SRI RAMACHANDRA MEDICAL CENTRE
Porur, Chennai - 600 116.

DEPARTMENT OF RADIOLOGY AND IMAGING SCIENCES

APPLICATION FORM 2019-20 Session

Affix your latest colour Passport size photograph here.

(**Note**: Please fill in each column in your own handwriting and put a tick mark (√) wherever necessary and strike off the portion not applicable. Incomplete application form will not be accepted).

1. CROSS SECTIONAL IMAGING (12 Months) ☐ 3. MSK IMAGING (6 Months) ☐

2.BREAST IMAGING & INTERVENTIONS (12 Months) ☐ 4. PET - CT (6 Months) ☐

(TICK ONE FELLOWSHIP ONLY)

1. a) Name of the candidate (AS PER PROVISIONAL / DEGREE CERTIFICATE IN BLOCK LETTERS)	:	Dr.
b) Expand the initials	:	
c) Complete address (with District, State & PIN CODE) to which communication is to be sent	:	
d) Phone No. with STD Code	:	Residence : Mobile : E-mail ID :
2. a) Father's Name Contact Details	: :	Mobile : E-mail ID :
b) Mother's Name Contact Details	: :	Mobile : E-mail ID :
c) Husband's Name Contact Details	: :	Mobile : E-mail ID :
3. Gender	:	Male ☐ Female ☐

4. a) Date of birth and age	:	DD/MM/YYYY	Age:
b) Place of birth, District and State	:		
5. Qualifying examination passed. (Self attested Photocopy of the Degree certificate and Statement of Marks of all examinations to be enclosed)	:	Name of PG Degree : University Regn. No : Month : Year :	
6. a) Name and address of the Medical College where qualified	:	UG …… …… PG …… ……	
b) Whether the College and course is ecognized by the Medical Council of India.	:	Recognised	Not Recognised
7. a) Whether the candidate has passed all the examinations in the first attempt	:	PG : Yes / No MBBS: Yes / No	
b) If no, how many attempts were made to pass	:	Course: MBBS / PG; No. of attempts:	
8. Details of Permanent Registration with the Medical Council incorporating PG qualification (Photocopy to be enclosed)	:	State : Regn. No.: Date :	

9. a) Papers Presented :

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b) Papers Published :

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(if necessary attach separate sheet)

DECLARATION BY THE CANDIDATE

I declare that the information furnished by me herein are true and correct. In case any information furnished herein is found to be incorrect or any document is found to be not genuine, I agree to forego my claim for admission and abide by the decision of the Sri Ramachandra Medical Centre authorities.

I further declare that I have read the prospectus furnished with the application form fully and understood the contents therein clearly and I hereby undertake to abide by the conditions prescribed therein. I undertake to abide by the Rules and Regulation of Sri Ramachandra Medical Centre.

Place: Signature of the Candidate

Date: Name:

Submit online Application (with attachments) to

The Medical Director, Sri Ramachandra Medical Centre, Porur, Chennai – 600 116.

medicaldirector@sriramachandra.edu.,in

with copies marked to

radiology@sriramachandra.edu.in

deanoffaculties@sriramachandra.edu.in

vicechancellor@sriramachandra.edu.in

registrar@sriramachandra.edu.in

Department of Radiology and Imaging Sciences

The Department of Radiology and Imaging Sciences, Sri Ramachandra Medical Center is pleased to announce the admission to Fellowship Programs in

1. Cross sectional Imaging.

2. Breast Imaging & Interventions

Aim of the Course:

Primary objectives:

- The fellow must acquire a working knowledge of the theoretical basis of the specialty, including its foundations in the basic medical sciences and research.
- Fellow must demonstrate the requisite knowledge, skills, and attitudes for effective patient-centered care and service to a diverse population.

Secondary objectives:

To be able to participate and contribute effectively to research projects initiated by experienced colleagues and/or to initiate research
- Increase the research output. The Fellow is encouraged to complete a project and at least one publication during the year.

Name(s) of the department offering the course:

Department of Radiology and Imaging Sciences, Sri Ramachandra Medical centre,porur, Chennai

Duration of the course: 12 months

Knowledge and skills required for admission to the Course and Entry criteria:

MD / DNB in Radiology.
Preference will be given to those who have worked in a teaching institute or tertiary centre.
Selection will be based on a multiple choice questions ,entrance exam, and interview.

