Professional Master's Degree

Cardio-Oncology

tech technological university

tech technological university

Professional Master's Degree

Cardio-Oncology

- Modality: **online**
- Duration: **12 months**
- Certificate: **TECH Technological University**
- Dedication: **16h/week**
- Schedule: **at your own pace**
- Exams: **online**

Website: www.techtitute.com/us/medicine/professional-master-degree/master-cardio-oncology

Index

01

Introduction

Cardiac toxicity (CT) occurs in up to 30% of the millions of patients undergoing cancer treatment. This is a "serious complication that usually manifests as heart failure and negatively affects the prognosis of patients". The onset and severity of CT related to oncologic treatment are varied, depending mainly on each patient's individual susceptibility, the mechanism of action of the therapy, the capacity for early detection and the establishment of targeted treatment.

Improve your knowledge in Cardio-Oncology through this program, where you will find the best teaching material with real case studies. Learn here about the latest advances in the specialty to be able to provide quality medical care"

Due to the growing importance of this clinical process, in recent years "multidisciplinary teams formed mainly by cardiologists and oncologists that make up the so-called Cardio-Oncology Units" have been developed.

The objective of the Professional Master's Degree in Cardio-Oncology is to offer up-to-date training in an area of current and future relevance from the clinical point of view, in which knowledge is advancing at breath-taking speed, focused on the training of professionals interested in the subject.

The Professional Master's Degree will have two main axes around which all its modules will be focused: "Research and clinical applications". All sections will be approached from the perspective of the most recent research findings. From the research point of view, both "basic and clinical research" lines will be addressed. The research background of the directors and co-directors of the Professional Master's Degree will be reflected in all the modules. As this is a Professional Master's Degree with a clinical application vocation, all modules will be presented, and their content will be "applied to real clinical cases".

Cardiologists, oncologists and hematologists with special interest in this field have, with this Professional Master's Degree, the opportunity to complete and update their knowledge in cardio-oncology. The final objective of this Professional Master's Degree will be for students to learn the "pathophysiological basis of the onset of CT, as well as how to detect and treat" it. Students will get to know, understand and apply the latest diagnostic techniques and preventive and therapeutic measures specific to CT in oncology patients.

Emphasis will be placed on "solving complex clinical problems" such as the need for chemotherapy treatment in patients with severe heart disease or the occurrence of acute cardiovascular events in oncology patients undergoing chemotherapy treatment. It also offers a unique opportunity to learn about the latest advances in research in this field and aims to encourage students' interest in research.

This **Professional Master's Degree in Oncologic Cardiology** contains the most complete and up-to-date program on the market. The most important features include:

- More than 75 clinical cases presented by experts in Cardio-Oncology
- The graphic, schematic, and practical contents with which they are created provide scientific and practical information on the disciplines that are essential for professional practice
- Diagnostic-therapeutic developments on assessment, diagnosis, and treatment in Cardio-Oncology
- Contains practical exercises where the self-evaluation process can be carried out to improve learning
- Iconography of clinical and diagnostic imaging tests
- An algorithm-based interactive learning system for decision-making in the clinical situations presented throughout the course
- With special emphasis on evidence-based medicine and research methodologies in Cardio-Oncology
- All of this will be complemented by theoretical lessons, questions to the expert, debate forums on controversial topics, and individual reflection assignments
- Content that is accessible from any fixed or portable device with an Internet connection

Update your knowledge through the Cardio-Oncology program"

This Professional Master's Degree may be the best investment you can make when selecting a refresher program, for two reasons: in addition to updating your knowledge in Cardio-Oncology, you will obtain a qualification from TECH"

This Professional Master's Degree offers training in simulated environments, which provides an immersive learning experience designed to train for real-life situations.

It includes clinical cases to bring the program's degree as close as possible to the reality of medical care.

The teaching staff includes professionals from the field of Cardio-Oncology, who bring their experience to this training program, as well as renowned specialists from leading scientific societies.

Thanks to its multimedia content developed with the latest educational technology, they will allow the professional a situated and contextual learning, that is to say, a simulated environment that will provide an immersive learning programmed to train in real situations.

The design of this program is based on problem-based learning, by means of which the physician must try to solve the different professional practice situations that arise throughout the Professional Master's Degree. For this purpose, the physician will be supported by an innovative interactive video system created by renowned and experienced experts in the field of Cardio-Oncology and other disciplines, with extensive teaching experience.

02

Objectives

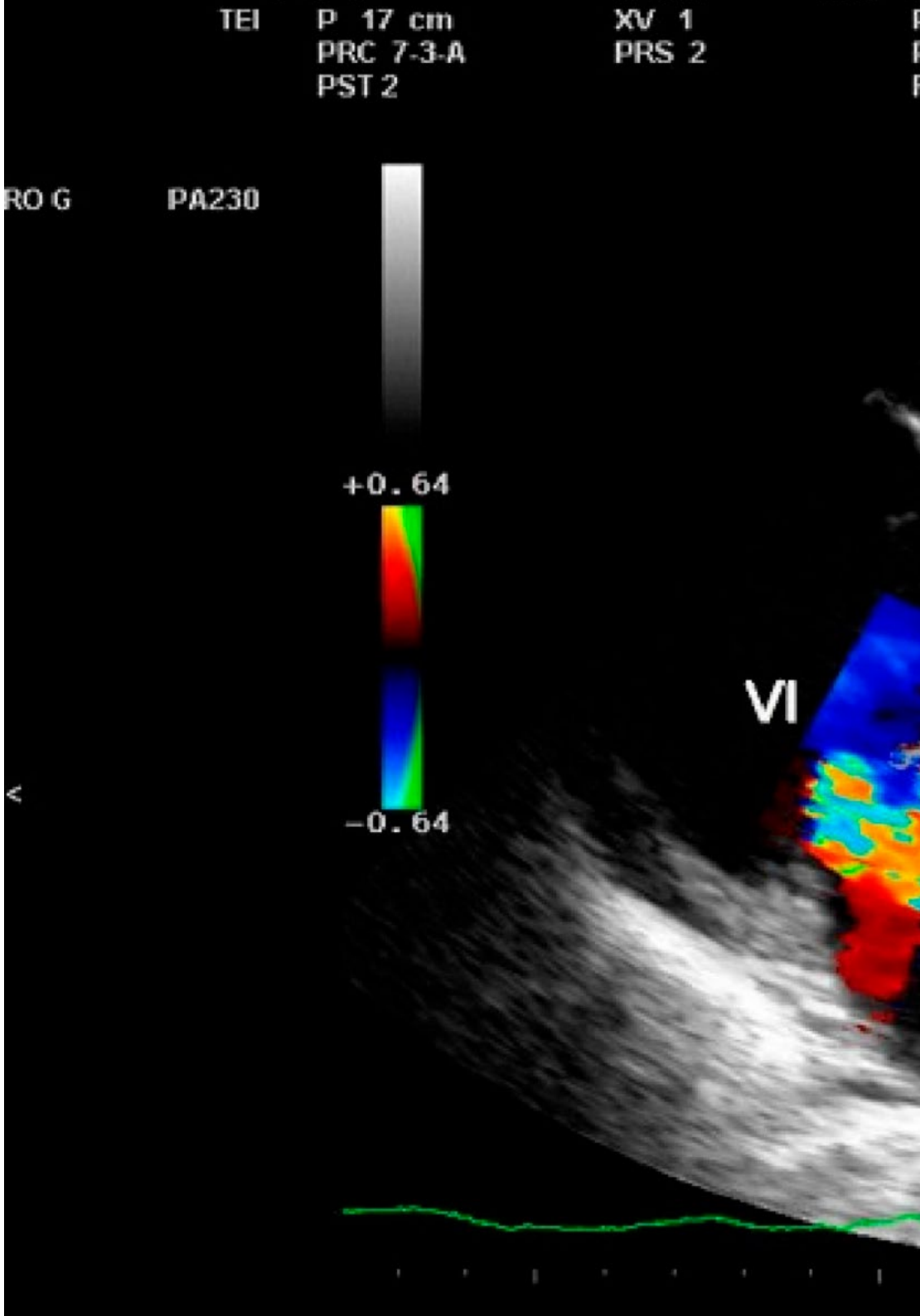
The program in Cardio-Oncology is aimed at facilitating the performance of physicians who are dedicated to the treatment of cardiological problems related to oncological processes.

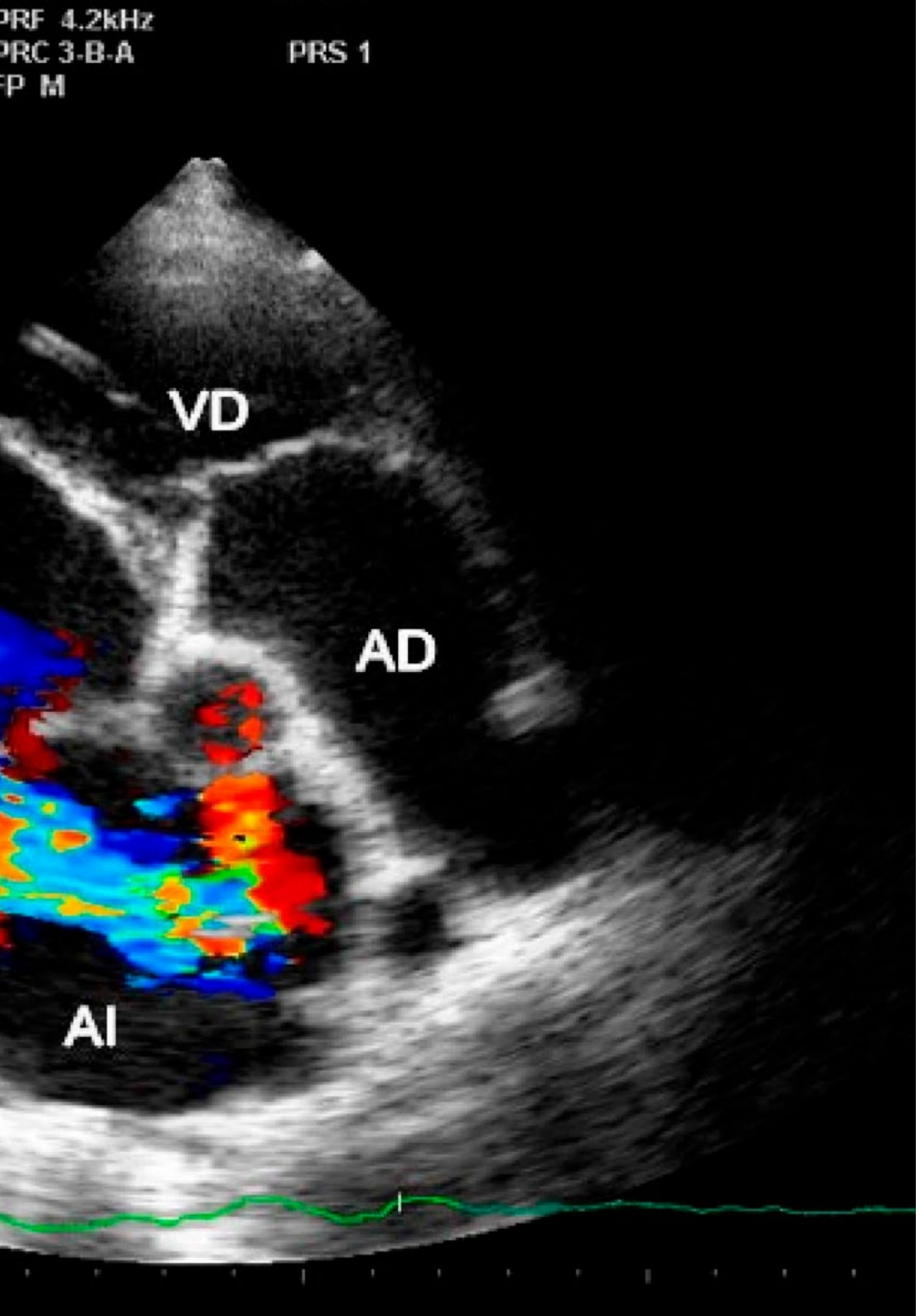
This program is designed for you to update your knowledge in Cardio-Oncology, using the latest educational technology to contribute with quality and safety to decision making, diagnosis, treatment and patient care"

