MAHATMA GANDHI UNIVERSITY
of
MEDICAL SCIENCES & TECHNOLOGY
JAIPUR

Super Specialty Courses

SYLLABUS

DM - ORGAN TRANSPLANT ANAESTHESIA AND CRITICAL CARE (DM08)

Edition 2021-22

Notice

1. Amendment made by the National Medical Commission in Rules/Regulations of Post Graduate Medical Courses shall automatically apply to the Rules/Regulations of the Mahatma Gandhi University of Medical Sciences & Technology (MGUMST), Jaipur.

2. The University reserves the right to make changes in the syllabus/books/guidelines, fees-structure or any other information at any time without prior notice. The decision of the University shall be binding on all.

3. The Jurisdiction of all court cases shall be Jaipur Bench of Hon'ble Rajasthan High Court only.

Syllabus of DM / M.Ch. Courses
ORGAN TRANSPLANT ANAESTHESIA AND CRITICAL CARE (DM08)

SELECTION OF CANDIDATES:

There shall be a uniform entrance examination to all medical educational institutions at the Postgraduate level namely 'National Eligibility-cum-Entrance Test' for admission to postgraduate courses in each academic year and shall be conducted under the overall supervision of the Ministry of Health & Family Welfare, Government of India.

In order to be eligible for admission to Postgraduate Course for an academic year, it shall be necessary for a candidate to obtain minimum of marks at 50th percentile in the 'National Eligibility-Cum-Entrance Test for Postgraduate courses' held for the said academic year. However, in respect of candidates belonging to Scheduled Castes, Scheduled Tribes, and Other Backward Classes, the minimum marks shall be at 40th percentile. In respect of candidates with benchmark disabilities specified under the Rights of Persons with Disabilities Act, 2016, the minimum marks shall be at 45th percentile for General Category and 40th percentile for SC/ST/OBC.

The percentile shall be determined on the basis of highest marks secured in the All India Common merit list in National Eligibility-cum-Entrance Test for Postgraduate courses.

Provided when sufficient number of candidates in the respective categories fail to secure minimum marks as prescribed in National Eligibility-cum-Entrance Test held for any academic year for admission to Postgraduate Courses, the Central Government in consultation with Medical council of India may at its discretion lower the minimum marks required for admission to Post Graduate Course for candidates belonging to respective categories and marks so lowered by the Central Government shall be applicable for the academic year only.

The reservation of seats in Medical Colleges/institutions for respective categories shall be as per applicable laws prevailing in States/Union Territories. An all India merit list as well as State-wise merit list of the eligible candidates shall be prepared on the basis of the marks obtained in National Eligibility-cum-Entrance Test and candidates shall be admitted to Postgraduate Courses from the said merit lists only.

There shall be no admission of students in respect of any academic session beyond 31st August under any circumstances. The Universities shall not register any student admitted beyond the said date.

ELIGIBILITY:

Candidates must meet the eligibility criteria required to get admission to DM courses through NEET-SS.

Common Counseling:

There shall be a common counseling for admission to all Postgraduate Super specialty Courses (DM/ M.Ch.) in all Medical Educational Institutions on the basis of merit list of the National Eligibility-cum-Entrance Test.

Period of Training:

The period of training for obtaining DM/M.Ch Degrees shall be three completed years including the examination period.

Migration:
Under no circumstance, Migration/transfer of student undergoing any Super Specialty course shall be permitted by any University/ Authority.

Staff - Faculty:
Only those teachers who possess 6 years teaching experience out of which at least 2 years teaching experience as Assistant Professor gained after obtaining the higher specialty degree shall be recognized post graduate teacher.

No teacher shall be considered as a postgraduate teacher in any other institution during the period till the postgraduate course at the institute which has been granted permission considering him as a postgraduate teacher is recognized u/s 11(2) of the Indian Medical Council Act, 1956.

Minimum staff required (Super-speciality):
1- Professor
1- Associate Professor
1- Assistant Professor
1- Senior Resident
2- Junior Resident

Training Programme:
All the candidates joining the Post Graduate training programme shall work as 'Full Time Residents' during the period of training and shall attend not less than 80% (Eighty percent) of the imparted training during each academic year (Academic Term of 6 months) including assignments, assessed full time responsibilities and participation in all facets of the educational process.

