cells
* Inflammation and its disorders
* Immunity and allergy

1.2.1.5. MUSCLE

* Action potential generation and its transmission
* Neuromuscular junction and transmission
* Muscle types
* Skeletal muscle contraction
* Motor unit
* Muscle wasting Smooth muscle contraction: sphincters

1.2.1.6. HEART & CIRCULATION

* Cardiac muscle contraction
* The cardiac cycle: pressure and volume relationships
* Rhythmicity of the heart
* Regulation of cardiac function; general and cellular
* Control of cardiac output (including the Starling relationship
* Fluid challenge and heart failure
* Electrocardiogram and arrhythmias
* Neurological and humoral control of systemic blood pressures, blood volume and blood flow (at rest and during physiological disturbances e.g. exercise, haemorrhage and Valsalva manoeuvre
* Peripheral circulation: capillaries, vascular endothelium and arteriolar smooth muscle Auto regulation and the effects of sepsis and the inflammatory response on the peripheral vasculature
* Characteristics of special circulations including: pulmonary, coronary, cerebral, renal, portal and foetal

1.2.1.7. RENAL TRACT

* Blood flow, glomerular filtration and plasma clearance
* Tubular function and urine formation
* Endocrine functions of kidney Assessment of renal function
* Regulation of fluid and electrolyte balance
* Regulation of acid-base balance

* Micturition
* Pathophysiology of acute renal failure
* Definitions of acute renal injury

1.2.1.8. RESPIRATION

* Oxygen cascade
* Gaseous exchange: O2 and CO2 transport, hypoxia and hyper- and hypocapnia, hyper-and hypobaric pressures
* Functions of haemoglobin in oxygen carriage and acid-base equilibrium
* Pulmonary ventilation: volumes, flows, dead space
* Effect of IPPV and PEEP on lungs and circulation
* Mechanics of ventilation: ventilation/perfusion abnormalities
* Control of breathing, acute and chronic ventilatory failure, effect of oxygen therapy
* Non-respiratory functions of the lungs
* Cardio-respiratory interactions in health & disease

1.2.1.9. NERVOUS SYSTEM

* Functions of nerve cells: action potentials, conduction, synaptic mechanisms and transmitters
* The brain: functional divisions
* Intracranial pressure: cerebrospinal fluid, blood flow
* Maintenance of posture
* Autonomic nervous system: functions
* Neurological reflexes Motor function: spinal and peripheral
* Senses: receptors, nociception, special senses
* Pain: afferent nociceptive pathways, dorsal horn, peripheral and central mechanisms, neuromodulatory systems, supraspinal mechanisms, visceral pain, neuropathic pain
* Influence of therapy on nociceptive mechanisms
* Spinal cord: anatomy and blood supply, effects of spinal cord section

1.2.1.10. LIVER

* Functional anatomy and blood supply
* Metabolic functions
* Tests of function

1.2.1.11. GASTROINTESTINAL

* Gastric function; secretions, nausea and vomiting
* Gut motility, sphincters and reflex control
* Digestive functions and enzymes
* Nutrition: calories, nutritional fuels and sources, trace elements, growth factors

1.2.1.12. METABOLISM AND NUTRITION

* Nutrients: carbohydrates, fats, proteins, vitamins, minerals and trace elements

* Metabolic pathways, energy production and enzymes; metabolic rate
* Hormonal control of metabolism: regulation of plasma glucose, response to trauma
* Physiological alterations in starvation, obesity, exercise and the stress response
* Body temperature and its regulation

1.2.1.13. ENDOCRINOLOGY

* Mechanisms of hormonal control: feedback mechanisms, effect on membrane and intracellular receptors
* Central neuro-endocrine interactions
* Adrenocortical hormones
* Adrenal medulla: adrenaline (epinephrine) and noradrenaline (norepinephrine)
* Pancreas: insulin, glucagon and exocrine function
* Thyroid and parathyroid hormones and calcium homeostasis

1.2.1.14. PREGNANCY

* Physiological changes associated with a normal pregnancy and delivery
* Materno-foetal, foetal and neonatal circulation
* Functions of the placenta: placental transfer
* Foetus: changes at birth
* The role and the potential of stem cells

1.3. Exercise safe pharmacological prescribing practices

1.3.1. *Understand theory of pharmacological intervention*

1.3.1.1. PRINCIPLES OF PHARMACOLOGY

* Dynamics of drug-receptor interaction
* Agonists, antagonists, partial agonists, inverse agonists
* Efficacy and potency
* Tolerance
* Receptor function and regulation
* Metabolic pathways; enzymes; drug: enzyme interactions
* Enzyme inducers and inhibitors
* Mechanisms of drug action Ion channels: types: relation to receptors
* Gating mechanisms
* Signal transduction: cell membrane/receptors/ion channels to intracellular molecular targets, second messengers
* Action of gases and vapours
* Osmotic effects
* pH effects
* Adsorption and chelation
* Mechanisms of drug interactions
* Inhibition and promotion of drug uptake
* Competitive protein binding
* Receptor inter-actions
* Effects of metabolites and other degradation products

1.3.1.2. PHARMACOKINETICS & PHARMACODYNAMICS

* Drug uptake from: gastrointestinal tract, lungs, nasal, transdermal, subcutaneous, IM, IV, epidural and intrathecal routes
* Bioavailability
* Factors determining the distribution of drugs: perfusion, molecular size, solubility, protein binding
* The influence of drug formulation on disposition
* Distribution of drugs to organs and tissues
* Body compartments Influence of specialised membranes: tissue binding and solubility
* Materno-foetal distribution
* Distribution in CSF and extradural space
* Modes of drug elimination: Direct excretion, Metabolism in organs of excretion: phase I & II mechanisms, Renal excretion and urinary pH, Non-organ breakdown of drugs
* Pharmacokinetic analysis: Concept of a pharmacokinetic compartment
* Apparent volume of distribution
* Orders of kinetics
* Clearance concepts applied to whole body and individual organs
* Simple 1 and 2 compartmental models
* Concepts of wash-in and washout curves
* Physiological models based on perfusion and partition coefficients
* Effect of organ blood flow: Fick principle
* Pharmacokinetic variation: influence of body size, sex, age, disease, pregnancy, anaesthesia, trauma, surgery, smoking, alcohol and other drugs
* Effects of acute organ failure (liver, kidney) on drug elimination Influence of renal replacement therapies on clearance of commonly used drugs
* Pharmacodynamics: concentration-effect relationships: hysteresis
* Pharmacogenetics: familial variation in drug response
* Adverse reactions to drugs: hypersensitivity, allergy, anaphylaxis, anaphylactoid reactions

1.3.1.3. SYSTEMIC PHARMACOLOGY

* Hypnotics, sedatives and intravenous anaesthetic agents
* Simple analgesics
* Opioids and other analgesics; Opioid antagonists
* Non-steroidal anti-inflammatory drugs
* Neuromuscular blocking agents (depolarising and non-depolarising) and anti-cholinesterases
* Drugs acting on the autonomic nervous system (including inotropes, vasodilators, vasoconstrictors, antiarrhythmics, diuretics)
* Drugs acting on the respiratory system (including respiratory stimulants and bronchodilators)
* Antihypertensives
* Anticonvulsants
* Anti-diabetic agents
* Diuretics
* Antibiotics

* Corticosteroids and other hormone preparations
* Antacids. Drugs influencing gastric secretion and motility
* Antiemetic agents
* Local anaesthetic agents
* Immunosuppressants
* Immune modulating biological agents
* Principles of therapy based on modulation of inflammatory mediators indications, actions and limitations
* Plasma volume expanders
* Antihistamines
* Antidepressants
* Anticoagulants
* Vitamins A-E, folate, B12

1.4. Apply relevant instruments of clinical measurement safe

1.4.1. *Understand basic concepts, safety issues and limitations in interpretation*

