GUIDELINES FOR COMPETENCY BASED POSTGRADUATE TRAINING PROGRAMME FOR DM IN CLINICAL IMMUNOLOGY AND RHEUMATOLOGY

Preamble

The goal of the training in DM in Clinical Immunology and Rheumatology is to have trained physicians competent to manage patients with immunological and rheumatic disease in hospital and community settings independently and serve as a teacher for training undergraduates/ postgraduates. In addition, she/he should be well versed to carry out research in clinical immunology and rheumatology. Thus, the major components of the curriculum shall cover theoretical knowledge, practical and clinical skills, attitude skills and training in research methodology and social care.

SUBJECT SPECIFIC OBJECTIVES

The objective of this training is to make the trainee learn the ability to make a working diagnosis in patients with rheumatological/immunological disease by analyzing the signs and symptoms related to these diseases and to make an investigative plan and reach the final diagnosis. In addition, the student should be able to make a management plan and execute it.

Rheumatic and immunological disease

1. Detailed history taking in a patient with rheumatic disease
2. Complete rheumatological examination
3. Rational use and interpretation of immunological tests
4. Diagnostic synovial fluid aspiration and examination
5. Tissue biopsies like salivary gland biopsy, sural nerve biopsy etc.
6. Interpretation of X-rays, US, MRI, bone densitometry and angiograms
7. Joint and soft-tissue injections and joint lavage
8. Proficiency in the use of disease modifying anti-rheumatic drugs, immunosuppressive agents and biologics
9. Use of IVIG and stem cell therapies
10. Advise on basic physiotherapy and rehabilitation

Training in other allied specialities:

In addition, the students will do a 4 weeks '*Elective posting*' in any of the following specialties:

2 weeks: Orthopedics & rehabilitation (to observe various surgical techniques in patients with joint diseases including joint replacement, rehabilitation)

2 weeks (in any of the following disciplines)**:**

Ophthalmology, Dermatology, Nephrology, Neurology, Hematology, Pulmonary medicine, Pediatric Immunology and Rheumatology

1. Laboratory skills

- Latex fixation test for rheumatoid factor and C-reactive protein
- Indirect immunofluorescence method for detection of Antinuclear antibodies on HEp-2 cell, ANCA on neutrophils, organ specific antibodies using rat liver, stomach and kidney sections, Crithidia lucillae assay for anti-dsDNA
- Nephelometry for the estimation of serum proteins like C3,C4, CRP, RF, Ferritin and immunoglobulins
- ELISA technique for the estimation of different autoantibodies like anti-dsDNA, PR3, MPO, CCP2, anti-phospholipid antibodies, cytokines etc
- Immunoblot assay for antibodies to specific antigens
- Serum electrophoresis and myeloma screening
- Synovial fluid examination to enumerate cell count
- Polarizing light microscopy for detection of crystals in synovial fluid
- DNA extraction and PCR for HLA B27
- HLA typing by micro-lympho-cytotoxicity and PCR (Observation only)
- Immunodeficiency tests including
    - NBT test for evaluation of phagocytic function (observation only)
    - Immunoglobulin estimation (IgG, IgM, IgA, IgE and IgG subclass)
    - Lymphocyte proliferation assay (Observation only)
    - Enumeration of lymphocyte subsets in peripheral blood using flowcytometry

2. **Teaching skills**:

   The post graduate student would acquire skills for teaching undergraduates and postgraduates the basics and clinical aspects of rheumatological and immunological disorders and expertise in running of clinical Immunology lab. In addition, they will be involved with the teaching of nursing staff in care of patients with these diseases and special care needed in an immuno-suppressed patient. In the laboratory, they will teach the technical staff.

3. **Research Methodology:**

   The trainee would be involved in two prospective studies that would result in 2 papers at the end of the 3 year period. Knowledge and skills that the trainee must acquire during the training period related to research work should include:

   a. Principles of research methodology
   b. Biostatistics
   c. Bioethics
   d. Observational studies
   e. How to plan a clinical trial according to GCP
   f. Laboratory research and GLP
   g. Critical appraisal of a scientific paper

4. **Group approach**: The post graduate student should be able to interact with specialists from other specialties like Dermatology, Pediatrics, General medicine, Gastroenterology, Nephrology, Orthopedics and Pulmonary Medicine.

