

SYLLABUS DEL CORSO

Diagnostics and Radiation Oncology

2627-3-H4102D129-H4102D12904

Aims

This course provides an in-depth review of integrated imaging techniques and their role in the diagnosis, staging, prognosis, and treatment monitoring of oncologic diseases. It covers conventional and nuclear imaging methods, including CT, MRI, ultrasound, scintigraphy, and PET/CT. The course also explores the application of imaging in guiding surgical and radiotherapy procedures, challenges in diagnostic appropriateness, and an introduction to radiation oncology and multimodal treatment strategies.

1. Understanding the application of integrated imaging modalities, including conventional radiology (computed tomography, ultrasound, and magnetic resonance imaging), Nuclear imaging (Scintigraphy and PET/CT) in cancer imaging
Knowledge and Understanding – Demonstrate comprehensive knowledge of imaging modalities in oncology.
2. Understanding the importance of each imaging modality in diagnosis, staging, prognostication, treatment response assessment and follow-up of patients with cancer.
Knowledge and Understanding – Grasp the clinical significance of imaging in various oncologic stages.
3. Understanding the complementarity of different imaging modalities.
Knowledge and Understanding & Applying Knowledge – Recognize and apply integrative imaging principles.
4. Learning the main imaging protocol
Applying Knowledge and Understanding – Apply standardized imaging protocols in clinical contexts.
5. Learning how to read a diagnostic flow-chart and a clinical guideline for each cancer type
Applying Knowledge and Understanding & Communication – Apply and communicate clinical diagnostic pathways.
6. Understanding the role of imaging in guiding surgery and radiotherapy
Knowledge and Understanding & Making Judgments – Evaluate imaging's influence in treatment planning.
7. Understanding the main challenges of the use of imaging in guiding the treatment and intrtreatment assessment
Making Judgments – Critically assess appropriateness and effectiveness of imaging in clinical decisions.
8. Understand the principles of EBRT and radionuclide-radioligant therapy, including their primary clinical

applications.

Knowledge and Understanding – Acquire insight into therapeutic oncology modalities.

9. Comprehend the principles of multimodality treatments and the rationale for their combined use in clinical practice.

Knowledge and Understanding – Acquire insight into therapeutic oncology modalities.

Contents

1. Refresh of imaging techniques
2. Imaging protocols: what you need to know to properly inform and prepare your patients
3. Imaging technique – how to make the proper choice for the diagnosis of solid tumors in the central nervous system, thorax, abdomen, breast, prostate and haematopoietic system
4. How to stage patients with solid and haematologic tumors by integrating different imaging modalities:
 - a. The key point of diagnostic imaging.
 - b. Strength, and weakness of cross sectional imaging techniques.
 - c. How to properly assess actual tumor spread in the view of optimal treatment planning.
 - d. Performances analysis: pro and cons, dosimetric burden, costs, availability.
5. Image guided therapy
6. Image for treatment planning and treatment assessment
7. Principle of AI in diagnostic imaging
8. Principles of EBRT and its main applications
9. Principles of radionuclide-radioligand therapy and its main applications
10. Principles of combination and sequential treatments

Detailed program

1. Review of main imaging techniques
2. Imaging in screening, diagnosis, staging, and treatment planning/monitoring in:
 - a. Breast cancer
 - b. Prostate cancer
 - c. Urological tumors
 - d. Lung cancer
 - e. Colon cancer
 - f. Gynecological tumors
 - g. Bone tumors
 - h. Hematologic tumors: Multiple myeloma and lymphomas
 - i. Melanoma
3. Role of AI in medical imaging
4. EBRT and its main applications
5. Radionuclide-radioligand therapy and its main applications
6. Principles of combination and sequential treatments

Prerequisites

Preparatory courses for Vertical Tracks

Teaching form

Lessons and small group activities, case reading, Problem Based Learning and Case Based Learning

Textbook and teaching resource

Diseases of the Abdomen and Pelvis 2023-2026, Diagnostic Imaging. Editors: Juerg Hodler, Rahel A. Kubik-Huch, Justus E. Roos, Gustav K. von Schulthess, Springer 2023 (open access). Chapters 11, 16

Computed Tomography of the Lung, A Pattern Approach. Editors: Johny A. Verschakelen, Walter De Wever, Springer 2018

Tutorials in Diagnostic Radiology for Medical Students, Editors: Ciaran E. Redmond, Michael Lee, Springer 2020

Handbook of Evidence-Based Radiation Oncology. Editors: Eric K. Hansen, Mack Roach III. Springer 2018

Breast Imaging, Diagnosis and Intervention. Editors: Michael Fuchsjäger, Elizabeth Morris, Thomas Helbich, Springer 2023

Molecular & Diagnostic Imaging in Prostate Cancer - Clinical Applications and Treatment Strategies. Editor Heide Schatten, Springer 2023

Nuclear medicine textbook, Methodology and Clinical Applications. Editors: Duccio Volterrani, Paola Anna Erba, Ignasi Carrió, H. William Strauss, Giuliano Mariani. Springer 2019. Chapters 14, 15, 16, 17, 18, 22, 23, 35, 38

Basic Radiotherapy Physics and Biology. Editors: David S. Chang , Foster D. Lasley , Indra J. Das , Marc S. Mendonca , Joseph R. Dynlacht. Springer 2021

Semester

Second term

Assessment method

Self-evaluation with cased based discussion, problem solving activities on specific issues during the course.

Final exam: integrated oral exams consisting of the discussion of a relevant clinical topic as part of the course program, requiring the integration of from different perspectives covered by each of the teaching units of the course.

Evaluation criteria: theoretical knowledge, synthesis skills, ability in the application of diagnostic methods to a specific clinical problem or contest.

Office hours

By appointment fixed by e-mail

Sustainable Development Goals

GOOD HEALTH AND WELL-BEING | QUALITY EDUCATION | GENDER EQUALITY