General Objectives

- Update Cardiologists', Oncologists', and Hematologists' knowledge in the field of Cardio-Oncology
- Promote work strategies based on a comprehensive approach to the patient as a standard model for achieving excellent care
- Encourage the acquisition of technical skills and abilities, through a powerful audiovisual system, and the possibility of development through online simulation workshops and/or specific training
- Encourage professional stimulation through continuous education and research

Take the opportunity and take the step to get up to date on the latest developments in Cardio-Oncology"





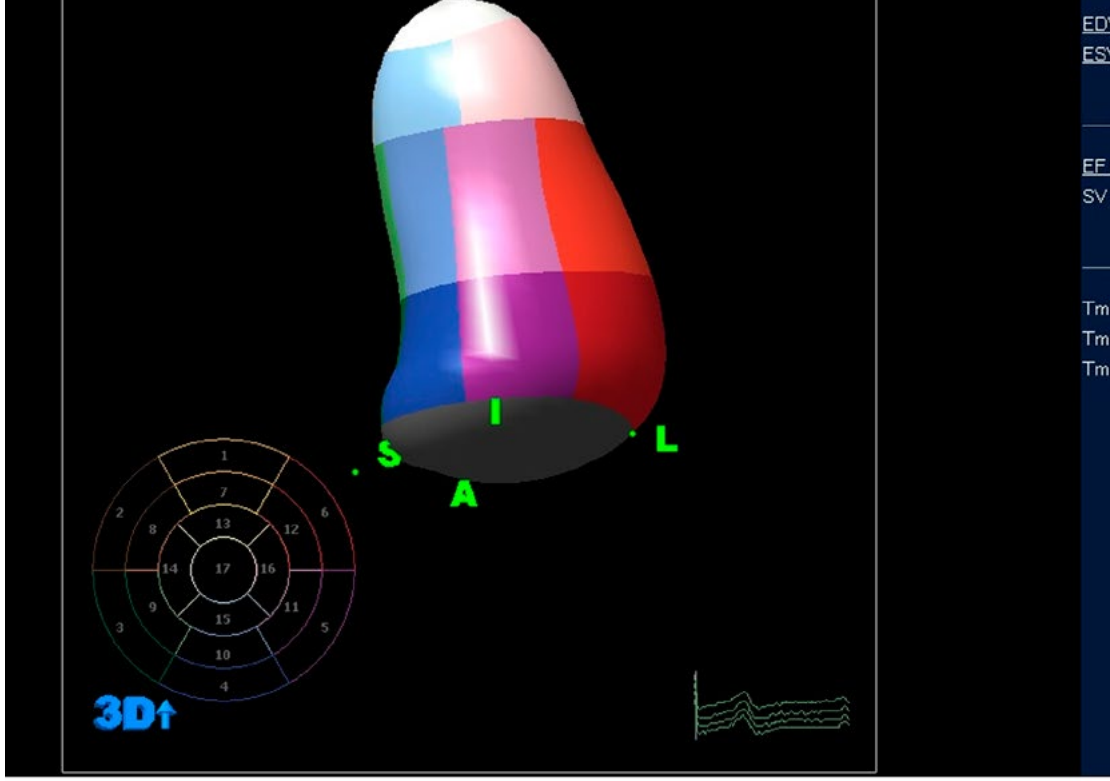
Specific Objectives

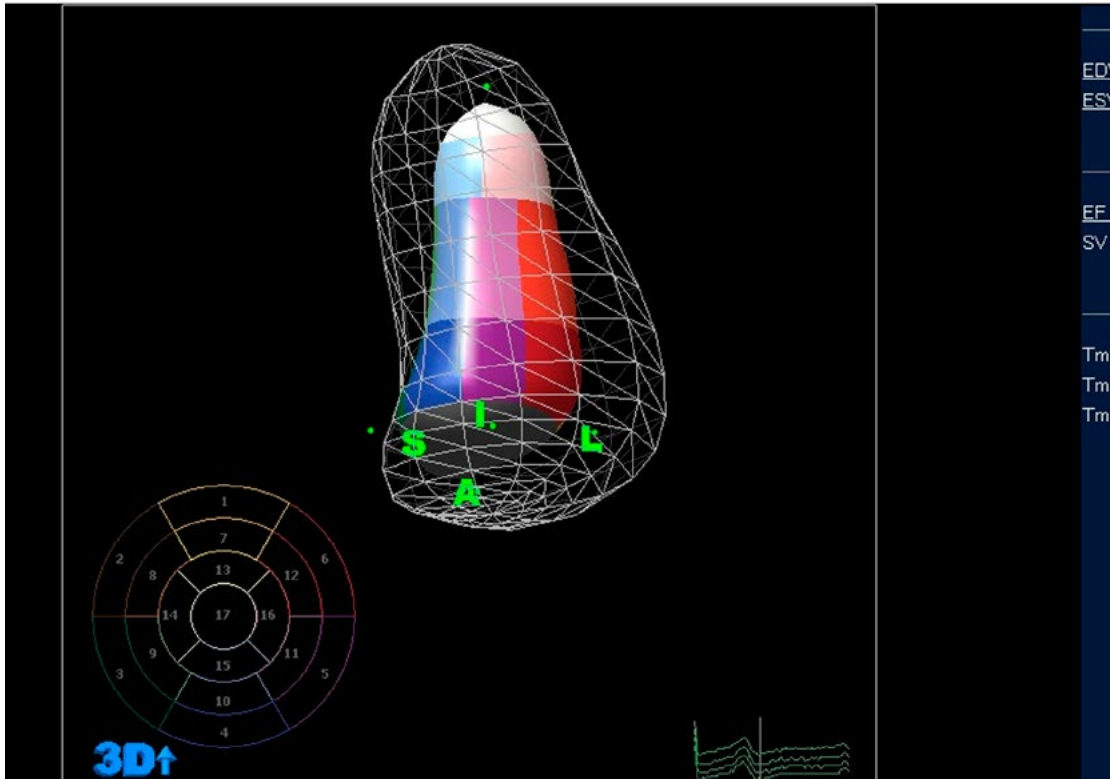
- Know the epidemiological relevance of cancer
- Know the clinical and epidemiological importance of cardiac toxicity
- Identify the epidemiological importance of prevention and early detection of cardiotoxicity
- Learn the objectives of Cardio-Oncology Units
- Know the structure and organization of Cardio-Oncology Units
- Define the concept of cardiotoxicity
- Learn the types of cardiotoxicity depending on the area affected
- Learn the types of cardiotoxicity according to the pathophysiological mechanism
- Understand the molecular and tissue mechanisms leading to CT
- Recognize the cardiotoxic effects of thoracic radiotherapy
- Update the knowledge concerning the evolution of thoracic radiotherapy equipment and methods
- Explain the factors influencing acute and chronic radioinduced cardiotoxicity
- Recognize chemotherapeutic drugs implicated in cardiotoxicity
- Analyze the cardiotoxic effects of anthracyclines
- Explain the cardiotoxic effects of anti-tubulin drugs
- Explain the cardiotoxic effects of antimetabolite drugs
- Explain the cardiotoxic effects of alkylating agents and other drugs that interact with DNA
- Analyze the cardiotoxic effects of biological agents, specifically trastuzumabtype monoclonal antibodies
- Become familiar with other potentially cardiotoxic biological agents