SUBJECT SPECIFIC COMPETENCIES

At the end of the course, the student should be able to acquire the following competencies under the three domains:

A. Cognitive domain (Knowledge domain)

1. Diagnosis of immunological and rheumatological diseases

2. Interpret laboratory data in relation to clinical findings with reasonable accuracy
3. Should be able to teach the subject to undergraduates, postgraduates, nurses and paramedical staff including laboratory personnel.
4. To carry out research on Clinical Immunology and Rheumatology related topics.
5. Maintain good patient and Laboratory records
6. Plan a good study and carry out data collection, analysis, writing the manuscript and presenting at conferences.
7. Able to develop a team approach and work with different persons in the department
8. Continuous updating of knowledge in the field by attending CMEs, reading literature etc.

B. Affective domain **(Attitudes including Communication and Professionalism)**

The student:

1. Should be able to function as a part of a team, develop an attitude of cooperation with colleagues, and interact with the patient and the clinician or other colleagues to provide the best possible diagnosis or opinion.
2. Always adopt ethical principles and maintain proper etiquette in dealings with patients, relatives and other health personnel and to respect the rights of the patient including the right to information and second opinion.
3. Develop communication skills to word reports and professional opinion as well as to interact with patients, relatives, peers and paramedical staff, and for effective teaching.

C. Psychomotor domain **(The student should be able to perform independently the following procedures)**

Clinical Skills

1. Detailed history taking
2. Detailed Physical examination in a patient with rheumatic and immunological disease
3. Use of standardized outcome measure in clinical practice
4. Joint aspiration
5. Nail fold capillaroscopy

6. Synovial fluid analysis
7. Salivary gland biopsy
8. Skin Biopsy
9. Muscle Biopsy
10. Immunofluorescence assay for ANA/ANCA
11. ELISA for autoantibodies
12. Nephlometry for proteins
13. Musculoskeletal ultrasound at least of knee and wrist
14. Basics of Joint MRI
15. Physiotherapy

(The student should be able to perform under supervision the following procedures)

1. Kidney biopsy
2. Synovial biopsy
3. Lab test like flow-cytometry, PCR, Lymphocyte proliferation assay

Syllabus

Course contents:

I. Understanding of Basic Immunology

- Cells and organs of the immune system
- Innate immune system
- T and B cell development and subsets
- TCR, HLA, Ig genes
- Antigen presentation and processing
- Generation of adaptive immune response
- Cytokines, chemokines and other mediators
- Complement pathway
- Function of phagocytes, mast cells, basophils and eosinophils
- Immune response to microbes
- Infections in the immuno-compromised host
- Aging and immune system
- Vaccines

- Primary immunodeficiency disorders
- HIV/AIDS
- Types of hypersensitivity reactions
- Tolerance induction in Thymus and bone marrow
- Mechanisms leading to breakage of tolerance
- Transplantation immunology

II: Immunology of musculoskeletal diseases

- Role of innate immune system
- Role of adaptive immune system
- Role of different inflammatory mediators
- Role of Complement
- Immune biomarkers in rheumatic diseases
- Immune mechanisms in joint replacement (response to metals etc)

III. Basic Biology of rheumatic diseases

- Anatomy, physiology, biochemistry, pathology, microbiology and serology, and immune response in musculoskeletal health and disease states (but not limited to):
- Cell biology, Molecular biology, Molecular genetics, Genomics, Pharmacology-pharmacokinetics, Protein chemistry and proteomics and their relevance in rheumatic diseases
- Collagen and connective tissue in health and disease
- Articular cartilage and bone in health and disease
- Skeletal muscle in health and disease
- Biomechanics of articulation and their derangements in diseases.
- Neurophysiology of pain

IV: Understanding of basic pathophysiology, diagnosis and management of rheumatic diseases

