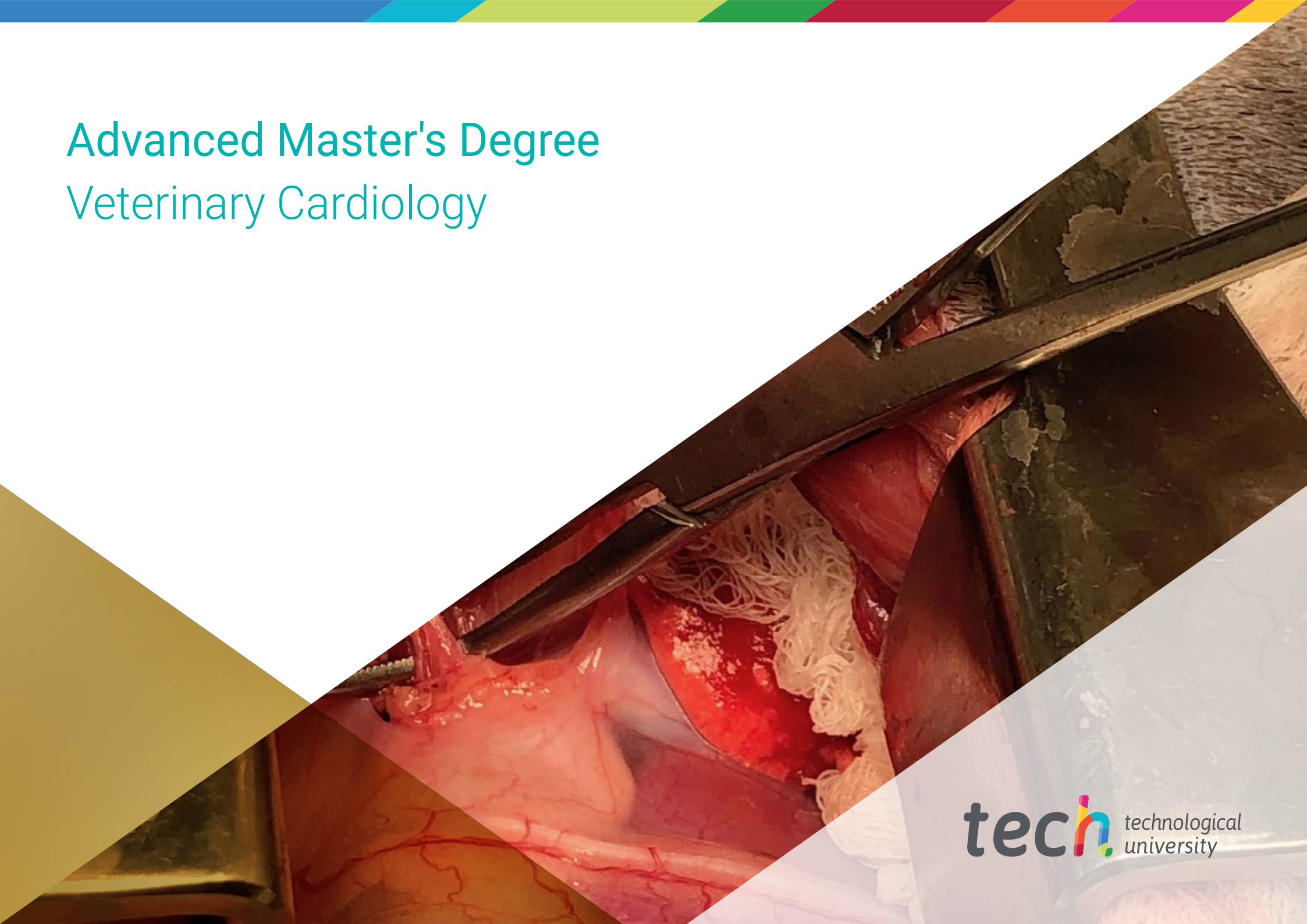
Advanced Master's Degree
Veterinary Cardiology



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Advanced Master's Degree
Veterinary Cardiology

Course Modality: **Online**
Duration: **2 years**
Accreditation: **TECH Technological University**
Official Nº of hours: **3,000 h.**
Website: **www.techtitute.com/us/veterinary-medicine/advanced-master-degree/advanced-master-degree-veterinary-cardiology**

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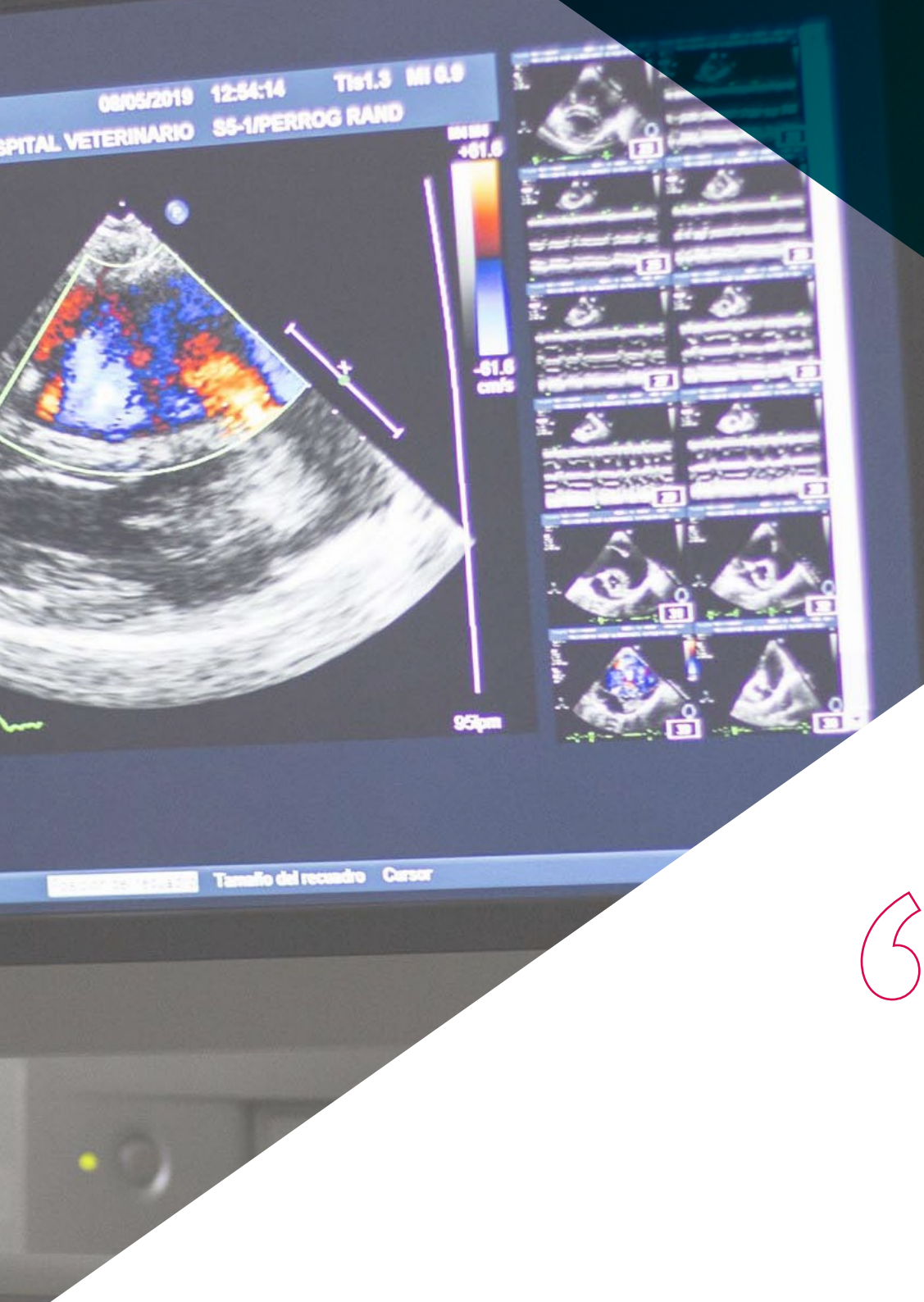
01