Publications and Presentations:

* Complete at least **one original research project** as principal author with the purpose of preparation of a manuscript suitable for publication in a peer-reviewed journal
* Present academic work at local, national or international scientific meetings
* Preparation of a formal yearly lecture on a topic to be presented to the department and undergo formal assessment
* Teach diagnostic radiology residents as well as residents from other clinical services and medical students

Method of evaluation:

Formative assessment:
- The fellow will undergo initial fully supervised rotation in each modality and will undertake independent role after assessment from the concerned faculty. The level of supervision will be tapered according to the experience and confidence gained.
- Formal assessment should be done by faculty and fellowship supervisor every 3 monthly

Summative assessment (at the end of course):
- The Fellow is expected to maintain a log book of interesting cases reported and total number of cases during each modality rotation
- An exit examination will be held with one internal and at least one external examiner from within the country

A theory and practical exam will be conducted at the end of the course as an exit exam with one internal and one external examiner from India.

Structured format of the fellowship programme:

I. TITLE OF THE COURSE: FELLOWSHIP IN CROSS SECTIONAL IMAGING

The Fellow will have rotation in the following areas:

CT Scan	4 months
MRI Scan	4 months
PET CT	2 months
*Ultrasound Doppler	2 months (optional; if not done, extra month added into other areas)

SYLLABUS:

Cardiovascular and thoracic imaging:

SYLLABUS FOR THORACIC IMAGING

• Benign and Malignant Neoplasms of the Thorax
* Lung Neoplasms :
- Staging system update for lung cancer
- Standard treatment regimens
* Mediastinal tumors
* Esophageal cancer
* Lymphoma
* Thoracic sarcomas

Trachea
- Tracheal neoplasms
- Tracheal stenosis
- Benign tracheal diseases
- Tracheobronchomalacia

• Interstitial Lung Disease

• Emphysema

• Airways Disease
- Broncholithiasis
- Large airways disease
- Small airways disease

• Pleural Disease
- Pleural effusion
- Pleural infection
- Pleural Tumors/Masses
- Pneumothorax, Hemothorax, Chylothorax

• Mediastinal Disease including various tumors, infective, inflammatory pathologies

• Infections of the Lung, Mediastinum and Pleura

• Imaging in the Immunocompromised Patient

• Pulmonary Vascular Diseases

• Occupational Lung Disease

• Critical Care/Intensive Care Unit Imaging

• Drug and Radiation Induced Diseases of the Lung

• Immunologic and Miscellaneous Diseases, including pulmonary manifestations of connective tissue diseases and amyloidosis

• Congenital Diseases of the Thorax

• Thoracic Trauma

• Transplant Imaging, including BMT and its complations

• Post Operative Chest

• Thoracic Positron Emission Tomography (PET)
in imaging of malignancy, inflammatory diseases

• Thoracic Magnetic Resonance Imaging (MRI)
- Mediastinal mass evaluation
- Pleural evaluation: pleural mass, mesothelioma, diaphragm and chest wall invasion
- Hilar evaluation
- Chest wall evaluation

SYLLABUS FOR CARDIOVASCULAR IMAGING

Anatomy - Segmental Cardiac Anatomy, coronary artery segments, cardiac veins anatomy

Cardiac MRI
Cardiac MRI physics, MR safety aspects
Technique
Cardiomyopathies

Ischemic heart disease – including viability imaging
Congenital heart disease
Pulmonary artery and aorta – congenital and acquired conditions
Post surgical repair of congenital heart disease
Valvular heart disease
Cardiac tumour and tumour mimics
Pericardial diseases

Cardiac CT
Technique
Coronary artery calcium scoring – for risk stratification
Congenital heart disease
Pulmonary vein mapping – pre and post ablation, anomalous pulmonary venous drainage assessment
Thrombus evaluation
TAVI
Cardiac tumors
Pericardial disease
Valvular heart disease