No candidate shall be permitted to run a clinic/work in clinic/laboratory/nursing home while studying postgraduate super specialty course. No candidate shall join any other course or appear for any other examination conducted by this university or any other university in India or abroad during the period of registration.

Every institution undertaking Post Graduate training programme shall set up an Academic cell or a curriculum committee, under the chairmanship of a senior faculty member, which shall work out the details of the training programme in each speciality in consultation with other department faculty staff and also coordinate and monitor the implementation of these training Programmes.

The training programmes shall be updated as and when required. The structured training programme shall be written up and strictly followed, to enable the examiners to determine the training undergone by the candidates and the Medical Council of India inspectors to assess the same at the time of inspection.

Post Graduate students shall maintain a record (log) book of the work carried out by them and the training programme undergone during the period of training including details of surgical operations assisted or done independently by M.Ch. candidates.

The Record (Log) Books shall be checked and assessed periodically by the faculty members imparting the training.

During the training for award of Degree / Superspecialty in clinical disciplines, there shall be proper training in Basic medical sciences related to the disciplines concerned; so also in the applied aspects of the subject; and allied subjects related to the disciplines concerned. In the Post

Graduate training programmes including both Clinical and Basic medical sciences, emphasis has to be laid on Preventive and Social aspects. Emergency care, facilities for Autopsies, Biopsies, Cytopsies, Endoscopy and Imaging etc. shall also be made available for training purposes.

The Post Graduate students shall be required to participate in the teaching and training programme of undergraduate students and interns.

Training in Medical Audit, Management, Health Economics, Health Information System, basics of statistics, exposure to human behaviour studies, knowledge of pharmaco – economics and introduction to nonlinear mathematics shall be imparted to the Post Graduate students.

The teaching and training of the students shall include graded responsibility in the management and treatment of patients entrusted to their care; participation in Seminars, Journal Clubs, Group Discussions, Clinical Meetings, Grand Rounds, and Clinico-Pathological Conferences; practical training in Diagnosis and Medical and Surgical treatment; training in the Basic Medical Sciences, as well as in allied clinical specialitites.

The training programme shall be on the same pattern as for M.D. / M.S. in clinical disciplines; with practical training including advanced Diagnostic, Therapeutic and Laboratory techniques, relevant to the subject of specialization. Postgraduate Superspecialty Residents in Surgical Specialties shall participate in Surgical operations as well.

A postgraduate student of a postgraduate degree course in super specialities would be required to present one poster presentation, to read one paper at a national/state conference and to present one research paper which should be published/accepted for publication/sent for publication during the period of his postgraduate studies so as to make him eligible to appear at the postgraduate degree examination.

ENROLMENT AND REGISTRATION:

Every candidate who is admitted to DM/MCh. course in Mahatma Gandhi Medical College & Hospital shall be required to get himself/herself enrolled and registered with the Mahatma Gandhi University of Medical Sciences & Technology (**MGUMST**) after paying the prescribed eligibility and enrolment fees.

The candidate shall have to submit an application to the MGUMST through Principal of College for the enrolment/eligibility along with the following original documents and the prescribed fees within two months of his/her admission or up to November 30 of the year of admission whichever is later without late fees. Then after, students will have to pay applicable late fees as per prevailing University Rules.

(a) MD/MS pass Marks sheet/Degree certificate issued by the University.
(b) Migration certificate issued by the concerned University (in case the University is other than the MGUMST).
(c) Date of Birth Certificate
(d) Certificate regarding registration with Rajasthan Medical Council / Medical Council of India / Other State Medical Council.

No candidate shall be allowed to appear in University examination without his/her enrolment with the University

SCHEME OF EXAMINATIONS:

The examination shall be held at the end of three academic years (six academic terms). The academic term shall mean six months training period. The examination shall consist of: Theory

and Clinical/Practical and Oral.

The examinations shall be organised on the basis of 'Marking system' to evaluate and to certify candidate's level of knowledge, skill and competence.

For passing DM/M.Ch. examination as a whole, a candidate shall secure not less than 50% marks in each head of passing which shall include (1) Theory (2) Clinical / Practical and Oral examination.

(1) **Theory:**

There shall be four theory papers of 3 hours duration and 100 marks each. The theory examination shall be held in advance before the Clinical and Practical examination, so that the answer books can be assessed and evaluated before the commencement of the clinical/Practical and Oral examination.