Introduction

Cardiovascular disorders in animals are highly significant because they can affect their quality of life and life expectancy. These disorders require veterinarians to have advanced knowledge of Cardiology, especially because it is an Internal Medicine subspecialty that has undergone great development in recent decades, requiring professionals to constantly update their knowledge.



Better trained veterinarians means longer life expectancy for animals. Don't think twice and develop your skills in the field of Veterinary Cardiology with this complete Advanced Master's Degree"

In recent years, considerable progress has been made in the area of Veterinary Cardiology, favored by the appearance of many new diagnostic and therapeutic techniques that have achieved successful results in the treatment of animals with heart disease.

Given these developments and the changing nature of the field, veterinary professionals must be in the habit of updating their knowledge in order to keep up with the applications of the most effective tools used in daily practice. That is the framework that structures this online Advanced Master's Degree, complemented by the added benefit of all the latest developments in Veterinary Cardiology on the market today, both in small animals and larger species.

When it comes to larger species, further study is still needed in the field. For example, Cardiology in ruminants and swine has been limited for a long time due to the scarce literature available and diagnostic limitations, especially in advanced therapeutic procedures. Similarly, equidae are often affected by heart disease due to the overexertion required of them, especially horses participating in sports competitions. That is why it is necessary to have specialized veterinarians who are able to improve animal health and quality of life.

Furthermore, this specialization is aimed at professionals who normally have long working days, which prevents them from being able to continue specializing in traditional face-to-face classes, and who cannot find quality online programs adapted to their needs. Given this context of need, TECH presents this Advanced Master's Degree in Veterinary Cardiology, which has come to revolutionize the world of veterinary specialization, both for its contents and for its teaching staff and innovative teaching methodology.

What's more, as it is a 100% online specialization, students decide where and when to take on the course load. Without the restrictions of fixed timetables or having to move between classrooms, this course can be combined with work and family life.

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

- The latest technology in e-learning software
- Intensely visual teaching system, supported by graphic and schematic contents that are easy to assimilate and understand
- The development of practical case studies presented by practicing experts
- State-of-the-art interactive video systems
- Teaching supported by telepractice
- Continuous updating and recycling systems
- Self-organized learning which makes the course completely compatible with other commitments
- Practical exercises for self-assessment and learning verification
- Support groups and educational synergies: questions to the expert, debates and knowledge forums
- Communication with the teacher and individual reflection work
- Content that is accessible from any fixed or portable device with an Internet connection
- Supplementary documentation databases are permanently available, even after the program

A highly scientific program, supported by advanced technological development and the teaching experience of the best professionals"

Advances in Veterinary Cardiology make it necessary for clinicians to constantly update their knowledge in order to know how to implement the latest techniques in their daily work"

Our teaching staff is made up of practicing professionals, ensuring that we offer the up-to-date information we intend to. A multidisciplinary staff of trained and experienced professionals from a variety of areas who will impart theoretical knowledge in an efficient manner, but above all, will contribute the practical knowledge derived from their experience to this program.

Their command of the subject is complemented by the effectiveness of the methodological design used in this Advanced Master's Degree. Developed by a multidisciplinary team of e-learning experts, it integrates the latest advances in educational technology. In this way, students will be able to study with a range of comfortable and versatile multimedia tools that will give them the operability needed throughout the program.

The design of this program is based on Problem-Based Learning, an approach that views learning as a highly practical process. To achieve this remotely, we will use telepractice. With the help of an innovative, interactive video system and Learning from an Expert, students will be able to acquire the knowledge as if they were dealing with the case in real time. A concept that will allow students to integrate and memorize what they have learnt in a more realistic and permanent way.

TECH offers you the opportunity to take an in-depth and complete look into the strategies and approaches used in Veterinary Cardiology.

A program created for professionals who aspire to excellence, and that will enable you to easily and effectively acquire new skills and strategies.

02

Objectives

TECH's objective is to create highly qualified professionals for work experience. An objective that is complemented in a global manner by promoting human development that lays the foundations for an improved society. This objective is focused on helping professionals reach a much higher level of expertise and control. A goal that is achievable, with a high-intensity and high-precision specialization.

If your goal is to improve in your profession and acquire a qualification that will enable you to compete among the best, then look no further: Welcome to TECH"

General objectives

- Examine the stages of embryonic development of the cardiovascular system
- Analyze cardiac and vascular anatomy
- Develop knowledge of the normal function of the cardiovascular system
- Examine the main pathophysiological mechanisms of cardiac diseases in small animals
- Examine the pathophysiology of heart failure as the main paradigm in cardiology
- Assess the hygienic-dietary management of cardiovascular disease
- Analyze the key aspects of owner communication about cardiovascular disease in small animals
- Determine the drugs available for the treatment of cardiovascular diseases in small animals
- Determine the performance of a correct anamnesis focused on the cardiovascular and respiratory systems
- Analyze in detail the fundamentals, technique and information provided by cardiorespiratory auscultation
- Develop knowledge of the main clinical pictures of cardiorespiratory diseases in small animals
- Analyze the diagnostic tests involved in the diagnosis and assessment of the cardiovascular system such as laboratory tests, cardiac markers and blood pressure measurement
- Establish the physical basis of radiology in a clear, precise and applicable manner
- Determine the radiographic technique to be used for the performance of correct thoracic radiographs
- Analyze the radiological findings of a normal thoracic radiograph
- Examine the radiological signs of the main diseases affecting the thoracic cavity
- Analyze sonographic signs in non-cardiac diseases affecting the thoracic cavity
- Develop and systematize a routine for the acquisition of high-quality electrocardiographic tracings
- Firmly consolidate knowledge of the characteristics of physiological electrical activity and identify those variations that are in the range of normality
- Delve into the electrophysiological mechanisms that cause arrhythmias
- Identify patients requiring therapeutic intervention
- Analyze the physical principles of ultrasound, the basis of imaging in echocardiography
- Establish the protocol for performing echocardiography and analyze in detail all the parameters that can be obtained through echocardiography
- Examine in depth the information provided by echocardiography in the hemodynamic assessment of patients
- Present advanced echocardiographic techniques and new advances in the field of echocardiography
- Develop in detail the diagnosis of chronic degenerative valve disease
- Assess treatments and new therapies that have been developed in recent years for chronic degenerative valve disease
- Analyze the assessment and treatment of patients with pericardial effusion and patients with bacterial endocarditis
- Consolidate the phenotypic characteristics that define each of the cardiomyopathies affecting small animals
- Generate specialized knowledge in the diagnosis of the etiological causes that can lead to a cardiomyopathy phenotype
- Determine the possible hemodynamic consequences of cardiomyopathies
- Develop an individualized treatment plan to maximize the quality of life and life expectancy of affected patients
- Analyze the embryological mechanisms that give rise to the most frequent congenital alterations

