

# Curriculum

## FNB Fellowship

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# Transplant Anaesthesia

- ◆ Introduction
- ◆ Programme Goals and Objectives
- ◆ Teaching and Training Activities
- ◆ Syllabus
- ◆ Competencies
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- ◆ Recommended Books

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## **I. INTRODUCTION**

Solid organ transplants have seen a revolutionary growth in the last five years. Renal transplants are being performed on a routine basis for almost 30- 40 years. Since 2004, the advancement in other abdominal solid organ transplants mainly the liver and lesser numbers of pancreatic transplants and small bowel transplants are being performed. In India today, about 2500 liver transplants are being performed per year. Although some states have been able to sustain a deceased donation programme, across most cities, the majority of transplants are from living donors. New centres are being commissioned for performing transplants and the need for trained surgeons and anaesthesiologists is imminent. Most of the transplants till date are being performed in private hospitals with the exception a few major institutions. Training for the anaesthesiologists at these centres is at the discretion of the supervisors and exit examinations at the local centres.

There is a need for more trained anaesthesiologists in transplant anaesthesia in accordance to the demands. Also there is a need to have a structures training programme and an accredited course with a common exit examination.

## **II. PROGRAMME GOALS AND OBJECTIVES**

1. Understand the pathophysiology of organ transplantation and surgical anatomy of multi-organ retrieval.
2. Develop the knowledge and skill for the anaesthetic and postoperative intensive care management of organ transplant patients.
3. Ability to evaluate donor suitability and manage retrieval of abdominal organs for transplantation
4. Develop the knowledge of acute and chronic liver/renal failure, causes, complications, pathophysiology and treatment options
5. To develop the knowledge and skill in Immunology, ABO compatibility, cytotoxic cross match, flow cytometry, HLA matching, immunosuppression, rejection, drug therapy, fluid management, laboratory, liver biopsy and imaging investigations
6. Understand medico-legal and ethical issues, record and retrieve information from databases

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7. Identify and treat post –op complications: drug side effects, infection, rejection, vascular complications, pancreatic fistula, graft pancreatitis, post- transplant graft pancreatectomy
  8. Ability to understand indications and contraindications for deceased and live liver donation, liver transplantation and re-transplantation
  9. Understand, identify and treat post op complications: drug side effects, infection, rejection, vascular complications, biliary complications, recurrent disease, hepatitis
  10. Develop the skill and spirit of scientific inquiry and orientation to the principles of research methodology and epidemiology.
  11. Develop inter-communication skills with surgeons and other members of organ transplant team.
  12. Develop communication and counselling skills with patient relatives.

### III. TEACHING AND TRAINING ACTIVITIES

The candidate enters the programme in the capacity of a senior resident. He/she works is given gradually increasing responsibility – from complete supervision of all activities initially to semi-independently managing the theatres and decision making in intensive care management.

The day-to-day work of the trainees will be supervised by the consultant of the department of Solid Organ transplant division of anaesthesiology.

The posting is so designed that the trainee gets posted in various areas including operation theatre and postoperative ICUs.

In addition to OT and bedside teaching, a structured class of at least 1 session per week, that could be a seminar, journal club or case presentation.

Scope for online teaching sessions that can be conducted fortnightly that can involve all the fellows in training can be considered

All the candidates joining the postgraduate course of a 2-year fellowship Organ Transplant Anaesthesia will work as fulltime residents during the whole 2-year period of training. They shall be given fulltime responsibility and assignments and their participation in all facets of the educational programme is assured.

Operation theatre : 18 days per month  
Intensive care unit duties : 6 days per month (6 days off)

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A candidate should fulfil the requirement of

**1. Rotation through high volume centres:**

Centres that may not have adequate numbers for liver transplant should send their candidate for training at high volume centres approved by the National board for at least 1 month per year of rotation.

At the end of 2 y, the candidate should have had experience in providing anaesthesia to at least 25 liver transplants and 50 renal transplants

**2. Subspecialty rotation**

- a. Gastroenterology: Anaesthesia for ERCP, endoscopy, pediatric and adult (minimum 2 days in 1 month or 1 month per year)
- b. Radiology: Anaesthesia for pediatric CT / MRI, TIPS, radio ablation and stenting (1 month per year or 2 days per month)
- c. Nephrology: Blocks for AVF, CAPD catheter, Insertion of dialysis access catheter
- d. Endocrinology: Anaesthesia for vascular debridement, vascular bypass surgery, diabetic patient management.
- e. CVTS OT: Training in TEE, PA catheter, femoral access. 1 week
- f. ER/ Trauma OT: Assessment of patients with head injury and brain death. Management of brain dead potential organ donor. 1 week

**3. ICU rotations: Mandatory**

- a. Post transplant ICU: at least 1 month each year, amounting to a total of 2 months (both liver and kidney)
- b. Post surgical ICU: hepatobiliary surgery, nephrectomy 2 months per year total 4 months
- c. CVTS ICU: 1 week for exposure on ECMO and LV assist devices

**4. Involvement in teaching**

The fellowship candidate shall be assigned the job of teaching postgraduate students and also students of paramedical courses. (respiratory therapy, anaesthesia technicians)

**5. Periodic internal assessment**

To improve the standards of the postgraduate training a periodic internal objective assessment is needed.

