

ADULT HEMATOLOGY FELLOWSHIP PROGRAM

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I. INTRODUCTION

The Kingdom of Saudi Arabia is a very rapidly developing country, with vast improvements occurring in private and government health services. Hematologic disorders constitute one of the major causes of morbidity and mortality in the country. At the present time there are very few qualified clinical hematologists in the Kingdom to handle such cases.

Based on this, there is a demand for a national training program to provide trainees with all the necessary skills towards acquisition of the Saudi Specialty Certificate in Adult Hematology, after which trainee will be capable of handling all types of blood disorders, with good understanding of the related social, economic and environmental aspects.

II. TRAINING PROGRAM

The program consists of two years of full-time structured supervised training in Adult Hematology. This will involve admission to an approved joint program with rotations in different hospitals and an optional third year in hematology or medical oncology as per the trainees' desire and interest.

Fellows trained in solid tumors and completed two years of training in an approved Saudi Board program in medical oncology can enter the hematology fellowship training program for one year and become eligible to enter the Saudi Board in Hematology after successful completion of their third year training. Similarly, Saudi Hematology board fellows will be eligible to enter the final Oncology program when this program becomes approved by SCHS.

III. GENERAL OBJECTIVES

- A. To graduate adult hematologists with adequate knowledge and skills to cope efficiently with the relevant health problems of patients with blood disorders.
- B. To train fellows to become self-disciplined and self-dependent learners, and to provide an educational environment that will promote health care standards.
- C. To train fellows to perform research and emphasize a research oriented approach to new problems.
- D. To graduate fellows at internationally acceptable standards.
- E. To make trainees realize the importance of team approach to medical problems.
- F. To graduate adult hematologists with appropriate attitude and medical ethics.

IV. SPECIFIC OBJECTIVES

The program emphasizes formal instruction in the following:

- A. Treatment of individual blood diseases with emphasis on coordinated multidisciplinary approach.
- B. Clinical experience that emphasizes patient management in both inpatient and outpatient settings.
- C. Ability to perform relevant procedures (see procedure logbook).
- D. Key tools in basic science that applies to patient management.

V. ADMISSION CRITERIA

- A. Holder of Saudi Specialty Certificate in Internal Medicine or its equivalent as per Saudi Commission regulation.
- B. A letter from the sponsoring organization approving the candidate for full time training for the whole period of the program.
- C. Passing an interview.
- D. Registration with SCHS for the subspecialty-training program in Adult Hematology.

VI. APPLICATION PROCEDURE

- A. Recruitment process should be based on the guidelines of the Saudi Commission for Health Specialties (SCHS).
- B. Documentation:
 - 1. Application form for Saudi Board of Hematology.
 - 2. Signature of an obligation to abide by the rules and regulations of the training program and SCHS.
 - 3. Copy of Saudi Specialty Certificate in Internal Medicine or its equivalent.
 - 4. Two letters of reference.
 - 5. Three passport size photographs.
 - 6. Sponsorship letter.

VII. TRAINING REQUIREMENTS

- A. Training is a full time commitment. Trainees shall be enrolled in continuous full time training for the whole period of the program.
- B. Training is to be conducted in institutions accredited by the SCHS.
- C. Training shall be comprehensive and includes inpatient, ambulatory and emergency management.
- D. Trainees shall be actively involved in patient care with gradual progression of responsibility.

- E. Trainees shall abide by training regulations and obligations set by the SCHS.
- F. During the trainees on-call, they are expected to reside in an area reachable by paging system range of that hospital.

VIII. TRAINING CENTRE ACCREDITATION REQUIREMENTS

Hospitals eligible to participate in the training program must fulfill the following requirements:

- A. The medical institution must be accredited for training by the SCHS for Internal Medicine training.
- B. Faculty: A minimum of three full-time faculty members, including the Program Director. In addition, each of the faculty members must be an experienced adult hematology consultant.
- C. Facilities and Resources:
The following are essential for the training program:
 - 1. An adequate number of new and follow-up patients to ensure adequate exposure to blood disorder problems.
 - 2. In-patient and ambulatory care facilities.
 - 3. Adequately equipped and staffed facilities for both diagnostic and therapeutic procedures, and laboratory facilities capable of performing specialized serological, immunologic and metabolic studies applicable to blood disorders.
 - 4. Support services such as diagnostic and interventional radiology units, emergency services and pathology laboratory.
 - 5. A well-stocked library with a facility for literature searches – e.g. internet.
- D. Integrated clinical activities:
 - 1. Journal Club
 - 2. Mortality and Morbidity Meetings
 - 3. Grand Rounds
 - 4. Hematopathology / Radiology combined Conferences

IX. STRUCTURE OF TRAINING PROGRAM

A. PROGRAM CONTENT

The Adult Hematology Fellowship Program provides a structure within which fellows can develop clinical competence in the overall field of Hematology. The content of the program is divided into clinical sciences, basic sciences and research. Exposure to clinical and laboratory research will be required.

