المجلس العربي للاختصاصات الصحية

The Arab Board of Health Specializations

دليل برنامج التصوير الطبي للآفات الورمية

المجلس العلمي لاختصاص الأشعة والتصوير الطبي

Oncology Imaging Program Guide

The Scientific Council of Radiology and Medical Imaging

December 2021

Introduction:

This curriculum outlines the training requirements for specialist fellowship training in oncologic imaging.

The subspecialty of oncologic imaging can be defined as the study of the application, performance and interpretation of all imaging techniques/procedures relevant to the investigation and management of oncologic diseases in adults and children.

The goals of subspecialty training in oncologic imaging are to provide the trainee with the opportunity to develop diagnostic, procedural, and technical skills essential to the performance of diagnostic imaging in that subspecialty, including:

- To gain knowledge in the technical aspects of imaging.
- To gain clinical experience in interpretation of images.
- To achieve competence allowing independent performance of this subspecialty.

The goals are achieved through:

- knowledge of the relevant anatomical, pathophysiological and clinical aspects of oncological diseases
- an in-depth understanding of the major imaging techniques.
- an in-depth knowledge of the indications, contra-indications, complications and limitations of surgical, medical and radiological interventions and procedures
- clinical knowledge relevant to medical and surgical management of oncological diseases such that the trainee may confidently discuss the appropriate imaging strategy for the clinical problem with the referring clinician
- detailed knowledge of current developments in the oncology and oncological imaging.
- an understanding of the value of a multidisciplinary approach to diagnosis and management in oncology.

- direct practical exposure with appropriate graded supervision in all forms of oncological imaging and intervention .

- competence in the selection, performance and reporting of oncological imaging investigations and image-guided intervention

Requirements of Institute of Training & Required Personnel:
The training centre/s should be approved for training by the Arab Board
A " Fellowship Director" must be identified/appointed by the training institution. S/he must be a consultant radiologist with appropriate expertise in Oncological imaging and with appropriate academic background

Facilities:

- The training department must provide access to appropriate computed tomography (CT), magnetic resonance imaging (MRI), ultrasound (US), radionuclide imaging and fluoroscopy. Centres should also provide access to relevant specialised radionuclide imaging, eg positron emission tomography (PET). Details are in appendix A

- The trainee undergoing subspecialty training should ideally be actively involved in oncological imaging within an educational environment with graduated supervision

- Clinical knowledge will be acquired by a variety of means, including multidisciplinary meetings. The following inter-relationships & clinical services are important:

  • Medical oncologists (adult and pediatric) preferentially sub specialized.
  • Radiation Oncologists.
  • Subspecialized surgeons preferentially in oncologic surgery (general surgeons, hepatobiliary surgeons, GI surgeons, cardiothoracic surgeons, breast surgeons, urologists, orthopedics gynecologists and ENT surgeons).

- The trainee should participate in relevant clinical audit, management, and clinical governance, and have a good working knowledge of local and national guidelines in relation to radiological practice and the subspecialty.
- PACS.
- Appropriate number of supervisors relative to trainees. Ideally there should be two consultants in the training unit. Ratio: One consultant : One fellow

Volume needed for training:

- To obtain the appropriate breadth of exposure to the full spectrum of diseases in both inpatient and outpatient settings.
- Facilities should have a sufficient volume and variety of patient material to provide specialist training. To obtain practical experience, the suggested minimum number of studies performed and interpreted under supervision in fellowship settings is outlined in appendix B.
- A teaching file of representative cases in each modality, with case histories and images, should be available to the trainee, either from the training institution itself or on electronic media. Training should include daily interpretation sessions and clinical case discussions.

Eligibility criteria for Training:
The applicant

- Must have successfully completed The Arab Board of Radiology & Medical Imaging. (eligibility of graduates from other training schemes will be evaluated).
- Is licensed to practice medicine in the country/ies of training
- Provides written permission from the sponsoring body allowing him/her to undertake full time training for the full two year programme
- Provides two letters of recommendation from the institute where he last worked
- Registers as a trainee with the Arab Board for Health Specialties

- Must have ACLS certificate or obtain it during the first month of training before starting any interventional rotation.

Application for Certification in Oncology Imaging Programme in Radiology & Medical Imaging:

- All applications must be completed online, and all supporting documentation must be uploaded through the online application system where requested.
- Fees paid.

Timetable for Training:

- The length of the programme is two years.
- Training guidelines and the curriculum are specified below

Examination Process:

- The examination is held once a year in October
- The format of the exam : One hour oral examination by a panel of experts and one hour of short and long case OSCE exam.
- The candidate is allowed three chances at passing the exam

Setup for the Training:

Formal rotations are highly desirable where the trainee spends defined periods dedicated to a specific modality that should be arranged by the fellowship director.