- Analyze the cardiotoxic effects of cell kinase inhibitors
- Be aware of other potentially cardiotoxic oncological treatments as antiangiogenic drugs, histone deacetylase inhibitors, differentiation and/or apoptosis inducers and hormone therapy
- Understand the individual susceptibility factors, both genetic and acquired, involved in the development of cardiac toxicit.
- Be able to perform a comprehensive risk assessment of patients undergoing oncologic treatment
- Describe the monitoring required by patients during treatment with cardiotoxicity therapies
- Identify biomarkers as a method used to detect cardiotoxicity early, especially troponins and natriuretic peptides
- Delve into the knowledge of echocardiography, with special attention to the "global longitudinal strain" technique as a marker for early detection of cardiac toxicity
- Know the role of cardiac magnetic resonance imaging in the early detection of cardiotoxicity
- Recognize the clinical relevance and mechanisms involved in the onset of ventricular dysfunction and heart failure secondary to cardiac toxicity
- Deepen our knowledge of myocardial involvement caused by anthracyclines
- Identify other chemotherapy drugs with the capacity to produce myocardial toxicity
- Deepen our knowledge of myocardial toxicity induced by monoclonal antibodies, especially tratuzumab
- Recognize the ability of therapies directed against novel molecular targets (cellular kinase inhibitors) and proteosome inhibitors that cause ventricular dysfunction and heart failure
- Learn the effects of thoracic radiotherapy on the myocardium
- Improve knowledge in the clinical diagnosis of heart failure associated with cardiotoxicity
- Acquire updated knowledge in the treatment of heart failure and ventricular dysfunction related to oncological treatments
- Know the importance of early detection of myocardial involvement due to cardiotoxicity
- Describe the appropriate action to be taken in the event of an increase in circulating biomarkers during oncologic treatment
- Describe the appropriate response to the appearance of "global longitudinal strain" alteration during oncological treatment.
- Learn the monitoring strategy during treatment with anthracyclines
- Learn the monitoring strategy during treatment with monoclonal antibodies, especially trastuzumab
- Learn the monitoring strategy during treatment with cell kinase inhibitors
- Understand the potential causes and mechanisms of ischemic heart disease in the context of cardiac toxicity
- Identify patients at high risk of coronary artery disease
- Define the role of oncological treatments such as fluoropyrimidines in the development of ischemic heart disease
- Acquire updated knowledge on diagnostic methods for coronary artery disease related to cardiotoxic drugs
- Get up to date on the management of acute coronary syndrome in the context of oncologic treatment
- Learn the monitoring strategy in patients who have had coronary ischemia
- Know the clinical relevance of thoracic radiotherapy in the development of coronary artery disease and its mechanisms

- Recognize the risk factors for the development of ischemic heart disease in patients who have received thoracic radiotherapy
- Expand knowledge of the diagnostic methods of radiation-induced coronary artery disease
- Analyze the treatment options in coronary artery disease associated with thoracic radiotherapy
- Improve knowledge of the treatment strategy for chronic ischemic patients receiving oncologic treatment
- Know the arrhythmogenic capacity and clinical relevance of cardiac toxicity
- Learn the oncological treatments with the capacity to prolong the QT interval of the electrocardiogram and the factors that increase the probability of this occurring
- Acquire in-depth knowledge of the electrocardiographic diagnosis of QT interval prolongation
- Know the risk of developing ventricular arrhythmias and their specific treatment
- Identify strategies to prevent prolongation of the QT interval on the electrocardiogram
- Define the implications of prolongation of the QT interval on the electrocardiogram and the appearance of ventricular arrhythmias on the continuity of specific treatment
- Recognize the clinical relevance and mechanisms of atrial tachyarrhythmias, especially atrial fibrillation in oncologic patients
- Learning about cancer treatments that favor the development of atrial fibrillation
- Analyze the need for anticoagulation and its risk-benefit in oncologic patients with atrial fibrillation
- Review therapeutic options in atrial fibrillation in the context of cardiotoxicity
- Recognize the clinical significance of bradyarrhythmias related to oncologic treatment

- Learn the oncological treatments that are associated with the development of bradyarrhythmias and their therapeutic implications
- Know the potential toxic effects of oncological treatments at the valvular level
- Update knowledge on the attitude towards chronic valvular patients and prosthetic valve patient receiving oncological treatment
- Know the potential toxic effects of oncological treatments on the pericardium
- Learn the treatment strategy for patients with pericardial effusion secondary to cardiac toxicity
- Recognize the specific role of radiotherapy in the development of pericardial disease
- Define the assessment of metastatic pericardial involvement
- Recognize the clinical relevance of hypertension in oncologic patients
- Analyze the relationship between antiangiogenic drugs and arterial hypertension and its mechanisms
- Deepen the knowledge of the diagnosis of arterial hypertension associated with the use of antiangiogenic drugs
- Define the strategy for monitoring arterial hypertension during oncologic treatment
- Know the treatment of arterial hypertension related to oncologic treatment
- Recognize the clinical relevance of venous thromboembolic disease in oncologic patients
- Know the different factors and situations that contribute to the development of venous thromboembolic disease in oncologic patients
- Learn the antineoplastic treatments associated with increased risk of venous thromboembolic disease





- Describe prevention measures for cancer-related venous thromboembolic disease in different clinical scenarios
- Analyze the relationship and clinical significance of venous thromboembolic disease with the use of central venous catheters
- Learn the forms of clinical presentation, diagnostic and follow-up methods, as well as the treatment of venous thromboembolic disease with the use of central venous catheters
- Know the methods of prevention of venous thromboembolic disease with the use of central venous catheters
- Identify the forms of presentation and deepen the knowledge of the diagnosis of deep vein thrombosis and cancer-associated pulmonary thromboembolism
- Analyze the different therapeutic options for cancer-associated thromboembolic disease
- Know the capacity of some oncological treatments to produce arterial thrombosis
- Recognize the clinical relevance and pathophysiological mechanisms of peripheral vascular disease in the oncologic patient
- Know the treatments involved in the early development of peripheral vascular disease
- Recognize the clinical significance and mechanisms involved in the occurrence of cerebral vascular disease in relation to oncological treatments
- Know the oncological treatments associated with the appearance of cerebral vascular disease
- Learn the relationship of some oncological treatments with the development of pulmonary hypertension
- Define strategies to identify and control risk factors to limit the development of cardiotoxicity related to oncologic drugs
- Know the measures capable of limiting cardiac toxicity due to anthracyclines
- Know the measures capable of limiting cardiac toxicity due to trastuzumabtype monoclonal antibodies
- Know the measures capable of limiting cardiac toxicity related to cellular kinase inhibitors
- Learn strategies to limit the risk of toxicity related to radiotherapy.
- Analyze the role of beta-blockers in cardioprotection
- Analyze the role of angiotensin receptor inhibitors and antagonists in cardioprotection
- Identify other pharmacological treatments with a possible cardioprotective effect
- Become familiar with the follow-up required in patients with cardiac toxicity or at high risk of developing it
- Explain the long-term follow-up of patients who have received thoracic radiotherapy.
- Understand the occurrence and determine the clinical management of patients with established oncologic disease who present with an acute ischemic event
- Understand the occurrence and determine the clinical management of pediatric patients requiring potentially cardiotoxic oncologic treatment
- Understand the onset and determine the clinical management of geriatric patients requiring oncologic treatment
- Get up to date on anticoagulant and antiplatelet therapy in oncology patients
- Broaden knowledge in relation to oncology patients with arrhythmias and require implantable devices (pacemakers, defibrillators)
- Recognize the importance of research in the context of cardiotoxicity
- Become familiar with current basic lines of research and future perspectives

03

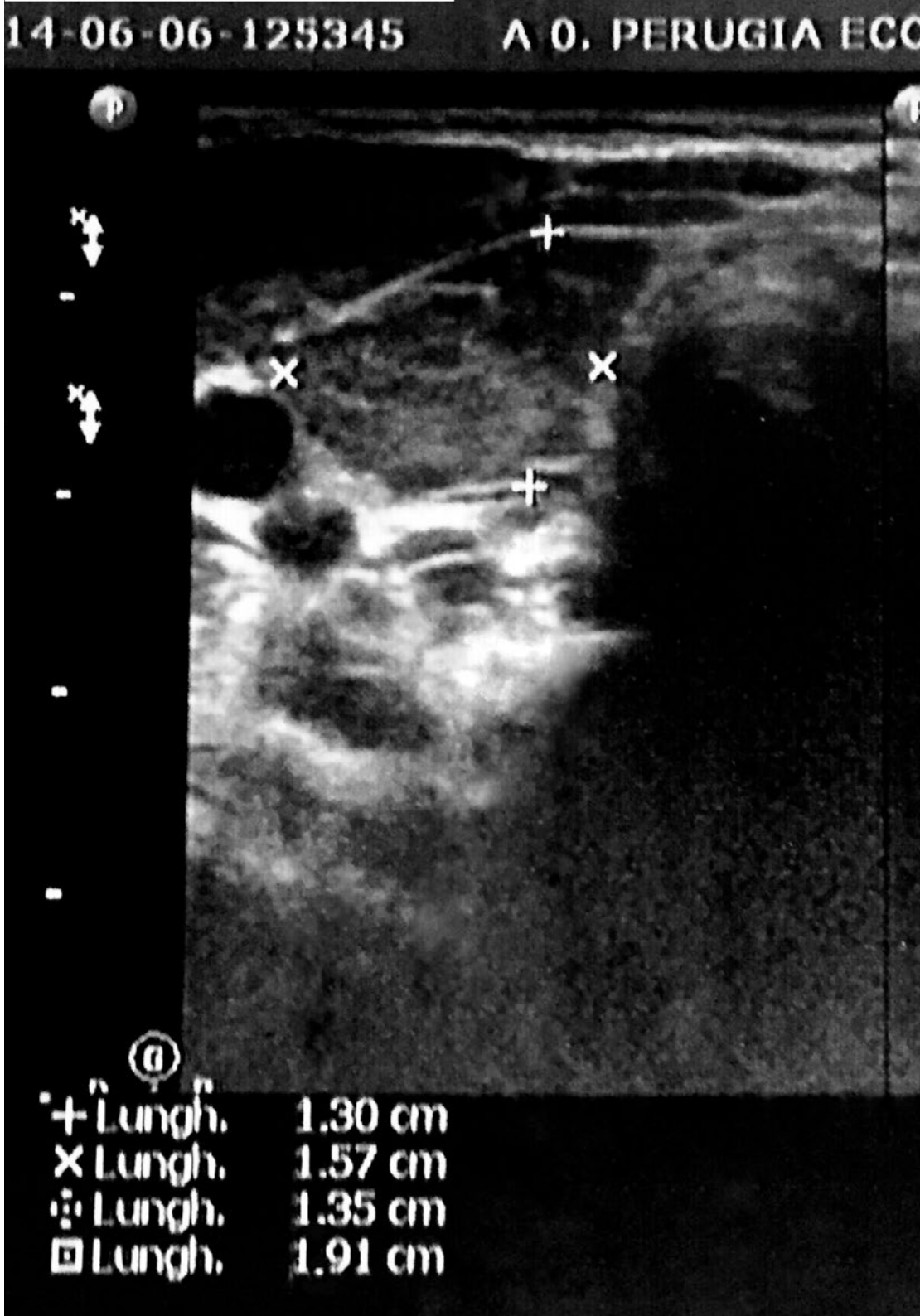
Skills

After passing the assessments on the Professional Master's Degree in Cardio-Oncology, the student will have acquired the necessary professional skills for a quality, up-to-date practice based on the most recent scientific evidence.