Vascular Imaging
CT angiogram and MR angiogram

Head and Neck Radiology

Specific anatomic regions and related pathology

a. Temporal bone
Imaging features of congenital disorders leading to deafness (e.g. cochlear aplasia/hypoplasia, Mondini malformation, large endolymphatic sac anomaly (LESA) / large vestibular aqueduct syndrome (LVAS)
Disorders leading to secondary deafness including otosclerosis, Menière's disease, temporal bone inflammatory disease, and tumors of the cerebellopontine angle
Course of cranial nerves VI – XI in their different components
Imaging of tumors of the temporal bone and cerebello-pontine angle
Imaging of fractures of the temporal bone
Imaging and clinical features of cholesteatoma and other inflammatory lesions
Pathologies of the external auditory canal, including atresia and tumorous lesions
Imaging of pathologies of the middle ear
Various causes of vascular tinnitus with imaging features
b. Facial skeleton, skull base and cranial nerves
Lesions of the jugular foramen, including glomus tumour / paraganglioma, jugular bulb pseudolesions, jugular bulb diverticulum, dehiscent jugular bulb, jugular foramen schwannoma, jugular foramen meningioma and others
Diffuse diseases of the skull base, including fibrous dysplasia, plasmocytoma, Langerhans cell histiocytosis, chondosarcoma and metastases
Normal anatomy of cranial nerves and common pathologies
Traumatic lesions of the facial skeleton and skull base and to be familiar with complications and therapeutic consequences
Jaw lesions including cysts and cyst-like lesions

Infectious and inflammatory lesions of the mandible, maxilla and skull base, including osteomyelitis, osteoradionecrosis, bisphosphonate osteonecrosis

c. Orbit and visual pathways

Imaging of congenital lesions of the orbit, including coloboma

Imaging of typical tumours of the orbit including dermoid and epidermoid cysts, cavernous haemangioma, lymphangioma, rhabdomyosarcoma and retinoblastoma, meningioma, optic/chiasmal glioma, orbital haemangioma, and benign mixed tumour of the lacrimal gland, ocular melanoma, orbital lymphoma, higher grade optic glioma, adenoid cystic carcinoma of the lacrimal glands

Orbital manifestations of neurofibromatosis type I and other congenital diseases

Imaging and clinical features of infectious and inflammatory disorders of the orbits including optic neuritis, abscesses, sarcoidosis and idiopathic inflammatory disorders

d. Nose, nasopharynx and paranasal sinuses

Imaging of congenital lesions of the paranasal sinuses including choanal atresia and frontoethmoidal encephalocele

Normal variants of the nose and paranasal sinuses

Imaging of infectious and inflammatory disorders and complications of the nose and paranasal sinuses including acute and chronic rhinosinusitis, fungal sinusitis, sinonasal polyposis, sinonasal mucocele and sinonasal Wegener granulomatosis

Imaging of benign and malignant neoplasms of the nose and paranasal sinuses including inverted papilloma, juvenile angiofibroma, sinonasal hemangioma, sinonasal osteoma, sinonasal fibrous dysplasia, sinonasal squamous cell carcinoma, sinonasal adenocarcinoma, sinonasal melanoma, esthesioneuroblastoma, sinonasal lymphoma and others

Imaging features of the nose and paranasal sinuses after surgery

Imaging features and clinical features of the nasopharyngeal pathologies including inflammatory and infectious lesions and neoplasms

e. Masticator space, parotid space and carotid space

Anatomical delineations of the masticator space, parotid space and carotid space

Imaging features of inflammatory conditions and benign and malignant neoplasms of the masticator space including peripheral nerve sheath tumors

Imaging features of infectious and inflammatory lesions of the parotid space including parotitis, Sjogren syndrome and benign lymphoepithelial lesions in patients with HIV

Imaging features and clinical features of benign and malignant neoplasms of the parotid space including Warthin tumor, benign mixed tumor, adenoid cystic carcinoma, mucoepidermoid carcinoma, lymphoma, lymph node metastases and malignant tumors of the skin

Imaging and clinical features of vascular lesions of the carotid space including ectatic carotid arteries, carotid artery pseudoaneurysm, carotid artery dissection, and jugular venous thrombosis

Imaging features of neoplasms of the carotid space including carotid body paraganglioma, glomus vagale paraganglioma, schwannoma, and neurofibroma

f. Lymph nodes of the head and neck region:

Nomenclature of the lymph nodes and nodal regions

Imaging features of infectious and inflammatory disorders of the lymph nodes including reactive lymph node enlargement, suppurative lymph nodes, Kimura disease, Castleman disease and others
Imaging features and clinical features of neoplastic disorders of the lymph nodes, including lymphoma (Hodgkin and Non-Hodgkin) and nodal metastases

g. Oral cavity, oropharynx and retropharyngeal space

Imaging features and clinical features of inflammatory and infectious lesions of the oral cavity and oropharynx, including abscesses, retention cysts, sialoceles, sialadenitis and ranula
Imaging features and clinical features of benign and malignant neoplasms of the oral cavity and oropharynx, including benign mixed tumors, squamous cell carcinoma, malignant tumors of the minor salivary glands
Imaging features of retropharyngeal abscesses and to know their patterns of spread as well as possible complications

