



Renal Transplant Fellowship Training Program **King Faisal Specialist Hospital & Research Centre**

I. Introduction:

The rapid expansion of renal transplantation and transplant immunology has led to the evolution of transplant nephrology as a recognized subspecialty. Renal transplantation is no longer viewed as a simple extension of nephrology practice but rather as a highly specialized field that requires special training or experience.

Renal transplantation is considered to be the treatment of choice for stage V chronic kidney disease which has become an endemic in many countries including Kingdom of Saudi Arabia. The number of renal transplantation performed and renal transplant programs in Saudi Arabia is unbalanced to the requirements and the growing number of stage V chronic kidney disease population.

Close to 170 renal transplants are performed annually in addition to 5-10 pancreas transplants. There are 13 inpatient beds assigned to Department of Kidney and Pancreas Transplantation. In year 2007, there were close to 10,000 outpatient visits to different renal transplant clinics. The program is currently staffed by 4 consultant renal transplant physicians, 4 assistant consultant renal transplant physicians, 3 consultant renal transplant surgeons, 1 associate consultant renal transplant surgeon, 2 assistant consultant renal transplant surgeons, 2 consultant nephropathologists, 1 consultant immunopathologist and 2 solid organ transplant clinical pharmacists.

Providing a world standard care for renal transplant recipients requires basic standardization of transplant nephrology training and a method of uniform documentation of education for those who wish to lead or practice in a renal transplant program.

II. General Objectives:

The primary mission of King Faisal Specialist Hospital and Research Centre (KFSH&RC) Renal Transplant fellowship program is to provide highly specialized renal transplant training for nephrologists and nephrology fellows, qualifying them to practice and lead transplant nephrology. Prospective renal transplant fellowship candidates are individuals who at the time of joining the renal transplant fellowship program are eligible or certified nephrologists.

On completion of the educational program, the graduate physician will be competent to function as a consultant transplant nephrologist.

III. Specific Objectives:

A. Knowledge:

The fellow must be able to demonstrate both basic and clinical knowledge in the topic areas listed in the program content. These topic areas are necessarily linked and form a framework for learning and knowledge acquisition. The knowledge components within each topic area include when applicable: clinical skills, differential diagnosis, diagnostic tests, etiology, pathophysiology, treatment/management issues including preventive health measures, complications of treatment, prognosis and any controversies in the area.

B. Clinical Skills

Fellows must acquire the following clinical and technical skills:

1. Mastery in obtaining complete and relevant history and physical examination and integration of findings in the assessment of a patient who is a candidate for, or has received kidney transplantation.
2. Mastery in obtaining complete and relevant history and physical examination and integration of findings in the assessment of a patient who is a candidate for, or has undergone donor nephrectomy.
3. Proficiency in the management of a patient with acute and chronic allograft dysfunction.
4. Demonstrable skill in dealing with the psychosocial and ethical issues related to kidney transplantation, including the ethical issues of organ donation and allocation.
5. Demonstrable knowledge of indications, risks, and interpretations of:
 - a. Renal biopsy findings
 - b. Anti-HLA antibodies
 - c. Cross match testing by conventional and flow cytometry techniques.
6. Fellows must be able to competently and safely perform real time ultrasound guided renal allograft biopsy.

C. Collaboration

Fellows are expected to be capable of collaborating with other health care providers:

- A. Understanding of the special nature of transplant multidisciplinary team work.
- B. Demonstrable capacity to work effectively in a multidisciplinary team environment for the management of patients with renal transplantation.
- C. Function creatively with renal transplant surgeons.
- D. Learn to consult effectively with other physicians and health care professionals, including particularly transplant coordinators, nurses, dietitians and social workers.
- E. Contribute successfully to other interdisciplinary team activities.

D. Professionalism

Fellows must demonstrate the ability to convey high quality medical care with honor, truthfulness and consideration and to exhibit proper personal and interpersonal professional behavior. The fellow must practice medicine ethically in consistency with the obligations of a physician and must understand the basic principles of bioethics.

E. Scholarship

The fellow must learn to grow, employ and observe a personal plan for continuing medical education. The fellow must be able to vitally judge sources of medical information and demonstrate the ability to assist the learning of patients, house staff, medical students and other health professionals. The fellow must develop the skill of contributing to the development of new knowledge, whether by the performance of quality assurance reviews, case reports or by conducting an original research.