With this program you will master new diagnostic and therapeutic procedures in Cardio-Oncology"

General Skills

- Possess and understand knowledge that provides a basis or opportunity to be original in the development and/or application of ideas, often in a research context
- Apply acquired knowledge and problem-solving skills in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their area of study
- Integrate knowledge and face the complexity of making judgments based on incomplete or limited information, including reflections on the social and ethical responsibilities linked to the application of their knowledge and judgments
- Students should be able to communicate their conclusions -and the ultimate knowledge and rationale behind them- to specialized and non-specialized audiences in a clear and unambiguous manner
- Acquire the learning skills that will enable them to continue studying in a manner that will be largely self-directed or autonomous



Specific Skills

- Assess the clinical and epidemiological importance of toxicity and the organization of Cardio-Oncology Units
- Understand the molecular and tissue mechanisms that lead to cardiac toxicity
- Determine the potential role that radiotherapy, immunotherapy, and chemotherapy treatments may play in causing CT
- Understand the individual susceptibility factors for the development of cardiac toxicity and be able to perform a comprehensive risk assessment of patients undergoing oncologic treatment
- Incorporate early detection methods for cardiac toxicity in each clinical context
- Identify the mechanisms and clinical significance of ventricular dysfunction and heart failure secondary to cardiac toxicity and become familiar with the different therapeutic options in the setting of established cardiac toxicity
- Incorporate knowledge of the relationship of cardiotoxic therapies to the genesis of ischemic heart disease
- Identify the arrhythmogenic capacity of cardiac toxicity and the management of arrhythmias in oncological patients
- Identify the potential toxic effects of oncological treatments at the valvular and pericardial levels
- Point out the implications on the oncologic treatment of arterial hypertension
- Describe the various vascular complications related to oncologic treatments
- Add to your knowledge the different treatment options with cardioprotective effect
- Become familiar with the follow-up required in patients with cardiac toxicity or at high risk of developing it
- Point out the importance and perform the appropriate management of complex clinical situations derived from cardiac toxicity
- Incorporate the latest advances in basic and clinical research in the context of cardiac toxicity

Take advantage of the opportunity and take the step to get up to date on the latest developments in Cardio-Oncology"

04

Course Management

The program's teaching staff includes leading specialists in Cardio-Oncology, and other related areas, who bring their years of work experience to this educational program. Additionally, other recognized specialists participate in its design and preparation, which means that the program is developed in an interdisciplinary manner.

Learn about the latest advances in Cardio-Oncology procedures from leading professionals"

International Guest Director

Dr. Arjun Ghosh is recognized in the healthcare field for his many efforts to improve the quality of care at the University College London Hospital (UCLH) and Barts Heart Center. Both institutions have become international references in Cardiology, an area in which this doctor is considered a true eminence.

From his position as Head of the Clinical Service at UCLH, the expert has devoted great efforts to the care of patients with cancer and to reduce the cardiac side effects that may result from aggressive treatments such as chemotherapy, radiotherapy and surgery. Thanks to his extensive experience in this field, he is a consultant specialist in the Long-Term Follow-Up Unit, created to monitor the evolution of people who have survived tumors.

Dr. Ghosh's research has been at the forefront of clinical innovation throughout his career. His PhD, for example, was defended at the Imperial College of London and subsequently presented to the British Parliament. This merit is only plausible for studies that make unquestionable contributions to society and science. The thesis has also received numerous national and international awards. It has also been endorsed by presentations at various congresses around the world.

The famous cardiologist is also a specialist in advanced Diagnostic Imaging techniques, using state-of-the-art tools: Magnetic Resonance Imaging and Echocardiography. He also has a broad academic vocation that led him to complete a Master's degree in Medical Education, obtaining accreditations from the Royal College of Physicians of the United Kingdom and University College London.

Dr. Ghosh is also the Director of the Foundation Program at St. Bartholomew's Hospital and holds various positions in local and international societies, such as the American College of Cardiology.

Dr. Arjun Ghosh

- Specialist in Cardio-Oncology and Advanced Cardiac Imaging
- Head of Clinical Service University College London Hospital (UCLH)
- Consultant Cardiologist at the Barts Heart Center
- Director of the St Bartholomew's Hospital Foundation Program
- Doctorate in Cardiology at Imperial College London
- Master's Degree in Medical Education from the Royal College of Physicians of the
- United Kingdom and University College London
- Member of:
- American College of Cardiology
- British Cardiovascular Society
- Royal Society of Medicine
- International Society of Cardio-Oncology

Thanks to TECH, you will be able to learn with the best professionals in the world"

Management

Dr. Macía Palafox, Ester

- Clinical Manager of the Cardio-Oncology Unit of the Fundación Jiménez Díaz University Hospital in Madrid
- Degree in Medicine from the Complutense University of Madrid.
- MIR specialist in Cardiology at La Paz University Hospital in Madrid
- Professional Master's Degree in Clinical Arrhythmology (Complutense University of Madrid)
- Fellowship in Investigative Arrhythmology (Columbia University, New York)
- Member of the Spanish Society of Cardiology. Cardio-Oncology Work Group.

Director

Dr. García Foncillas, Jesús

- Director of the Chair of Molecular Individualized Medicine of the Autonomous University of Madrid (UAM-Merck).
- Director of the Oncology Institute "OncoHealth".
- Director of the Oncology Department of the University Hospital "Fundación Jiménez Díaz".
- Director of the Translational Oncology Division of the Health Research Institute FJD-UAM
- Professor of Oncology at the Autonomous University of Madrid

Dr. Ibáñez Cabeza, Borja

- Head of the Jiménez Díaz Cardiology Fundation Research Unit
- Director of the Clinical Research Department of the Carlos III National Center for Cardiovascular Research (CNIC)

Coordinators

Dr. Caramés Sánchez, Cristina
- Oncologist. Jiménez Díaz Foundation

Dr. Córdoba Mascuñano, Raúl
- Hematologist. Jiménez Díaz Foundation Hospital

Dr. Kallmeyer Mayor, Andrea
- Cardiology. Jiménez Díaz Foundation Hospital

Dr. Fernández, José
- Cardiologist. Jiménez Díaz Foundation Hospital

Dr. Gómez Rubín, María Carmen
- Cardiology Service at the Ruber Juan Bravo Hospital Complex Quironsalud, Madrid

Dr. Gómez-Talavera, Sandra
- Cardiologist at the Jiménez Díaz Foundation Hospital. Quironsalud

Dr. Llamas Sillero, Pilar
- Hematologist. Jiménez Díaz Foundation Hospital

Dr. Mitroi, Cristina
- Cardiology. Puerta de Hierro University Hospital

Dr. Martín García, Ana
- Cardiologist at the University Health Care Complex of Salamanca. Institute of Biomedical Research of Salamanca

Dr. Pastor Planas, Ana
- Cardiologist at the Quiron University Hospital Madrid

Dr. Porta Sánchez, Andreu
- Cardiologist. Quironsalud University Hospital, Madrid Carlos III National Center for Cardiovascular Research (CNIC)

Dr. Sánchez Fernández, Pedro Luis
- University Health Care Complex of Salamanca. Institute of Biomedical Research of Salamanca

Dr. Taibo Urquía, Mikel
- Cardiology. Jiménez Díaz Foundation Hospital

Professors

Dr. Álvaro, Margarita
- Geriatrics Unit of the Can Ruti Hospital, Barcelona

Dr. Alonso Martín, Joaquín Jesús
- Head of the Cardiology Department at Getafe University Hospital, Madrid

Dr. Arroyo Rivera, Belén
- Cardiology Department, Jiménez Díaz Foundation University Hospital, Quironsalud, Madrid

Dr. Azinovic Gamo, Ignacio
- Head of the Radiation Oncology Department at the Jiménez Díaz Foundation Hospital, Quironsalud, Madrid

Dr. Barreiro Pérez, Manuel
- Cardiologist. Salamanca University Hospital.

Dr. Bravo Calero, Loreto
- Cardiology Department, Jiménez Díaz Foundation University Hospital, Quironsalud, Madrid.

Dr. Caravaca
- Heart Failure Unit, the 12 de Octubre Hospital CNIC, Madrid

Dr. Carbonell, Alejandra
- Cardiac Imaging Unit, 12 de Octubre Hospital, Madrid

Dr. Carretero, Alberto
- Cardiac Imaging Unit, 12 de Octubre Hospital, Madrid

Dr. Casado Álvarez, Raquel
- Cardiology Department, Quironsalud University Hospital, Madrid

Dr. Cornago Navascues, Javier
- Hematology Department, Jiménez Díaz Foundation University Hospital, Quironsalud, Madrid

Dr. De Juan, Javier
- Heart Failure Unit, 12 de Octubre Hospital, Madrid

Dr. Devesa Arbiol, Ana
- Cardiology Department, Jiménez Díaz Foundation University Hospital, Quironsalud, Madrid

Dr. Díaz Antón, Belén
- Cardiology Departmentat Montepríncipe Hospital, Madrid

Dr. Domínguez Rullán, José Antonio
- Department of Radiation Oncology, Ramón y Cajal Hospital, Madrid

Dr. Eiros Bachiller, María del Rocío
- Cardiology Service, University Complex of Salamanca. Institute of Biomedical Research of Salamanca (IBSAL)

Ms. Fernández de Gatta, Marta Alonso
- Cardiology Service, University Complex of Salamanca. Institute of Biomedical Research of Salamanca (IBSAL)

Dr. Fuertes Suárez, Beatriz
- Cardiology Departmentat Montepríncipe Hospital, Madrid

Dr. García Torres, Araceli
- Neurology Department, Jiménez Díaz Foundation University Hospital, Quironsalud, Madrid

Ms. García Talavera, Camila Sofía
- Cardiology Department, Jiménez Díaz Foundation University Hospital, Quironsalud, Madrid

Dr. Galán Arriola, Carlos
- Carlos III National Center for Cardiovascular Research (CNIC)

Dr. González-Caballero, Eva
- Cardiologist at Jerez de la Frontera Hospital

Dr. Guisasola
- Heart Failure Unit, the 12 de Octubre Hospital CNIC, Madrid

Dr. Hernández González, Ignacio
- Cardiology Department, Jiménez Díaz Foundation University Hospital, Quironsalud, Madrid

Dr. Higueras Nafria, Javier
- Cardiology Department, San Carlos Clinical University Hospital, Madrid

Dr. Jiménez Barral, Elena
- Hematology Department, Jiménez Díaz Foundation University Hospital, Quironsalud, Madrid

Dr. Lobo González, Manuel
- Cardiology Department at Ruber Juan Bravo Hospital Complex Quironsalud, Madrid. Carlos III National Center for Cardiovascular Research (CNIC)
- Department of Oncology, Hospital Universitario Fundación Jiménez Díaz, Autonomous University of Madrid, Madrid (Spain)

Dr. Lorenzo Muñoz, Natalia
- Cardiology Department, Infanta Cristina University Hospital, Madrid

Dr. Martínez Milla, Juan
- Cardiology Department, Jiménez Díaz Foundation University Hospital, Quironsalud, Madrid.

