

Course- Curriculum for MSc Part-I Critical care Science, Perfusion Science and Operation Theatre Science course

WBUHS

(Lecture, Demonstration and Practical Training to cover the syllabus)

Paper-I Basic science

Anatomy

CNS: Part of brain (hind brain, mid brain and fore brain), spinal chord and their coverings, cranial nerves

Respiratory system: Air way, lobes of lungs and lung parenchyma

CV system: coronary circulation, coronary perfusion pressure, coronary sinus, all valves

Liver: hepatic circulation, hepatic architecture

Kidney: Cortex, medula, tubules

GI system: stomach, small intestine, large intestine, gall bladder, bile and bile pigments

Organ location (Right upper quadrant, Left upper quadrant)

Pathophysiology:

CNS- Cerebro spinal fluid (CSF), Cerebral circulation, Cerebral metabolism, cerebral Ischaemia,

RS-Physiology of ventilation and perfusion and gas exchange, Haemoptysis, Broncheal asthma, Pneumothorax, Hydro pneumothorax, tuberculosis, respiratory failure

CVS-Hypertension, Acute coronary syndrom, heart failure

Liver: Hepatic blood supply, hepatitis, liver failure

Kidney: Renal blood supply, Acute and chronic renal failure, RRT

GI system: Gastric juices, hematemesis, melena, enteral/parenteral feeding/total parenteral nutrition (TPN)

Body Fluid and Electrolytes/ Micro nutrients

Biochemistry: ABG, Electrolytes and its abnormality, Pleural and pericardial fluid, Ascetic fluid (Peritoneal fluid), CSF, Liver Function Test, Renal function test, Acid fast Bacilli

Pharmacology: All drugs related to ITU/ICU/CCU/NICU/PICU

Midazolam/Propofol/Dex-meditomidine/Clonidine

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Pathology: Culture and sensitivity of blood, Wound including all invasive procedures, Stool, Urine, CSF.

Biopsy, Fine Needle Aspiration Cytology (FNAC)

Microbiology: Systemic Inflammatory Response Syndrome (SIRS)/ Hospital acquired Infection, Ventilator Associated Pneumonia (VAP)

Paper-II Sterilisation

Details of Plasma Sterilisation, Disinfection, sterilisation, Biomedical Waste and their disposal, HEPA FILTER, Universal Precaution, "Sero positive Patient handling, newer concept of sterilant-Peracetic acid, biological indicator/chemical indicator, Central sterile Supply Department (CSSD) Organisation, Bio Film, Protein Denature Solution/ Features of Ideal Sterilizer (Autoclave/Plasma/ETO/Gamma), Protein Denatured Solution/ Lay Out of CSSD- One Way/ General Ward Cleaning/ Critical care Unit Cleaning, WHO guided/ OT Cleaning

Paper-III Monitoring and Imaging

Monitoring System:

Respiratory system: Pulse Oximetry, ETCO₂, ABG, Chest X-Ray, CT Thorax

CVS: Central Venous Pressure Monitoring, Invasive Blood Pressure/ Non Invasive Blood Pressure, ECG, Cardiac output Monitor, Intra Aortic Balloon Pump, Pacemaker, Echocardiography (TTE/TEE), Coronary Angiography, Myocardial Perfusion Images, Temperature Monitoring, Blood Anticoagulant Profile Monitoring

CT, MRI, USG of whole abdomen, Nuclear Imaging

IV Contrast Agents in Relation to Radiological, CT and MRI studies.

Paper-IV Research and Managements

Definition of and Types of Research, Quantitative as qualitative Research

Case control study/ Cohort study/ sample/sample volume

Literature Review-Importance and source

Data collection, Visual Analogue Scale, Hypothesis, Assumption, Null Hypothesis, Research Hypothesis

Randomized and Non- Randomized Study, Reference, table, Abstract Writing

Different types of Article in a journal and their importance

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Meta analysis, Peer Review, Sensitivity and Specificity, Student-T Test, CHI-Square Test

Thesis Writing

Mean, Median, Sd, Pictogram, Vencouper style in Indexing Reference, P-Value Management Model for Hospital in your state

Human Resource Management

Patient Assessment System in Indoor

Hospital Management Components

Crew Resource management: Creating a culture of safety in the Operating Room.