1.4.1.1. MATHEMATICAL CONCEPTS

* Relationships and graphs
* Concepts of exponential functions and logarithms: wash-in and washout
* Basic measurement concepts: linearity, drift, hysteresis, signal: noise ratio, static and dynamic response
* SI units: fundamental and derived units
* Other systems of units where relevant to intensive care medicine(e.g. mmHg, bar, atmospheres)
* Simple mechanics: Mass, Force, Work and Power

1.4.1.2. GASES & VAPOURS

* Absolute and relative pressure.
* The gas laws; triple point; critical temperature and pressure
* Density and viscosity of gases.
* Laminar and turbulent flow; Poiseuille's equation, the Bernoulli principle
* Vapour pressure: saturated vapour pressure
* Measurement of volume and flow in gases and liquids.
* The pneumotachograph and other respirometers.
* Principles of surface tension

1.4.1.3. ELECTRICITY & MAGNETISM

* Basic concepts of electricity and magnetism.
* Capacitance, inductance and impedance
* Amplifiers: bandwidth, filters
* Amplification of biological potentials: ECG, EMG, EEG.
* Sources of electrical interference
* Processing, storage and display of physiological measurements
* Bridge circuits

1.4.1.4. ELECTRICAL SAFETY

* Principles of cardiac pacemakers and defibrillators
* Electrical hazards: causes and prevention.
* Electrocution, fires and explosions.
* Diathermy and its safe use
* Basic principles and safety of lasers
* Basic principles of ultrasound and the Doppler effect

1.4.1.5. PRESSURE & FLOW MONITORING

* Principles of pressure transducers
* Resonance and damping, frequency response
* Measurement and units of pressure.
* Direct and indirect methods of blood pressure measurement; arterial curve analysis
* Principles of pulmonary artery and wedge pressure measurement
* Cardiac output: Fick principle, thermodilution

1.4.1.6. CLINICAL MEASUREMENT

* Measurement of gas and vapour concentrations, (oxygen, carbon dioxide, nitrous oxide, and volatile anaesthetic agents) using infrared, paramagnetic, fuel cell, oxygen electrode and mass spectrometry methods
* Measurement of H+, pH, pCO_2 , pO_2
* Measurement CO_2 production/ oxygen consumption/ respiratory quotient
* Colligative properties: osmometry
* Simple tests of pulmonary function e.g. peak flow measurement, spirometry.
* Capnography
* Pulse oximetry
* Measurement of neuromuscular blockade
* Measurement of pain
* Measurement of sedation

2. RESUSCITATION & INITIAL MANAGEMENT OF THE ACUTELY ILL PATIENT

2.1. Recognise and adopts a structured and timely approach to the assessment and stabilization of the acutely ill patient

2.1.1. *Demonstrate ability to recognize life-threatening illness or injury and apply basic principles of stabilization without delay*

2.1.1.1. RECOGNISE AND INITIATE FIRST AID FOR AIRWAY OBSTRUCTION

* Cyanosis
* Stridor
* Optimising the patient's position for airway management
* Airway management with mask and oral/nasal airways
* Endotracheal intubation
* Laryngeal mask/ Pharyngeal mask airway
* Cricothyrotomy

2.1.1.2. PROVIDE RAPID INTRAVENOUS ACCESS AND FLUID/BLOOD ADMINISTRATION

* Peripheral
* Central

2.1.2. Capable of triage and management of competing priorities for admission to intensive care

2.1.2.1. UNDERSTAND TRIAGE

* Definition
* Its philosophy
* Various triage scales

2.1.2.2. UNDERSTAND PRINCIPLES GOVERNING ICU ADMISSION AND DISCHARGE POLICY

* Admission for intensive monitoring
* Admission for monitoring and Intensive therapy
* Rationing admissions for potentially recoverable illnesses

2.1.2.3. UNDERSTAND CRITICAL ILLNESS

* As a state of maximum compensation
* As a state with little or no margin for error
* As a state needing earliest possible attention and rapid rectification of physiological and biochemical anomalies to improve outcomes

2.1.3. Institute immediate management of common medical emergencies

2.1.3.1. . OBTAIN A FOCUSED HISTORY AND EXAMINATION

* From patient
* From relative or by standees
* From referring doctor

2.1.3.2. OFFER A PRIORITIZED DIFFERENTIAL DIAGNOSIS

* To formulate initial management
* For further investigation

2.1.3.3. INITIATE RELEVANT VITAL SIGNS MEASURING AND MONITORING

* Clinical vital signs
* Non invasive electronic monitoring
* Invasive monitoring

2.1.3.4. IMPLEMENTS A METHOD OF MAINTAINING A PATENT AIRWAY

* Indications for and methods of tracheal intubation
* Appropriate use of drugs to facilitate airway control
* Selection of tube type (oral, nasal, armoured etc), diameter and length
* Management protocols of difficult intubation and failed intubation
* Methods of confirming correct placement of the endotracheal tube

* Insertion and use of oral airways, face masks and laryngeal mask airway

2.1.3.5. CONFIDENT ON THE FAILED INTUBATION DRILL

* Safety first/ checking of resuscitation equipment
* Able to achieve control of airway with bag and mask
* Understand risk factors for, and methods of prevention of, cardiopulmonary arrest
* Selects appropriate choices for anticipated / failed intubation drill
* Use of gum elastic bougie and stiletto
* Interpretation of capnograph trace
* Rapid sequence induction/cricoid pressure
* Support of ventilation using bag Identifying correct/incorrect placement of tube (oesophagus, R main bronchus) and mask Orotracheal

2.1.3.6. CAPABLE OF AIRWAY MANAGEMENT IN SPECIAL CIRCUMSTANCES

* Head injury
* Full stomach
* Upper airway obstruction
* Shock
* Suspected cervical spine injury

2.1.4. *Recognise and manage different types of shock*

2.1.4.1. CARDIOGENIC SHOCK

* Myocardial infarction
* Cardiac dysrhythmia

2.1.4.2. DISTRIBUTIVE SHOCK

* Anaphylactic shock
* Septic shock

2.1.4.3. OBSTRUCTIVE SHOCK

* Pulmonary embolism
* Coarctation
* Cardiac tamponade

2.1.4.4. HYPOVOLEMIC SHOCK

* Hemorrhagic shock
* Dehydration

2.1.5. *Understand patho-physiology and clinical approach to cardiac related diseases*

2.1.5.1. ACUTE CORONARY SYNDROMES

* STEMI
* NON STEMI

2.1.5.2. CARDIAC DYSRHYTHMIA

* SVT, AF
* VT, frequent VE
* Bradyarrhythmias

2.1.5.3. HYPERTENSION

* Hypertensive crises
* Aetiologies

2.1.5.4. PERICARDIAL DISEASE

* Effusion
* Tamponade

2.1.5.5. CRITICAL VALVULAR LESIONS

* MS, AS, MR, AR
* Co-arctation

2.1.5.6. PULMONARY OEDEMA

* Causes
* Management

2.1.5.7. MISCELLANEOUS

* Severe pulmonary hypertension
* Aortic dissection
* Cardiac syncope
* CVA in a cardiac patient on anticoagulants

2.1.5.8. UNDERSTAND INDICATIONS FOR AND METHODS OF VENTILATORY SUPPORT

* Non invasive
* Invasive

2.1.5.9. USE OF DRUGS DURING MECHANICAL VENTILATION

* Pharmacology and dosages of hypnotics, analgesics and relaxants
* Aware of side effects of drugs used and their interactions
* Monitoring during sedation /induction of anaesthesia for endotracheal intubation

2.1.5.10. RECOGNISE AND MANAGE UNEXPECTED COMPLICATIONS

* Anaphylactic and anaphylactoid reactions

* Inadvertent intra-arterial injection of harmful substances
* Problems of the obese or immobilised patient
* Impact of drug therapy on organ system function
* Management and avoidance of cardiovascular and respiratory changes during and after intubation

2.1.6. *Recognise, resuscitate and stabilize patients sustaining, or at risk of, cardiopulmonary arrest*

2.1.6.1. UNDERSTAND THE SITUATIONS IN NEED OF RESUSCITATION

* To normalise physiology
* To normalise Biochemistry
* To achieve normothermia

2.1.6.2. CONDUCT EFFECTIVE RESUSCITATION

* Adequate oxygenation
* Adequate tissue perfusion
* Pharmacologic support

2.1.7. *Manage cardiopulmonary resuscitation*

2.1.7.1. RECOGNISE THE NEED FOR CPR

* Pulse less
* Unconscious

2.1.7.2. ADOPT BEST TECHNIQUE (SINGLE OR TWO RESCUERS)

* Basic life support
* Advanced life support.
* Rapid sequence intubation
* Principles of cerebral resuscitation in brain illness and injury.