h. Hypopharynx, larynx and cervical esophagus

Imaging features and clinical features of neoplasms of the hypopharynx and larynx, including squamous cell carcinoma of the hypopharynx, of the supraglottic, glottic and subglottic regions, chondrosarcoma and other malignant tumors of the larynx
Imaging features of vocal cord paralysis
Imaging features of tracheal stenoses
Imaging features of laryngoceles and pharyngoceles, webs and strictures
Imaging features of cervical esophageal carcinoma

i. Thyroid and parathyroid glands

Imaging of thyroiditis, multinodular goiter, benign and malignant neoplasms of the thyroid and parathyroid glands, including thyroid and parathyroid adenomas, different types of thyroid carcinoma, and thyroid lymphoma
Tc-99m-scintigraphy and PET/CT in various diseases of the thyroid gland

j. Congenital and trans-spatial lesions

Embryology of the head and neck region
Imaging features of branchial cleft cysts, thyroglossal duct cysts, thymus cysts, vascular lesions including AVM, venous and lymphatic malformations of the head and neck region, neurocutaneous syndromes, including neurofibromatosis type I and II in the head and neck region
Congenital malformations of the skull base and face and in particular of the inner ear and middle ear

Musculoskeletal Radiology

Knowledge and skills to be acquired by the students on completion of the Course:
The fellow will be equipped to independently
-report CT and MRI of bone and joints
-perform and interpret musculoskeletal ultrasound
-perform USG guided joint injections, biopsies, FNAC

2. Detailed syllabus, Regulation, Guidelines and Curriculum mentioning the purpose and the knowledge aimed to be acquired for each of the theory papers and practical sessions:

1. **Basics of musculoskeletal cross sectional imaging**

Available cross-sectional imaging modalities and appropriate indications
Anatomy of musculoskeletal tissues

2. **Imaging of pathology of joints**

SHOULDER –
Shoulder impingement
Tendon tears, degeneration and dislocation
Shoulder impingement
Rotator interval abnormalities
Shoulder instability
SLAP
Arthritis
Post operative shoulder
Nerve abnormalities

ELBOW –
Fractures
Ligament injuries
Muscle and tendon injuries
Joint pathology
Nerve related pathologies

WRIST & HAND
Ligament & TFCC injury
Tendon Pathology
Carpal tunnel and nerve related pathology
Osseous abnormalities & Instability
Impaction syndromes
Occult Fractures.
Physeal Injuries.
Osteonecrosis
Congenital Osseous Lesions.
Arthritis

HIP –
Fractures

Vascular Abnormalities of Bone
Osteonecrosis (Avascular Necrosis)
Idiopathic Transient Osteoporosis of the Hip (Transient Painful Bone Marrow Edema)
Avulsion injuries
Muscle, tendon & ligament pathologies
Labrador injuries
Impingement syndromes
Sciatic Nerve pathologies

KNEE –
Fractures
Meniscal & Ligament pathologies
Posteromedial & Posterolateral corner injuries
Extensor mechanism
Avulsion injuries
Infection / Inflammatory diseases
Vascular pathologies
Post op knee

ANKLE & FOOT–
Fractures
Ligament & Tendon injuries
Impingement syndromes
Sinus Tarsi Syndrome
Plantar Fasciitis
Nerve related injuries & pathologies
Tarsal Coalition
Osteonecrosis of the foot and ankle
Accessory Muscles.
Pressure Lesions
Diabetic Foot
Foreign Bodies

TEMPOROMANDIBULAR JOINT
Normal anatomy
Internal derangement

3. Imaging of focal lesions of bone and soft tissue

Principles of staging
- Grade, Local Extent & Metastases

Bone & Soft Tissue Tumors

Post treatment evaluation of tumors

4. **Marrow pathology imaging**

Normal marrow anatomy and function
Marrow pathology
Post chemotherapy & radiation marrow changes
Miscellaneous Marrow Diseases

5. **Spine imaging**

Degenerative disease
Spinal canal stenosis
Post-operative imaging
Infections
Neoplasms
Trauma
Vascular pathologies

6. **Imaging of peripheral nerves and plexus**

Principles of nerve imaging
Normal imaging anatomy
Pathologies of brachial plexus
Pathologies of lumbosacral plexus
Pathologies of peripheral nerves of upper and lower limb

