Curriculum for

Post-Doctoral Fellowship Course

In

BREAST IMAGING

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**SRI AUROBINDO UNIVERSITY**

SAIMS HOSPITAL CAMPUS, Indore Ujjain, State Highway, Bhawrasla, Indore, Madhya Pradesh 453555

# FELLOWSHIP IN BREAST IMAGING

**SYLLABUS**

**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

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.

1. Interpret MRI examination of breast
2. Perform interventions including Stereotactic and ultrasound guided core biopsy and fine-needle aspiration , cyst aspiration , Ultrasound/mammography guided hook-wire localization, Ductography, etc.
3. Assess and treat patients having an anaphylactic reaction or an adverse side effect from any supervised procedure.
4. Teach residents and medical students as part of their daily assigned duties.
5. Perform and interpret examinations performed on-call.
6. 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:

1. **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

* 1. Radiologic-pathologic considerations To have sound ability in the in recognition of the above in all imaging modalities as stated earlier.

1. **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
2. **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
3. **Breast ultrasound**
   1. Equipment and physical principles, including the role of harmonic

,Elastography principle and color Doppler imaging

* 1. Techniques, including assessment of image quality, image labeling
  2. Indications
  3. 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

1. **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
2. **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
3. **Therapeutic and management considerations**
4. Basic understanding of breast cancer treatment options
5. 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
6. 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):

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.

**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

**TRAINING SCHEDULE:**

State-of-the-art equipment includes 64-slice CT, 1.5-T MRI, PET/CT, Gamma Imaging, digital radiography, US, Digital Mammography, Perfusion MRI , MR Spectroscopy.

#### The Fellow will have rotation in the following areas:

MAMMOGRAPHY 3 months

Ultrasound Doppler 3 months (1 month compulsory & 1 month optional; if not done, extra month added into other areas)

CT Scan 2 months

MRI Scan 3 months

PET CT 1 months

* 64 Slice CT : Three sessions per week
* 1.5T MRI : three sessions per week
* Ultrasound : two session per week
* Mammography : Three session per week
* Nuclear Medicine (PET CT & GammaCT) : one sessions per week
* Flexible session for simple imaging-guided interventional procedures
* General cross section radiology (reporting / procedures) : three session per week
* Study / meetings : one session per week
* Research / audit : one session per week