- Reinforce the need for early diagnosis of congenital disease
- Anticipate the possible hemodynamic consequences of these alterations, which may be treatable
- Consolidate knowledge of interventional techniques
- Develop an appropriate diagnostic protocol to avoid missing the presence of secondary cardiac disease or systemic disease that may affect the cardiovascular system
- Anticipate possible cardiovascular complications in the course of other primary pathologies
- Integrate information from Internal Medicine with information from Cardiology to design individualized treatment plans
- Simultaneously monitor cardiovascular disease and primary disease in order to prioritize etiological therapies and reduce polypharmacy
- Analyze the embryological development of the different cardiac structures
- Gain in-depth knowledge of the fetal circulation and its evolution to the adult animal
- Examine cardiac anatomy and its topography in the thoracic cavity in depth
- Establish the basic principles of cardiovascular functioning
- Generate specialized knowledge in cardiac physiology
- Recognize the mechanisms involved in the genesis of arrhythmias
- Identify the basis of cardiac pathophysiology of syncope and heart failure
- Detail the mechanisms of action, adverse effects and contraindications of drugs used in the cardiovascular area
- Establish a suitable methodology for animal cardiopathy examination
- Identify all clinical signs associated with cardiovascular disease
- Generate specialized knowledge of cardiac auscultation
- Establish the specific clinical approach to animals with a cardiovascular disorder
- Develop a suitable working methodology to optimize the use of non-invasive diagnostic tests
- Analyze the basics of ultrasound to learn the tools useful in the assessment of cardiac function and structure
- Establish solid concepts in the genesis of the electrocardiogram
- Develop a diagnostic protocol based on the electrocardiogram
- Examine the main aspects involved in the development of congenital heart disease and its progression after birth
- Analyze the anatomical-ecocardiographic relationship of complex congenital heart diseases in order to make a simple diagnosis
- Develop the etiology, progression and prognosis of acquired structural heart disorders
- Establish a diagnostic methodology to address acquired structural cardiac disorders and select the appropriate therapeutic management for each of them
- Perform a proper identification of sinus rhythm
- Establish an appropriate methodology for the interpretation of arrhythmias
- Generate specialized knowledge of resting and stress electrocardiograms
- Establish the specific clinical approach to animals with arrhythmia
- Generate specialized knowledge on the most common vascular problems
- Identify all clinical signs associated with each disease
- Establish the specific clinical approach for each pathology
- Determine the prognosis and the most appropriate treatment in each case
- Know the adaptations of the cardiovascular system to exercise and their application in the examination of sports horses

- Identify all clinical signs associated with cardiovascular overtraining and undertraining
- Establish cardiovascular fitness assessment methods
- Know the complementary tests used to evaluate horses with heart disease during exercise
- Establish an accurate criterion to address performance decline and sudden death in horses
- Examine in detail how organ imbalances, intoxications and critical pathologies such as shock affect the heart
- Develop knowledge of systemic diseases related to cardiovascular disorders
- Establish the adaptive and pathological changes manifested by the heart with certain systemic diseases
- Establish therapeutic protocols in systemic diseases that affect the heart, addressing treatment as a whole
- Generate specialized knowledge in advanced cardiac diagnostic and therapeutic techniques
- Examine the instrumentation required to perform cardiac catheterization and minimally invasive surgery
- Establish the appropriate methodology for the performance of these advanced procedures, including their anesthetic approach
- Strengthen the basis for selecting appropriate cases for cardiac catheterization and minimally invasive surgery
- Develop knowledge of cardiopulmonary resuscitation protocols

Specific objectives

Module 1. Cardiac Embryology, Anatomy, Physiology and Pathophysiology

- Compile the chronology of embryonic and fetal development of the cardiovascular system in small animals
- Examine cardiac macro- and microstructural morphology and vascular macro- and microstructural morphology
- Develop knowledge of the fundamental hemodynamic principles underlying cardiac physiology
- Determine the functions and design of the cardiovascular system
- Examine the contractile function of the heart
- Establish the parts of the cardiac cycle
- Analyze the factors on which cardiac output depends and the main mechanisms of cardiovascular regulation
- Assess the main pathophysiological mechanisms involved in diseases of the endocardium, myocardium and pericardium
- Generate specialized knowledge on cardiogenic pulmonary edema

Module 2. Heart Failure Cardiac Pharmacology

- Analyze the pathophysiological mechanisms of heart failure and its repercussions on the rest of the systems and apparatuses
- Compile the existing evidence on the dietary management of cardiovascular disease in small animals
- Establish guidelines to provide correct information to the owner about the pet's cardiovascular disease
- Establish the mechanism of action, indications, adverse effects and contraindications of the main medication used in treating heart failure such as ACE inhibitors, diuretics and Pimobendan
- Examine the mechanism of action, indications, posology, adverse effects and contraindications of the main drugs used in the treatment of arrhythmias
- Determine the mechanism of action, indications, posology, adverse effects and contraindications of anticoagulant drugs

Module 3. Anamnesis and Cardiovascular Examination

- Establish the key questions and their epidemiological and pathophysiological correlates of cardiorespiratory anamnesis in small animals
- Develop knowledge of the fundamentals of cardiopulmonary auscultation and its implication in the clinic
- Examine cardiac and pulmonary auscultation technique
- Analyze the information that cardiac and pulmonary auscultation can provide in the differential diagnosis
- Identify the key aspects for the diagnosis of the clinical picture of cough and dyspnea
- Establish the key aspects for the diagnosis of the clinical picture of cyanosis and the clinical picture of syncope
- Determine the proper technique for measuring blood pressure and the information it provides in cardiovascular diseases
- Examine the proper technique for measuring central venous pressure and the information it provides in patients in critical care units
- Analyze basic blood count and biochemistry parameters that may be altered in cardiovascular disease
- Compile specialized knowledge to interpret the information provided by the assessment of cardiac markers in cardiorespiratory disease

Module 4. Complementary Tests. Diagnostic Imaging

- Develop knowledge of the physical fundamentals of Radiology
- Determine the radiographic technique for the assessment of the thoracic cavity
- Analyze the normal radiological findings of the thoracic cavity of small animals
- Establish the main errors in the radiological technique and their implication in the diagnosis
- Determine the radiological findings in thoracic diseases affecting extrathoracic structures, mediastinum, esophagus and trachea
- Generate specialized knowledge about normal ultrasound findings and non-cardiac diseases of the thoracic cavity