F. Communication

Fellows are expected to:

1. Establish therapeutic relationships with patients/families.
2. Obtain and synthesize relevant history from patients/families/communities.
3. Listen effectively.
4. Discuss appropriate information with patients/families and the health care team.

IV. Admission Requirements

- A. The candidate must have completed formal residency training in internal medicine and must have been awarded a Saudi Specialty Certificate by the Saudi Commission for Health Specialties (SCHS), or its equivalent.
- B. The candidate must have completed formal fellowship training in nephrology and or its equivalent.
- C. The candidate must have successfully completed a personal interview by members of the renal transplant program.

V. Structure of the training program:

A. Duration

The duration of the fellowship program is one year. The program offers an additional six months to one year of extra training. This optional extra training period is meant to further enhance the clinical and/or the research skills of the fellow.

B. Training Capacity:

One fellow will be accepted each year. An additional fellow may be accepted if deemed necessary.

C. Faculty Qualifications:

All faculty members are fully qualified renal transplant consultant according to KFSH&RC credentialing guidelines and meet the criteria of the American Society of Transplantation and United Network of Organ Sharing as Transplant Nephrologists.

VI. PROGRAM CONTENT:

1. Topics

1. Medical evaluation of renal transplant candidate(s).
 - a. Obtaining detailed history and physical examination
 - b. Ordering laboratory and radiological investigations relevant to transplant evaluation
 - c. Interpretation of history, physical examination, tissue typing and other investigations findings
 - d. Identifying the etiology of original kidney disease
 - e. Risk assessment of renal transplantation and recurrence of original kidney disease
 - f. Screening and evaluation of malignancy pre-transplantation
 - g. Screening of infectious diseases pre-transplantation
 - h. Assessment of liver disease in candidate(s) with viral hepatitis
 - i. Vaccination pre-transplantation
 - j. Evaluation of cardiovascular system and possible undiagnosed or diagnosed coronary artery disease
 - k. Health education and assessment of adherence to medical regimens post transplantation

2. Medical evaluation of living kidney donor candidate(s).
 - a. Obtaining detailed history and physical examination
 - b. Ordering laboratory and radiological investigations relevant to transplant evaluation

- c. Interpretation of history, physical examination, tissue typing and other investigations findings
 - d. Assessment of intention to donate
 - e. Psychosocial assessment
 - f. Assessment of Incentives of organ donation
 - g. Selecting most suitable donor candidate(s)
 - h. Risk assessment of future development of hypertension and diabetes post donor nephrectomy
 - i. Vaccination of pre-donation
 - j. Screening and evaluation of malignancy pre-donation
 - k. Assessment of risk of development of renal disease post nephrectomy
 - l. Identification of genetic renal disease
 - m. Health education
3. Medical evaluation of pancreas transplant candidate(s).
- a. Obtaining detailed history and physical examination
 - b. Ordering laboratory and radiological investigations relevant to transplant evaluation
 - c. Interpretation of history, physical examination, tissue typing and other investigations findings.
 - d. Identifying the etiology of original kidney disease
 - e. Risk assessment of renal transplantation and recurrence of original kidney disease
 - f. Screening and evaluation of malignancy pre-transplantation
 - g. Screening of infectious diseases pre-transplantation
 - h. Assessment of liver disease in candidate(s) with viral hepatitis
 - i. Treatment of viral hepatitis pre-transplantation
 - j. Vaccination pre-transplantation
 - k. Evaluation of cardiovascular system and possible undiagnosed or diagnosed coronary artery disease
 - l. Health education
 - m. Assessment of the type of diabetes mellitus in a potential pancreas transplant candidate
 - n. Assessment of diabetes mellitus complications pre-transplantation
 - o. Pancreas transplantation risk benefit stratification
4. Indication and contraindication for kidney and kidney-pancreas transplantation
- a. Pre-emptive Kidney transplantation
 - b. Living donor kidney transplantation in comparison to deceased donor transplantation
 - c. Pancreas transplantation in type 1 and 2 diabetes mellitus
 - d. Malignancy as a contraindication for transplantation
 - e. Age limits in pancreas and renal transplantation
 - f. Contraindications in various Cardiovascular diseases