Paper I and II will be set by one external examiner from outside of the state and paper III and IV by another external examiner from outside of the state. The external examiner, who is paper setter for paper I & II shall evaluate the answer books of paper II. The external examiner, who is paper setter for paper III & IV shall evaluate the answer books of paper III. The answer books of paper I & IV shall be evaluated by internal examiners. The answer books of paper IV shall be evaluated by the Head of the Department and the answer books of paper I shall be evaluated by the second Internal Examiner.

Candidates will be required to attempt all the questions in every question paper. In Paper I, Paper II and Paper III there will be 10 questions. Each question shall carry 10 marks. In Paper IV there will be 5 questions of 20 marks each.

Obtaining a minimum of 40% marks in each theory paper and not less than 50% cumulatively in all the four papers shall be compulsory to pass the examination.

The paper wise distribution of the Theory Examination shall be as follows:

Paper I:	Basic sciences related to organ transplant anaesthesia
Paper II:	Clinical specialties related to organ transplant anaesthesia
Paper III:	Critical care related to organ transplantation anaesthesia
Paper IV:	Recent advances the organ transplant anaesthesia and critical care

(2) **Clinical / Practical and Oral:**

Clinical/Practical examination shall be conducted to test / aimed at assessing the knowledge and competence of the candidate for undertaking independent work as a specialist / teacher. Practical examination shall consist of carrying out special investigative techniques for Diagnosis and Therapy. Candidates shall also be examined in surgical procedures. Oral examination may be comprehensive enough to test the candidate's overall knowledge and competence about the subject, investigative procedures, therapeutic technique and other aspects of the specialty, which shall form a part of the examination.

Obtaining of 50% marks in Clinical / Practical and Oral examination shall be mandatory for passing the Clinical / Practical and Oral examination.

Maximum Marks: 400.

Result:
For passing DM/M.Ch. Examination, a candidate will be required to obtain at least 40% marks in each theory paper, 50% marks in the aggregate of all the four theory papers and 50% marks in the aggregate of Clinical / Practical and Oral examination separately. A candidate failing in any theory paper or in the aggregate of all four theory papers or Clinical / Practical and Oral examination shall have to repeat the whole DM/M.Ch. examination.

Grace Marks:
No grace marks will be provided in DM/M.Ch. examinations.

Revaluation / Scrutiny:
No Revaluation shall be permitted in the DM/M.Ch. examinations. However, the student can apply for scrutiny of the answer books as per University Rules

Examiners:
As per the Amendment Notification of the MCI dated June 5, 2017, no person shall be appointed as an internal examiner in any subject unless he/she has three years experience as recognized PG teacher in the concerned subject. For external examiners, he/she should have minimum six years of experience as recognized PG teacher in the concerned subject.

For all Post Graduate Super specialties examinations, the minimum number of Examiners shall be four, out of which at least two (50%) shall be External Examiners, who shall be invited from other recognised universities from outside the State.

Number of Candidates:
The maximum number of candidates to be examined in Clinical / Practical and Oral on any day shall not exceed three for D.M./M.Ch. Examinations.

Number of Examinations:
The university shall conduct not more than two examinations in a year, for any subject, with an interval of not less than 4 and not more than 6 months between the two examinations.

GUIDELINES FOR COMPETENCY BASED POSTGRADUATE TRAINING PROGRAMME FOR DM IN ORGAN TRANSPLANT ANAESTHESIA AND CRITICAL CARE

Preamble

The purpose of post-doctoral education is to create specialists who would provide high quality health care and advance the cause of science through research and training.

A post-doctoral specialist having undergone the required training in organ transplant anesthesia and critical care and passed the exit examination should be able to recognize the health needs of the organ transplant donors and recipients. The post graduate student should be aware of organ transplant guidelines and amendments, recent advances in the specialty and be able to handle effectively medical problems that would arise during and after organ transplantation. The post graduate student should be a highly competent anesthesiologist and intensivist with broad range of skills that will enable her/him to practice organ transplantation anesthesia effectively. Transplant anesthesiologists should have an extensive background in critical care medicine, and provide information/advice during the peri-operative period.

These guidelines are for DM programme in **ORGAN TRANSPLANT ANAESTHESIA AND CRITICAL CARE** of solid organ transplant donors and recipients.