7. **Arthritis imaging and cartilage imaging**

Cartilage
Rheumatoid Arthritis
Ankylosing Spondylitis
Gout
Calcium Pyrophosphate Dihydrate Deposition
Hemophilia
Amyloid
Tumors
Synovial Chondromatosis
Pigmented Villonodular Synovitis

8. **Imaging in trauma**

Acute Osseous Trauma

Impaction injuries
Radiographically Occult Fracture
Avulsion injuries
Insufficiency fractures
Fatigue fractures
Post-traumatic Osteolysis
Post op imaging
Trauma to immature skeleton
Epiphysiolysis, Post-traumatic Physeal Bridges
Avulsion Fractures

9. **Whole body MRI**

Indications
Protocol
Technique
Myositis
Multifocal osteomyelitis

Recommended list of Text books & Journals:

Text books:
- Bone and Joint Imaging: Donald L. Resnick, Mark J. Kransdorf
- MRI in orthopaedics & sports medicine - Stoller
- Yochum & Rowe's essentials of skeletal radiology
- Musculoskeletal imaging : The Requisites: B. J. Manaster, David A. May, and David g. Disler
- Ultrasound of the musculoskeletal system - Carlo Martinoli and Stefano Bianchi
- Fundamentals of Musculoskeletal Ultrasound - Jon Jacobson
- Ultrasound guided musculoskeletal injections - Gina M. Allen, David J. Wilson

Journals:
Skeletal radiology
Radiology & Radiographics journal
American journal of radiology

The Fellow is expected to take part in daily teaching sessions within the department, and make regular presentations.
The Fellow will be taking part in the different Inter-departmental meetings with departments of orthopedics, rheumatology, spine imaging including others

Neuro Radiology

Syllabus, books, skills (minimum training/competency requirements).

Books:

Anne Osborn "Brain- Imaging, Pathology and Anatomy"
Scott Atlas – Magnetic Resonance Imaging of the Brain and Spine
James Barkovich: Paediatric Neuroimaging 2nd Edition

Journals:

American Journal of Neuroradiology
European Journal of Spine
Radiology
Radiographics

Syllabus:

1. Anatomy
2. Trauma
3. Non traumatic haemorrhage
4. Vascular Lesions – Infarcts, malformations
5. Infections
6. Inflammatory conditions
7. Demyelination
8. Neoplasms – Area specific
9. Cystic lesions
10. Other tumors
11. Toxic Encephalopathy
12. Metabolic Encephalopathy
13. Degenerative disorders
14. CSF disorders
15. Congenital malformations of skull, brain
16. Recent advances

Spinal Cord

1. Anatomy and vascular anatomy
2. Tumors
3. Infections
4. Inflammation, Demyelination
5. Vascular lesions and malformations
6. Vertebral and Disc infections, tumors of the bone
7. Miscellaneous

GI & GU

- **Gastrointestinal Imaging**
  - Gastrointestinal Tract
    - ESOPHAGUS
      - Normal anatomy
      - Imaging Techniques
      - Pathologic Conditions
      - Trauma
    - STOMACH
      - Normal Anatomy
      - CT Gastrography
      - Pathologic Conditions
    - DUODENUM
    - SMALL INTESTINE
      - Normal Anatomy
      - Imaging Techniques
      - Pathologic Conditions
      - Trauma
      - Hernias
      - Intussusception
      - Small Bowel Obstruction
      - Primary Causes of Obstruction
      - Mesenteric Ischemia
      - Vasculitis
      - Drug – Induced Enteropathy
      - Radiation Enteritis
      - Obscure Gastrointestinal bleeding
    - COLON & RECTUM
      - Normal Anatomy & Imaging Techniques
      - Pathologic Conditions

  - Biliary Tract & Gallbladder
    - BILIARY TRACT
      - Normal anatomy & Variants
      - Congenital Biliary Anomalies
      - Pathologic Conditions