1. Clinical Science

Clinical skills to be acquired include:

- a. Expanded competence in internal medicine.
- b. Competence in hematology.
- c. Familiarity with the natural history of hematologic disorders.
- d. Systematization of physical examination and special attention to clinical hematological manifestations.
- e. Implementation of efficient diagnostic evaluations.
- f. Rational expansion of differential diagnoses.
- g. Correct interpretation of laboratory tests and familiarity with coagulation laboratory methods.
- h. Acquaintance with recent developments in diagnostic imaging.
- i. Familiarity with the diagnosis, investigation and management of acute leukemia, myeloproliferative disorders, Hodgkin's and non-Hodgkin's lymphomas, thrombophilic and hemorrhagic disorders, hemoglobinopathies, and all benign hematological conditions.
- j. Performance of lumbar punctures for diagnostic and therapeutic purposes and evaluation of the cerebrospinal fluid (CSF).
- k. Blood film preparation and interpretation, performance of bone marrow aspiration and biopsy, interpretation of marrow smears and bone marrow biopsies.
- l. Familiarity with blood typing and banking, tissue typing, mixed lymphocyte culture and apheresis techniques.
- m. Knowledge and experience in stem cell transplantation.
- n. Familiarity with the use of chemotherapeutic agents, with knowledge of their short and long-term side effects, mechanism of action, administration route, contra-indications, etc.
- o. Familiarity with multi-modality therapy, including the utilization of radiotherapy and surgery.
- p. Familiarity with recommended symptomatic treatment, supportive therapy, psychological assistance and palliative care.
- q. Development of effective interaction with physicians in other specialties and sub-specialties and paramedical personnel.
- r. Ethics and law - legal and ethical aspects of the practice of hematology and compliance with hospital policies and rules governing the practice of medicine in the Kingdom.

2. Basic Science

The fellow is required to develop competence in disciplines, which include:

- a. Anatomic knowledge of the normal reticulo-endothelial system and hematopoietic organs.
- b. Physiology - Basic understanding of physiological aspects of Hematological disorders.

- c. Pharmacology, pharmacokinetics, and regulatory mechanisms of drug action, excretion and metabolism with the aim of preventing irreversible side-effects from treatment.
Acquaintance with the most commonly used chemical agents used to treat patients with benign and malignant hematological diseases.
- d. Immunology and microbiology. Trainee should understand the immunological mechanisms related to specific hematological and oncological diseases and stem cell transplantation. Trainee must acquire knowledge of the optimal utilization of immunosuppressive agents, and the treatment of infections such as bacterial, viral, fungal and protozoal, utilizing in a rational way the most effective single or combined therapeutic agents.
- e. Genetics - the mode of inheritance of various hematological and oncological diseases. Basic principles of genetics and genetic counseling.
- f. Statistics - understanding the proper analyses of clinical and laboratory data and stratification of patients according to risk categories in each disease entity, for the purpose of improving therapeutic designs and results of treatments.

3. Research

Fellows will be encouraged to participate in specific research projects that might have an impact on the quality of their future practice. They will be involved in the design, preparation of protocols, and the coordination of their research project. They should learn how to write abstracts for presentations at local, national, and international scientific meetings; and acquire skills in drafting manuscripts under the guidance of the hematology staff for submission and presentation to national and international journals. Fellows will be invited to participate on a regular basis in the academic activities within the Section and Department, and also in the activities related to other departments. Individualized clinical research projects tailored to the fellow's interests and career path with a specified mentor will be undertaken within the second year of the fellowship program.

4. Lectures and Conferences

Fellows will be required to attend all activities as deemed necessary by the participating center's departments/sections. They should attend at least one international annual meeting, preferably the annual ASH meeting.