Module 5. Complementary Tests. Electrocardiogram

- Generate specialized knowledge on tools for the unambiguous identification of P-waves
- Develop knowledge of a systematic method for understanding the electrical activity illustrated by the ECG tracing
- Establish the characteristics that allow discerning the etiology of the arrhythmia
- Establish criteria to define the anatomical origin of the arrhythmia
- Specify the criteria defining the malignancy of an arrhythmia
- Clearly define patients who require a Holter study
- Develop knowledge of advanced techniques in the range of therapeutic possibilities

Module 6. Complementary Tests. Echocardiography

- Establish the basic principles of imaging training in echocardiography
- Identify the main artifacts that may appear during the echocardiographic technique
- Determine patient preparation and positioning guidelines for echocardiography
- Determine the common echocardiographic slices and develop the information that can be obtained from them in the M-mode and two-dimensional modes
- Review Doppler assessment and evaluation and highlight its importance in hemodynamic assessment
- Utilize hemodynamic assessment in depth in terms of systolic, diastolic, spectral and color Doppler function
- Determine the use of thoracic ultrasound in other diseases that may be a consequence of cardiac disease
- Gain expertise in the performance and assessment of echocardiography in small mammals

Module 7. Acquired Heart Diseases. Chronic Mitral and Tricuspid Valve Disease. Endocarditis. Pericardial Alterations. Cardiac Masses

- Generate specialized knowledge of the epidemiology of chronic degenerative valve disease
- Determine an assessment protocol for chronic degenerative valve disease
- Analyze the different tests used in the diagnosis of chronic degenerative valve disease
- Compile the information available on the therapy of chronic degenerative valve disease
- Propose a diagnostic and therapeutic algorithm for pericardial effusion
- Develop knowledge of the pericardioventesis technique
- Examine the etiology of bacterial endocarditis
- Determine a diagnostic and therapeutic algorithm for bacterial endocarditis

Module 8. Acquired Heart Disease. Cardiomyopathies

- Develop a diagnostic protocol for the phenotype of canine dilated cardiomyopathy and the features that may raise suspicion of secondary cardiomyopathy
- Systematically assess the possible presence of etiological causes of canine dilated cardiomyopathy that can be treated
- Develop an assessment of the risk of negative events in cases of dilated and arrhythmogenic right cardiomyopathy
- Develop individualized treatment protocols to maximize patient life expectancy, and sometimes reverse the phenotype
- Specify the echocardiographic criteria for the diagnosis of feline hypertrophic cardiomyopathy
- Generate advanced knowledge on the latest feline hypertrophic cardiomyopathy staging model for clinical decision making
- Analyze the differentiating characteristics of other types of feline cardiomyopathies

Module 9. Congenital Heart Disease

- Generate specialized knowledge for a correct understanding of the embryological mechanisms of each of the pathologies that may predispose to the presence of several simultaneous alterations
- Establish the anatomical characteristics of patent ductus arteriosus that advise surgical or interventional treatment
- Review the various surgical and interventional techniques available for the treatment of pulmonary stenosis
- Develop knowledge of available treatment modalities for aortic stenosis
- Compile available diagnostic techniques to determine the direction of a shunt in intra- and extra-chamber communications
- Establish anatomical criteria to differentiate between congenital and acquired heart valve processes
- Predict the hemodynamic consequences of vascular defects or multiple defects

Module 10. Pulmonary and Systemic Hypertension, Systemic Diseases with Cardiac Repercussions and Anesthesia in the Cardiac Patient

- Deepen the understanding of the pathophysiological mechanisms that may lead to the development of pulmonary hypertension
- Identify echocardiographic features that may be helpful in the diagnosis of pulmonary hypertension in the presence and absence of tricuspid regurgitation
- Quantify the damage generated in target organs by systemic hypertension
- Become familiar with the most frequently used drugs for the treatment of systemic hypertension and monitoring of therapy
- Consolidate the treatment protocols most commonly used in filariasis, and identify the differences in the pathophysiology of the disease in dogs and cats
- Monitor response to etiological treatment of hyperthyroidism in feline cardiac anatomy
- Assess the hemodynamic consequences of metabolic diseases that induce hypercoagulable state
- Assess the need for surgical intervention and its risks in cases of pheochromocytoma
- Consider the advantages and disadvantages of antiarrhythmic treatments in cases of splenic disease or gastric dilatation/torsion syndrome
- Identify the hemodynamic consequences of electrolyte disturbances

Module 11. Cardiac Embryology, Anatomy and Physiology in Large Animals: Equidae, Ruminants and Swine

- Specify the foundations of embryonic development
- Establish the foundations of possible cardiac malformations
- Carry out an in-depth examination of the cardiac structure
- Analyze the microscopic characteristics of the heart
- Develop knowledge of the concepts of the electrical activity of the heart
- Examine the characteristics of cardiomyocytes
- Generate specialized knowledge about ion channels and action potentials

Module 12. Cardiovascular Pathophysiology and Pharmacology in Large Animals: Equidae, Ruminants and Swine

- Analyze the arrhythmogenic bases and classify them according to the causative mechanism
- Recognize the main mechanisms underlying syncope
- Differentiate the mechanisms leading to the onset of heart failure
- Establish the different pathways activated in heart failure
- Detail the control of the organism in heart failure
- Describe and detail the pharmacological groups with action on the cardiovascular system
- Specify the indications for antiarrhythmic drugs, their mechanism of action and adverse effects

Module 13. General Examination of Large Animals with Cardiovascular Pathology: Equidae, Ruminants and Swine

- Develop knowledge of specialized information on the clinical examination of cardiac patients
- Accurately recognize the normal sounds that can be encountered
- Differentiate between physiological murmurs and pathological murmurs
- Establish differential diagnoses of abnormal rhythms based on irregularity and heart rate
- Establish a work methodology for patients with murmurs and for patients with arrhythmias
- Generate a work methodology for patients with syncope
- Develop a work methodology for animals with heart failure

Module 14. Complementary Non-Invasive Cardiovascular Tests in Large Animals: Equidae, Ruminants, Swine

- Substantiate the physical principles of ultrasound and imaging training
- Differentiate the types of echocardiography and analyze their usefulness in different clinical situations
- Recognize all the ultrasound planes described and propose a standardized protocol for evaluating the heart
- Gain insight into the genesis of the electrocardiogram in order to analyze its pattern, the existence of artifacts and morphological anomalies
- Specify the different recording systems and methods used to obtain the electrocardiogram and adapt it to the patient's clinical situation
- Establish a systematic protocol that simplifies the reading of the electrocardiogram
- Identify the main mistakes made when analyzing the electrocardiogram

Module 15. Structural Cardiac Pathologies in Large Animals: Equidae, Ruminants and Swine