SUBJECT SPECIFIC OBJECTIVES

At the end of the course, the student should be able to perform independently the following:

1. Preoperative anaesthesia assessment regarding fitness for organ donation.
2. Preoperative anaesthesia assessment of the organ recipients
3. Conduct of anaesthesia for organ retrieval
4. Conduct of anaesthesia for organ transplantation
5. Postoperative care of the organ recipients in the ICU

SUBJECT SPECIFIC COMPETENCIES

By the end of the course, the student should have acquired knowledge (cognitive domain), professionalism (affective domain) and skills (psychomotor domain) as given below:

A. COGNITIVE DOMAIN

The postgraduate student should acquire knowledge:

1. for diagnosis, investigations and recommend general/specific treatment of end-stage disease of the liver, heart, lung, kidney, and the gut, including the resuscitation and emergency treatment for the transplant patient with complex medical and surgical problems with necessary skills for cardiopulmonary resuscitation.
2. for diagnosis of brain death and the management of the organ donor based on principles of the assessment of the liver, heart, lung, kidney, and the gut for the purposes of organ donation including assessment of organ suitability for transplantation and multi-organ harvesting as per the THE TRANSPLANTATION OF HUMAN ORGANS ACT, 1994 and the amendments thereof.
3. For diagnosis, requisition investigations and recommend general/specific treatment of organ rejection and proper use of immuno-suppressive drugs.
4. Of the pharmacokinetics and pharmacodynamics of anesthetic drugs and adjuncts.
5. On the construction and functioning of equipments used in anaesthesia and monitoring.
6. to manage acute and chronic pain
7. To teach relevant aspects of the subject to trainees, nursing and para-medical staff.
8. To identify and investigate a research problem in the subject using appropriate methodology
9. to communicate effectively with patients, colleagues and the community as well as counsel patients and relatives before, during and after transplantation by working in the pre-anaesthesia assessment clinic, operation theatres, radiological and diagnostic labs, and intensive care unit.
10. and ability to work amicably and cooperatively with caregivers such as surgeons, nurses, technicians and other paramedical staff. This will include handling of crisis situations.
11. Legal and ethical issues regarding brain death and organ donation with special reference to:
    a. Transplant of Human Organs Act notified in 2014 or subsequent amendments or new acts
    b. Prerequisites for organ donation
12. Setting up of an organ donation programme and its functioning.
13. Research methodology.
14. Procedural consents, bereavement and family counselling
15. Basic and advanced principles of transplant immunology.
    a. Organ matching
    b. Immunosuppressive therapy
16. Evaluation and management of a patient with end stage organ disease.

17. Hemodynamic monitoring modalities
18. Invasive and non-invasive ventilatory management in organ donors and recipients including their withdrawal / weaning.
19. Tracheostomy- techniques, types, management and decanulation.
20. Basic principles of intravenous fluid therapy – crystalloid, colloid, blood and blood products
21. Consequences of blood loss and massive transfusion
22. Hypothermia, implications and temperature control, specific to organ transplantation
23. Acid-base equilibrium, disorders and management
24. Coagulation and organ transplantation
25. Principles of general care in critically ill patients
26. Preservation solutions and their pharmacology
27. Anaesthetic management of live and deceased organ donors and recipients.
28. Pharmacodynamics and pharmacokinetics of drugs likely to be used in patients undergoing transplantation of different organs.
29. Advanced Cardiac Life Support and Advanced Trauma Life Support
30. Use of ultrasound in the operating room and intensive care unit.
31. Management of difficult airway
32. Transesophageal and transthoracic echocardiography.
33. Renal replacement therapies
34. Donation after cardiac death
35. Transport critically ill patients to and from the operation theatre safely

B. AFFECTIVE DOMAIN:

The post graduate student should be:

1. Able to function as a part of a team, develop an attitude of cooperation with colleagues, and interact with the patient and the clinician or other colleagues to provide the best possible diagnosis or opinion.

2. Always adopt ethical principles and maintain proper etiquette in dealings with patients, relatives and other health personnel and to respect the rights of the patient including the right to information and second opinion.

3. Develop communication skills to word reports and professional opinion as well as to interact with patients, relatives, peers and paramedical staff, and for effective teaching.