Methods of Training:

- Lectures
- Individual interpretation session of representative cases (a teaching file).
- Daily self-studies of course materials and reference textbooks or papers (acquiring knowledge of basic principles, applied anatomy, pathophysiology, diagnostic criteria, and clinical applications).
- Daily interpretation sessions
- Weekly conferences with faculty (discussion of current cases, Q&A, differential diagnosis).
- Individual skill assessment (performing a procedure under direct supervision).

Methods of evaluation of Trainees:

1. On-going evaluation: (under the supervision of the Fellowship Director)
   - Performance and interpretation skills assessment by the training personnel (monthly).
   - Interpretation skills assessment using case reviews (monthly).
   - The trainee's professionalism, attitude to work, team work, responsibility and adherence to ethical principles in medical practice will be included in the assessment

2. Final evaluation of proficiency in interpretation (Arab Board subspecialty certification examination):
   - Individual consultants should provide written evaluation of trainees who have completed formal rotations in oncological imaging. The evaluations will be collected and endorsed by the fellowship director
   - After finishing training, the trainee should pass the exit examination
   - Evaluation forms required for a CME activity filled out by the trainee upon course completion

Methods of Upgrading Knowledge/CME:

- During the training course, trainees are required to perform self- studies of selected textbooks and papers, and participate in weekly discussions with faculty of current cases.
- Trainees are expected to participate in research and audit.

- The trainee is expected to present 10 full case conferences/lectures during each year of training. S/he is required to demonstrate ability to instruct and teach junior colleagues and medical students
- The trainee is expected to be cognizant of radiation protection guidelines and practice
- Upon completion of the course, trainees are expected to prepare for the Arab Board certification examination in oncologic imaging

Leave / Vacation:

- The trainee is entitled to three weeks of annual leave per year
- One week of educational leave is available per year to attend courses/scientific meetings

Core Curriculum:

During the training period it is recommended that the trainee obtains experience in the following:

• Plain Radiography and fluoroscopy :
– screening radiographs
– perioperative care
– intensive care
– interpretation of musculoskeletal tumors by radiographs.

• MRI (7 months):
– the use of MRI for the primary diagnosis of benign and malignant tumors
– detection of direct extension tumors
– the use of MRI for survey of some tumors (e.g. prostate cancer).
– The use of MRI for early detection of recurrent tumors.
– The use of MRI in detecting metastasis.
– The use of MRI as problem solving modality for cases referred from other modalities.

• CT scan (8 months):
– the use of CT for the primary diagnosis of benign and malignant tumors
– detection of direct extension of tumors and recurrence.
– detection of metastatic disease.
– evaluation of operability of tumors
– detection of oncologic and surgical complications and emergencies.

• Ultrasound (2 months):
– screening for certain oncologic diseases (e.g. thyroid cancer and Wilms' tumor in selected population).
– Screening for metastatic disease in the abdomen and pelvis.
–screening for oncologic and surgical complications.

• Interventional Radiology (2 months):
• biopsy of bone and soft tissue lesions in the body and extremities.
• diagnostic and therapeutic fluid aspiration (pleural and peritoneal drainage).

• PET scan (2 months):
– Technique and indication of PET scan in oncology using different types of radiotracers.
– Basic interpretation of PET scan findings in oncologic diseases.

• Elective (3 months):
including one or more of the following:

– Neuroimaging
– Breast Imaging
– Musculoskeletal Imaging
– PET scan
– Radiation oncology (not more than one month).
– Pediatric imaging.
– Any MRI rotation.
– Interventional Radiology.
– Clinical Rotation.

Regardless of the imaging technique or procedure concerned, the supervising trainer must be satisfied that the trainee is clinically competent, as determined by an in-training performance assessment, and can consistently interpret the results of investigations accurately and reliably and formulate correct management plans.
The trainee should become familiar with providing analgesia and/or sedation where required, as well as the necessary continuous monitoring required to perform this safely.
The trainee should be aware of local and national guidelines on consent, and be capable of obtaining informed patient consent for practical procedures.

