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
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
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
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
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
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