C. PSYCHOMOTOR DOMAIN

At the end of the course, the student should acquire the following skills under supervision and be able to perform independently after the successful completion of the course the following:

Procedures in the OT

1. Setting up of intravenous lines and gaining peripheral venous access

2. Instituting non-invasive and invasive monitoring
3. Securing and management of airway
4. Intra-operative monitoring and trouble-shooting
5. Blood conservation strategies, management of massive blood loss and complications
6. Use of specialised equipment – ultrasound, echocardiography, transcranial doppler, point-of-care coagulation, cell saver, rapid infusers, depth of anaesthesia monitors

Procedures in the ICU

1. Routine ICU procedures and management
2. Monitoring and trouble-shooting
3. Blood conservation strategies, management of massive blood loss and complications
4. Use of specialised equipment – ultrasound, echocardiography, transcranial doppler, point-of-care coagulation, cell saver, rapid infusers, depth of anaesthesia monitors
5. Basic and advanced ventilation techniques
6. Surgical procedures carried out in an ICU – Front-of-neck procedures for rescue airway, tracheostomy, insertion of chest drains, suprapubic catheters, and dialysis catheters
7. Basic and advanced organ support systems and modalities – Renal replacement therapy, intra-aortic balloon pump, pacemakers, ventricular assist devices, extra-corporeal membrane oxygenation, molecular adsorbent recirculation system

Syllabus

Course contents:

1. **Anesthetic care**
   - History of anesthetic practice
   - Scope of modern anesthetic practice
   - Ethical aspects of anesthetic practice
   - Legal aspects of anesthetic care
2. **Pharmacology**
   a. Basic knowledge on pharmacokinetics and pharmacodynamics of drugs, drug interactions, complications of drugs used in transplantation medicine and critical care
   b. Delivery systems for anesthetics
      - Inhaled anesthetics
      - Intravenous anesthetics
      - Local anesthetics

c. Transfusion medicine

d. Complications of anesthesia

3. Immunology, rejection & immunosuppression

- Basic Immunology
- Immunologic mechanisms of rejection
- Immunosuppressive drugs: mechanism of action

4. Liver transplantation- curriculum and training objectives

a. **Anatomy of various organs**

- **Physiology and Pathophysiology**
  a. Physiology, pathophysiology of various organs and systems
  b. Rejection – types and management
- **Biochemistry**
  a. Biochemical basis of ischemic-anoxic injury
  b. Reperfusion injury
  c. Apoptosis
  d. Antioxidant biochemistry
  e. Promising treatment modalities for reperfusion injury.
- **Pharmacology**
  a. pharmacology of various drugs in patients with end stage liver disease
- **Patient centric training**
  a. Principles of organ procurement and donation- Implications for Liver
  b. Donor and recipient selection criteria for liver transplant
  c. Anesthesia for patients with hepatocellular disease
  d. Anaesthesia for pancreas transplantation
  e. Anaesthesia for intestinal and multiple organ transplantation
  f. Infectious diseases and transplantation
  g. Management of acute liver failure including parturients
  h. Intensive care management of the liver, pancreatic and GI transplant patients
  i. Molecular Adsorbents Recirculation System(MARS)

5. Cardiac transplantation- curriculum and training objectives

- **Anatomy of various organs and cardio vascular system.**
- Cardiovascular physiology and pathophysiology
- **Biochemistry**
  a. Cardiac enzymes
  b. Cardiac biomarkers
  c. Cardiac ischemic injury
- **Cardiovascular Pharmacology**
- **Patient centric training**
  a. Perform a preoperative cardiac evaluation
  b. Donor and recipient selection criteria for cardiac transplant
  c. Pathophysiology, diagnosis and management of heart failure
  d. Mechanical ventricular support

e. Physiology and conduct of cardiac bypass and oxygenators.
f. Principles of myocardial preservation
g. Anesthesia for patients with compromised cardiac function.
h. Principles of extracorporeal circulation including ECMO, circulatory assist devices and circulatory arrest
i. Intra-operative TEE
j. Monitor, diagnose and treat peri-operative myocardial ischemia, cardiac arrhythmias and, left and right ventricular dysfunction
k. Monitor, diagnose and treat acute pulmonary dysfunction and pulmonary hypertension in the peri-operative period
l. Management of right heart in a newly implanted heart
m. Reperfusion injury
n. Cardiac emergencies and their management
o. Cardiopulmonary Bypass (CPB)