2.1.7.3. EVALUATE PROGRESS

* Vital signs

2.1.7.4. ATTEND TO AMELIORATE PRECIPITATING CAUSES

* Hypotension
* Hyperkalemia
* Hypothermia
* Hypoxia
* Hypoglycemia
* Tension pneumothorax
* Tamponade

2.1.7.5. TAKE MEASURES TO PREVENT PULMONARY ASPIRATION

* Understand causes of regurgitation and vomiting
* Cricoid pressure
* Manages pulmonary aspiration

2.1.8. *Manage the patient post-resuscitation*

2.1.8.1. RECOGNISE WHEN TO STOP CPR

* Return of pulse
* Clinical signs of recovery
* Regaining consciousness

2.1.8.2. INSTITUTE POST ARREST CARE

* Neurological care
* Maintenance of tissue perfusion
* Preventing secondary injury
* Monitoring and effectively managing multi-organ injury

2.1.8.3. EVALUATE AND CONTINUE NECESSARY VITAL FUNCTION SUPPORT

* Non invasive mechanical ventilation
* Invasive mechanical ventilation
* Inotrope support

2.1.8.4. DEALING WITH RELATIVES AND STAFF

* Reassuring patients and relatives
* Being clear in explanations to patient and staff
* Consideration of ethical issues: patient autonomy, appropriateness of ICU admission.

2.1.9. *Manage coma*

2.1.9.1. AETIOLOGY

* Hypoxia
* Hypoglycaemia
* Poisoning
* Trauma
* Seizures

2.1.9.2. INITIAL MANAGEMENT

* Airway
* Cerebral perfusion
* Intra cranial pressure

2.1.9.3. CONTINUING CARE

* Monitoring
* Appropriate investigation
* Appropriate referral

2.1.9.4. BRAIN DEATH

* Criteria
* Confirmation

2.2. Able to assess and offer initial management for major trauma

2.2.1. *Understand the basic principles*

2.2.1.1. DEMONSTRATE BASIC TRAUMA MANAGEMENT SKILLS

* Initial assessment using the ABC approach
* Full spine immobilization
* Understand principles of wound care

2.2.1.2. DEMONSTRATE WOUND CARE

* Basic wound care techniques.
* Basic wound closure techniques
* Wound dressings

2.2.1.3. AWARE OF THE NEEDS OF SPECIAL WOUNDS

* Puncture wounds
* Bites and stings
* Blast injury
* De-gloving injury
* Amputations
* Infected wounds

2.2.1.4. RECOGNISE CIRCUMSTANCES LEADING TO MAJOR TRAUMA

* High speed road collision
* Death of another individual in the same accident

2.2.1.5. UNDERSTAND MECHANISMS OF INJURY

* Direct impact
* Explosion
* Hypoxia
* Haemorrhage

2.2.1.6. UNDERSTAND SCORING SYSTEMS

* Injury Severity Score
* Glasgow Coma Scale

2.2.2. *Capable of mounting Advanced Trauma Life Support (ATLS)*

2.2.2.1. PRIMARY SURVEY (ABC APPROACH)

* Airway maintenance with cervical spine control
* Breathing and ventilation
* Circulation and haemorrhage control
* Disability (rapid assessment of neurological function)
* Exposure to allow full examination

2.2.2.2. RESUSCITATION PHASE

* Rectification of problems identified in primary survey
* Further practical procedures such as insertion of chest tube, urinary catheter, NG tube

2.2.2.3. SECONDARY SURVEY

* Head to toe examination to identify other injuries
* Investigations X Ray etc
* Look for occult injuries

2.2.2.4. DEFINITE CARE PHASE

* Fracture stabilization
* Emergency operative intervention
* Transfer to appropriate units for further management

2.2.3. *Understand specific issues*

2.2.3.1. HEAD INJURY

* Monitoring
* Reducing level of consciousness
* Raised ICP
* Cervical spine

2.2.3.2. CHEST TRAUMA

* Flail chest
* Hemothorax
* Tension pneumothorax
* Oesophageal rupture
* Ruptured diaphragm
* Lung contusion
* Pulmonary aspiration

* Cardiac tamponade
* Aortic injury

2.2.3.3. ABDOMINAL TRAUMA

* Ruptured viscous
* Ruptured internal organ such a liver, spleen
* Kidney trauma
* Internal haemorrhage

2.2.3.4. PELVIC AND GENITO-URINARY TRAUMA

* Bladder injury
* Urethral injury
* Testicular trauma

2.2.3.5. SPINAL INJURY

* Airway
* Spinal immobilisation
* Cord injury
* Spinal shock

2.2.3.6. MAXILLO-FACIAL TRAUMA

* Dento-alveolar fractures
* Le Fort facial fractures
* Nasoethmoidal fractures
* Zygomatic fractures
* Orbital 'blow out' fractures
* T-M joint dislocation

2.2.3.7. EXTREMITY TRAUMA

* Compartment syndrome
* Crush syndrome

2.3. Ability to assess and institute initial management of burns

2.3.1. *Understand principles of burns care*

2.3.1.1. EVALUATION

* Surface area
* Deep vs. superficial burns
* Fluid management
* Pain relief
* Supportive care

2.3.1.2. EARLY MANAGEMENT OF SPECIAL ISSUES

* Inhalational burns
* Thermal burns
* Electrical burns
* Chemical burns

2.3.1.3. BURNS WOUND CARE

* General
* Gunshot injuries
* Blast injuries
* Escharotomy

3. DIAGNOSIS: ASSESSMENT, INVESTIGATION, MONITORING AND DATA INTERPRETATION

3.1. Provide good medical care in any emergency situation

3.1.1. *Able to establish a diagnosis through a systematic approach*

3.1.1.1. ACQUIRE PROFICIENCY IN TAKING A FOCUSED HISTORY

* From patient
* From patients family, caregivers and other professionals

3.1.1.2. ACQUIRE PROFICIENCY IN PHYSICAL EXAMINATION

* General examination
* System examination

3.1.1.3. ACQUIRE PROFICIENCY IN MENTAL STATE EXAMINATION

* In relation to psychiatric disorders
* In relation to organic disorders

3.1.1.4. UNDERTAKE TIMELY AND APPROPRIATE INVESTIGATIONS

* Assist echocardiography (transthoracic / transoesophageal)
* Assist electrocardiography (ECG / EKG) and interpret the results
* Obtains appropriate microbiological samples and interprets results
* Obtains and interprets the results from blood gas samples
* Interprets chest x-rays

3.1.1.5. CONTINUING CARE

* Liaises with radiologists to organize and interpret clinical imaging
* Monitors and responds to trends in physiological variables
* Integrates clinical findings with laboratory investigations to form a differential diagnosis