Dr. Martínez Díez, Yolanda
- Hematology Department, Jiménez Díaz Foundation University Hospital, Quironsalud, Madrid

Dr. Montañés, Óscar Salvador
- Cardiology Department at the Quironsalud University Hospital Madrid

Dr. Navarro Amo, Felipe
- Associate Chief of Cardiology at the Jiménez Díaz Foundation Hospital

Dr. Nuche, Jorge
- Heart Failure Unit, the 12 de Octubre Hospital CNIC, Madrid

Dr. Orejas Orejas, Miguel
- Cardiologist at the Jiménez Díaz Foundation Hospital

Dr. Osuna Barco, Marta Pilar
- Oncopediatrics Service of the HM Montepríncipe University Hospital

Dr. Ponz de Antonio, Inés
- Heart Failure Unit, La Paz Hospital, Madrid

Dr. Rodríguez Chavarri, Adriana
- Cardiologist at HM Montepríncipe University Hospital

Dr. Salamanca Viloria, Jorge
- Cardiology Department, La Princesa University Hospital, Madrid

Dr. Serrano Antolín, José María
- Cardiology Department at Fuenlabrada University Hospital, Madrid

Dr. Valbuena López, Silvia Cayetana
- Cardiology Department La Paz University Hospital

Dr. Vega Primo, Alejandro
- Cardiology Department at the Ruber Juan Bravo Hospital Complex Quironsalud, Madrid

Dr. Velasco Rodríguez, Diego
- Hematology Department, Jiménez Díaz Foundation University Hospital, Quironsalud, Madrid

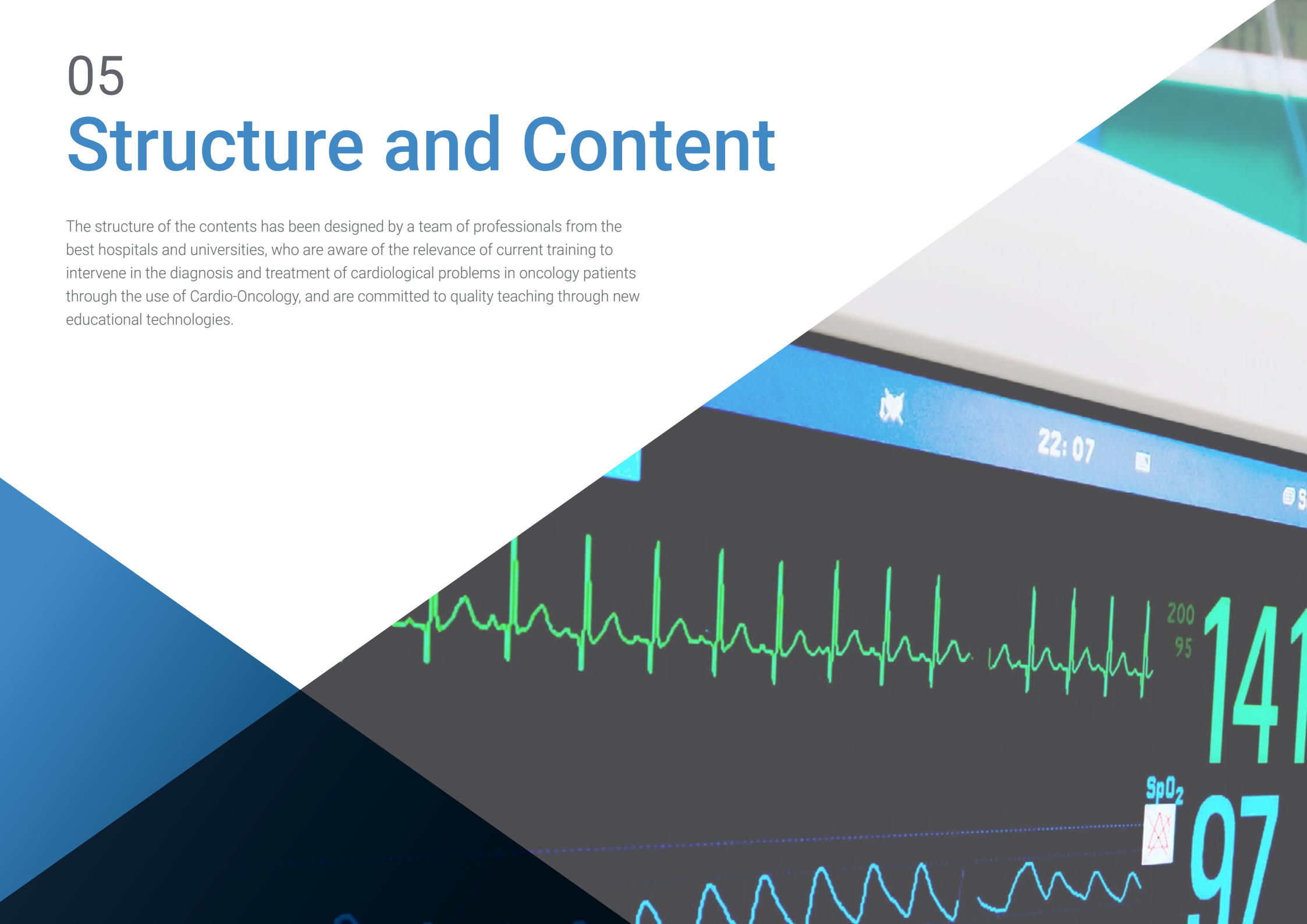
Dr. Vidal Laso, Rosa
- Hematology Department, Jiménez Díaz Foundation University Hospital, Quironsalud, Madrid

Dr. Zorita Gil, Blanca
- Cardiology Departmentat Montepríncipe Hospital, Madrid

05

Structure and Content

The structure of the contents has been designed by a team of professionals from the best hospitals and universities, who are aware of the relevance of current training to intervene in the diagnosis and treatment of cardiological problems in oncology patients through the use of Cardio-Oncology, and are committed to quality teaching through new educational technologies.



This Professional Master's Degree in Oncological Cardiology contains the most complete and up-to-date scientific program on the market"

Module 1. Epidemiology of Cancer

1.1. Epidemiological Significance of Cancer
1.2. Epidemiological Significance of Cardiotoxicity in Oncology
1.3. Epidemiological Significance of Cardiotoxicity in Hematology

Module 2. Oncologic Treatments with Cardiotoxic Effect

2.1. Definition of Cardiotoxicity. Affected Cardiac Chambers. Pathophysiological Mechanisms of Cardiotoxicity
2.2. Radiotherapy as a Cause of Cardiotoxicity
  2.2.1. Evolution of Radiotherapy Equipment and Methods
  2.2.2. Factors that Influence Radiation-Induced Cardiotoxicity
  2.2.3. Acute Toxicity
  2.2.4. Chronic Toxicity
2.3. Chemotherapy as a Cause of Cardiotoxicity
  2.3.1. Anthracyclines
  2.3.2. Antitubulin Drugs
  2.3.3. Antimetabolites
  2.3.4. Alkylating Agents and Other Drugs that Interact with DNA
2.4. Biological Agents as a Cause of Cardiotoxicity: Monoclonal Antibodies
  2.4.1. Trastuzumab
  2.4.2. Other Monoclonal Antibodies
2.5. Other Potentially Cardiotoxic Biological Agents
  2.5.1. Cytokines
  2.5.2. Interferons
2.6. Therapies Aimed at New Molecular Targets and Cardiotoxicity: Cellular Kinase Inhibitors
2.7. Immune Checkpoint Inhibitors and Cardiotoxicity
2.8. Other Potentially Cardiotoxic Oncologic Treatments
  2.8.1. Histone Deacetylase Inhibitors
  2.8.2. Oral Antiangiogenics
  2.8.3. Differentiation and/or Apoptosis Inducers
  2.8.4. Hormonal Agents

Module 3. Comprehensive Assessment of the Risk of Cardiotoxicity Development

3.1. Individual Susceptibility to Cardiotoxicity: Genetic Factors
3.2. Individual Susceptibility to Cardiotoxicity: Non-Genetic Factors
  3.2.1. Cardiovascular Risk Factors
  3.2.2. Comorbidities
  3.2.3. Combination of Oncologic Treatments
3.3. Cardiological Evaluation before Treatment in Patients without Known Heart Disease
  3.3.1. Clinical Assessment
  3.3.2. Complementary Tests
3.4. Cardiological Evaluation before Treatment in Patients with Known Heart Disease
  3.4.1. Clinical Assessment
  3.4.2. Complementary Tests
3.5. Monitoring during Treatment of Patients Subjected to Cardiotoxic Treatments
  3.5.1. Clinical Assessment
  3.5.2. Complementary Tests

Module 4. Early Detection of Cardiotoxicity

4.1. Circulating Biomarkers: Troponins
4.2. Circulating Biomarkers: Natriuretic Peptides
4.3. Other Circulating Biomarkers for Early Detection of Cardiotoxicity
4.4. Echocardiography
4.5. Cardiovascular Magnetic Resonance Imaging
4.6. Computerized Axial Tomography

Module 5. Myocardial Toxicity

5.1. Incidence and Clinical Relevance
5.2. Pathophysiology of Ventricular Dysfunction and Heart Failure in the Context of Cardiotoxicity
5.3. Drugs Implicated in the Development of Ventricular Dysfunction and Heart Failure
  5.3.1. Anthracyclines
  5.3.2. Other Chemotherapy Drugs
  5.3.3. Biological Agents: Monoclonal Antibodies
  5.3.4. Therapies Aimed at New Molecular Targets: Inhibitors of Cellular Kinases
  5.3.5. Protease Inhibitors