6. Kidney transplantation- curriculum and training objectives

- **Anatomy of the** Kidneys and Urinary Tract
- **Physiology and Pathophysiology**
  a. Renal physiology, renal failure and renal function tests
  b. End Stage Renal Disease
- **Biochemistry**
  a. Biochemical basis of ischemic-anoxic injury of kidney
  b. Reperfusion injury, apoptosis
  c. Established modalities and research into treatment for reperfusion injury
  d. Antioxidant biochemistry
- **Patient-centric training**
  a. Management of acute kidney injury
  b. Preoperative Management of a patient with ESRD(End-stage kidney or renal disease)
  c. Anaesthesia for patients with ESRD
  d. Rejection of transplanted organs – Types, recognition and management
  e. Renal Replacement Therapy – modalities, indications and complications

7. Multiple organ donation

a. Preoperative evaluation and intra-operative management of organ donors.
b. Brain death, criteria for certifying brain death and tests to confirm diagnosis
c. Organ dysfunction after brain death especially cardiopulmonary complications, coagulopathy, temperature changes and diabetes insipidus, assessment of organ suitability for transplantation
d. Pathophysiology of organ preservation
e. Intra-operative management of multi-organ donors – Multi-organ brain dead donors, Donation after cardiac death (DCD)

8. Preservation and transportation of retrieved organs

9. Organ recipients

a. Preoperative evaluation and management of recipients for organ transplantation

b. Basic principles of immuno-suppression and graft rejection
c. Reperfusion injury
d. Management of hyperkalemia
e. Post- transplant complications including rejection, infection, immune- suppression
f. Transfusion medicine and coagulation management
g. Safe transport of critically ill patients

10. Ethical issues

a. Patient confidentiality and privacy legislation
b. Patient autonomy
c. Principles of informed consent and decision making
d. Next of kin designation
e. End of life decision making
f. Organ procurement for transplantation
g. Management and review of adverse events
h. Communication with families in crisis

TEACHING LEARNING METHODS

1. **Journal Club:** The post graduate student will present a journal article relevant to organ transplant anaesthesia, either an original article or a short study along with a review article. She/he is expected to present the article citing the relevance, background/context, study methods and statistical analysis, interpret results and discussion, summarize, present limitation and critically analyze the study methods and outcomes.
2. **Didactic Lectures:** Didactic lectures on organ transplantation, biostatistics, research methodology, teaching methodology, medical ethics and legal issues related to organ transplant anesthesia should be conducted once or twice a week.
3. **Subject Seminar:** The post graduate student will present a subject topic allocated after doing a comprehensive preparation, relevant literature search and present the topic in detail.
4. **Clinical Case Presentation:** The post graduate student will present a clinical case (either from anaesthesia point of view or on some critical care case) after performing thorough history and physical examination. She/he will elicit physical and non-physical aspects in history, formulate diagnosis/differential diagnosis and present a comprehensive care plan for the patient.
5. **ICU Grand Rounds:** The post graduate student will attend the ICU Grand Rounds
6. **Mortality/morbidity review** and departmental audit should be held regularly to review all deaths and complications.
7. The post graduate student should have a minimum of two publications/articles accepted for publication in indexed international /national journals during the three year course.
8. A post graduate student of a postdoctoral course in broad specialities/super specialities

would be required to present one poster presentation, to read one paper at a national/state conference and to present one research paper which should be published/accepted for publication/sent for publication during the period of his postgraduate studies so as to make him eligible to appear at the postgraduate degree examination.

9. The post graduate student shall be required to participate in the teaching and training programme of undergraduate students and interns.
10. Department should encourage e-learning activities.

11. Additional teaching/training

All the post graduate students are expected to attend regular CMEs, Conferences, Workshops; Small group teaching organized by local/national/international institutes and required to be abreast with the current knowledge and recent advances in the field of organ transplant anaesthesia and critical care.

12. Log book

The maintenance of log book is essential. The Log books shall be checked and assessed periodically by the faculty members imparting the training and should include:

a. Observing / working under supervision for at least 20 renal transplant recipients.
b. Observing / working under supervision for at least 1 heart transplant recipient or bioprosthetic cardiac valve replacements
c. Observing / working under supervision for at least 10 liver transplant recipients.
d. Observing / working under supervision for organ harvesting in 15 cases.
e. Should have managed independently or under supervision 10 deceased organ donors in the ICU.
f. Should have worked under supervision in a dialysis unit for two months.
g. Observed / worked under supervision in at least 20 paediatric and 50 adult cardiac surgeries.
h. Should have been actively involved in obtaining, transport and histopathological procedures associated with donor and recipient tissues of at least 5 donor and recipient organ transplant patients each.