- g. Contraindication for transplantation in candidate(s) with infections
 - h. Non-adherence to medical regimen as contraindication for transplantation
5. Fundamentals in transplant immunology
- a. Basic principles of immunology in solid organ transplantation
 - b. T-cell immunity
 - c. B-cell immunity
 - d. Mechanisms of allograft rejection
 - e. Role of anti-HLA antibodies in allograft rejection
 - f. Allograft accommodation
6. Acute allograft rejections and dysfunction
- a. Diagnosis and treatment of acute cellular allograft rejection
 - b. Diagnosis and treatment of acute antibody mediated allograft rejection
 - c. Management of delayed graft function
 - d. Steroids sensitive vs. steroids resistant allograft rejections
 - e. Recurrence of glomerulonephritis or original disease and its management
 - f. Microangiopathic hemolytic anemia
 - g. De-novo anti-GBM post transplantation
 - h. Urinary tract infections post kidney/pancreas transplantation
7. Post renal and pancreas transplant surgical complications
- a. Renal artery thrombosis
 - b. Renal vein thrombosis
 - c. Primary non-functioning graft
 - d. Urinary leaks
 - e. Urinary obstruction
 - f. Ureteric stenosis
 - g. Lymphoceles post transplantation
8. Chronic allograft dysfunction.
- a. Recurrence of original disease
 - b. Chronic antibody mediated rejection and its management
 - c. Chronic glomerulopathy and its management
 - d. Late acute cellular rejections
9. Detection, prophylaxis and management of transplant related infectious diseases, such as BK Virus Nephropathy, CMV and other opportunistic infections
- a. Surveillance of post transplant infections
 - b. CMV prophylaxis and treatment
 - c. Urinary tract infections
 - d. BK virus Surveillance and management
 - e. Management of immunosuppression in infected host

- f. Vaccination post transplantation
 - g. Management of viral hepatitis post kidney and pancreas transplantation
10. Transplant related malignancies
- a. Malignancy screening post transplantation
 - b. Management of immunosuppression in patients with diagnosed malignancy
 - c. Role of EBV in lymphoma post transplantation
11. Immunosuppressive medications
- a. Selection of appropriate immunosuppressive medication according to recipients immunologic and medical risk profile
 - b. Side effects of various immunosuppressant
 - c. Role of calcineurin inhibitors in allograft dysfunction
 - d. Immunosuppressant's metabolic risk
 - e. Drug toxicities and its manifestation
12. Combined kidney and other solid organ transplantation
- a. Indication for combined organ transplantation
 - b. Combined liver kidney transplantation in decompensated liver disease and hereditary metabolic syndromes
 - c. Chronic kidney disease in non-renal solid organ transplantation
13. Post transplant co-morbidities which include: cardiovascular disease, diabetes, hypertension, metabolic bone disease, anemia in both inpatient and outpatient settings
- a. Management of cardiovascular disease post transplantation
 - b. Risk modification of coronary artery disease post transplantation
 - c. Management of new onset diabetes post kidney transplantation
 - d. Osteoporosis post transplantation
 - e. Management of hyperlipidemia
 - f. Management of hypertension
 - g. Tertiary hyperparathyroidism post transplantation
14. Highly sensitized renal transplant recipients
- a. Detection of anti-HLA antibodies pre-transplantation
 - b. Indication for desensitization pre-kidney transplantation
 - c. Applying various desensitization protocols in highly sensitized renal transplant recipient(s)
 - d. Use of plasma exchange in highly sensitized renal transplant recipient(s)
 - e. Use of immunoadsorption pre-transplantation in highly sensitized renal transplant recipient(s)
 - f. Treatment of antibody mediated rejection post transplantation in highly sensitized renal transplant recipient(s)
 - g. Protocol kidney biopsy in highly sensitized renal transplant recipient(s)

15. ABO incompatible kidney transplantation
 - a. Indication for ABO incompatible kidney transplantation
 - b. Detection of isoagglutinin antibodies pre-transplantation
 - c. Pre-transplant conditioning regimens
 - d. Surveillance of post transplantation
 - e. Treatment of antibody mediated rejection in the context of ABO incompatible kidney transplantation
 - f. Protocol kidney biopsy in ABO incompatible kidney transplantation
16. Organ allocation strategies
 - a. Principals of organ allocation
 - b. Role of Saudi Center of Organ Transplantation
 - c. Management of deceased donor waiting list at KFSH&RC
 - d. Organ shortage
 - e. Strategies to improve organ access to minority groups
17. Ethics of Organ transplantation
18. Cost issues in kidney and pancreas transplantation

B. Main Rotations

The training program consists of four major clinical rotations: The pre-renal and pancreas transplant clinic (an outpatient activity) the hospitalized renal and pancreas transplant patients (an inpatient activity), the consultation service and the post renal and pancreas transplant clinic (an outpatient activity). Each rotation is staffed by a senior (consultant) transplant nephrologist and a junior (an assistant or fellow) transplant nephrologist.