5.4. Radiotherapy and Heart Failure
5.5. Methods for Diagnosing Myocardial Involvement
  5.5.1. Electrocardiogram
  5.5.2. Echocardiography
  5.5.3. Other Non-Invasive Imaging Techniques
5.6. Treatment Strategies
  5.6.1. Treatment of Acute Heart Failure
  5.6.2. Chronic Treatment of Patients with Ventricular Dysfunction
5.7. Presymptomatic Myocardial Involvement
  5.7.1. Management of Patients with Elevated Circulating Biomarkers during Oncologic Treatment
  5.7.2. Management of Patients with Preclinical Impairment of Ventricular Function during Oncologic Treatment
5.8. Monitoring Strategy during Treatment with Drugs Capable of Causing Myocardial Toxicity
  5.8.1. Anthracyclines
  5.8.2. Biological Agents: Monoclonal Antibodies
  5.8.3. Therapies Aimed at New Molecular Targets: Inhibitors of Cellular Kinases
  5.8.4. Immune Checkpoint Inhibitors

Module 6. Ischemic Heart Disease and Cardiotoxicity

6.1. Incidence of Ischemic Heart Disease in Oncology Patients
6.2. Identifying Patients at High Risk of Coronary Artery Disease
6.3. Pathophysiology of Ischemic Heart Disease in the Context of Oncologic Treatment
6.4. Pharmacologic Oncologic Therapies that are Associated with Ischemic Heart Disease
  6.4.1. Fluoropyrimidine
  6.4.2. Vascular Endothelial Growth Factor Inhibitors
  6.4.3. Other (Cisplatin)
6.5. Diagnostic Methods for Coronary Artery Disease Related to Cardiotoxic Drugs
  6.5.1. Electrocardiogram
  6.5.2. Functional Tests
  6.5.3. Non-Invasive Imaging Tests
  6.5.4. Invasive Imaging Tests

6.6. Acute Coronary Syndrome in the Context of Oncologic Treatment
6.7. Monitoring and Treatment Strategy in the Patient with Coronary Ischemia
6.8. Thoracic Radiotherapy and Ischemic Heart Disease
  6.8.1. Incidence and Pathophysiology of Radiation-Induced Coronary Artery Disease
  6.8.2. Risk Factors for the Development of Ischemic Heart Disease in Radiotherapy Patients
  6.8.3. Clinical Assessment and Diagnostic Methods of Coronary Heart Disease in Radiotherapy Patients
  6.8.4. Treatment Options in Coronary Artery Disease Associated with Radiotherapy
6.9. Management of Chronic Ischemic Patients Receiving Oncologic Treatment

Module 7. Arrhythmias and Cardiotoxicity

7.1. Incidence and Pathophysiology of Cardiac Arrhythmias Related to Oncologic Treatments
7.2. QT Interval Prolongation: Causative Drugs and Associated Risk Factors
7.3. QT Interval Prolongation: Diagnostic Criteria and Risk Stratification of Ventricular Arrhythmias
7.4. QT Interval Prolongation: Prevention Strategies and Implications on the Continuity of Specific Treatment
7.5. Atrial Fibrillation: Incidence, Risk Factors, and Clinical Presentation
7.6. Atrial Fibrillation: Oncologic Treatments Involved in its Development
7. 7. Atrial Fibrillation: Anticoagulant Treatment
  7.7.1. Thrombotic and Hemorrhagic Risk Assessment
  7.7.2. Anticoagulation with Heparin
  7.7.3. Anticoagulation with Dicoumarinics
  7.7.4. Direct Acting Anticoagulants
7.8. Treatment Strategy in Atrial Fibrillation: Rate Control versus Rhythm Control
7.9. Bradyarrhythmias Associated with Oncologic Treatment
  7.9.1. Sinus Dysfunction
  7.9.2. Atrioventricular Block
  7.9.3. Therapeutic Implications

Module 8. Valvular and Pericardial Involvement Related to Cardiotoxicity

8.1. Oncologic Treatments that May Lead to the Development of Valvulopathies
- 8.1.1. Pharmacological Treatments
- 8.1.2. Thoracic Radiotherapy

8.2. Management of Chronic Valvular Patients Receiving Oncologic Treatment
- 8.2.1. Mitral Valve Disease
- 8.2.2. Aortic Valve Disease
- 8.2.3. Valve Prosthesis

8.3. Pharmacological Treatments that May Lead to the Development of Pericardial Disease
- 8.3.1. Incidence and Physiopathology
- 8.3.2. Clinical Presentation and Diagnosis
- 8.3.3. Approach to Pericardial Effusion Secondary to Treatment

8.4. Thoracic Radiotherapy and Pericardial Disease
- 8.4.1. Acute Pericarditis
- 8.4.2. Chronic Pericarditis

8.5. Assessing Patients with Metastatic Pericardial Involvement

Module 9. Arterial Hypertension as a Result of Oncologic Treatments

9.1. Clinical Relevance of Hypertension in Oncology Patients

9.2. Arterial Hypertension Associated with Antiangiogenic Drugs
- 9.2.1. Incidence
- 9.2.2. Pathophysiology
- 9.2.3. Diagnosis

9.3. Other Treatments Associated with the Development of Arterial Hypertension

9.4. Treatment of Arterial Hypertension Related to Oncologic Treatment

9.5. Monitoring Strategy

Module 10. Venous Thromboembolic Disease and Other Vascular Complications in the Oncology Patient

10.1. Venous Thromboembolic Disease in the Oncologic Patient: Clinical Relevance
- 10.1.1. Incidence
- 10.1.2. Pathophysiology
- 10.1.3. Risk Factors

10.2. Antineoplastic Treatments Associated with Increased Risk of Thromboembolic Disease
- 10.2.1. Chemotherapy and Antiangiogenic Drugs
- 10.2.2. Hormone Therapy

10.3. Prevention of Cancer-Related Venous Thromboembolic Disease
- 10.3.1. Prevention Strategy in Outpatients with Active Oncology Treatment. Thrombotic Risk Scales
- 10.3.2. Prevention Strategy in Hospitalized Patients
- 10.3.3. Perisurgical Prevention Strategy

10.4. Venous Thromboembolic Disease Related to the Use of Central Venous Catheters
- 10.4.1. Incidence
- 10.4.2. Clinical Presentation
- 10.4.3. Diagnostic Techniques
- 10.4.4. Treatment and Monitoring
- 10.4.5. Prevention

10.5. Forms of Presentation and Diagnosis of Cancer-Associated Thromboembolic Disease
- 10.5.1. Deep Vein Thrombosis
- 10.5.2. Pulmonary Embolism

10.6. Treatment of Cancer-Associated Thromboembolic Disease
- 10.6.1. Initial Treatment
- 10.6.2. Extended Treatment

10.7. Management of Thromboembolic Disease in Special Situations
- 10.7.1. Brain Tumors
- 10.7.2. Obesity
- 10.7.3. Renal Insufficiency
- 10.7.4. Thrombopenia

10.8. Primary Prevention of Cardiovascular Disease in Cancer Patients
- 10.8.1. Incidence and Risk Factors
- 10.8.2. Implicated Drugs
- 10.8.3. Clinic, Diagnosis and Treatment

10.9. Cerebrovascular Disease
- 10.9.1. Incidence and Risk Factors
- 10.9.2. Implicated Treatments
- 10.9.3. Clinic, Diagnosis and Treatment

10.10. Pulmonary Hypertension
- 10.10.1. Implicated Drugs Pathophysiology
- 10.10.2. Clinical Diagnosis
- 10.10.3. Treatment and Monitoring

Module 11. Therapies with Cardioprotective Effects

11.1. Identification and Control of Cardiotoxicity Risk
- 11.1.1. Treatment of Traditional Risk Factors
- 11.1.2. Treatment of Comorbidities

11.2. Strategies to Limit Oncologic Drug-Related Cardiotoxicity
- 11.2.1. Anthracyclines
- 11.2.2. Monoclonal Antibodies. HER2 Inhibitors
- 11.2.3. Cell Kinase Inhibitors

11.3. Strategies to Limit Cardiotoxicity Related to Thoracic Radiotherapy

11.4. Role of Beta-Blockers in Cardioprotection

11.5. Role of Angiotensin Receptor Inhibitors and Antagonists in Cardioprotection

11.6. Other Interventions with a Possible Cardioprotective Effect

Module 12. Long-Term Monitoring Programs for Patients Who Have Received Cardiotoxic Therapies

12.1. Risk of Late Cardiotoxicity Secondary to Oncological Drugs

12.2. Monitoring Protocol for the Detection of Late Cardiotoxicity

12.3. Risk of Late Cardiotoxicity Secondary to Thoracic Radiotherapy

12.4. Monitoring Protocol for Detecting Late Radiation-Induced Toxicity

Module 13. Complex Clinical Situations in the Context of Cardiotoxicity

13.1. Patient with Complex Cardiovascular Disease Requiring Oncologic Treatment
13.2. Patient with Established Oncologic Disease Presenting with an Acute Ischemic Event
13.3. Pediatric Patients in Need of Potentially Cardiotoxic Oncology Treatment
13.4. Geriatric Patients in need of Oncologic Treatment
13.5. Oncology Patients Requiring Anticoagulation or Antiplatelet
13.6. Oncology Patients who Exhibit Arrhythmias and Require Implantable Devices (Pacemakers or Defibrillators)

Module 14. The Future of Cardio-Oncology: Most Relevant Lines of Research

14.1. Basic Research.
14.2. Clinical Research
14.3. Gaps in Evidence and Future Research

Module 15. Multidisciplinary Cardio-Oncology Units

15.1. Objectives of the Cardio-Oncology Units
  15.1.1. Care Objectives
  15.1.2. Research Objectives
  15.1.3. Teaching and Dissemination Objectives
15.2. Components of Cardio-Oncology Equipment
  15.2.1. Coordination between the In-Hospital and Out-of-Hospital Environment
  15.2.2. Coordination between Different Healthcare Professionals

A unique, key, and decisive educational experience to boost your professional development"

06

Methodology

This academic program offers students a different way of learning. Our methodology uses a cyclical learning approach: **Relearning.**