13. Posting in Allied Departments

Each student should be exposed for one week each to modern principles of Clinical epidemiology and Biostatistics/Research methodology of the Institution. For this, he/she should attend lectures arranged by the Biostatistics and Epidemiology departments from time to time. She/he should be posted to various allied departments/units by rotation to acquire more knowledge and hands-on training as per details given below:

The following postings/rotations are recommended:

- **First year:**
  Biostatistics : 15 days
  Nephrology : 2 months
  Intensive coronary care unit/Cardiothoracic surgery intensive care unit: 1 month
  Neurosurgery intensive care unit : 1 month

- **Second year:**
  Clinical Immunology : 15 days
  Immunopathology : 15 days
  Radiology : 15 days

- **Third year:**
  Emergency medical services: 1 month

During the training programme, patient safety is of paramount importance; therefore, skills are to be learnt initially on the models, later to be performed under supervision followed by performing independently; for this purpose, provision of surgical skills laboratories in the medical colleges is mandatory.

ASSESSMENT

Formative assessment

Formative assessment should be continual and should assess medical knowledge, patient care, procedural & academic skills, interpersonal skills, professionalism, self directed learning and ability to practice in the system.

General Principles

Internal Assessment should be frequent, cover all domains of learning and used to provide feedback to improve learning; it should also cover professionalism and communication skills. The Internal Assessment should be conducted in theory and clinical examination.

Quarterly assessment during the post-doctoral training should be based on following educational activities:

1. Journal based / recent advances learning
2. Patient based /Laboratory or Skill based learning
3. Self directed learning and teaching
4. Departmental and interdepartmental learning activity
5. External and Outreach Activities / CMEs
6.

The student to be assessed periodically as per categories listed in postgraduate student appraisal form (Annexure I).

SUMMATIVE EXAMINATION, at the end of the course

The summative examination would be carried out as per the Rules given in POSTGRADUATE MEDICAL EDUCATION REGULATIONS, 2000.

The summative assessment examination shall include two heads:

A. Theory examination.
B. Practical, Clinical examination and Viva-voce.

Theory examination and Practical/Clinical, Viva-voce shall be separate heads of passing. Theory examination shall comprise of four papers. Passing percentage shall be cumulatively 50% with minimum of 40% marks in each theory paper.

Practical /Clinical examination consisting of at least one long case, three short cases and viva-voce. Passing percentage shall be 50%. Passing shall be separate for each head and failing shall be common, meaning thereby that clearance at theory and failure at practical / clinical shall amount to failure at Summative examination and vice versa.

The examination will be in two parts:

1. **Theory Examination**
   There shall be 04 theory papers as follows:
   Paper I: Basic sciences related to organ transplant anaesthesia
   Paper II: Clinical specialties related to organ transplant anaesthesia
   Paper III: Critical care related to organ transplantation anaesthesia
   Paper IV: Recent advances the organ transplant anaesthesia and critical care

2. **Clinical / Practical and Oral examination: Clinical examination**
   Post graduate students shall examine a minimum one long case and 03 short cases

3. **Oral Examination** shall be thorough and shall aim at assessing the post graduate student's knowledge and competence about the subject, investigative procedures, therapeutic techniques and other aspects of the specialty, which form a part of the examination.

Books and Journals recommended Books (latest edition)

1. Oxford Textbook of Transplant Anaesthesia and Critical Care ed: Ernesto A Pretto
2. Oh's Intensive Care Manual
3. Textbook of Critical Care ed: Jean-Louis Vincent et al
4. Anaesthesia and Perioperative Care for Organ Transplantation. Ed: Subramaniam K, Sakai T
5. Oxford Textbook of Cardiac Anaesthesia. Ed: RP Alston et al
6. Anaesthesia and Intensive Care A-Z. ed: SM Yentis et al
7. Liver Anaesthesia and Critical Care Medicine. ed: G Wagener

Journals:

3-5 International journals and 02 national journals (indexed)

Annexure I

Postgraduate Students Appraisal Form

Name of the Department/Unit :

Name of the PG Student :