- Generate specific knowledge of the underlying pathophysiology of congenital heart disease
- Specify the appropriate diagnostic and therapeutic protocol for each of them
- Propose a standardized protocol for evaluating the heart when there is a congenital anomaly
- Analyze the etiology and pathophysiology of acquired cardiac disorders in order to understand their evolution, treatment and progression
- Identify clinical, echocardiographic and electrocardiographic markers that provide information to establish the clinical relevance of structural pathologies
- Update knowledge with the latest therapeutic advances in congenital and acquired pathologies of the heart

Module 16. Arrhythmias in Large Animals: Equidae, Ruminants and Swine

- Generate knowledge of the genesis of the electrocardiogram
- Be able to accurately recognize sinus rhythm and pathological rhythm
- Differentiate all arrhythmias from each other
- Establish differential diagnoses for physiological and pathological arrhythmias
- Know the clinical relevance of arrhythmias
- Establish therapeutic protocols for arrhythmias

Module 17. Pathologies of the Endocardium, Myocardium, Pericardium and Vascular System in Major Species: Equidae, Ruminants and Swine

- Identify the main pathologies affecting blood vessels
- Analyze the origin of the problem and establish the prognosis of myocarditis
- Recognize the clinical and laboratory signs of the main intoxications affecting the myocardium
- Specify the mechanisms of pericardial disease and its consequences
- Establish the prognosis of horses with thrombophlebitis and possible complications
- Identify the symptoms of vasculitis and propose treatment options
- Perform an in-depth examination of vascular lesions caused by parasites
- Recognize the signs of horses with vascular fistulas and their implications
- Propose a treatment plan for horses with dilated cardiomyopathy

Module 18. Cardiac Response to Exercise, Sports Performance and Sudden Death in Sports Horses

- Generate specialized knowledge on the cardiovascular fitness required according to discipline and the different training methods
- Specify the information required in clinical examination of sports horses
- Precisely examine the cardiovascular and hematological adaptations resulting from cardiovascular education
- Analyze the different cardiovascular training methods according to discipline
- Differentiate between the symptoms of overtraining and cardiovascular detraining
- Propose a methodology for assessing cardiovascular fitness of horses
- Establish working protocols for the clinical evaluation of cardiac horses during performance
- Identify cardiac pathologies that decrease performance and cardiac pathologies that increase the risk of sudden death
- Establish criteria for assessing the risk of sudden death in horses

Module 19. Systemic Disorders and Specific Situations Affecting the Heart in Large Animals: Equidae, Ruminants and Swine

- Specify the specific risks of electrolyte disturbances in patients
- Examine the specific risks of critical states such as shock
- Develop knowledge of the most common endocrine pathologies and establish their relationship with the heart
- Develop specialized knowledge of cardiorenal syndrome and establish its treatment
- Differentiate between primary and secondary cardiac pathologies
- Establish the complications associated with the administration of sedative and anesthetic drugs routinely used in daily clinical practice

Module 20. Advanced Cardiac Procedures: Interventionism, Minimally Invasive Surgery and Cardiopulmonary Resuscitation in Large Animals: Equidae, Ruminants and Swine

- Analyze the specific risks posed by anesthesia
- Develop knowledge of appropriate anesthetic protocols that allow for safe anesthesia
- Adequately select cases that can undergo cardiac catheterization and minimally invasive surgery, establishing a risk-benefit ratio
- Develop in-depth knowledge of the instruments used in cardiac catheterization and minimally invasive surgical techniques
- Differentiate the types of existing pacemakers and defibrillators
- Integrating electrical cardioversion as a routine treatment option in the equine clinic
- Examine the complications that arise during cardiac catheterization and minimally invasive surgery and establish protocols for dealing with these complications
- Establish up-to-date protocols for cardiopulmonary resuscitation in foals and adult horses

Quality specialized programs for outstanding students. At TECH, we offer the perfect education for high-level specialization"

03

Skills

Once all the contents have been studied and the objectives of this Advanced Master's Degree in Veterinary Cardiology have been achieved, professionals will have better competence and improved job performance in this area. A very complete approach in a high-level master's degree which makes the difference.

Achieving excellence in any profession requires effort and perseverance but, above all, it requires the support of professionals who will give you the boost you require. At TECH, we offer you everything you need"

General skills

- Examine the main pathophysiological mechanisms of cardiac diseases in small animals
- Examine the pathophysiology of heart failure as the main paradigm in cardiology
- Analyze the diagnostic tests involved in the diagnosis and assessment of the cardiovascular system such as laboratory tests, cardiac markers and blood pressure measurement
- Analyze sonographic signs in non-cardiac diseases affecting the thoracic cavity
- Delve into the electrophysiological mechanisms that cause arrhythmias
- Identify patients requiring therapeutic intervention
- Examine in depth the information provided by echocardiography in the hemodynamic assessment of patients
- Assess treatments and new therapies that have been developed in recent years for chronic degenerative valve disease
- Develop an individualized treatment plan to maximize the quality of life and life expectancy of affected patients
- Analyze the embryological mechanisms that give rise to the most frequent congenital alterations
- Simultaneously monitor cardiovascular disease and primary disease in order to prioritize etiological therapies and reduce polypharmacy
- Analyze the embryological development of the different cardiac structures
- Identify the basis of cardiac pathophysiology of syncope and heart failure
- Develop a suitable working methodology to optimize the use of non-invasive diagnostic tests
- Analyze the basics of ultrasound to learn the tools useful in the assessment of cardiac function and structure
- Analyze the anatomical-echocardiographic relationship of complex congenital heart diseases in order to make a simple diagnosis
- Develop knowledge of the etiology, progression and prognosis of acquired structural heart disorders
- Establish the specific clinical approach to animals with arrhythmia
- Identify all clinical signs associated with each disease
- Identify all clinical signs associated with cardiovascular overtraining and undertraining
- Develop knowledge of systemic diseases related to cardiovascular disorders
- Establish therapeutic protocols in systemic diseases affecting the heart, addressing the treatment as a whole
- Examine the instrumentation required to perform cardiac catheterization and minimally invasive surgery
- Develop knowledge of cardiopulmonary resuscitation protocols

Specific skills

- Establish the foundations of possible cardiac malformations
- Recognize the main mechanisms underlying syncope
- Differentiate between physiological murmurs and pathological murmurs
- Differentiate between the types of echocardiography and analyze their usefulness in different clinical situations
- Propose a standardized protocol for evaluating the heart when there is a congenital anomaly
- Establish differential diagnoses for physiological and pathological arrhythmias
- Identify the main pathologies affecting blood vessels
- Analyze the different cardiovascular training methods according to discipline
- Develop specialized knowledge of cardiorenal syndrome and establish its treatment
- Establish up-to-date protocols for cardiopulmonary resuscitation in foals and adult horses

04

Course Management

In upholding our concept of total quality, we are proud to offer students the support of a high-level teaching staff, chosen for their proven experience in education. Professionals from different areas and fields of expertise that make up a complete, multidisciplinary team. A unique opportunity to learn from the best.