5. Other Responsibilities

Fellows will assist in the supervision of medical residents during their rotations through Hematology. Fellows will be assigned on-call duties for night and weekend coverage in order to provide widened opportunities for clinical experience and graduated responsibility for patient care.

In summary, the fellows will be involved in the activities of the faculty members with varied interests and expertise. They will participate actively in research and the existing treatment protocols; critically analyze the literature and synthesize the information gained; attend regularly-scheduled semi-didactic sessions in which basic disciplines such as Laboratory Medicine, Pathology, Blood Banking, Radiology, Biochemistry, Immunology, Biostatistics, and others are discussed; and attend regular clinical sessions and ward rounds to actively discuss the management of both outpatient and inpatient issues.

B. OUTLINE OF CLINICAL AND ACADEMIC ACTIVITIES

Year 1

Fellows will rotate in the following areas:

6. Hematopathology: 2 months
7. Consultative Hematology: 2 months
8. Inpatient: 2 months
9. BMT: 1 month
10. Elective rotation: 1 month
11. Blood Bank: 1 month
12. Leave: 1 month
13. Pediatric Hematology Consultation/Clinics: 1 month
14. Palliative Care: 1 month

The purpose of the first fellowship year is to introduce the fellow to laboratory and clinical hematology. The fellow will rotate in the hematology laboratory in the first year of his fellowship in order to be able to read and familiarize himself with the interpretation of peripheral and bone marrow smears early in his/her training. During the clinical hematology rotations, the fellow will be in immediate contact with the patient and will learn how to deal with problems associated with patient care on a one to one basis in conjunction with the senior fellow/assistant supervised by the attending hematologist. This is to allow the fellows first hand exposure to blood disorders and introduce them to the special care and needs of patients in order to gain experience in tackling the various problems associated with these patients.

Year 2

Fellows will rotate in the following areas:

1. Inpatient: 3 months
2. BMT: 1 month
3. Consultative Hematology: 2 months
4. Elective rotation: 1 month
5. BMT: Clinics: 1 month
6. Coagulation: 1 month
7. Specialized Hematology Laboratory Services: 1 month
 - Molecular
 - Cytogenetics
 - Flow
 - Immunology/Cell Biology
8. Medical Oncology Lymphoma: 1 month
9. Leave: 1 month

Year 3 (Optional)

Fellows interested in extending their training for one more year in research or in certain area of interest in clinical hematology may do so after approval as per the regulations of SCHS and reference employer.

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C. DETAILS OF REPRESENTATIVE ROTATIONS

1. Hematological Pathology

1.1 Objective

The rotation is designed to train the fellow in all aspects of clinical laboratory cellular hematopathology, so that he/she becomes capable of critically evaluating numerical and quantitative data. Training includes demonstration and practice of manual as well as automated procedures; and blood, bone marrow and other body fluid cell morphology relevant to diagnostic hematology.

1.2 Duration

The duration of the rotation shall be eight weeks.

- Week 1: Blood sample collection, transport and storage.
Introduction to cell counting and hemoglobin measurement, including relevant QC procedures.
Peripheral blood smear preparation and staining.
Statistical considerations in cell counting.
- Week 2: Peripheral blood microscopic evaluation.
Differential white cell count.
- Week 3: Peripheral blood microscopy and WBC differential counting (continued).
Preparation and processing of bone marrow samples for diagnosis.
Bone marrow cell microscopy and cell differential counting.
- Week 4: Special Hematology: Hemolytic anemia studies.
Bone marrow cell microscopy and differential counting.
- Week 5/6: Bone marrow cell differential counting.
CSF cell counting and staining.
CSF cell morphology.
- Week 7: Peripheral blood microscopy reporting.
- Week 8: Bone marrow reporting.

2. Hemostasis Laboratory

2.1 Objective

To familiarize fellows with procedures for the laboratory evaluation and management of patients with hemorrhagic or thrombotic disorders.

2.2 Duration

The duration of the rotation shall be four weeks.

Week 1:

Learn about sample collection, preparation and storage in relation to hemostasis studies.

Review and learn other quality control procedures applicable in hemostasis testing.

Review and learn all screening tests for hemostatic function, to include PT, APTT, TT, fibrinogen, D-Dimers, RT and BT, as well as blood film review.

Learn how to determine the INR and its relation to the ISI.