Period of Training : FROM……TO……

Sr. No.	PARTICULARS	Not Satisfactory	Satisfactory	More Than Satisfactory	Remarks
		1 2 3	4 5 6	7 8 9	
1.	Journal based / recent advances learning				
2.	Patient based /Laboratory or Skill based learning				
3.	Self directed learning and teaching				
4.	Departmental and interdepartmental learning activity				
5.	External and Outreach Activities / CMEs				
6.	Thesis / Research work				
7.	Log Book Maintenance				

Publications Yes/ No

Remarks* _____

_____

_____

_____

***REMARKS: Any significant positive or negative attributes of a postgraduate student to be mentioned. For score less than 4 in any category, remediation must be suggested. Individual feedback to postgraduate student is strongly recommended.**

Signature of Assessee Signature of Consultant Signature of Hod

MODEL PAPER

DM08301 **OTCC -I**

DM Examination Month, Year

ORGAN TRANSPLANT ANAESTHESIA AND CRITICAL CARE

Paper-I

Basic sciences related to organ transplant anaesthesia

Time: Three Hours

Maximum Marks: 100

Attempt all questions

All questions carry equal marks

Draw labelled diagrams wherever necessary

1. Definition and staging of chronic kidney disease. Describe pathophysiologic changes on various systems in patient with end-stage renal disease.
2. Describe Hepato-pulmonary syndrome.
3. Describe splenic circulation. Which factors will regulate splenic blood flow?
4. IL-2 receptor antagonists.
5. Enumerate cause of anemia in CKD patients and its anesthetic consideration.
6. Renal function tests.
7. Modified end stage liver disease scoring system.
8. Discuss immunology of rejection.
9. Antifibrinolytic agents.
10. Define brain death, tests to confirm diagnosis.

MODEL PAPER

DM08302 **OTCC-II**

DM Examination Month, Year

ORGAN TRASPLANT ANAESTHESIA AND CRITICAL CARE

Paper-II

Clinical specialties related to organ transplant anaesthesia

Time: Three Hours

Maximum Marks: 100

Attempt all questions

All questions carry equal marks

Draw labelled diagrams wherever necessary

1. Discuss maintenance immunotherapy in renal transplant.
2. Briefly Write on Porto-pulmonary hypertension and its anaesthetic implication.
3. Tabulate the effects on coagulation system in cirrhosis.
4. Write in brief the role thromboelastography in perioperative coagulation management.
5. ABO Incompatible renal transplant. Anaesthetic considerations.
6. Anaesthetic management of brain dead organ donor.
7. Define reperfusion syndrome in liver transplant and management.
8. Discuss role of induction agents in transplant immunology.
9. Intraoperative TEE.
10. Briefly write on dynamic indices of fluid responsiveness.

MODEL PAPER

DM08303 **OTCC -III**

DM Examination Month, Year

ORGAN TRANSPLANT ANAESTHESIA AND CRITICAL CARE

Paper-III

Critical care related to organ transplantation anaesthesia

Time: Three Hours

Maximum Marks: 100

Attempt all questions

All questions carry equal marks

Draw labelled diagrams wherever necessary

1. Discuss postoperative pulmonary complications after liver transplant and management.
2. Define short for size syndrome and its implications.
3. Antibody mediated rejection in renal transplant and its management.
4. Write in brief about early postoperative complications in liver transplant recipient.
5. Write short note on Post-transplant psychosis.
6. Briefly write on DVT prophylaxis.
7. Discuss management of brain dead organ donor in ICU before organ retrieval.
8. Discuss various strategy of postoperative pain management after donor Hepatectomy.
9. Describe postoperative fluid management in liver transplant recipient.
10. Write short note on delayed graft functioning.

MODEL PAPER

DM08304 **OTCC-IV**

DM Examination Month, Year

ORGAN TRANSPLANT ANAESTHESIA AND CRITICAL CARE

Paper-IV

Recent advances the organ transplant anaesthesia and critical care

Time: Three Hours

Maximum Marks: 100

Attempt all questions

All questions carry equal marks

Draw labelled diagrams wherever necessary

1. Briefly write on point of care tests for coagulation. Discuss ROTEM in liver transplant.
2. Discuss the anesthetic management of a 30 year patient with end –stage renal disease posted for renal transplantation. (Recipient blood group O positive and donor B positive).
3. Describe fluid management strategy in liver transplant. Discuss types of fluid, their advantages and disadvantages, and recent monitoring for assess fluid responsiveness.
4. Discuss medically complex donor in renal transplant.
5. Blood conservation strategies, management of massive blood loss and complications