Our professors contribute their vast experience and their teaching skills to this degree in order to offer you a stimulating and creative specialized program"

Management

Dr. Martínez Delgado, Rubén

- Graduated in Veterinary Medicine in 2008 from the Complutense University of Madrid (UCM)
- Internships in Surgery (2006) and in Cardiology (2007-2008) at UCM
- Collaboration project in Minimally Invasive Interventional Cardiology, Cardiology Department, UCM, 2008
- From 2009 to 2010 he completed the Intership of the official internship of the European College of Internal Medicine (ECVIM) at the Gran Sasso Veterinary Clinic in Milan (a reference center in cardiology and ultrasound diagnosis and a center specialized in interventional cardiology)
- From 2010 to the present, he has been working as an ambulatory Cardiologist in many centers in Madrid and surrounding areas
- Collaborates with the Veterinary Hospital of the UCM developing the part of minimally invasive interventional cardiology
- Since 2017, he has headed the Cardiology service at the Estoril Veterinary Hospital, Móstoles
- Member of AVEPA and GECAR and a regular attendee of congresses in the specialty of Cardiology and Diagnostic Imaging; presented several conferences on electrocardiography and echocardiography

Dr. Villalba Orero, María

- PhD in Veterinary Medicine, Complutense University of Madrid
- Doctoral thesis in Equine Anesthesia in 2014
- Degree in Veterinary Medicine from the Complutense University Madrid

Professors

Ms. Criado García, Guadalupe

- Degree in Veterinary Medicine from the University of Extremadura (2015)
- Private equine medicine service (2020, Catalonia)

Dr. Cortés Sánchez, Pablo M

- Degree in Veterinary Medicine, Complutense University of Madrid (UCM), 2007, including a year of scholarship studies at the University of Southern Indiana, USA
- Internships in Internal Medicine (2006) and Cardiology at UCM (2007)
- Master's Degree in Cardiology for generalists by ISVPS (International School of Veterinary Postgraduate Studies) in 2011
- Master's Degree in Veterinary Medicine (MVM) at present
- Internship in Cardiology at the University of Liverpool (2017), with completion of a research project in mitral disease pending publication
- Internship in Cardiology at the University of Glasgow, as a result of which he began a Master's Degree in Veterinary Medicine (MVM), which he is currently pursuing
- Head of the Cardiology service and co-director of the Intensive Care Unit (ICU) of the Estoril Veterinary Hospital, Móstoles, Madrid (2007 to 2017)
- Head of Cardiology service and part of the ICU team at Braid Vets, Edinburgh UK (January 2018 to July 2019)
- Speaker in cardiology, radiology, intensive care and anesthesia, sponsored by prestigious firms, both in Spain and in the UK
- Member of GECAR (Cardiology and Respiratory System Specialists Group), and certified in echocardiography by this institution, for which he is currently developing the official echocardiographic screening guidelines for congenital heart disease
- Registered member of the Royal College of Veterinary Surgeons (RCVS), UK, which has certified him as an Advanced Veterinary Practitioner

Ms. Fuentes Romero, Beatriz

- Degree in Veterinary Medicine from Alfonso X El Sabio University
- Member of the Spanish Association of Equine Veterinarians (AVEE)

Dr. Gómez Trujillo, Blanca

- Head of the Cardiology Service of the Madrid Este Veterinary Hospital
- Veterinarian, member of the Cardiology and Echocardiography Service of the VETSIA Veterinary Hospital
- Veterinary Degree. Complutense University of Madrid
- General Certificate in Small Animal Medicine. ISVPS
- Postgraduate course in Small Animal Internal Medicine. Improve International. Madrid
- Small Animal Cardiology Course. FORVET. Madrid
- Course of Echocardiography in Small Animals. FORVET. Madrid

Ms. Mateos Pañero, María

- Degree in Veterinary Medicine from the University of Extremadura
- Member of the British Small Animal Veterinary Association, member of the Veterinary Cardiovascular Society

Dr. Martín Cuervo, María

- Doctorate with international mention (2017)
- Degree in Veterinary Medicine from the University of Cordoba in 2005

Dr. Medina Torres, Carlos Eduardo

- PhD in Internal Medicine of Large Animals
- Doctorate (PhD) - The University of Queensland (International Scholarship)
- Australian Equine Laminitis Research Unit
- School of Veterinary Medicine, Faculty of Science, The University of Queensland

Dr. Ortiz Díez, Gustavo

- PhD and Undergraduate Degree in Veterinary Medicine from the UCM
- AVEPA Accredited Soft Tissue Surgery
- Member of the scientific committee and current president of GECIRA (AVEPA's Soft Tissue Surgery Specialty Group)
- Master's Degree in Research Methodology in Health Sciences from the UAB
- ICT competencies course for teachers by UNED
- Specialist in Traumatology and Orthopedic Surgery in Companion Animals by the UCM Degree in Cardiology of Small Animals by the UCM
- Jesús Usón Accredited in functions B, C, D and E in Experimental Animals, Community of Madrid
- Proprietary Degree in Emotional Intelligence, UR, completed training in Gestalt Psychology
- Associate Professor, Department of Animal Medicine and Surgery, Faculty of Veterinary Medicine, Complutense University of Madrid
- Head of Small Animal Unit at Complutense Clinical Veterinary Hospital
- Head of the Department of Soft Tissue Surgery and Minimally Invasive Procedures at the Veterinary Specialties 4 Octubre Hospital (Arteixo, La Coruña, Spain)

Ms. Pradillo Martínez, Alicia

- Degree in Veterinary Medicine from the Complutense University Madrid
- Equine Physical Preparation Teacher in Technical Sports Training Level 3

Ms. Roquet Carné, Imma

- Degree in Veterinary Medicine, Autonomous University of Barcelona, 2005
- Master's Degree in Veterinary Science from the University of Saskatchewan (Canada)
- Professor of several Equine Clinical Master's Degrees at the University of Extremadura and the Autonomous University of Barcelona

Dr. Sanchez Afonso, Tiago

- PhD in Veterinary Medicine from the University of Georgia (USA)
- Doctoral thesis on Equine Cardiology, University of Georgia (USA)
- Degree in Veterinary Medicine from the University of Lisbon (Portugal)

Dr. Troya Portillo, Lucas

- Degree in Veterinary Medicine, Complutense University of Madrid
- Associate Professor, Department of Animal Medicine and Surgery, Autonomous University of Barcelona; teaching equine internal medicine since 2018

A high-level team for a very high-quality specialization"

05

Structure and Content

The contents of this specialization have been developed by different professors with a clear purpose: to ensure that students acquire each and every one of the skills necessary to become true experts in this field. The content of this course will allow you to learn all aspects of the different disciplines involved in this area. A complete and well-structured program will take you to the highest standards of quality and success.