3.1.1.6. UNDERSTAND EQUIPMENT USES AND ITS PITFALLS

* Capnography
* Pulse oxymetry
* ECG
* Ventilators
* Non invasive ventilators

4. DISEASE MANAGEMENT

4.1. Recognise and manage acute disease with appropriate referral

4.1.1. *Demonstrate fundamental knowledge of basic sciences applied to critical care medicine*

4.1.1.1. DEVELOP AN UNDERSTANDING OF CLINICAL MANAGEMENT ISSUES WHEN APPLIED TO ACUTE CARE SITUATIONS

* Resuscitation and stabilisation
* Supportive care
* Definitive care

4.1.1.2. DEMONSTRATE THE CAPACITY TO PRIORITIZE ATTENTION TO THOSE PATIENTS WITH MORE URGENT CONDITIONS

* Triage
* Neurological deterioration
* Uncontrolled haemorrhage
* Dysrhythmias/ infarction affecting cardiac output
* Poisoning

4.1.2. *Recognise physiological and biochemical derangements*

4.1.2.1. AWARE OF NORMAL PHYSIOLOGICAL PATTERNS AND BIOCHEMICAL PATTERNS

* Age/ Sex adjusted physiological ranges
* Age/ Sex adjust biochemical parameters

4.1.2.2. ABLE TO INTERPRET PHYSIOLOGICAL AND BIOCHEMICAL ABNORMALITIES

* Recognises limitations of investigations and normal ranges

4.1.2.3. RECOGNISE LIFE THREATENING PHYSIOLOGICAL AND BIOCHEMICAL

DERANGEMENTS

* Hypoxia
* Hypovolemia
* Hypoglycaemia
* Hypotension
* Hyperkalemia
* Hypothermia

4.1.3. *Understand approach to respiratory problems and conditions needing urgent attention*

4.1.3.1. UPPER AIRWAY OBSTRUCTION

* Croup
* Epiglottis

4.1.3.2. LUNG PARENCHYMAL DISEASES

* Acute lung injury
* Pneumonia
* ARDS

4.1.3.3. OBSTRUCTIVE AIRWAY DISEASE

* Chronic obstructive airway disease
* Asthma

4.1.3.4. RESTRICTIVE LUNG PROBLEMS

* Pneumothorax
* Pleural effusions

4.1.3.5. MISCELLANEOUS

* Disorders of the chest wall
* Disorders of the mediastinum
* Sleep apnoea

4.2. Recognise and manage chronic disease with appropriate referral

4.2.1. *Understand approach to acute neurological disease and management*

4.2.1.1. SYNDROMES OF CEREBRO-VASCULAR ACCIDENT

* Anterior cerebral artery
* Middle cerebral artery
* Poster inferior cerebellar artery syndrome
* Lacunar syndrome

* Mid brain, pontine and brainstem syndromes

4.2.1.2. HEADACHE

* Indications for CT, MRI
* Migraine
* Cluster headache
* Tension headache
* Raised intracranial pressure
* Temporal arteritis

4.2.1.3. CRANIAL NERVE PARALYSIS

* Facial nerve paralysis
* Other

4.2.1.4. ALTERED MENTAL STATE

* Comas
* Acute brain syndrome
* Dementia
* Memory disorders

4.2.1.5. SEIZURES

* Status epilepticus
* Dystonic reactions

4.2.1.6. PERIPHERAL NEUROPATHIES

* Guillan barre syndrome
* Motor neuron diseases
* Myasthenia gravis
* Multiple sclerosis
* Botulism
* Para-neoplastic disorders

4.2.1.7. PARAPLEGIA

* Causes

4.2.1.8. ABILITY TO INTERPRET

* EEG

4.2.2. *Understand approach to* renal disease

4.2.2.1. AETIOLOGIES

* UTI

* Prostatitis
* Pyelonephritis
* Rhabdomyolysis
* Haemolytic uremic syndrome

4.2.2.2. METABOLIC EFFECTS

* Hyperkalemia
* Acidosis

4.2.2.3. SPECIAL SITUATIONS

* Post renal transplant

4.3. Capable of recognition and initial management of poisoning

4.3.1. *Understand general and specific approach to poisoning*

4.3.1.1. RISK ASSESSMENT AND PREDICTION OF TOXICITY

* Clinical features
* Trends in monitoring
* Scoring systems
* Normograms

4.3.1.2. MANAGEMENT ISSUES

* Emesis
* Gastric lavage
* Activated Charcoal
* Cathartics
* Whole bowel irrigation

4.3.1.3. ANTIDOTES

* Anti-cholinergic
* Chelating agents
* Methylene blue
* Anti-Cyanide therapy

4.3.1.4. ANALYTICAL TOXICOLOGY

* Drug screening

4.3.1.5. CHEMICAL DEPENDENCY AND SUBSTANCE ABUSE

* Drug abuse
* Drug dependence
* Drug withdrawal

* Tolerance

4.3.1.6. POISONING WITH

* Anti-inflammatory agents and analgesics
* Antimicrobials
* Autonomic agents
* CNS drugs and muscle relaxants
* Cardio-vascular
* Environmental (Plants)
* GI agents
* Industrial toxicology (Metals, Toxic gases)

4.3.1.7. MANAGE INTOXICATION WITH DRUGS OR ENVIRONMENTAL TOXINS

* General measures
* Specific measures

4.3.1.8. RECOGNISE AND MANAGE THE SEPTIC PATIENT

* The role of early antibiotic therapy
* The role of goal directed therapy
* Sepsis induced multi-organ failure

4.4. Capable of appropriate use of laboratory investigations for clinical decision making

4.4.1. *Understand the basics of laboratory investigation*

4.4.1.1. PATIENT PREPARATION AND SAMPLING

* Venepuncture, finger prick specimen, anticoagulants
* Serum separation & effects of various procedures
* Specimen collection for haematology, biochemistry, microbiology, histopathology, urine analysis.
* Preparation of patients for investigations, specimen processing, safety aspects in specimen collection and detecting problems in specimen collection.

4.4.1.2. CLINICAL BIOCHEMISTRY

* Specimen collection, transport, processing, manual analytical techniques, blood, urine and body fluid analysis in relation to the biochemical tests.
* Enzymes , enzymes in health and disease, markers of heart disease, renal disease, serum electrolytes, mineral metabolism, thyroid disorder, sex hormones and infertility, tumour markers. Assessment of re- productive status, Thyroid function tests, Calcium, phosphorous, homeostasis and bone, Iron status, Inborn errors in metabolisms, special diagnostic tests.

4.4.1.3. HAEMATOLOGY

* Normal blood film and bone marrow film, hypochromic microcytic iron deficiency, macrocytic and megaloblastic, haemolytic anaemia and their laboratory investigation.
* Lab investigations of G6PD deficiency, hereditary spherocytosis, thalassaemia and haemoglobinopathy.

* Disorders of white cells- acute and chronic leukaemia, myeloproliferative disorders, paraproteinaemia, urine and protein electrophoresis.

4.4.1.4. MICROBIOLOGY

* Normal flora and collection and transport of specimens, respiratory tract infections, gastrointestinal infections, sexually transmitted infections, central nervous system infections, bacteraemia/infective endocarditis, skin and wound infections, urinary tract infections, ENT and eye infections
* Infection in the compromised host
* Antibiotics and antibiotic sensitivity testing , choice of appropriate test in an infective disease, sputum-microscopy, culture, identification of pneumococci, faeces-culture of faeces.
* Blood culture-Gram stain and subculture, device for Maki method, urine - inoculate.

4.4.1.5. HISTOLOGY

* Routine and special stains, immunohistochemistry, morphometry, cytology, collection and transport, fixation cytotechnology, special stains in cytology, frozen sections, electron microscopy.

4.4.2. *Understand sampling errors and hazards*

4.4.2.1. CLINICAL BIOCHEMISTRY

* Identification of laboratory errors, maintenance quality control charts and interpretations
* Supervising satellite laboratories and night laboratories
* Collecting procedure, containers,

4.4.2.2. PUBLIC HEALTH MICROBIOLOGY

* Microbial hazards relating to food, water and sanitation: sampling transportation and identification of microbial agents.

