



Transplant Medicine Curriculum

Common trunk

1: Ethical and moral considerations:

Informed consent
Concept of death
Concept of brain death
Organ procurement
Live donor issues

2: Organization of transplant medicine:

The candidate should know his/her country organization of organ allocation and transplantation services (including legal aspects) and give a critical appraisal on this subject and emphasize differences between the European and the US approach Public opinion in transplantation

3: General principles of organ preservation:

Ischaemia-reperfusion injury
Basic knowledge of reperfusion machines

4: Immunology:

Normal immune response
Acquired immune response
Innate immune response
Relevance of ABO blood group antigens in transplantation
Role and nomenclature of HLA
Concept of sensitization
Role of HLA antibodies
Concept of cross matching
Principles of tolerance and stem cells

5: General mechanisms of rejection:

Immune response to allograft
Mechanism of recognition
Effector mechanisms
Inflammatory response to the allograft

6: Immunosuppression:

6.1 General:

Action and pharmacology of immunosuppressants incl. concept of TDM and drug interactions
The intrinsic effects/side-effects of commonly used immunosuppressants
Understanding of synergy and the rationale for the diverse immunosuppressant combinations

6.2 Specific:

Prednisolone



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CNIs
mTOR inhibitors
MPA
Azathioprine
ATG
IVIg
IL2 receptor blockade
Alemtuzumab (Campath)
Anti-CD20 antibodies (Rituximab)
Costimulatory pathway inhibitors: belatacept
Eculizumab
Bortezomib
6.3 Side effects:
Long term side effects of immune suppression in general
De novo cancers including skin cancer
Renal function
Cardiovascular function
Diabetes
Haematology

7: Infectious diseases:

Immune response to infections in the compromised host
Knowledge of window of the occurrence of the diverse types of infection following transplantation
Principles of viral, bacterial, fungal and other opportunistic infections
Specific infections:
Herpes viruses, CMV, EBV
Hepatitis viruses: A, B, C, E
Poliomavirus BKV and JCV
HIV
Pneumocystis jiroveci pneumonia
Tuberculosis
Fungal infections
Vaccination programs before and after transplantation
Occurrence and treatment of diseases associated with viruses (Kaposi's sarcoma, skin cancer, cervical cancer, and post-transplant lymphoproliferative disorders)

Liver Transplantation Module

1. Indications and contraindication to liver transplantation

Pre-transplant management of major complications of cirrhosis
Management of acute liver failure.

Indications for liver transplantation in adults and paediatrics (according to age), general principles and specificities by indications and in special situations (HIV, re-transplantation)

Contraindications to liver transplantation: absolute and relative



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Evaluation of the liver transplant candidate: physical, social, psychological assessments, addictive behaviors.

2. Management of the waiting list

Management of patients with HCV and HBV, alcoholic and autoimmune related and other liver diseases on the waiting list.

Assessment and management of the liver transplant candidate with renal dysfunction: indication to combined liver-kidney versus liver transplant alone

Prognostic scores in chronic liver disease: Child-Pugh, MELD/MELD-Na/PELD scores; disease specific scores (PBC/PSC);

Prognostic scores in acute liver failure

The issue of HCC: down-staging, priority and delisting

Standard exceptions to MELD score

3. Principles of organ donation and organ allocation

Evaluation of the deceased and living donors

Extended-criteria donor

Liver transplantation using donors after cardiac death

Matching the donor to the recipient

4. The transplant operation

General principles of liver transplantation surgery

Whole organ transplantation technique

Split liver transplantation

Living donor liver transplantation including living donor evaluation.

Domino transplantation

Auxiliary transplantation

Coagulation and blood transfusion management

Short and long term results, according to age, diagnosis, type of transplantation

5. Early post-transplant management

Immunosuppression: initial protocols

Acute rejection: diagnosis/ histopathology/management

Early renal dysfunction

Respiratory, neurologic and cardiac function

Frailty of liver transplant candidates, assessment and outcome

6. Diagnosis and management of early complications

Preservation/reperfusion injury including histopathology aspects

Primary non-function/dysfunction

Vascular complications including histopathology aspects

Biliary complications including histopathology aspects

Infections: diagnosis, histopathology, timing, risk factors, prevention and management

7. Long-term management



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Long-term immunosuppressive standard protocols
Immunosuppressive strategies in special patient groups (i.e. HCV, HCC, autoimmune diseases)
Drug interactions and toxicity
Renal dysfunction: prevention and management
Cardiovascular and metabolic complications: risk factors, prevention, treatment
“De novo” malignancies: types, timing, prevention, treatment
Recurrent disease: incidence, histopathology, risk factors, prevention, treatment
Long-term infections (CMV, EBV, etc.).
The issue of adherence to medical regimen amongst adult and paediatric transplanted patients
Late acute and chronic rejection: diagnosis/histopathology/staging/management
Late biliary and vascular complications
Re-transplantation: indications and prognostic models
Sexual function and fertility after liver transplantation
Assessment of quality of life following transplantation
Physical activity and sports