- Systemic Lupus erythematosus
- Rheumatoid arthritis

- Juvenile idiopathic arthritis
- Rheumatic fever
- Spondyloarthropathies
- Systemic sclerosis
- Polymyositis/dermatomyositis
- Vasculitis
- Sjogren's disease
- Crystal arthritides
- Osteoarthritis
- Soft tissue rheumatism
- Auto-inflammatory syndromes
- Overlap syndromes
- Behcet's disease
- Sarcoidosis
- Amyloidosis
- Goodpasture's syndrome
- Systemic disease associated with rheumatic manifestations (metabolic, endocrine and malignancy)
- Infections of musculoskeletal system
- Organ specific autoimmune disease
- Others (Polmyalgiarheumatica, relapsing panniculitis, relapsing polychondritis, erythema nodosum)

V Basis of allergic disorders

- Basis of hypersensitivity reactions
- Pathogenesis of airway allergy
- Drug induced hypersensitivity
- Anaphylaxis and serum sickness
- Diagnosis of allergic disorders including skin test

- Treatment of allergic disorders especially immune mediate therapies (anti-cytokine therapies)

VI Basis and delivery of Immunological therapies

- Anti-inflammatory medications: steroids, NSAIDs, and antihistamines
- Immunomodulatory/immunosuppressive drugs
    a. Synthetic drugs
    b. Biological therapy
    c. IVIG therapy
- Cell based therapies
    d. Stem cell including MSCs
    e. Regulatory T cells
- Gene therapy
- Vaccines
- Plasmapheresis and experimental immunotherapies

VII. Immunodiagnostics

- Understanding of principles of all basic techniques utilized in immunology
- Evaluation of immune system function (immunodeficiency tests)
- Evaluation of autoantibodies
- HLA typing

TEACHING AND LEARNING METHODS

Postgraduate Training (Teaching methodology)

Formal Teaching

1. **Journal Club:** 1 hour duration - Paper presentation/discussion - once per week.
2. **Seminar:** One seminar every week of one hour duration
3. **Case presentation** in the ward. Trainees will present a clinical case for discussion before a faculty and discussion made pertaining to its management and decision to be recorded in case files.

4. **Case review:** Trainees are expected to work up one long case and present the same to a faculty member and discuss the management.
5. **Faculty journal club/lecture:** Once a week
6. **Pathology session:** Once in a month in which the pathological features of various problems are discussed.
7. **Radiology Class**: Once in a month in which the radiological features of various problems are discussed.
8. **Combined Round/Grand Round:** These exercises are to be done for the hospital once a week involving presentation of unusual or difficult cases. Presentation of cases in clinical combined / grand rounds and clinical series/research data for the benefit of all clinicians and other related disciplines once in week or fortnightly.
9. Clinical teaching: In OPD and ward rounds
10. Should have attended two national conferences/CMEs/Workshops during his tenure.
11. PG student shall be required to participate in the teaching and training program of undergraduate students and interns.
12. A post graduate student of a post graduate degree course in broad specialities/super specialities would be required to present one poster presentation, to read one paper at a national/state conference and to present one research paper which should be published/accepted for publication/sent for publication in an indexed journal during the period of his post graduate studies so as to make him eligible to appear at the postgraduate degree examination.
13. Log books shall be maintained regularly and should be checked and assessed periodically by the faculty members imparting the training.
14. Department should encourage e-learning activities.

Clinical postings: Recommended schedule for three years training

The post graduate student is required to work full time and participate in the patient care, academic and research activities as described below.

Clinical posting

Ward and OPD posting	30 months

Elective	01 month
Lab posting	05 months

During the training programme, patient safety is of paramount importance; therefore, skills are to be learnt initially on the models, later to be performed under supervision followed by performing independently. For this purpose, provision of skills laboratories in medical colleges is mandatory.

ASSESSMENT

FORMATIVE ASSESSMENT, during the training program

Formative assessment should be continual and should assess medical knowledge, patient care, procedural & academic skills, interpersonal skills, professionalism, self-directed learning and ability to practice in the system.

General Principles

Internal Assessment should be frequent, cover all domains of learning and used to provide feedback to improve learning; it should also cover professionalism and communication skills. The Internal Assessment should be conducted in theory and practical/clinical examination.