4.4.3. *Understand limitations in interpretation*

4.4.3.1. QUALITY CONTROL/ASSURANCE & MANAGEMENT

* Accuracy, precision, internal quality control
* Quality assurance, quality management
* Laboratory manuals, accreditation

4.4.3.2. CLINICAL BIOCHEMISTRY

* Use of automated biochemistry analyzers
* Specimen collection and processing
* Special biochemical tests & special urine tests

4.4.3.3. HAEMATOTECHNOLOGY

* Quality assurance and quality control in haematology
* Automated haematology analyzers
* Blood gas machines

* Identification of laboratory errors
* Quality control charts and interpretations

4.4.3.4. HISTOLOGY

* Quality control
* Specimen handling and transport

4.4.4. *Understand the indications, techniques and interpretation of common imaging studies*

4.4.4.1. PLAIN RADIOLOGY

* Trauma series
* Chest
* Abdomen
* Limbs
* Spine
* Thoracic
* Lumbo-sacral
* Skull
* Soft tissue

4.4.4.2. CONTRAST RADIOLOGY

* Angiography

4.4.4.3. COMPUTED TOMOGRAPHY

* Brain
* C-spine

4.4.4.4. MAGNETIC RESONANCE IMAGING

* Brain
* Spine

4.4.4.5. NUCLEAR MEDICINE

* Ventilation/ perfusion scans
* Bone scans

4.4.4.6. ULTRASOUND

* Focused Assessment using Sonography in Trauma (FAST)
* Assessment of peritoneal cavity, pleural cavity, pericardial space
* Assessment of the abdominal aorta and IVC
* Vascular access
* Echocardiography in life support

* Lung ultrasound

5. THERAPEUTIC INTERVENTIONS/ SPECIFIC MANAGEMENT / ORGAN SYSTEM SUPPORT IN SINGLE OR MULTIPLE ORGAN FAILURE

5.1. Recognise and manage organ system failure

5.1.1. *Aware of common system based disorders*

5.1.1.1. RESPIRATORY

* Asthma
* Acute Respiratory Distress Syndrome
* Transfusion Related Acute Lung Injury
* Chronic Obstructive Pulmonary Disease
* Pnemothorax
* Collapse/ consolidation
* Restrictive lung disease

5.1.1.2. CARDIOVASCULAR SYSTEM

* Acute coronary syndromes
* Pulmonary embolism
* Malignant hypertension
* Cardiac tamponade
* Cor pulmonale
* Arrhythmias
* Cardiomyopathies
* Congenital heart diseases
* Valvuar dysfunction
* Artificial valves/ assist devices
* Pacing

5.1.1.3. RENAL

* Urological sepsis
* Nephritis
* Nephrotic syndrome
* Acute renal injury
* End stage renal disease

5.1.1.4. GASTRO INTESTINAL

* Abdominal pain/ distension
* Peptic ulceration
* Upper GI haemorrhage

* Diarrhoea and vomiting
* Pancreatitis
* Liver impairment (cirrhosis, metabolic disease)
* Liver injury (e.g. paracetamol induced)

5.1.1.5. NEUROLOGICAL

* Confusion and coma
* Post anoxic brain damage
* Intracranial haemorrhage and infarction
* Raised intra cranial pressure
* Neuro-myopathies
* Meningitis / encephalitis
* Convulsions and status epileptics

5.1.1.6. SEPSIS

* Viral / Rickettsial
* Bacterial
* Fungal
* Parasitological
* Systemic inflammatory response syndromes
* Septicaemia and shock
* Antibiotic use

5.1.1.7. HAEMATOLOGY AND ONCOLOGY

* Coagulation disorders
* Immune suppression
* Leukaemia
* Tumour lysis syndrome
* Hormone secreting tumours
* Haemaglobinopathies
* Chemotherapy
* Radiotherapy
* Use of biological agents

5.1.1.8. ENDOCRINE/ METABOLIC

* Diabetes
* Thyroid disorders
* Pituitary disorders
* Adrenal disorders (cortex, medulla)
* SIADH
* With acute gastrointestinal failure
* With acute lung injury syndromes (ALI / ARDS)

5.1.2. *Prescribe drugs and therapies safely*

5.1.2.1. MANAGE ANTIMICROBIAL DRUG THERAPY

* Hospital vs community acquired infections
* Evolging drug resisntace in hospital
* Therpaetic index and toxocty

5.1.2.2. ADMINISTER BLOOD AND BLOOD PRODUCTS SAFELY

* Compatibility
* Allergic reactons
* Hyperkalemia
* Sensitisation
* Transmission of infections
* White cell depletion
* Washed cells
* Irradiated blood

5.1.2.3. USE FLUIDS AND VASOACTIVE / INOTROPIC DRUGS TO SUPPORT THE CIRCULATION WITH CAUTION

* Infsion techinies
* Vehicle compatibility
* Overload

5.1.2.4. DESCRIBE THE USE OF MECHANICAL ASSIST DEVICES TO SUPPORT THE CIRCULATION

* Aortic balloon pump
* Pace makers

5.2. Understand the principles of management of multi-organ failure

5.2.1. *Central nervous system*

5.2.1.1. MAINTAIN CEREBRAL PERFUSION PRESSURE

* Ensuring venous drainage
* Postural intervention
* Safe use of osmotic agents
* The role of hypocarbia

5.2.2. *Cardiovascular system*

5.2.2.1. MAINTAIN ADEQUATE MEAN ARTERIAL PRESSURE

* Pre-load
* After load
* Myocardial contractility
* Use of inotropes
* Pace makers
* Devices to support diastolic flow

5.2.3. *Gastro intestinal tract*

5.2.3.1. PREVENT STASIS

* Factors affecting gut motility
* Ileus
* Obstruction

5.2.3.2. PREVENT GUT ISCHEMIA

* Cautious use of vasoconstrictors
* Effect of excessive venous pressure
* Abdominal compartment syndrome

5.2.3.3. ENTERAL NUTRITION

* Routes of nutrition
* Preparations
* Advantages over parenteral nutrition

5.2.3.4. MANAGING FISTULAE

* Replacing losses

5.2.4. *Hepato-biliary system*

5.2.4.1. LIVER PROTECTION STRATEGIES

* Maintain liver perfusion
* Managing portal venous pressure
* Minimising liver toxins

5.2.5. *Respiratory system*

5.2.5.1. METHODS OF RESPIRATORY SUPPORT

* Non invasive vs. invasive ventilation
* Securing mask/ ET tube/ Tracheotomy tubes
* Pressure vs volume control ventilation
* Ventilator settings
* Extracorporeal membrane oxygenation (ECMO)

5.2.5.2. STRATEGIES FOR LUNG PROTECTIVE VENTILATION

* Minimizing oxygen toxicity
* Minimizing baro trauma
* Minimizing volu trauma

5.2.5.3. INITIATES, MANAGES, AND WEANS

* Patients from invasive and non-invasive ventilator support

5.2.6. *Nephro-urological system*

5.2.6.1. CAUSES OF ACUTE RENAL INJURY

* Renal parenchyma disease: glomerular, tubular
* Poor renal perfusion
* Urinary outflow obstruction

5.2.6.2. MAINTAINING RENAL PERFUSION PRESSURES

* Role of arterial pressure
* Role of Venous pressure
* Role of Abdominal pressure

5.2.6.3. MAINTAINING GLOMERULAR FILTRATION PRESSURE

* Afferent arterial tome
* Efferent arteriolar tone

5.2.6.4. OLIGURIA

* Fluid restriction
* Electrolyte management

5.2.6.5. POLYURIA

* Replacing losses

5.2.7. *Managing established renal failure*

5.2.7.1. PERITONEAL DIALYSIS

* PD catheter insertion
* PD care
* PD balancing
* PD fluids
* Adult vs. paediatric differences