Quality Control Management, Leadership.

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MSc 2nd year Syllabus

Critical Care Sciences Part-II

Paper-I (Critical Care Science I)

Central ICU monitoring system, ICU setup, Analgesic score, Sedation score, GCS score, Apgar score, Pulmonary Function Test, Blood transfusion trigger in ICU, Blood Transfusion reaction and care, Management of patient with septic shock, Different modes of ventilation including newer modes, Indications of mechanical ventilation, Weaning from mechanical ventilation.

Briefly discuss:

CVA, Hypertensive crisis, Chest pain, Heart failure in ICU, Poisoning, Snake bite, Status epilepsy, Burn, Drowning, Aspiration pneumonitis, Acute abdomen, RTA (Road-Traffic-Accident), Head injury, Defibrillation, ICD, Pacemaker (Temporary/ Permanent), Patient transfer from or/to other words.

Paper-II (Critical Care Science II)

Electrolytes abnormalities, ABG analysis, Mixed venous and central venous oxygenation, Oxygen administration, Activated Clotting Time, Renal Replacement Therapy, Airway obstruction & management in ICU, Anti-coagulants, Anti-platelets, Blood substitute, Artificial blood,

Briefly discuss:

Heart block, Arrhythmias, Cardiomyopathy, Cardiac arrest, ARDS, TRALI, Diabetic ketoacidosis, Hypoglycemia, COMA, Nephrotic syndrome, Leukemia, Acute pancreatitis, Hemiplegia, Paraplegia, Paediatric emergency (Meconium aspiration, congenital diaphragmatic hernia, Tracheoesophageal fistula).

Paper-III (Recent Advance)

Cardiac output monitoring (Flow-tract/Thermodilution), Pulmonary artery catheter, Bronchoscopy - Fibre Optic Bronchoscopy (FOB) & Rigid Bronchoscopy, Transesophageal echocardiography (TEE), IABP, Portable chest x-ray, C-arm, Thromboelastogram (TEG), cerebral oximetry (NIRS)

PACU, Step down unit, HDU, NICU, BLS, ALS and its related drugs

Antiarrhythmic drugs, Amiodrone, Milrinone, Levosimendine, Antianginal drugs, Sildenafil or PGE-5 inhibitor, Dexmedetomidine, Etomidate, Fentanyl, Sufentanil, Remifentanyl, Morphine, Pethidine, Xylocard

BIPAP, CPAP, Laryngeal Mask Airway, Data recording in ICU, ICU sedation, Difficult airway trolley, Crash cart trolley in ICU, Pharmacological therapies for blood loss in the peri-operative period, Tracheal extubation & re-intubation strategy, Airway exchange catheter

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MSc 2nd year Syllabus

Perfusion Sciences Part-II

Paper-I (Perfusion Science I)

Minimally invasive valve surgery (MIVS), Less-invasive valve surgical technique and CPB, Trans catheter aortic valve replacement (TAVI), Autologous blood transfusion

Hybrid procedure for aortic diseases, Management of unusual condition affecting CPB, Prepare an emergency protocol for massive gas embolism, Cardiovascular and non-cardiovascular consideration after successful weaning from CPB, Off-pump coronary artery bypass (OPCAB) and minimally invasive direct coronary artery bypass (MIDCAB) surgery and your role, Emergency CABG under CPB

Pericardial tamponade, Cardioplegia, Different CPB cannula, Heater-cooler machine, Monitoring during CPB, H-L machine, Oxygenator, Intra-operative record keeping

Paper-II (Perfusion science II)