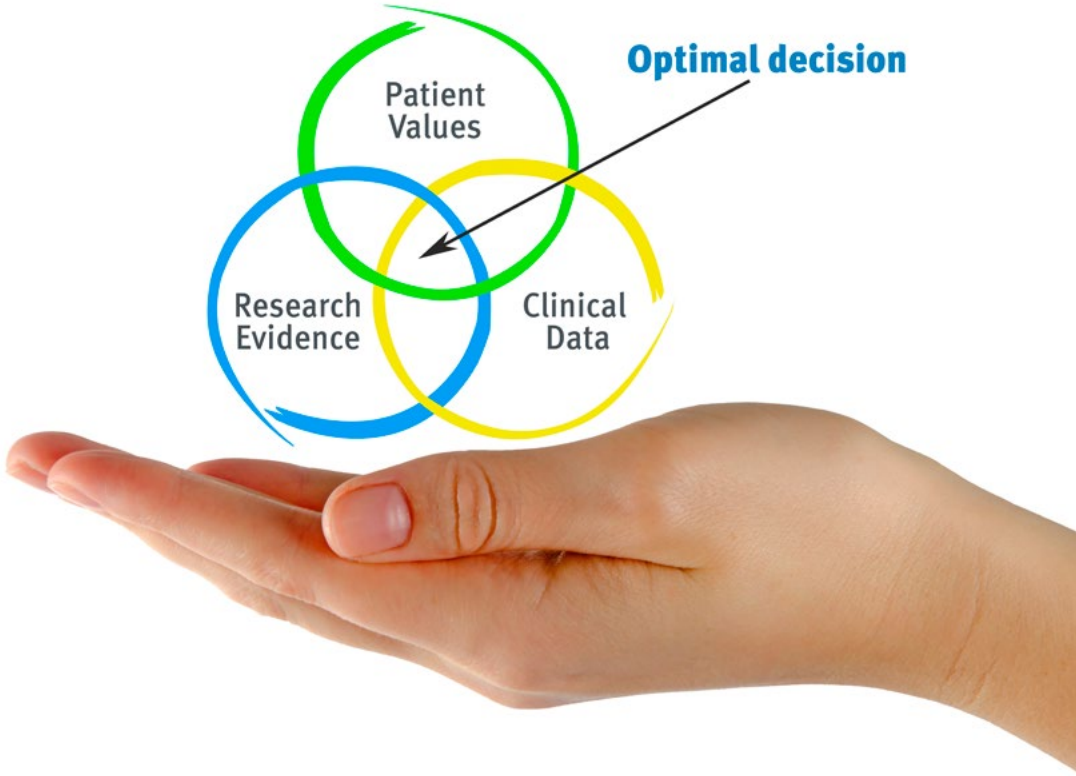
This teaching system is used, for example, in the most prestigious medical schools in the world, and major publications such as the **New England Journal of Medicine** have considered it to be one of the most effective.

Discover Relearning, a system that abandons conventional linear learning, to take you through cyclical teaching systems: a way of learning that has proven to be extremely effective, especially in subjects that require memorization"

At TECH we use the Case Method

What should a professional do in a given situation? Throughout the program, students will face multiple simulated clinical cases, based on real patients, in which they will have to do research, establish hypotheses, and ultimately resolve the situation. There is an abundance of scientific evidence on the effectiveness of the method. Specialists learn better, faster, and more sustainably over time.

With TECH you will experience a way of learning that is shaking the foundations of traditional universities around the world.



According to Dr. Gérvas, the clinical case is the annotated presentation of a patient, or group of patients, which becomes a "case", an example or model that illustrates some peculiar clinical component, either because of its teaching power or because of its uniqueness or rarity. It is essential that the case is based on current professional life, trying to recreate the real conditions in the physician's professional practice.

Did you know that this method was developed in 1912, at Harvard, for law students? The case method consisted of presenting students with real-life, complex situations for them to make decisions and justify their decisions on how to solve them. In 1924, Harvard adopted it as a standard teaching method"

The effectiveness of the method is justified by four fundamental achievements:

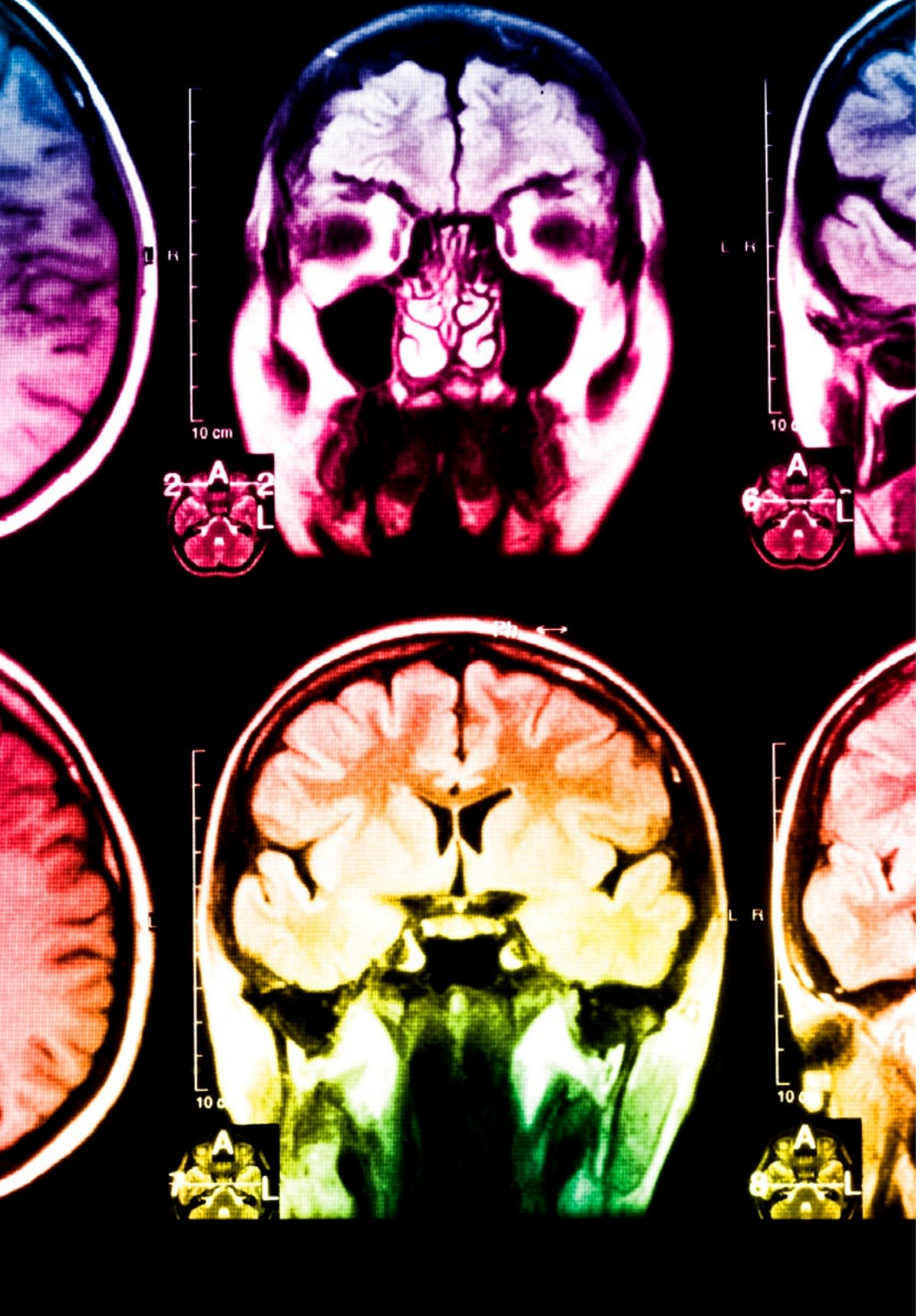
1. Students who follow this method not only achieve the assimilation of concepts, but also a development of their mental capacity, through exercises that evaluate real situations and the application of knowledge.
2. Learning is solidly translated into practical skills that allow the student to better integrate into the real world.
3. Ideas and concepts are understood more efficiently, given that the example situations are based on real-life.
4. Students like to feel that the effort they put into their studies is worthwhile. This then translates into a greater interest in learning and more time dedicated to working on the course.

Relearning Methodology

At TECH we enhance the case method with the best 100% online teaching methodology available: Relearning.

This university is the first in the world to combine the study of clinical cases with a 100% online learning system based on repetition, combining a minimum of 8 different elements in each lesson, a real revolution with respect to the mere study and analysis of cases.

Professionals will learn through real cases and by resolving complex situations in simulated learning environments. These simulations are developed using state-of-the-art software to facilitate immersive learning.



At the forefront of world teaching, the Relearning method has managed to improve the overall satisfaction levels of professionals who complete their studies, with respect to the quality indicators of the best online university (Columbia University).

With this methodology, more than 250,000 physicians have been trained with unprecedented success in all clinical specialties regardless of surgical load. Our pedagogical methodology is developed in a highly competitive environment, with a university student body with a strong socioeconomic profile and an average age of 43.5 years old.

Relearning will allow you to learn with less effort and better performance, involving you more in your specialization, developing a critical mindset, defending arguments, and contrasting opinions: a direct equation to success.

In our program, learning is not a linear process, but rather a spiral (learn, unlearn, forget, and re-learn). Therefore, we combine each of these elements concentrically.

The overall score obtained by TECH's learning system is 8.01, according to the highest international standards.

This program offers the best educational material, prepared with professionals in mind:

Study Material

All teaching material is produced by the specialists who teach the course, specifically for the course, so that the teaching content is highly specific and precise.

These contents are then applied to the audiovisual format, to create the TECH online working method. All this, with the latest techniques that offer high quality pieces in each and every one of the materials that are made available to the student.

Surgical Techniques and Procedures on Video

TECH introduces students to the latest techniques, the latest educational advances and to the forefront of current medical techniques. All of this in direct contact with students and explained in detail so as to aid their assimilation and understanding. And best of all, you can watch the videos as many times as you like.