5.2.7.2. HAEMODIALYSIS

* Haemo dialysis catheter insertion and sizes
* Intermittent vs. continuous dialysis
* CVVHD

5.2.7.3. MINIMISING NEPHROTOXICTY

* Iatrogenic

5.2.7.4. MANAGE

* Plasma exchange
* Exchange transfusion
* Massive transfusion
* Coagulation disorders
* Heparinisation
* Electrolyte
* Glucose control
* Acid-base disturbances

6. PRACTICAL PROCEDURES

6.1. Undertake common practical procedures with confidence with appropriate referral where necessary

6.1.1. *Respiratory system*

6.1.1.1. ADMINISTERS OXYGEN

* Using a variety of administration devices

6.1.1.2. PERFORM EMERGENCY AIRWAY MANAGEMENT

* Difficult and failed airway management according to local protocols
* Endotracheal suction along with chest physiotherapy
* Fbreoptic bronchoscope and Broncho-alvelolar lavage in the intubated patient
* Percutaneous tracheostomy
* Fbreoptic laryngoscopy awake / under anaesthesia
* Thoracocentesis via a chest drain
* Spirometry
* Peak flow measurement

6.1.2. *Cardiovascular system*

6.1.2.1. COMPETENT IN

* Peripheral venous catheterization
* A arterial catheterization

* Surgical isolation of vein / artery
* Ultrasound techniques for vascular localization
* Central venous catheterization
* Jugular bulb catheterisation and SjO2 monitoring
* Defibrillation and cardio version
* Cardiac pacing (transvenous or transcutaneous)
* Pericardiocentesis
* Methods of measuring cardiac output and derive hemodynamic variables

6.1.3. *Central nervous system*

6.1.3.1. COMPETENT IN

* Lumbar puncture
* Train of four neuromuscular monitoring

6.1.3.2. MANAGE INTRACRANIAL PRESSURE

* ICP monitoring
* Cerebral perfusion pressure
* Use of osmolar agents
* Use of posture
* Appropriate use of ventricular drainage

6.1.4. *Gastrointestinal system*

6.1.4.1. COMPETENT IN

* Nasogastric tube placement
* abdominal paracentesis
* Safe conduct of endoscopy

6.1.5. *Genitourinary system*

6.1.5.1. PERFORMS

* Urinary catheterization
* Supra pubic puncture

7. PERI-OPERATIVE CARE

7.1. Manage the pre- and post-operative care of the high risk surgical patient

7.1.1. *Optimization of*

7.1.1.1. HAEMATOLOGY, PHYSIOLOGY AND BIOCHEMISTRY

* Coagulation
* Electrolytes
* Cardiovascular stability

7.1.1.2. CO-MORBID CONDITIONS

* Diabetes
* Respiratory function
* Ischemic heart disease
* Renal impairment
* Body temperature

7.2. Understand implications of

7.2.1. *Type of anesthesia*

7.2.1.1. REGIONAL

7.2.1.2. GENERAL ANAESTHESIA

7.2.2. *Type of Surgery*

7.2.2.1. FOLLOWING CARDIAC SURGERY

* correcting congenital abnormities
* Valve replacement
* Coronary by pass
* Shunt surgery

7.2.2.2. FOLLOWING CRANIOTOMY

* Intra cranial haemorrhage
* Tumours
* Hydrocephalus

7.2.2.3. FOLLOWING SOLID ORGAN TRANSPLANTATION

* Liver
* Kidney
* heart
* Lung

7.2.2.4. FOLLOWING TRAUMA

8. COMFORT, PAIN RELIEF & RECOVERY

8.1. Understand the basics

8.1.1. *ICU is an intimidating environment*

8.1.1.1. MAINTAIN

* Privacy

8.1.1.2. MINIMISE

* Pain
* Discomfort
* Unpleasant symptoms

8.1.1.3. OFFER

* Compassion when delivering care

8.2. Capable of providing appropriate and safe use of anaesthetics and pain relief in the intensive care unit setting

8.2.1. *Institute therapies understanding the limitations*

8.2.1.1. LOCAL ANAESTHETIC TECHNIQUES

* Local infiltration
* Peripheral Nerve blocks

8.2.1.2. SAFE CONSCIOUS SEDATION AND NEUROMUSCULAR BLOCKADE

* Analgesics
* Sedatives

8.2.1.3. GENERAL ANAESTHETIC TECHNIQUES

* Induction agents
* Muscle relaxants
* Inhalational agents

8.2.1.4. PAIN MANAGEMENT

* Acute pain
* Chronic pain
* Pain scores

8.2.1.5. PHARMACOLOGICAL APPROACH AND ROUTES

* Oral/ sublingual/ rectal/ epidural
* Drugs
* Adjuncts

8.3. Attempts to minimise the physical and psychosocial consequences of critical illness

8.3.1. *For patients*

8.3.1.1. MANAGE

* The assessment, prevention and treatment of pain and delirium

8.3.2. *For families*

8.3.2.1. MANAGE

* the safe and timely discharge of patients from the ICU
* Communicates the continuing care requirements of patients at ICU discharge to health care professionals, patients and relatives

9. END OF LIFE CARE

9.1. Manage death

9.1.1. *Understand basics*

9.1.1.1. DEATH MAY BE AN INEVITABLE EVENT

* Dignified deatlh is desirable
* Sustanied organ system support in patients certain to die is unkind, unethical, inappropriate and futile

9.1.1.2. CONSIDER RELIGIOUS VALUES AND FAMILY WISHES

* Withdrawal of support does not mean withdrawal of care

9.1.1.3. AUTOPSY

* Resolves medico-legal issues
* Is an important opportunity for learnig

9.1.2. *Understand the principles governing end of life care*

9.1.2.1. MEDICAL CARE

* Palliative care

9.1.2.2. DOCUMENTS

* Death certificates
* Living wills

9.1.2.3. BRAIN DEATH

* Advance directives
* Coroner

9.1.2.4. THE NEED TO REFER FOR ORGAN DONATION

* The timed constraints of organ retrieval

9.1.2.5. AWARE OF FORENSIC ISSUES SURROUNDING HOSPITAL ADMISSIONS

* Forensic evidence
* Chain of evidence
* Drugs and alcohol testing

9.2. Manage palliative care of the critically ill patient

9.2.1. *Patients perspective*

9.2.1.1. PAIN RELIEF

9.2.1.2. COMFORT

9.2.1.3. NUTRITION

9.2.1.4. HYDRATION

9.2.2. *Relatives perspective*

9.2.2.1. DISCUSS END OF LIFE CARE WITH

* Patients and their families / surrogates

9.2.2.2. COMPETENT IN

* Brain-stem death testing

9.2.2.3. MANAGE

* the physiological support of the organ donor
* The process of withholding or withdrawing treatment with the multidisciplinary team

10. OBSTETRIC CARE

10.1. Capable of recognition, management and early referral of obstetric emergencies

10.1.1. *Understand approach to obstetric problems*

10.1.1.1. CLEARLY DESCRIBE

* Normal pregnancy
* High risk pregnancy

10.1.1.2. UNDERSTAND COMPLICATIONS OF PREGNANCY

* Hyper-emesis gravid arum
* Miscarriage
* Septic abortion
* HELLP syndrome
* Ante partum haemorrhage
* Fevers
* Post partum haemorrhage
* Pelvic infection
* Mastitis and breast abscess

10.1.1.3. UNDERSTAND COMPLICATIONS OF LABOUR

* Foetal distress
* Premature labour
* Premature rupture of membranes
* Complications of delivery
* Poor progress of labour
* Prolapsed cord
* Rupture/ inversion of uterus
* Retained products of conception