Through a very well compartmentalized development, you will be able to access the most advanced knowledge available today in Veterinary Cardiology"

Module 1. Cardiac Embryology, Anatomy, Physiology and Pathophysiology

1.1. Cardiac and Vascular Embryology
- 1.1.1. Cardiac Embryology
- 1.1.2. Vascular Embryology

1.2. Cardiac and Vascular Anatomy and Histology
- 1.2.1. Cardiac Anatomy
- 1.2.2. Vascular Anatomy
- 1.2.3. Cardiac Histology
- 1.2.4. Vascular Histology

1.3. Normal Cardiovascular Physiology
- 1.3.1. Functions
- 1.3.2. Circulation Design
- 1.3.3. Contractibility

1.4. Normal Cardiovascular Physiology
- 1.4.1. Cardiac Cycle

1.5. Normal Cardiovascular Physiology
- 1.5.1. Blood Vessel Physiology
- 1.5.2. Systemic and Pulmonary Circulation

1.6. Cardiac Physiopathology
- 1.6.1. Cardiovascular Regulation

1.7. Cardiac Physiopathology
- 1.7.1. Hemodynamic Concepts
- 1.7.2. Cardiac Output. What Does it Depend On?

1.8. Cardiac Physiopathology
- 1.8.1. Valvulopathies

1.9. Cardiac Physiopathology
- 1.9.1. Pericardium
- 1.9.2. Cardiomyopathies
- 1.9.3. Vascular Physiopathology

1.10. Cardiac Physiopathology
- 1.10.1. Pulmonary Edema

Module 2. Heart Failure Cardiac Pharmacology

2.1. Congestive Heart Failure
- 2.1.1. Definition
- 2.1.2. Pathophysiological Mechanisms
- 2.1.3. Pathophysiological Consequences

2.2. Dietary Hygiene Management. Communication with Owners
- 2.2.1. Communication with Owners
- 2.2.2. Feeding in the Cardiac Patient

2.3. Angiotensin-Converting Enzyme Inhibitors (ACE Inhibitors)
- 2.3.1. Mechanism of Action
- 2.3.2. Types
- 2.3.3. Indications
- 2.3.4. Posology
- 2.3.5. Side Effects
- 2.3.6. Contraindications

2.4. Pimobendan and Other Inotropics
- 2.4.1. Pimobendan
  - 2.4.1.1. Mechanism of Action
  - 2.4.1.2. Indications
  - 2.4.1.3. Posology
  - 2.4.1.4. Side Effects
  - 2.4.1.5. Contraindications
- 2.4.2. Sympathomimetics
  - 2.4.2.1. Mechanism of Action
  - 2.4.2.2. Indications
  - 2.4.2.3. Posology
  - 2.4.2.4. Side Effects
  - 2.4.2.5. Contraindications
- 2.4.3. Others

2.5. Diuretics
- 2.5.1. Mechanism of Action
- 2.5.2. Types
- 2.5.3. Indications
- 2.5.4. Posology
- 2.5.5. Side Effects:
- 2.5.6. Contraindications

2.6. Antiarrhythmics (1)
- 2.6.1. Preliminary Considerations
- 2.6.2. Classification of Antiarrhythmics
- 2.6.3. Class 1 Antiarrhythmics

2.7. Antiarrhythmics (2)
- 2.7.1. Class 2 Antiarrhythmics
- 2.7.2. Class 3 Antiarrhythmics
- 2.7.3. Class 4 Antiarrhythmics

2.8. Antihypertensive Drugs
- 2.8.1. Venous
- 2.8.2. Arterials
- 2.8.3. Mixed
- 2.8.4. Pulmonary

2.9. Anticoagulants
- 2.9.1. Heparins
- 2.9.2. Clopidogrel
- 2.9.3. IAAS
- 2.9.4. Others

2.10. Other Drugs Used in the Treatment of Cardiovascular Disease
- 2.10.1. Angiotensin Receptor Antagonists II
- 2.10.2. Spironolactone (Fibrosis and Antiremodeling Study)
- 2.10.3. Carvedilol
- 2.10.4. Positive Chronotropics
- 2.10.5. Atropine (Atropine Test)
- 2.10.6. Taurine in CMD
- 2.10.7. Atenolol in Stenosis
- 2.10.8. Atenolol or Diltiazem in Obstructive HCM

Module 3. Anamnesis and Cardiovascular Examination

3.1. Cardiovascular and Respiratory Anamnesis
- 3.1.1. Epidemiology of Heart Disease
- 3.1.2. Medical History
  - 3.1.2.1. General Symptoms
  - 3.1.2.2. Specific Symptoms

3.2. Cardiovascular and Respiratory Examination
- 3.2.1. Respiratory Pattern
- 3.2.2. Exploration of the Head
- 3.2.3. Neck Exploration
- 3.2.4. Examination of the Thorax
- 3.2.5. Examination of the Abdomen
- 3.2.6. Other Explorations

3.3. Auscultation (I)
- 3.3.1. Physical Principles
- 3.3.2. Phonendoscope
- 3.3.3. Technique
- 3.3.4. Heart Sounds

3.4. Auscultation (II)
- 3.4.1. Murmurs
- 3.4.2. Pulmonary Auscultation

3.5. Cough
- 3.5.1. Definition and Pathophysiological Mechanisms
- 3.5.2. Differential Diagnoses and Diagnostic Algorithm for Cough

3.6. Dyspnoea
- 3.6.1. Definition and Pathophysiological Mechanisms
- 3.6.2. Differential Diagnoses and Diagnostic Algorithm for Dyspnoea

3.7. Syncope
- 3.7.1. Definition and Pathophysiological Mechanisms
- 3.7.2. Differential Diagnoses and Diagnostic Algorithm for Syncope

3.8. Cyanosis
- 3.8.1. Definition and Pathophysiological Mechanisms
- 3.8.2. Differential Diagnoses and Diagnostic Algorithm for Syncope

3.9. Arterial and Central Pressure Venous Pressure
- 3.9.1. Arterial Pressure
- 3.9.2. Central Venous Pressure

3.10. Laboratory Tests and Cardiac Markers
- 3.10.1. Laboratory Tests in Heart Disease
- 3.10.2. Cardiac Biomarkers
- 3.10.3. Genetic Tests

Module 4. Complementary Tests. Diagnostic Imaging

4.1. Principles of Radiology
- 4.1.1. Physical Fundamentals of X-ray Production
- 4.1.2. X-ray Machine
- 4.1.3. Selection of mAs and KV
- 4.1.4. Types of Radiology

4.2. Radiographic Technique in Thoracic Radiology
- 4.2.1. Radiographic Technique
- 4.2.2. Positioning

4.3. Thoracic Radiography (I)
- 4.3.1. Assessment of a Thoracic Radiography
- 4.3.2. Diseases of Extrathoracic Structures

4.4. Thoracic Radiology (II)
- 4.4.1. Tracheal Diseases
- 4.4.2. Mediastinal Diseases

4.5. Thoracic Radiology (III)
- 4.5.1. Diseases of the Pleura
- 4.5.2. Diseases of the Esophagus

4.6. Cardiac Silhouette (1)
- 4.6.1. Assessment of Normal Cardiac Silhouette
- 4.6.2. Size
- 4.6.3. Topography

4.7. Cardiac Silhouette (2)
- 4.7.1. Diseases Affecting the Heart
- 4.7.2. Diseases

4.8. Pulmonary Parenchyma (1)
- 4.8.1. Assessment of Normal Lung Parenchyma
- 4.8.2. Pulmonary Patterns (1)

4.9. Pulmonary Parenchyma (2)
- 4.9.1. Pulmonary Patterns (2)
- 4.9.2. Radiologic Findings in Pulmonary Parenchymal Diseases