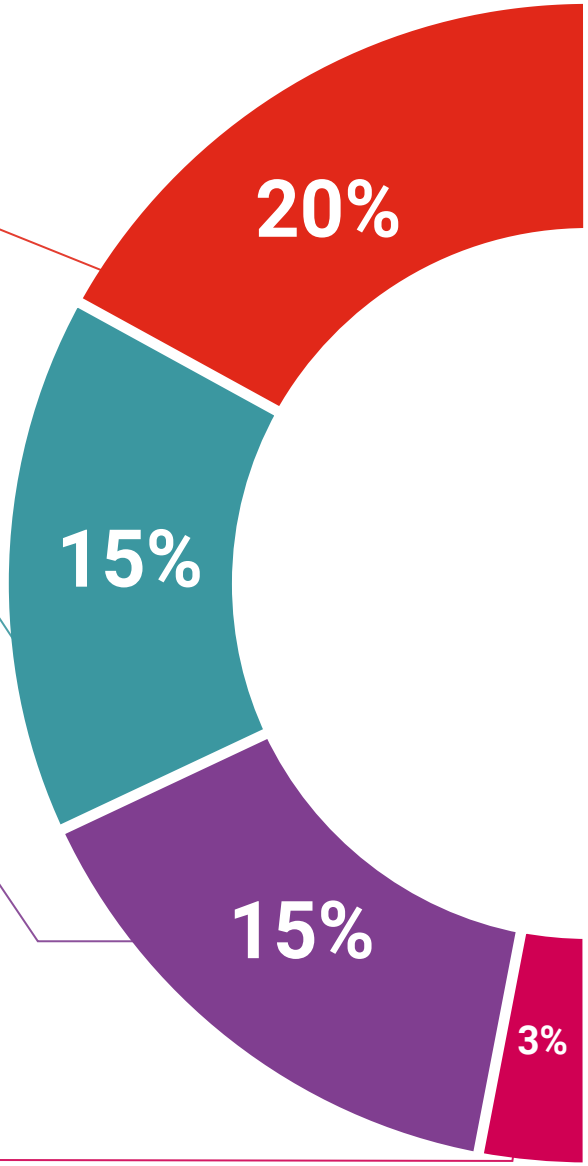
Interactive Summaries

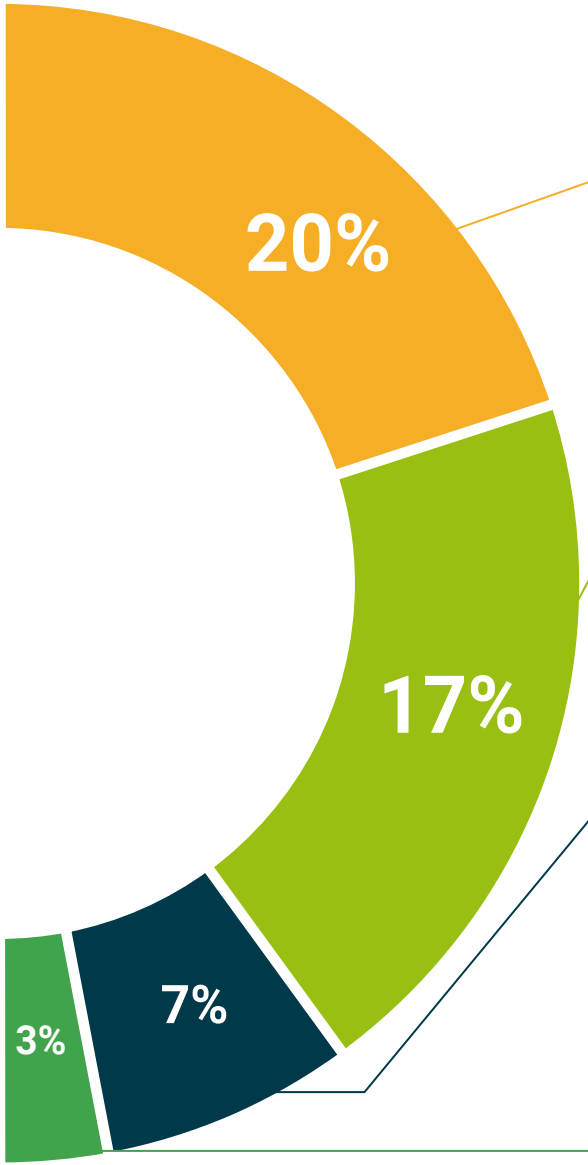
The TECH team presents the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

This exclusive educational system for presenting multimedia content was awarded by Microsoft as a "European Success Story".

Additional Reading

Recent articles, consensus documents and international guidelines, among others. In TECH's virtual library, students will have access to everything they need to complete their course.





Expert-Led Case Studies and Case Analysis

Effective learning ought to be contextual. Therefore, TECH presents real cases in which the expert will guide students, focusing on and solving the different situations: a clear and direct way to achieve the highest degree of understanding.

Testing & Retesting

We periodically evaluate and re-evaluate students' knowledge throughout the program, through assessment and self-assessment activities and exercises, so that they can see how they are achieving their goals.

Classes

There is scientific evidence on the usefulness of learning by observing experts. The system known as Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.

Quick Action Guides

TECH offers the most relevant contents of the course in the form of worksheets or quick action guides. A synthetic, practical, and effective way to help students progress in their learning.

07

Certificate

The Professional Master's Degree in Cardio-Oncology guarantees you, in addition to the most rigorous and updated training, access to a Professional Master's Degree issued by TECH Technological University.

Successfully complete this program and receive your university degree without travel or laborious paperwork"

This **Professional Master's Degree in Cardio-Oncology** contains the most complete and updated scientific program on the market.

After the student has passed the assessments, they will receive their corresponding **Professional Master's Degree** issued by **TECH Technological University** via tracked delivery*.

The diploma issued by **TECH Technological University** will reflect the qualification obtained in the Professional Master's Degree, and meets the requirements commonly demanded by labor exchanges, competitive examinations, and professional career evaluation committees.

Title: **Professional Master's Degree in Cardio-Oncology**

Official Nº of hours: **1,500 h.**

tech technological university

Awards the following

DIPLOMA

to

Mr./Ms. _____, with identification number _____.

For having successfully passed and accredited the following program

PROFESSIONAL MASTER'S DEGREE

in

Cardio-Oncology

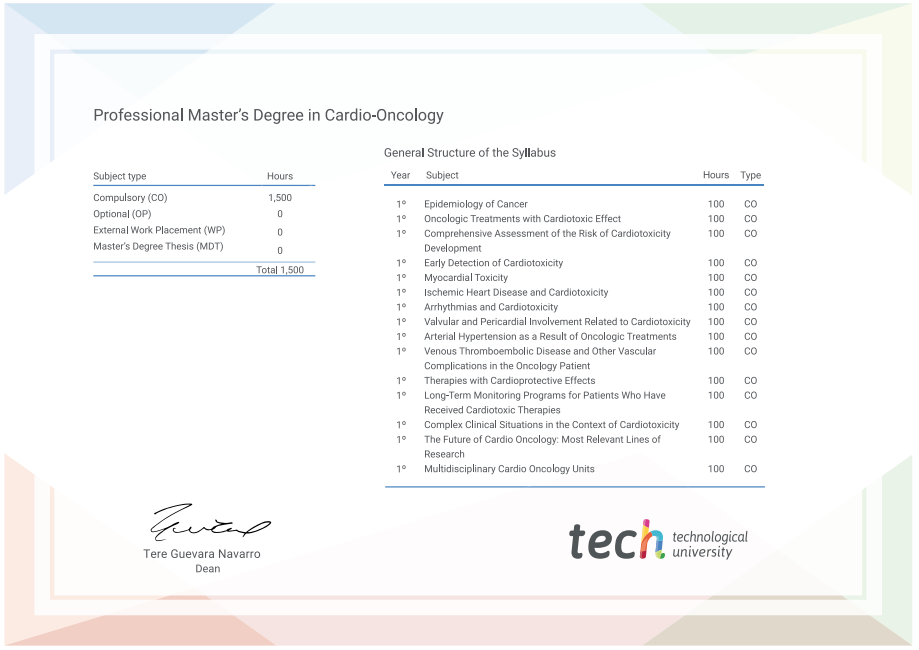
This is a qualification awarded by this University, equivalent to 1,500 hours, with a start date of dd/mm/yyyy and an end date of dd/mm/yyyy.

TECH is a Private Institution of Higher Education recognized by the Ministry of Public Education as of June 28, 2018.

June 17, 2020

Tere Guevara Navarro
Dean

This qualification must always be accompanied by the university degree issued by the competent authority to practice professionally in each country. Unique TECH Code: AFWORD23S techtitute.com/certificates



Professional Master's Degree in Cardio-Oncology

Subject type	Hours
Compulsory (CO)	1,500
Optional (OP)	0
External Work Placement (WP)	0
Master's Degree Thesis (MDT)	0
	Total 1,500

General Structure of the Syllabus

Year	Subject	Hours	Type
1º	Epidemiology of Cancer	100	CO
1º	Oncologic Treatments with Cardiotoxic Effect	100	CO
1º	Comprehensive Assessment of the Risk of Cardiotoxicity Development	100	CO
1º	Early Detection of Cardiotoxicity	100	CO
1º	Myocardial Toxicity	100	CO
1º	Ischemic Heart Disease and Cardiotoxicity	100	CO
1º	Arrhythmias and Cardiotoxicity	100	CO
1º	Valvular and Pericardial Involvement Related to Cardiotoxicity	100	CO
1º	Arterial Hypertension as a Result of Oncologic Treatments	100	CO
1º	Venous Thromboembolic Disease and Other Vascular Complications in the Oncology Patient	100	CO
1º	Therapies with Cardioprotective Effects	100	CO
1º	Long-Term Monitoring Programs for Patients Who Have Received Cardiotoxic Therapies	100	CO
1º	Complex Clinical Situations in the Context of Cardiotoxicity	100	CO
1º	The Future of Cardio Oncology: Most Relevant Lines of Research	100	CO
1º	Multidisciplinary Cardio Oncology Units	100	CO

Tere Guevara Navarro
Dean

tech technological university

*Apostille Convention. In the event that the student wishes to have their paper diploma issued with an apostille, TECH EDUCATION will make the necessary arrangements to obtain it, at an additional cost.

tech technological university

Professional Master's Degree
Cardio-Oncology

- Modality: **online**
- Duration: **12 months**
- Certificate: **TECH Technological University**
- Dedication: **16h/week**
- Schedule: **at your own pace**
- Exams: **online**

Professional Master's Degree

Cardio-Oncology

tech technological university