        - GALLBLADDER
            - Normal Anatomy
            - Congenital Variants & Anomalies
            - Pathologic Conditions
    - Liver: Normal Anatomy, Imaging Techniques & Diffuse Diseases
        - Normal Anatomy & Variants
        - Hepatic Imaging Techniques
        - Diffuse Parenchymal Diseases of the Liver
    - Liver: Focal Hepatic Mass Lesions
        - Types of Lesions
        - Imaging Techniques
    - Liver Transplantation
        - History
        - Indications for Liver Transplantation
        - Contraindications to Liver Transplantation
        - Evaluation of the Donor
        - Surgical Techniques
        - Posttransplant Complications
        - Conclusion
    - Pancreas
        - Normal Anatomy
        - Embryology & Developmental Anomalies & Variants
        - Imaging Techniques
        - Pathologic conditions
        - Trauma
        - Pancreatic Transplantation
    - Peritoneum
        - Embryology
        - Normal Peritoneal Anatomy
        - Peritoneal Physiology
        - Pathologic Conditions
        - PET Imaging of Peritoneal Processes
    - Mesentery
        - Embryology
        - Normal Anatomy
        - Imaging Findings in Disease
        - Primary Mesenteric Diseases
        - Secondary Mesenteric Disease

- Spleen
  - Normal Anatomy & Variants
  - Imaging Techniques
  - Pathologic Conditions
  - Trauma
  - Splenic Infarct
  - Miscellaneous Disorders of the Spleen

- **Genitourinary Imaging**
  - Contrast Nephropathy & Its Prevention
    - Risk Factors for Contrast-Induced Nephropathy
    - Incidence
    - Pathophysiology
    - Reducing the Risk of Contrast-Induced Nephropathy
    - Summary
  - Adrenal Glands
    - Normal Development & Anatomy
    - Adrenal Physiology
    - Imaging Techniques
    - Pathologic Conditions
    - Percutaneous Adrenal Biopsy
  - Kidney
    - Normal Computed Tomographic Anatomy
    - Imaging Techniques
    - Pathologic Conditions
    - Renal Trauma
    - Renal Blood Flow Disorders
    - Urinary Tract Stones
    - Retroperitoneal Fibrosis
    - Urinoma
    - Renal Transplants
  - Retroperitoneum
    - Normal Anatomy
    - CT & MRI of the Retroperitoneum
    - Pathologic Conditions
    - Retroperitoneal Fluid Collections
    - Retroperitoneal & Pelvic Lymphadenopathy
    - Other Selected Retroperitoneal Neoplasms

        - Miscellaneous Nonneoplastic Retroperitoneal Conditions
    - Male Pelvis
        - Normal Anatomy
        - Imaging Techniques
        - Pathologic Conditions
        - Trauma
    - Female Pelvis
        - Normal Anatomy
        - Developmental & Congenital Abnormalities
        - Imaging Considerations
        - Pathologic Conditions
        - Inflammatory Conditions
        - Vascular Diseases

Recommended list of text books / journals:
Multiple (as per speciality) variable, including internet sources... continually evolving.

FORMATIVE ASSESSMENT OF THE STUDENT :

Patient care
Medical knowledge
Professionalism
Practice – based learning
System- based practice
Ability to work as health care team
Medical record keeping/Documentation
Leadership qualities
Interpersonal and communication skills
Participation in department programme
Logbook
Achievements during the period under review

SUMMATIVE ASSESSMENT OF THE STUDENT :

Regular assessment by faculty
Image quizzes
preparing teaching material
Contribution to departmental film museum

CERTIFICATION :

CME ATTENDED -

CONFERENCES ATTENDED –

GUEST LECTURES ATTENDED -

TAMILNADU MEDICAL COUNCIL CREDIT HOURS –
(OBTAINED DURING THE ABOVE PROGRAMME)

TAMILNADU Dr. M.G.R. MEDICAL UNIVERSITY UNIVERSITY CREDIT HOURS –
(OBTAINED DURING THE ABOVE PROGRAMME)

II . TITLE OF THE COURSE:

FELLOWSHIP IN BREAST IMAGING & INTERVENTIONS

Breast cancer has become the most common cancer and one of the leading causes of death in India. Breast Imaging is an emerging area of Radiology that places emphasis on the unique health needs of women and provides an increased focus on public awareness and screening programs. It is a subspecialty involved in the diagnosis of diseases including breast disorders like nipple discharge, mastitis, breast lumps, as well as various benign and malignant breast pathologies. Apart from imaging various diseases, the radiologist is also involved in diagnostic and therapeutic interventional procedures like image guided FNAC's, biopsies, aspirations, etc.

Instructional Objectives

The fellowship course in breast imaging division of Radiology is targeted to develop breast imaging experts with abilities to perform full range of diagnostic imaging and interventional procedures in this field. On completion of the course, the candidate should be capable of delivering the highest quality of patient care by making an early and accurate diagnosis and guiding subsequent management. He should be clinically competent, and be able to pursue both clinical and experimental research in this field.