1. Pre-renal transplant clinic rotation (4 months): the fellow will be directly involved in the evaluation of renal and pancreas transplant candidates and potential living kidney donor candidate(s). Once the evaluation process is completed, the fellow is responsible for presenting the candidate(s) at the renal transplant conference (a consensus group weekly meeting) for final approval.
2. Inpatient rotation (3 months): the fellow is directly involved in the medical care of the renal and pancreas transplant patient(s). The trainee will also serve as a primary member of the renal and pancreas transplant team who participates in the joint care of patients. All hospitalized renal and pancreas transplant patients are cared for jointly by staff of renal transplant surgery and transplant nephrology.
3. Inpatient Consultation Service (1 month): the fellow will provide under the supervision of a consultant, consultations for renal transplant recipients who are admitted under other medical services in the hospital.

During this rotation, the fellow will spend an average of two weeks in the immunopathology lab to gain experience in the technical aspects and interpretation of tissue typing and different crossmatch techniques.

4. Post transplant clinic rotation (4 months): the fellow will be directly involved in the post transplant management of renal and pancreas recipients. The trainee will be a primary team member in delivering care to renal and pancreas transplant recipient(s) in the immediate post renal transplant clinic, urgent care clinic and in the long term follow up clinic.

The fellow is expected to perform ten to twenty renal allograft biopsies. Additionally, the fellow must observe at least three renal transplant surgeries and three kidney procurement procedures.

C. Educational Activities

1. Core lectures (didactic sessions) on kidney and pancreas transplantation. These core lectures are held at the beginning of each academic year. They are delivered by the senior staff of the renal and pancreas transplant program. The topics that are covered include :
 - a. A brief review of transplant immunobiology
 - b. HLA testing and crossmatching
 - c. An overview of immunosuppression
 - d. Review of renal transplant program immunosuppression protocol
 - e. Medical aspects of kidney and pancreas transplantation
 - f. Surgical aspects of kidney and pancreas transplantation
2. Renal pathology conference. A weekly meeting where all renal transplant biopsies are reviewed by the transplant pathologists. It is a practical and semi-didactic training session where fellows are trained on the interpretation of renal transplant pathologies.
3. Renal transplant conference. A weekly meeting where all renal and pancreas transplant candidates and potential living kidney donors are presented for approval by consensus. During this interactive session, the fellow will learn the skills of appropriate selection of candidates and the scientific justification for excluding or approving candidates.
4. Journal club. A bi-monthly session where the fellow is expected to present a minimum of five papers from peer reviewed journal.

VII. Evaluation and Promotion

The fellow's level of competence and performance will be evaluated at a frequency determined by the Postgraduate Education Committee and in the manner as detailed in the Policy for Fellowship Training Program.

VIII. Completion

A certificate of fellowship training at KFSH&RC will be awarded upon satisfactory completion of the requirements of the program.

IX. Duties, Leaves & Holidays

A. Regulations governing duties, leaves and holidays are as stipulated in the Policy for Fellowship Training Program.

1. Participates in the care of renal transplant recipients immediately following transplantation in conjunction with Renal Transplant Surgeon Consultant and Renal Transplant Consultant.
2. Participates in the evaluation of potential renal transplant donors and recipients in conjunction with renal transplant consultant.
3. Participates in the care of, and provides high quality care for the renal transplant patients following discharge from the Renal Transplant ward.
4. Attends renal transplant clinic and sub-specialty clinic.
5. Participates in the consultative services as required.
6. Participates in the Renal Transplant Committee, Renal Transplant Collaborative Practice Committee and other committees as required.
7. Participates in the on-call schedule of the Renal Transplant Program.
8. Participates in research activities.
9. Participates in the training and teaching residents.
10. Participates in the educational activity of the Renal Transplant Program.
11. Performs all other related duties as assigned.
12. Participates in self and others' education, training and development, as applicable.
13. Follows all Hospital related policies and procedures

B. Leaves and Holidays: Regulations governing leaves and holidays are as stipulated in the Policy for fellowship Training Program.