Week 2:

Learn about the causes of prolongation of PT, APTT, TT, BT and learn how to resolve them at the bench level.

Learn about hemostatic factor assays to include the common ones, such as FVIII, FIX.

Learn the various methods of performing coagulation factor assays: clotting, chromogenic and immunologic.

Week 3:

Learn about specialized tests to include AT3, PC, PS, APCR, VWF, R:CoF and platelet aggregation assays.

Review ultrastructure of abnormal platelets and platelet glycoprotein assays.

Week 4:

Consult with floors, clinicians and laboratory technologists on lines of investigation of patients with bleeding and thrombotic disorders.

Discuss and report hemostasis results.

Reading:

KFSH&RC Coagulation Laboratory Manual.

Upon completing the first year, the fellow will have graduated responsibilities and will take up a more senior role. The fellow will have gained experience during the first year to enable him/her to make appropriate decisions and be able to handle patients in a more mature fashion.

3. Blood Transfusion Medicine

The Blood Transfusion Service (BTS) is supervised by a management team consisting of Medical Director, TM Consultants and two Technical Supervisors.

3.1 Objective

To prepare the fellow to use the BTS in a manner most effective for patient management, and to develop clinical and consultation skills in relation to patients requiring blood component therapy or elucidation of immunohematological problems.

3.2 Duration

The duration of the rotation shall be one month.

Week 1:

General overview of BTS

Donor services.

Donor sample processing.

Blood component preparation.

Crossmatch, component issue and investigation of immunohematologic problems.

Observe and learn activities in donor services, to include donor selection, interview and requirements for acceptance and criteria for rejection.

Observe and perform donor phlebotomy.

Perform donor counselling when significant disease markers are demonstrated.

Observe donation apheresis and therapeutic apheresis.

Learn about the indications for therapeutic apheresis.

Week 2:

Learn about donor specimen processing and relevant tests.

Learn the algorithms of testing.

Observe and learn about blood component preparation and storage.

Week 3:

Learn the processing of orders for blood transfusion.

Learn the basic principles of blood group serology.

Learn about principles of crossmatching, using various techniques.

Learn the indications for blood component transfusion.

Week 4:

Learn about resolving complex RBC antibody problems.

Learn about resolving complex problems of platelet transfusion and selection of appropriate platelets.

Learn the special needs of immunosuppressed patients.

Learn about processing bone marrow and stem peripheral cells for transplant.

Fellows are expected to attend, at least once every week, the administration/logistics meeting held every morning from 0815 for approximately 20 minutes.

During their four-week rotation, fellows are expected to attend a scheduled meeting of the Hospital Blood Transfusion Committee.

4. Adult Hematology Inpatient Service Rotation

Fellows will take more or less full responsibility as primary care physician for their assigned patients. During this rotation fellows will further expand their competence in Internal Medicine and Hematology. They will gain experience on the implementation of efficient diagnostic evaluation and rational expansion of differential diagnoses with correct interpretation of laboratory and diagnostic imaging tests used in patients with blood diseases. They will have hands-on experience and knowledge in the clinical manifestations, diagnostic modalities and management of acute leukemias, other bone marrow failure syndromes, as well as other hematologic problems.

Fellows will be familiarized with:

- a. The course of treatment of patients with acute leukemia, particularly the induction and consolidation phases.
- b. Mechanism of action, route of administration, contraindications and adverse effects of chemotherapy and management of side effects, including treatment of febrile neutropenia, mucositis and gastrointestinal adverse effects.
- c. Indications for blood component transfusion and its adverse effects as well as their prevention and treatment.
- d. Performance of bone marrow aspiration and biopsy, and requesting the appropriate tests that need to be done on the samples.
- e. Performance of lumbar punctures for diagnostic and therapeutic purposes and evaluation of the cerebrospinal fluid (CSF).
- f. Recognition and management of Hickman line and central venous catheter related complications.
- g. Multidisciplinary care, including effective interaction with and involvement of nursing staff, infectious diseases, pulmonologists, radiation oncologists, surgery, dentists, palliative care, social service, and other supportive services in the management of hematologic disorders.

5. Adult Bone Marrow Transplantation Rotation

Fellows will take more or less full responsibility as primary care physician for their assigned patients with various hematological disorders requiring hematopoietic stem cell transplant (HSCT), such as acute and chronic leukemia, aplastic anemia, multiple myeloma, Burkitt's lymphoma, and MDS. During this rotation fellows will be exposed to a new medical field. They will be able to follow the HSCT

patients from the beginning of their treatment course.