Quarterly assessment during the DM training should be based on:

1. Journal based / recent advances learning
2. Patient based /Laboratory or Skill based learning
3. Self-directed learning and teaching
4. Departmental and interdepartmental learning activity
5. External and Outreach Activities / CMEs

The student to be assessed periodically as per categories listed in postgraduate student appraisal form (Annexure I).

SUMMATIVE ASSESSMENT, namely, assessment at the end of training

The summative examination would be carried out as per the Rules given in POSTGRADUATE MEDICAL EDUCATION REGULATIONS, 2000.

The summative assessment examination shall include two heads:

A. Theory examination.

B. Practical, Clinical examination and Viva-voce.

Theory examination and Practical/Clinical, Viva-voce shall be separate heads of passing.

Theory examination shall comprise of four papers. Passing percentage shall be cumulatively 50% with minimum of 40% marks in each theory paper.

Practical /Clinical examination consisting of at least one long case, three short cases and viva-voce. Passing percentage shall be 50%.

Passing shall be separate for each head and failing shall be common, meaning thereby that clearance at theory and failure at practical / clinical shall amount to failure at Summative examination and vice versa.

1. Theory:

The examinations shall be organized on the basis of 'Grading'or 'Marking system' to evaluate and to certify post graduate student's level of knowledge, skill and competence at the end of the training. Obtaining a minimum of 50% marks in 'Theory' as well as 'Practical' separately shall be mandatory for passing examination as a whole.

There will be four theory papers as below:

Paper I: Basic Sciences related to the subject

Paper II: Practice of Clinical Immunology& Rheumatology

Paper III: Practice of Clinical Immunology& Rheumatology including therapeutics, allied specialities

Paper IV: Recent Advances in Clinical Immunology & Rheumatology

2. Clinical / Practical and Oral/viva voce Examination:

The final clinical examination should include: (modify as per requirement)

- **Cases pertaining to major systems**

The clinical examination will be based on structured and objective evaluation of history taking, examination skills, data interpretation and synthesis of the overall clinical case and its discussion. It will include at least 5 cases (2 long and 3 short cases).

- **Stations for clinical, procedural and communication skills**

  This will be an objective assessment based on lab data interpretation, radiology spots, histology slides, clinical photographs as well as lab skill assessment

- **Log Book Records and day-to-day observation during the training**

- **Oral/viva voce examination shall be comprehensive enough to test the post graduate student's overall knowledge of the subject**

Recommended Reading

Text Books (latest edition)

1. Hochberg's Rheumatology by Mosby Elsevier
2. Oxford Textbook of Rheumatology
3. Arthritis & Allied Conditions by Koopman& Moreland
4. Kelley's Textbook of Rheumatology
5. Resnick's Musculoskeletal Radiology
6. Bianchi's musculoskeletal ultrasound
7. Kuby Immunology
8. Steihm: Immunological diseases of infancy and childhood
9. Allergy and Immunology

Journals

3-5 International journals and 2 national journals (no names to be given)

Annexure I

Postgraduate Students Appraisal Form

Pre / Para /Clinical Disciplines

Name of the Department/Unit :

Name of the PG Student :

Period of Training : FROM……TO……

Sr. No.	PARTICULARS	Not Satisfactory	Satisfactory	More Than Satisfactory	Remarks
		1 2 3	4 5 6	7 8 9	
1.	Journal based / recent advances learning				
2.	Patient based /Laboratory or Skill based learning				
3.	Self-directed learning and teaching				
4.	Departmental and interdepartmental learning activity				
5.	External and Outreach Activities / CMEs				
6.	Thesis / Research work				
7.	Log Book Maintenance				

Publications Yes/ No

Remarks*_____

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***REMARKS: Any significant positive or negative attributes of a postgraduate student to be mentioned. For score less than 4 in any category, remediation must be suggested. Individual feedback to postgraduate student is strongly recommended.**

SIGNATURE OF ASSESSEE SIGNATURE OF CONSULTANT SIGNATURE OF HOD