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Internal examination will be conducted every 6 months and the marks maintained in a register.

Log books should be submitted for evaluation at the end of year I and the final log book to the NB at the end of 2 years.

## **IV. SYLLABUS**

### **1. The Anaesthesia Teaching Would Essentially Consist of:**

- a. Applied anatomy
- b. Applied physiology and pharmacology
- c. Clinical management of different pathological conditions
- d. Clinical guidelines for different case scenario
- e. Review of literature
- f. Applied physics related to anaesthesia

### **2. Intensive Care Management**

- a. Organizational aspects
- b. Acute Liver failure management
- c. Management of Decompensation in Liver disease
- d. Gastroenterological emergencies
- e. Acute Renal failure
- f. Neurological disorders in Liver Disease both acute and chronic.
- g. Endocrine disorders in ESLD & CKD
- h. Liver diseases in Pregnancy
- i. Metabolic haemostasis: Hyponatremia
- j. Haematological management
- k. Postoperative Care of Liver transplant.
- l. Postoperative Care in Renal Transplant.
- m. Renal Replacement therapy in The ICU
- n. Pediatric intensive care

### **3. Monitoring In Anaesthesia**

Invasive & Non-Invasive monitoring techniques for Pre-peri & Post-operative periods in intensive care:

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- a. Understanding of basic concepts of monitoring
  - b. Indications, cost effectiveness, complications
  - c. Equipment usage & knowledge of accessories

#### **4. Liver Transplant Related Topics:**

- a. Anatomy of Liver & Biliary tree
- b. Physiology & functions of the Liver
- c. Biochemical Pathways in Liver functions
- d. Anaesthetic Implications in Liver Disease.
- e. Evaluation of Liver Functions
- f. Liver & Lactate metabolism
- g. Acute Liver Failure
- h. Chronic Liver Failure
- i. Preoperative workup of Cirrhotics
- j. Hepato renal syndrome
- k. Hepato pulmonary Syndrome (articles)
- l. Hepatic Encephalopathy
- m. Portal Hypertension
- n. Gastrointestinal Bleed
- o. Anaesthesia for Hepatic Resections
- p. Indications for Liver Transplant
- q. Preoperative work up transplant recipient
- r. Preoperative workup of transplant donor.
- s. Anaesthetic Concerns and postoperative follow up of Donor hepatectomy
- t. Brain Death- Criteria for Diagnosis.
- u. Deceased Donors- Management until Cross clamping.
- v. Anaesthesia for Liver Transplant
- w. Renal Failure in a transplant recipient
- x. Post-Operative Management of Transplant Recipient
- y. Antibiotics/Antivirals/Antifungal. Policies in Liver Transplant
- z. Peri operative Fluid Management: Discuss types of fluids only
- aa. Massive Blood transfusion;(product usage during transplantation)
- bb. TEG
- cc. Metabolic Liver Diseases
- dd. Pediatric Liver Transplant
- ee. Liver Tumors/ tumors for Transplant
- ff. Pancreatic tumors: Whipple's Surgery

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- gg. Radiology: Interpretation of Abdominal CT
  - hh. Other organ transplant

## **5. Renal Transplantation Related Topics:**

- a. Anatomy of the Kidney and urinary tract
- b. Physiology of the kidneys and function.
- c. Renal Dysfunction & Failure: Diagnostic tests
- d. Chronic Renal Failure
- e. Renal Replacement therapies
- f. Peritoneal Dialysis
- g. Vascular Access; Types, complications
- h. Pre-Operative Evaluation of CRF for Renal Transplant Surgery
- i. Anaesthesia for Renal Transplant
- j. Post-Operative ICU care. Complications

## **V. COMPETENCIES**

At the end of training the candidate is expected to have

1. An understanding of the pathophysiology of CLD/ CKD and organ systems involved.
2. Ability to perform an effective end organ assessment for consideration for surgery.
3. Proficient in securing invasive lines and use of ultrasound.
4. Understanding the function of invasive monitors and choosing appropriate monitors for each case.
5. Use of IV fluids.
6. Understanding coagulation and management.
7. Management of patients in the postoperative care with respect to hemodynamics, lines, pain and postoperative complications.

## **VI. LOG BOOK**

Each candidate shall maintain a systematic log book in which the academic, clinical and research work shall be neatly entered. Senior faculty may be entrusted to periodically evaluate the log book and assign scoring for the same.

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A model for the same will be submitted from the National Board to maintain uniformity.

The log book shall be submitted after certification by the Head of Department in the final year practical examination for scrutiny by the examiners.