10.1.1.4. UNDERSTAND MEDICAL COMPLICATIONS OF PREGNANCY

* Pre-eclampsia and eclampsia
* Thrombo-embolic disease
* Disseminated intravascular coagulation
* diabetes crisis

10.1.1.5. AWARE OF SAFE DRUGS IN PREGNANCY

* Terotogenicy
* Foetal effects
* Placental barrier
* Lactation

10.1.1.6. UNDERSTAND TRAUMA IN PREGNANCY

* Foetal injury
* Placental abruption
* Uterine rupture
* Amniotic fluid embolism

10.1.1.7. MANAGE LIFE-THREATENING MATERNAL PERI-PARTUM COMPLICATIONS

* Haemorrhage
* Sepsis
* Neurological effects
* Psychosocial effects
* Deep Vein Thrombosis

11. PAEDIATRIC CARE

11.1. Capable of recognition and initial management of paediatrics and neonatal problems

11.1.1. *Understand differences from that of adults*

* Physiology
* Anatomy
* Haematological and biochemical changes with age
* Thermoregulation especially infants
* Psychological aspects
* Ethical aspects and consent
* Fluid and nutritional requirements

11.1.2. *Understand approach to acute pediatric and neonatal diseases*

11.1.2.1. INITIAL APPROACH

* Dealing with children
* Dealing with parents
* Special issues
* Drug doses
* Immunisation
* Venous access
* Intra-osseous infusion

11.1.3. *Recognise the acutely ill child and institute initial management of paediatric*

emergencies

11.1.3.1. SPECIFIC ISSUES

* Neonatal resuscitation
* Paediatric life support
* Choking from a foreign body
* Anaphylaxis in children
* Sudden infant death syndrome
* Neonatal conditions (e.g. jaundice)
* Infantile skins conditions
* Purpuric rashes
* Paediatric ENT problems
* Stridor
* Acute asthma
* Acute bronchiolitis
* Whooping cough
* Pneumonia
* Febrile convulsions
* Funny turns
* Status epilepticus
* UTI
* Renal failure
* Poisoning
* Abdominal pain in children
* Inguinal an scrotal swellings
* The limping child
* Painful hip
* Paediatric trauma

11.1.4. *Understand the principles*

11.1.4.1. NEONATAL AND PAEDIATRIC MECHANICAL VENTILATION IN CONTRAST TO THAT IN ADULTS

* Pressure controlled vs. volume controlled
* Cuffed vs. uncuffed endo-tracheal tubes

12. TRANSPORT

12.1. Provide safe transport

12.1.1. *Understand the basics*

12.1.1.1. THE PREPARATION

* Stabilization before transfer
* Pre transfer check list including personnel
* Rescue plan for anticipated problems during transfer
* Communication with referring institutions an teams
* Monitoring issues
* Maintaining organ support utilizing portable equipment
* Ensuring adequate support and resources/ consumables

12.1.2. *Special situations to obtain emergency radiological investigations*

12.1.2.1. UNDERSTAND THE PLACE OF RADIOLOGY

* Limited resource
* Distant patients and difficulties in monitoring
* Special needs in the presence of magnetic fields
* Safe doses of radiation
* Complications (including contrast induced)

12.1.3. *Special circumstances*

12.1.3.1. AWARE OF THE ISSUES

* Pregnancy and shielding
* The unstable patient – monitoring and transfer

12.1.3.2. PROVIDE SAFE TRANSPORTATION FOR CRITICALLY ILL PATIENTS

* Risks when transporting by road
* Special considerations during patient transport by air

12.1.3.3. TRANSPORT OF THE MECHANICALLY VENTILATED

* Within the hospital
* Between hospitals

13. PATIENT SAFETY AND HEALTH SYSTEMS MANAGEMENT

13.1. Understand that outcomes of health care services are not dependent on single professional but are a product of team working

13.1.1. *Respect differences in opinion*

13.1.1.1. PROMOTE TEAM WORKING

* Joins daily multidisciplinary ward round
* Systematic approach to each patient
* Problem based therapy
* Ensure continuity of care through effective handover
* Seek advice for specific management
* Liaise with referring physicians/ surgeons
* Collaborate with others

13.1.1.2. COMPLY WITH LOCAL INFECTION CONTROL MEASURES

* Antibiotic policy
* Hand washing
* Barrier nursing
* Reverse Barrier nursing
* Cleaning

13.1.1.3. CRITICALLY APPRAISES AND APPLIES

* Guidelines
* Protocols
* Care bundles

13.1.1.4. JUSTIFY COURSES OF ACTION BASED ON

* Current evidence
* Consensus opinion as much as possible
* Consults when appropriate

13.1.1.5. SUPPORT MEASURES THAT IMPROVE PATIENT OUTCOMES

* In respect of the survival
* In respect of duration of stay in ICU

13.1.2. *Provide clinical leadership in the management of a multi-disciplinary team*

13.1.2.1. CONDUCT

* Mortality and morbidity meetings
* Organizes case conferences

13.1.2.2. DESCRIBE

* Commonly used scoring systems for assessment of severity of illness, case mix and workload

13.1.2.3. UNDERSTAND

* Tools that can be used in risk management
* Root cause analysis

13.1.2.4. DEMONSTRATE AN UNDERSTANDING OF

* The managerial & administrative responsibilities of the Intensive Care Medicine specialist

13.2. Understand concepts of quality and safety in health care practice

13.2.1. *Promote quality and safety*

13.2.1.1. IDENTIFY AND MINIMISE

* Environmental hazards and promotes safety for patients & staff
* Risk of critical incidents and adverse events, including complications of critical illness

13.2.1.2. AWARE OF POTENTIAL RISKS TO PATIENTS AND STAFF

* As a result of interventions
* Acts and communicates in a manner to actively minimise risk
* Reports incidents that could have or lead to harm and also discusses measures to be taken to prevent its occurrence
* Comply with systems and policies designed to minimise risk and ensure safety

13.2.1.3. UNDERSTAND SAFE EQUIPMENT USE

* Use of pressure regulators, flow meters, vaporizers, breathing systems
* Disconnection monitors
* Use of cylinders for gas storage (oxygen, air, helium)
* Pipeline gasses and suction systems
* Sterilisation and cleaning
* Check lists
* Alarms settings and use
* Electrical safety

13.3. Understand Medico-legal issues in Intensive Care practice

13.3.1. *Conscious over the duty of care*

13.3.1.1. OF THE DOCTOR

* General Medical Council Guidelines
* Sri Lanka Medical Council Guidelines

13.3.1.2. OF THE HOSPITAL

* Ministry of Health Circulars
* Free Health Care Policy of Sri Lanka

13.3.1.3. WORK TO MINIMISE MEDICAL ERRORS

* Negligence
* Systems vs. team and individual failure
* Preventability
* Root cause analysis

13.3.1.4. AWARE OF APPROPRIATE DOCUMENTATION

* Medical record components
* Authenticity for record keeping

14. PROFESSIONALISM

14.1. Communicate effectively

14.1.1. *Understand modes and methods of effective Communication*

14.1.1.1. WITH COLLEAGUES AND MEMBERS OF THE HEALTH CARE TEAM

* Referral writing
* Summarizing
* Report writing

14.1.1.2. TO ENSURE CONTINUITY OF CARE

* Through effective hand-over of clinical information
* Supporting clinical staff outside the ICU to enable the delivery of effective care
* Through appropriate supervision and delegation to others the delivery of patient care

14.1.1.3. MAINTAIN

* Accurate and legible records / documentation

14.1.1.4. PROVIDE

* Explanations and teaches multidisciplinary members of critical care team.