Difference between fetal and adult circulation, Structural difference of heart between child and adult, Temperature regulation in pediatric patient, Complex cardiac surgery and CPB, Goals of perioperative management, Cardiac operation under CPB in patients with co-morbid conditions (hypertension, DM, sickle-cell-anemia), CPB in pregnant patient

Blood gas management during CPB especially in infant and neonates, CPB in pediatric cardiac surgery (complex congenital cardiac surgery), Partial bypass, Aortic aneurism repair

Paper-III (Recent Advance)

Cardiac output monitoring (Flow-tract/Thermodilution), IABP, Cell sever, Thromboelastogram (TEG), Cerebral oximetry (NIRS), Transcranial Doppler (TCD), Blood conservation strategies

ALS, BLS and its related drugs, Amiodrone, Milrinone, Levosimendine, Dexmedetomidine, Antianginal drugs, Antiarrhythmic drugs, Fentanyl, Sufentanyl, Remifentanyl, Morphine, Pethidine

Patient warmer, Fluid warmer, Infusion pump, Blood warmer, Ventricular-assist device (VAD), IABP, Perfusion emergency and its management, ECMO, Modern heart-lung machine, Robotic cardiac surgery, MUF, Heart transplantation, Transmyocardial laser revascularization (TMLR)

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MSc 2nd year Syllabus

Operation Theatre Sciences Part-II

Paper-I (Operation Theatre Science I)

Future design of OT, Modular OT, Laser safety, Fire extinguishers, Fire prevention and preparation (surgical fire and thermal injury), The risk of electrocution, Protection from electrical shock, Environmental factors in the operating room, Success of medical gases and their safety mechanism, Ionization radiation in the OT, Noise in the OT, OT light, OT table, Data recording in OT, Difficult intubation trolley, Crush trolley, Crew Resource management: Creating a culture of safety in the operating room.

Instruments used in Ophthalmology (cataract and glaucoma surgery) and ENT operation (tonsillectomy and middle ear surgery), Preparation of OT for combined spinal-epidural anaesthesia, Awareness under anaesthesia, Managing routine & difficult tracheal extubation, Operating room standard

Paper-II (Operation Theatre Science II)

Hybrid cardiac OT, Laser ETT for laser airway surgery, VATS, Minimally Invasive surgery, OPCAB, MIDCAB-Instruments for this operation (OT preparation), Joint replacement surgery (Knee & Hip)-Instruments and main steps of the operation (OT preparation), ESWL (Extracorporeal shock wave lithotripsy)-Instruments and main steps of operation (OT preparation), PCNL (Percutaneous Nephrolithotomy), FESS (Functional Endoscopic Sinus Surgery) -Instruments and main steps of operation, OT preparation of patient in cath lab, Laminar airflow in OT, Safety devices in the OT, Endoscopy - OT setup, Instruments sterilization and brief idea about the procedure, Crew Resource management: Creating a culture of safety in the operating room, Anaesthesia work-station

Paper-III (Recent Advance)

Cardiac output monitoring (Flow-tract/Thermodilution), Pulmonary artery catheter

FOB, Rigid Bronchoscopy, TEE, IABP, Portable chest x-ray, C-arm, Thromboelastogram (TEG), Cerebral Oximetry (NIRS), Transcranial Doppler (TDC), BIS, Blood conservation, Neuromuscular monitoring (TOF), Nerve stimulator, ALS, BLS and its related drugs Amiodrone, Milrinone, Levosimendine, Dexmedetomidine, Antianginal drugs, Antiarrhythmic drugs, Patient warmer, Fluid warmer, Infusion pump, Blood warmer, Patient control analgesia, Ventilator Assist Device (VAD), DLT, C-Trac LMA, Fast-Trac LMA, ECMO, Robotic surgery, Modern instruments use in neurosurgery OT (bar-hole & intracranial tumor surgery), Preparation and monitoring for thoracic, aortic, thoraco-abdominal aortic surgery, Instruments for (Lithotripsy, TURP), OT scavenging system

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