Structured format of the fellowship programme:

Breast Imaging & Interventions

1. Imaging Considerations in normal & pathological conditions using following
    - Ultrasound
    - X-ray mammogram (CR& DR)
    - Tomosynthesis
    - MR Mammogram

2. Image guided breast interventions
    - Fine Needle Aspiration
    - Biopsy (USG , Sterotactic)

- Needle wire localization
- Clip Placement

Syllabus

Specific Objectives

By the end of one year the fellow is expected to:

1. Perform independently and act as a competent breast imaging consultant to clinicians in capable of performing ultrasound, CT, MRI and various interventional procedures.
2. Perform and interpret Mammography for various indications including familiarity with equipment, technical factors and various positioning techniques.
3. Perform and interpret ultrasound examinations of the breast
4. Supervise acquisition of MRI examination and A) Assess for absolute and relative contraindications, (B) Protocol each case appropriately, (C) Supervise technical adequacy and completeness of cases at the technologist's request.
5. Interpret MRI examination of breast
6. Perform interventions including Stereotactic and ultrasound guided core biopsy and fine-needle aspiration , cyst aspiration , Ultrasound/mammography guided hook-wire localization, Ductography, etc.
7. Assess and treat patients having an anaphylactic reaction or an adverse side effect from any supervised procedure.
8. Teach residents and medical students as part of their daily assigned duties.
9. Perform and interpret examinations performed on-call.
10. Prepare and present women imaging rounds/tumour board meetings.

By means of clinical experience, lectures, conferences, journal and online references, the fellow should become familiar with and understand the following topics in breast disease:

(I) Breast anatomy, physiology, and pathology

1. Breast development
2. Normal breast anatomy and histology; alteration with age, pregnancy, menstrual cycle, and hormonal effects; male breast anatomy
3. Regional lymph node anatomy and drainage patterns

4. Pathologic appearance and clinical significance of: Benign breast processes including fibrocystic changes, usual duct hyperplasia, columnar cell lesions without atypia, fibroadenomas, and fat necrosis as well as various high risk malignant pathologies like atypical ductal hyperplasia, flat epithelial atypia, lobular neoplasia (atypical lobular hyperplasia and lobular carcinoma in situ), papillary lesions, radial scar/complex sclerosing lesions, and other high risk lesions; ductal carcinoma in situ, including its histologic subtypes; invasive ductal carcinoma; invasive lobular carcinoma; multifocal and multicentric carcinoma; less commonly encountered cancers, such as Paget's disease and inflammatory carcinoma; other malignancies involving the breast, including phyllodes tumor, lymphoma,leukemia, sarcomas, metaplastic carcinomas, and metastases
5. Radiologic-pathologic considerations To have sound ability in the in recognition of the above in all imaging modalities as stated earlier.

(II) Screening mammography

1. Relative screening efficacy of clinical breast examination, breast self-examination, and mammography screening, interval cancer rate, survival rates
2. Benefit-risk assessment, including radiation risk and false positives
3. Cost-effectiveness
4. Controversies regarding screening women aged 40-49 years; younger than age 40
5. Interpretation of screening mammography examinations
6. ACR Practice Guideline for the Performance of Screening Mammography

(III) Mammographic interpretation

1. Techniques and indications for and value of supplementary mammographic views
2. Demonstrate proficiency in:
    - Recognizing normal mammographic anatomy

- Recognizing the mammographic features of characteristically benign and suspicious
- Breast calcifications
- Recognizing the mammographic features of characteristically benign and suspicious breast masses
- Recognizing the mammographic appearance of indirect signs of malignancy
- Familiarity with BI-RADS descriptors
- Recognizing the mammographic features of the surgically altered breast
- Recognizing the mammographic features of probably benign (BI-RADS category 3) lesions
- Correlation of palpable with imaging findings
- Evaluation and management of a palpable mass (or other focal symptoms) when there are no associated mammographic findings

(IV) Breast ultrasound

1. Equipment and physical principles, including the role of harmonic ,Elastography principle and color Doppler imaging
2. Techniques, including assessment of image quality, image labeling
3. Indications
4. Demonstrate proficiency in:
    - Scanning the breast
    - Recognizing normal sonographic anatomy
    - Recognizing features of simple cysts, complicated cysts and complex cystic and solid masses
    - Recognizing differential features of benign and malignant solid masses
    - Familiarity with breast US BI-RADS descriptors
    - Correlation with findings at mammography and clinical breast examination
    - Evaluation and management of young women with symptoms
    - Assessment of extent of disease for known malignancy or highly suspicious lesions, including evaluation of the axilla