14.1.2. *Maintain good relationships with patients and relatives and care givers*

14.1.2.1. INVOLVE

* Patients (or their surrogates if applicable) in decisions about care and treatment

14.1.2.2. RESPECT

* Cultural and religious beliefs and an awareness of their impact on decision making
* Privacy, dignity, confidentiality and legal constraints on the use of patient data

14.1.2.3. UNDERSTAND

* Patient concerns such as fear of death, mutilation and disability

14.1.2.4. BREAKING BAD NEWS

* Expresses sympathy
* Allows time for assimilation
* Appropriate reiteration
* Deals with others grief

14.1.2.5. USE A DELIVERY LANGUAGE IN APPROPRIATION TO THE PATIENT

* Use of lay language
* Use of interpreter

14.2. Conversant with adequate IT skills to use patient systems in operation in hospitals, laboratories.

14.2.1. *Make effective use of information technology*

14.2.1.1. UNDERSTAND BASIC COMPUTER CONCEPTS AND MANAGE FIELDS

* Word processing
* Use of spread sheets
* Managing Data bases for patients records
* Retrieving medical information and evidence
* E mail communication
* Preparing presentations
* Use of ICU scoring systems (e.g. APACHE)
* Ability to use World Wide Web as an information resource and also ability to filter to correct information from misconceptions.
* Search databases such as Medline, Pub Med
* Understand issues of confidentiality and retrieval.

14.2.1.2. POSSESSES SKILLS IN

* Presentation in a variety of formats
* Writing reports
* Writing publications (for general public and scientific)
* Commanding discussions with relatives
* Maintaining multidisciplinary team interactions
* Teaching programmes – both at departmental level and more widely
* Making requests for service developments – both within and outside hospitals
* Making an impact in research and training meetings
* Interviews for jobs

14.3. Takes responsibility in

14.3.1.1. SAFE PATIENT CARE

* Ensuring that patient understands both risks and benefits of treatment and non treatment options
* For care of the individual who is unable to do so.

14.3.1.2. SELF GOVERNANCE

* In the management of equipment with regard to efficacy, accuracy and safety
* In assessing pharmaceutical needs
* In financial implicates
* Formulating clinical decisions with respect for ethical and legal principles with advice
* Seeks learning opportunities and integrates new knowledge in to clinical practise
* Participates in multidisciplinary teaching
* Participates in research or audit under supervision and quality assurance
* Participates in the team approach with respect for team members

14.4. Demonstrate ability to teach

14.4.1. *Informally on the shop floor*

14.4.1.1. AT THE BED-SIDE

* Demonstration
* Simulation
* Case discussion

14.4.2. *In specified circumstances under a more formal setting*

14.4.2.1. TEACHER LED

* Lectures
* Tutorials

14.4.2.2. STUDENT LED

* Promote self directed learning
* Case scenarios

14.4.3. *Tools to promote learning*

14.4.3.1. UNDERSTAND THE IMPORTANCE OF

* The different, but linked processes, of appraisal and assessment
* Appraisal of trainees – in particular, eliciting strengths and weaknesses for further development
* Provision of clear learning outcomes at local level; in terms not only of knowledge and skills, but also of

attitudes and behaviours

* Appropriate assessment at local level, against both local and national standards, using methods that are recognised to be both valid and reliable

14.4.4. *Maintain career and professional development*

14.4.4.1. ASSIST OTHERS DEVELOP THROUGH LEARNING

* CME
* Career guidance

14.4.4.2. ASSESSMENT AND APPRAISAL

* Methods of appraisal and assessment

14.4.4.3. UNDERSTAND PROFESSIONAL PRACTISE

* As more than just performance of clinical skills, no matter how complex
* It carries a built-in commitment to standards and the attitudes which will maintain those standards throughout life
* Recognises own limitations and refers and seeks advice without delay

14.5. Shows ability to impose moral reasoning and apply clinical ethics

14.5.1. *Understand professional behaviour and probity*

14.5.1.1. PROFESSIONAL ATTRIBUTES

* Patient autonomy
* Do no harm
* Equity

14.5.1.2. MAINTAIN PRIVACY AND CONFIDENTIALITY

* Managing inappropriate attendees
* Entitled information for Police via Road Traffic Act
* Disclosure in the public interest
* Ability to drive

14.5.2. *Show ability to obtain Informed consent*

14.5.2.1. CAPACITY TO CONSENT

* Children and adolescents
* Intellectually disabled
* Mentally ill
* Sedated or on the influence of drugs

14.5.2.2. VALIDITY

* Implied consent
* Verbal consent
* Written consent

14.5.2.3. REFUSAL TO CONSENT

* Patient autonomy
* Safeguarding patient interest when unable to consent
* Obtaining legal authority for life saving procedures (e.g. blood transfusion for a Jovial Witness)

14.5.2.4. CAPABLE OF MOUNTING

* Do Not Resuscitate and advanced directives

15. RESEARCH & AUDIT

15.1. Understand the principles of critical appraisal and research methodology and apply these to acute care situations

15.1.1. *Critical appraisal*

15.1.1.1. PORTFOLIO MANAGEMENT

* A log of procedures carried out
* Reflective Practice
* Teaching experience
* Research and Audit involvement
* Information Technology use
* Ethics and Medico-legal Issues
* Professional Development activities
* Peer, patient, community feed back

15.1.2. *Information management*

15.1.2.1. MANAGEMENT OF DATABASES

* Confidentiality
* Data retrieval

15.1.2.2. RECORDS ROOM

* Filing systems
* Document retrieval
* Storage
* Security

15.1.2.3. DATA COLLECTION:

* Simple aspects of study design (research question, selection of the method of investigation, population, Intervention, outcome measures)
* Power analysis
* Defining the outcome measures and the uncertainty of measuring them
* The basic concept of meta-analysis and evidence based medicine

15.1.2.4. DESCRIPTIVE STATISTICS:

* Types of data and their representation
* The normal distribution as an example of parametric distribution
* Indices of central tendency and variability

15.1.2.5. DEDUCTIVE & INFERENTIAL STATISTICS:

* Simple probability theory and the relation to confidence intervals
* The null hypothesis.
* Choice of simple statistical tests for different data types
* Type I and type II errors
* Inappropriate use of statistics

15.2. Clearly recognise and performs to achieve the objectives of Critical Care Medicine

15.2.1. *Understand principles of Critical Care Medicine*

15.2.1.1. DEFINITIONS AND BACKGROUND

* Critical Care Medicine
* Intensive Care Unit
* Intensivist

15.2.1.2. HISTORY OF INTENSIVE CARE MEDICINE

* Global
* Sri Lanka

15.2.2. *Demonstrate the capacity to work in multi-professional teams*

15.2.2.1. UNDERSTAND CLEARLY THE ROLES AND RESPONSIBILITIES OF OTHER TEAM MEMBERS

* Recognize and respect competencies and diverse roles of team members
* Participate effectively in inter-professional meetings
* Respect team ethics including confidentiality
* Demonstrate leadership where appropriate
* The importance of the ICUs as an essential link to advance medicine was a whole

15.3. Able to review clinical practice, indentify areas for change and implement change through provision of guidelines

15.3.1. *Effectively carries out clinical audits related to intensive care*

15.3.1.1. UNDERSTAND THE AUDIT CYCLE

* To monitor care delivery
* To improve care quality

15.3.1.2. AUDIT DESIGN

* Critical review of current practice and comparison against predefined standards
* Identification of key features of clinical practice allowing relevant lessons to be learnt
* Identify areas in which knowledge could be improved or is deficient, suggesting the need for research
* Data collection and interpretation
* Implement improvements in practice

15.3.2. *Able to conduct research to acquire new knowledge*

15.3.2.1. BASICS OF RESEARCH

* Sample size
* Choice of research method
* Enrolment/ consent
* Randomization
* Bias
* Concealment
* Validity
* Gold standard
* Planning

15.3.2.2. TYPES OF RESEARCH

* Interventional studies
* Observational studies

15.3.2.3. UNDERSTAND EVIDENCE BASED MEDICINE

* Evidence generation
* Evidence interpretation
* Evidence application