Kidney Transplantation Module

1. The place of kidney transplantation in the treatment of end-stage renal disease:

Treatment options for patients with end-stage renal disease
Indications and major contraindications for kidney transplantation
The type of the donor and optimal recipient outcome
Waitlist management and kidney allocation policy problems
Renal transplantation and health economy
Legal and ethical issues in kidney transplantation

2. Evaluation of the recipient for kidney transplantation:

General investigations
Recipient diabetes and obesity
Complex cardiovascular evaluation
Suitability for immunosuppressive therapy (infections, malignancies, gastro-intestinal diseases, etc)
Primary renal disease and renal transplantation – special issues and contraindications
Psychosocial issues
Recipient ethnicity
Overall risk assessment and strategies to improve physical condition
Preemptive transplantation

3. Live donation:

Live kidney donor evaluation process
General contraindications for live donation
Justification of the medically complex living kidney donor
Evaluation of psychosocial and ethical suitability
Alternative living donor programs (paired exchange donation, non-directed or altruistic donation)
Surgical process of kidney donation



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Long-term follow up of live donors

4. Renal transplantation specific immunology issues:

Histocompatibility of the donor and recipient, virtual and pre-transplant cross matching
HLA mismatches, panel reactive antibody status and the highly sensitized patient
Immune monitoring during post-transplant care
Principles of ABO incompatible and HLA cross match positive renal transplantation

5. The surgical procedure of renal transplantation:

Pre-transplant procedures, indications for native nephrectomy
Deceased donor kidney suitability for transplantation
The surgery of renal transplantation and postoperative surgical management
Late surgical complications

6. Pre-, peri-, and early post-operative non-surgical management of the recipient:

specific transplant related issues in fluid balance, acid-base and metabolic management
Cold ischemia time, ischemia-reperfusion injury, delayed graft function, kidney preservation
Perioperative indications of renal replacement therapy

7. Immunosuppressive therapy of renal transplant recipient:

Indications for induction therapy, practical management of different agents: IL2-RAb, lymphocyte-depleting agents

Initial maintenance immunosuppressive therapy, landmark studies and special indications

Calcineurin Inhibitors: timing of initiation, dosing, tacrolimus vs cyclosporine

mTORi, in combination with CNIs

Long-term maintenance immunosuppressive medication:

- CNI based protocols
- CNI-free protocols
- Corticosteroid avoidance or withdrawal protocols

TDM monitoring during immunosuppressive protocols

Measuring biological efficacy of immunosuppression, biomarkers and immune monitoring

Immunosuppressive drug interactions and role of kidney function

8. Infections and malignancies:

Renal transplantation specific issues of infections (Urinary tract infections, CMV, polyoma-virus prophylaxis and treatment, HBV and HCV management)

Renal transplantation specific malignant diseases

9. The differential diagnosis and therapy of allograft dysfunction:

Differential diagnosis of early graft dysfunction- clinical signs of acute rejection:

Risk factors for acute rejection

Subclinical rejection and protocol biopsies

Acute cellular and antibody-mediated acute rejection

Differential diagnosis of late graft dysfunction – chronic rejection: clinical decision algorithm



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Imaging in renal transplantation

Performing and interpreting the kidney allograft biopsy:

Histopathology of T-cell and antibody mediated rejection

Viral interstitial lesions

Recurrent or de novo renal diseases

Chronic allograft damage, interstitial fibrosis and tubular atrophy

CNI toxicity

Treatment of acute rejection forms: acute cellular rejection and antibody-mediated rejection

Prophylaxis and management of recurrent primary renal diseases

10. CKD management in renal transplant patient:

Kidney graft function and CKD, effect on recipient and graft survival

Cardiovascular disease: tobacco use, independent predictors in KTR

Hypertension and major antihypertensive agent classes in KTRs

Metabolic disorders: Diabetes mellitus and NODAT, dyslipidemia management

Nutrition aspects of the renal transplant patient

Anemia and post-transplant erythrocytosis

Management of graft loss

11. Other special issues:

Depression, anxiety and other psychological and psychiatric problems

Post-transplant pregnancy

Issues of pediatric kidney transplantation, transition from pediatric to adult care

Diagnosis and management of non-adherence

Management of renal transplantation in combination with other simultaneous or consecutive organ transplantations

12. Evaluation of a manuscript: optional