- Evaluation and management of the patient with mastitis/abscess symptoms
- Limitations in the detection and assessment of microcalcifications

(V) Breast MRI

1. Equipment and physical principles
2. Techniques
3. Indications
4. MRI breast sequences & its significance
5. Strengths and limitations of kinetic and morphologic analysis
6. Demonstrate proficiency in:
    - Recognizing normal MRI anatomy
    - Categorization of enhancing lesions as mass, nonmass, or focus (foci)
    - Recognizing differential features of benign and malignant masses
    - Recognizing differential features of benign and malignant non-mass enhancement
    - Evaluation of background parenchymal enhancement and tissue composition
    - Familiarity with breast MRI BI-RADS descriptors
    - Evaluating implant integrity and pulse sequences specific to this evaluation
    - Correlation with findings at mammography, ultrasound, and clinical breast examination
    - Evaluation of need for and approach to MRI guided biopsy
    - Post MR biopsy evaluation, pathology correlation, and follow-up
    - Limitations in the detection and assessment of lesions presenting as microcalcifications

(VI) Interventional procedures

1. Principles, indications and contraindications, equipment, preparation, technique, advantages, disadvantages and accuracy.
2. Demonstrate proficiency in :

- Needle-wire localization guided by mammography and ultrasound
- Core needle biopsy by stereotactic and ultrasound, guidance
- Fine needle aspiration with ultrasound guidance
- Cyst aspiration with ultrasound guidance
- Seroma and other fluid-collection aspirations with ultrasound guidance

3. Post - procedure follow-up imaging

(VII) Therapeutic and management considerations

1. Basic understanding of breast cancer treatment options
2. Understand the key role of each member of the multidisciplinary team needed to care for a breast cancer patient, including the radiation oncologist, surgeon, medical oncologist, pathologist, radiologist, and the patient
3. Role of breast imaging in planning and monitoring of breast cancer treatment and post treatment follow-up The expected case load a fellow is expected to cover in the time period is following (which will be maintained by a log-book):
   2500 Mammograms
   1000 Breast ultrasounds
   150 Interventional procedures
   150 MRI

Teaching: As a fellow, the candidate will undertake postgraduate teaching assignments of the department, both in form of didactic lectures and practical demonstrations. Obligatory responsibilities include regular journal reviews and case presentations to peer group. This would include conducting clinico-radiological conferences in collaboration with other departments. Apart from routine postings, the fellow will also be on call duty as per existing policies of the department.

Recommended Text Books, Journals, Websites

Apart from standard textbooks and journals for Radiology, the candidate is suggested to refer to the following body imaging textbooks, journals and websites for updating knowledge and skills.

Text Books

1. Diagnostic ultrasound, rumack
2. Breast ultrasound, a.Thomas stavros
3. Breast imaging, Daniel.b.kopens
4. Vascular and interventional radiology, Karim valji
5. Teaching atlas of mammography , Laszlo tabar
6. Diagnosis of diseases of the breast, bassett, lawrence w
7. Breast imaging companion, cardenosa, gilda
8. Breast imaging: the requisites, ikeda, debra m
9. Breast imaging: case review, conant, emilyf

Journals

1. The breast journal
2. American journal of roentgenology
3. Journal of vascular and interventional radiology
4. Radiology
5. American journal of obstetrics and gynaecology
6. American institute of ultrasound in medicine
7. Seminars in us , ct and mri.
8. British journal of Radiology

FORMATIVE ASSESSMENT OF THE STUDENT :

Patient care
Medical knowledge
Professionalism
Practice – based learning
System- based practice
Ability to work as health care team
Medical record keeping/Documentation
Leadership qualities
Interpersonal and communication skills
Participation in department programme
Logbook
Achievements during the period under review

SUMMATIVE ASSESSMENT OF THE STUDENT :

Regular assessment by faculty
Image quizzes
preparing teaching material
Contribution to departmental film museum

CERTIFICATION :

CME ATTENDED -

CONFERENCES ATTENDED –

GUEST LECTURES ATTENDED -

TAMILNADU MEDICAL COUNCIL CREDIT HOURS –
(OBTAINED DURING THE ABOVE PROGRAMME)

TAMILNADU Dr. M.G.R. MEDICAL UNIVERSITY UNIVERSITY CREDIT HOURS –
(OBTAINED DURING THE ABOVE PROGRAMME)