Objectives of this rotation include:

- a. Recognition of the underlying diseases in which allogenic and autologous HSCT are indicated.
- b. Knowledge of the different conditioning regimens including their indications, contraindications, and short- and long-term regimen related toxicities.
- c. Recognition of short- and long-term complications of HSCT and their management, including:
Prophylaxis of graft versus host disease (GVHD) using the various immune suppressive therapies, Manifestations and treatment of acute and chronic GVHD, Early diagnosis and treatment of venoocclusive disease of the Liver, Bacterial, viral and fungal infections in patients undergoing HSCT, Principles of transfusion and nutritional support in HSCT and Understanding the principles of immunobiology and immune reconstitution in HSCT.

6. Consultative Hematology Rotation

Fellows are expected to contribute to the teaching of residents rotating with them. Exposure to a wide variety of interesting consultative hematology cases will complement other rotations to give fellows a broad experience in both benign and malignant hematologic disorders. Cases expected to be the subject of consultation include undiagnosed cytopenias, hemoglobinopathies, hemorrhagic and thrombophilic states, transfusion related issues, anemias, platelet related disorders, hematologic manifestations of infections, e.g., HIV and infectious mononucleosis as well as perioperative management of patients with a variety of blood disorders, including sickle cell anemia, coagulopathies, and thrombocytopenia.

7. Elective Rotations

Include relevant rotations of interest such as radiation oncology, pediatric hematology, general hospitals hematology service or basic science laboratory.

Rotations can be spent in an institution within or outside Riyadh.

X. EVALUATION OF FELLOWS' COMPETENCE

Evaluation of knowledge and performance of fellows through an established committee using regular written records detailing the progress of each fellow.

- A. Elements of competence to be evaluated should include:
 - 1. Knowledge of history taking and ability to perform a comprehensive and accurate physical examination.
 - 2. Ability to arrive at an appropriate differential diagnosis.
 - 3. Ability to gain procedural skills appropriate to the level of training.
 - 4. Knowledge in adult hematology, basic and clinical, as needed.

- B. Methods of evaluation:
 - 1. Completion of standard formal evaluation form from each faculty member for each rotation.
 - 2. Written evaluation examination done at the end of the first year, and written and oral examination at the end of the second year.

XI. ON-CALLS

On-call fellows are expected to take around 5 on-calls (including a weekend) per month at the hospital which they rotate. These calls are not in hospital calls and they are expected to do the calls as per Section policies, however, seeing medical oncology patients is not mandatory.

XII. CLINICS

Fellows are expected to do one clinic per week when they are in clinical rotations and two clinics per week when they are in laboratory rotations.

XIII. PROMOTION

- A. By the end of the first and second year, the fellow should pass the examination evaluation conducted by the fellowship program supervisory committee. If unsuccessful, the fellow should repeat the training year.
- B. Upon successful completion of the two years training program and having passed the final examination in Internal Medicine, the fellow is considered eligible for the Saudi Specialty Certificate in Adult Hematology.
- C. End of Year and final examination will be performed as per the SCHS regulation (written and clinical examination)

XIV. LEAVES

Regulations governing leaves are as stipulated in the policy of the SCHS and are suggested by the Scientific Board for each fellow. However, fellows can have a grace period of 2 months (Nov-Dec, the preceding year) to request leaves to be on specific dates. Any unplanned leaves (e.g. emergency or maternity) have to be requested to the Chairman of Scientific Board and Members assigned to organize the rotation schedule. Fellows can have one month leave per year and maximum of 10 days Eid leaves. Professional and Educational leave is also allowed.

Conferences which are accepted for educational leave are:

1. American Society of Hematology (ASH)
2. International Society on Thrombosis and Haemostasis (ISTH)
3. The European Group for Blood and Marrow Transplantation (EBMT)
4. International Blood and Marrow Transplant Research (IBMTR)
5. European Hematology Association (EHA)
6. Hemophilic Congress
7. Local Hematology Conference
8. Poster or Oral Presentation in any related Conference
9. Lugano Lymphoma Conference

XV. CERTIFICATION

After passing the final examination conducted through the SCHS, the fellow will be awarded the “Saudi Specialty Certificate in Adult Hematology”.