Core contents:

I: GENERALPRINCIPLES

- **Trends in Cancer Incidence, Survival and Mortality**
- **Staging of Cancer**
- **Multidisciplinary Treatment of Cancer: Surgery, Chemotherapy and Radiotherapy**.
- **Assessment of Response to Treatment**
- **Secondary Malignancies**

II: PRIMARY TUMOR EVALUATION AND STAGING

- **Lung Cancer**
- **Mediastinal Tumors**
- **Pleural Tumors**
- **Esophageal Cancer**
- **Gastric Cancer**

- **Colorectal Cancer**
- **Primary Tumors of the Liver and Biliary Tract**
- **Renal Tumors**
- **Primary Adrenal Malignancy**
- **Pancreatic Malignancy**
- **Prostate Cancer**
- **Testicular Germ Cell Tumors**
- **Ovarian Cancer**
- **Uterine and Cervical Tumors**
- **Primary Retroperitoneal Tumors**
- **Primary Bone Tumors**
- **Soft Tissue Sarcomas**
- **Breast Cancer**
- **Paranasal Sinus Neoplasms**
- **Tumors of the Pharynx, Tongue, and Mouth**
- **Laryngeal Tumors**
- **Thyroid Cancer**
- **Primary Tumors of the Central Nervous System**
- **Neuroendocrine Tumors**

III: HEMATOLOGY MALIGNANCY

- **Lymphoma**
- **Multiple Myeloma**

- **Leukemia**
- **IV: PEDIATRICS**
- **General Principles in Pediatric Oncology**
- **Wilms' Tumor and Associated Neoplasms of the Kidney**
- **Neuroblastoma**
- **Uncommon Pediatric Neoplasms**

V: METASTASES

- **Lymph Node Metastases**
- **Lung and Pleural Metastases**
- **Bone Metastases**
- **Liver Metastases**
- **Metastatic Effects on the Nervous System**
- **Adrenal Metastases**
- **Peritoneal Metastases**
- **Spleen**
- **Malignant Tumors of the Skin**
- **Radiological Investigation of Carcinoma of Unknown Primary Site**

VI: IMAGING AND TREATMENT

- **Radiological Manifestations of Acute Complications of Treatment**
- **Effects of Treatment on Normal Tissue**

VII: FUNCTIONAL IMAGING

- **Clinical Applications in Molecular Targeted Therapy**
- **Positron Emission Tomography: Principles and Clinical Applications**
- **Measurement of Angiogensis: MRI and CT Principles and Practice**
- **Magnetic Resonance: Emerging Technologies and Applications**

List of References/Resources for Oncologic Imaging:

1. Diagnostic and Surgical Imaging Anatomy: B J Manaster Ed.,Amirsys.2006.

2. MRI of the Musculoskeletal System - Thomas H. Berquist 2013
3. Abdominal-Pelvic MRI 4th Edition - Richard C. Semelka.
4. Imaging in Oncology Husband and Rezneks Third Edition 2010.
5. Imaging of Soft Tissue Tumors. 3rdEdition.Mark Kransdorf& Mark D Murphey.Wolters Kluwer Lippincott Williams & Wilkins. 2013.
6. Diagnostic Imaging: Breast. Published: 3rd June 2019 Authors: Wendie A. Berg Jessica Leung

7. Diagnostic Imaging: Interventional Procedures: 3rd August 2017 Author: Brandt C. Wible
8. Diagnostic Imaging: Head and Neck: 17th October 2016 Authors: Bernadette Koch Bronwyn E. Hamilton Patricia Hudgins H. Ric Harnsberger
9. Diagnostic Imaging: Brain: 20th October 2015 Authors: Anne G. Osborn Miral D. Jhaveri Karen L. Salzman A. James Barkovich

10. Diagnostic Imaging: Nuclear Medicine: 13th October 2015 Authors: Paige Bennett Umesh Oza

11. Diagnostic Imaging: Genitourinary: 24th September 2015 Author: Mitchell E. Tublin

12. Diagnostic Imaging: Spine: 23rd June 2015 Authors: Jeffrey S. Ross Kevin R. Moore

13. Diagnostic Imaging: Gastrointestinal: 26th May 2015 Authors: Michael P. Federle Siva P. Raman
14. https://www.statdx.com
15.ACR Radiology teaching file disc.
16.www.RSNA.org
17.www.radiologyassistant.nl/en
18. www.acr.org
19. http://www.learningradiology.com

Qualification Degree: Arab Board Fellowship in Oncologic Imaging

APPENDIX A

Minimum equipment requirements for recognition of the training center for subspecialty rotational training in body imaging are:

- ***Ultrasound***: Probe frequencies ranging between 7-15 MHz.
- ***CT scan***: Multi-detector scanner (>16 detector rows) with radiation dose modulation. Non-ionic IV contrast media must be available.
- ***MRI***: 1.5 T or above scanner with available phase array body coils. Basic spin-echo, gradient-echo & fat suppression sequences are a must.
- ***Fluoroscopy***: Standard digital fluoroscopic capabilities are required for various interventions.

APPENDIX B

Minimum average workload requirements for recognition of the training center for subspecialty rotational training in Oncologic imaging (deficiencies may be complemented by rotations at other institutions):

Examination	Cases per week
Ultrasound	60
CT scan	100
MRI	60
PET scan	30
Imaging guided biopsies & Therapeutic Interventions	35