## VII. RECOMMENDED TEXT BOOKS AND JOURNALS

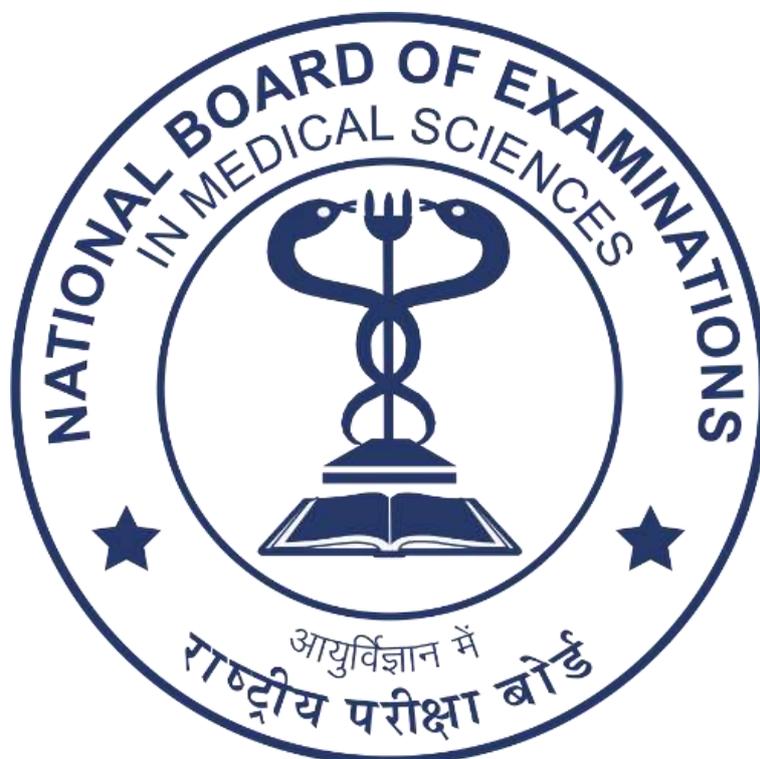
### Text Books

1. Physiology and Pharmacology in Anaesthetic Practice. Stoelting
2. Anaesthesia and Intensive Care for Patients with Liver Disease. Gilbert R. Park, Yoogoo Kang (Ed.). Butterworth-Heinemann Medical.
3. Transplantation of the Liver. Ronald W. Busuttil, Goran B. Klintmalm (Ed.). Saunders.
4. Schiff's Diseases of the Liver. Eugene R. Schiff, Michael F. Sorrell, Willis C. Maddrey (Ed.). Lippincott Williams & Wilkin.
5. Handbook of Kidney Transplantation (Lippincott Williams & Wilkins Handbook Series) Gabriel M. Danovitch (Editor).
6. Handbook of Organ Transplantation - Jayashri A Shah, Sujatha Patwardhan.
7. Anaesthesia for Hepatico- Pancreatic -Biliary Surgery and Transplantation - Zoka Milan, Chula Goonasekara.
8. Oxford Textbook of Transplant Anaesthesia and Critical Care Ernesto A, Presto, Jr.
9. Anaesthesia for Transplant Surgery - Jayashree Sood, Vijay Vohra
10. Organ Transplantation A Clinical Guide - Andrew A Klein, Clive J. Lewis, JorenC. Madsen
11. Hepatic Transplantation - Anaesthetic and Perioperative Management - Peter M Winter, Yoo Goo Kang.
12. Liver Anaesthesia and Critical Care Medicine - Gebhard Wagener.
13. Anaesthesia and perioperative care for organ transplantation - Kathirvel Subramaniam.
14. Contemporary Liver Transplantation - Cataldo Doria
15. Liver Transplantation: Operative Techniques and Medical Management - Ernesto P. Molmenti.
16. Clinical Management of the Transplant Patient - Paul C Kuo

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17. Anaesthesia for Organ Transplantation - Judith A Fabian.
  18. Critical care of potential Liver Transplant Candidates - Dmitri Bezinover,  
Fuat H Saner

## Journals

1. Journal of transplantation
2. American Journal of transplantation
3. Transplantation
4. Transplantation proceedings
5. Annals of Transplantation
6. Journal of hepatology
7. Journal of gastroenterology
8. Journal of Gastroenterology and Hepatology
9. Indian Journal of Transplantation
10. Liver Transplantation
11. Clinical Liver Diseases
12. Hepatology communications
13. Liver Transplantation
14. Journal of Liver Transplantation
15. Current Opinion in Critical Care.
16. European Journal of Intensive Care Medicine
17. Journal of Intensive Care Medicine.
18. Pediatric Critical Care Medicine
19. Current Opinion in Organ Transplantation.
20. Journal of Critical Care Medicine.
21. Seminars in Liver Diseases
22. Liver Clinics of North America
23. New England Journal of Medicine



## आयुर्विज्ञान में राष्ट्रीय परीक्षा बोर्ड

स्वास्थ्य एवं परिवार कल्याण मंत्रालय, भारत सरकार  
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**NATIONAL BOARD OF EXAMINATIONS IN MEDICAL  
SCIENCES**

**Ministry of Health & Family Welfare, Govt. of India  
Medical Enclave, Ansari Nagar, New Delhi- 110029**