4.10. Other Tests
- 4.10.1. Pulmonary Ultrasound Scan
- 4.10.2. Bubble Study

Module 5. Complementary Tests. Electrocardiogram

5.1. Anatomy of the Conduction System and Action Potentials
- 5.1.1. Sinus Node and Supraventricular Conduction Pathways
- 5.1.2. Atrioventricular Node and Ventricular Conduction Pathways
- 5.1.3. Action Potential
  - 5.1.3.1. Pacemaker Cells
  - 5.1.3.2. Contractile Cells

5.2. Obtaining a High-Quality Electrocardiographic Tracing
- 5.2.1. Limb-Led System
- 5.2.2. Precordial-Led System
- 5.2.3. Artifact Reduction

5.3. Sinus Rhythm
- 5.3.1. Typical Electrocardiographic Characteristics of Sinus Rhythm
- 5.3.2. Respiratory Sinus Arrhythmia
- 5.3.3. Non-Respiratory Sinus Arrhythmia
- 5.3.4. Wandering Pacemaker
- 5.3.5. Sinus Tachycardia
- 5.3.6. Sinus Bradycardia
- 5.3.7. Intraventricular Conduction Blocks

5.4. Electrophysiological Mechanisms Causing Arrhythmias
- 5.4.1. Stimulus Formation Disorders
  - 5.4.1.1. Altered Normal Automatism
  - 5.4.1.2. Abnormal Automatism

5.4.1.3. Triggered Activity: Late Postpotentials
5.4.1.4. Triggered Activity: Early Postpotentials
5.4.2. Impulse Conduction Disorders
5.4.2.1. Anatomical Re-Entry
5.4.2.2. Functional Re-Entry
5.5. Supraventricular Arrhythmias (I)
5.5.1. Atrial Premature Complexes
5.5.2. Paroxysmal Supraventricular Tachycardia
5.5.3. Atrioventricular Junctional Tachycardia
5.5.4. Accessory Conduction Routes
5.6. Supraventricular Arrhythmias (II): Atrial Fibrillation
5.6.1. Anatomical and Functional Substrate
5.6.2. Hemodynamic Consequences
5.6.3. Treatment for Frequency Control
5.6.4. Treatment for Rhythm Control
5.7. Ventricular Arrhythmias
5.7.1. Ventricular Premature Complexes
5.7.2. Monomorphic Ventricular Tachycardia
5.7.3. Polymorphic Ventricular Tachycardia
5.7.4. Idioventricular Rhythm
5.8. Bradyarrhythmias
5.8.1. Sick Sinus Disease
5.8.2. Atrioventricular Block
5.8.3. Atrial Silence
5.9. Holter
5.9.1. Holter Monitoring Indications
5.9.2. Equipment
5.9.3. Interpretation
5.10. Advanced Treatment Techniques
5.10.1. Pacemaker Implantation
5.10.2. Radiofrequency Ablation

Module 6. Complementary Tests. Echocardiography

6.1. Introduction: Ultrasound and Equipment
6.1.1. Ultrasound Physics
6.1.2. Equipment and Transducers
6.1.3. Doppler
6.1.4. Artefacts
6.2. Echocardiographic Examination
6.2.1. Patient Preparation and Positioning
6.2.2. 2D Two-Dimensional Echocardiography
6.2.2.1. Echocardiographic Slicing
6.2.2.2. Two-Dimensional Imaging Controls
6.2.2.3. M Mode
6.2.2.4. Spectral Doppler
6.2.2.5. Color Doppler
6.2.2.6. Tissue Doppler
6.3. Measurements and Assessment of 2D and M-mode Images
6.3.1. General Aspects
6.3.2. Left Ventricle and Mitral Valve
6.3.3. Left Atrium
6.3.4. Aorta
6.3.5. Right Ventricle and Tricuspid Valve
6.3.6. Right Atrium and Caval Veins
6.3.7. Pulmonary Trunk and Arteries
6.3.8. Pericardium

6.4. Doppler Measurements and Assessment
- 6.4.1. General Aspects
  - 6.4.1.1. Alignment
  - 6.4.1.2. Laminar and Turbulent Flow
  - 6.4.1.3. Hemodynamic Information
- 6.4.2. Spectral Doppler: Aortic and Pulmonary Flow
- 6.4.3. Spectral Doppler: Mitral and Tricuspid Flow
- 6.4.4. Spectral Doppler: Flow of the Pulmonary and Left Atrial Veins
- 6.4.5. Colour Doppler Assessment
- 6.4.6. Tissue Doppler Measurement and Assessment

6.5. Advanced Echocardiography
- 6.5.1. Tissue Doppler-Derived Techniques
- 6.5.2. Transesophageal Echocardiogram
- 6.5.3. 3D Echocardiography

6.6. Hemodynamic Assessment I
- 6.6.1. Left Ventricular Systolic Function
  - 6.6.1.1. M-Mode Analysis
  - 6.6.1.2. Two-Dimensional Analysis
  - 6.6.1.3. Spectral Doppler Analysis
  - 6.6.1.4. Tissue Doppler Analysis

6.7. Hemodynamic Assessment II
- 6.7.1. Left Ventricular Diastolic Function
  - 6.7.1.1. Types of Diastolic Dysfunction
- 6.7.2. Left Ventricular Filling Pressures
- 6.7.3. Right Ventricular Function
  - 6.7.3.1. Radial Systolic Function
  - 6.7.3.2. Longitudinal Systolic Function
  - 6.7.3.3. Tissue Doppler

6.8. Hemodynamic Assessment III
- 6.8.1. Spectral Doppler
  - 6.8.1.1. Pressure Gradients
  - 6.8.1.2. Pressure Half Time
  - 6.8.1.3. Regurgitation Volume and Fraction
  - 6.8.1.4. Shunt Quota
- 6.8.2. M-Mode
  - 6.8.2.1. Aorta
  - 6.8.2.2. Mitral
  - 6.8.2.3. Septum
  - 6.8.2.4. Left Ventricular Free Wall

6.9. Hemodynamic Assessment IV
- 6.9.1. Color Doppler
  - 6.9.1.1. Jet Size
  - 6.9.1.2. PISA
  - 6.9.1.3. Contracted Vein
- 6.9.2. Assessment of Mitral Regurgitation
- 6.9.3. Assessment of Tricuspid Regurgitation
- 6.9.4. Assessment of Aortic Regurgitation
- 6.9.5. Assessment of Pulmonary Regurgitation

6.10. Thoracic Ultrasound Scan
- 6.10.1. Thoracic Ultrasound Scan
  - 6.10.1.1. Spills
  - 6.10.1.2. Masses
  - 6.10.1.3. Pulmonary Parenchyma
- 6.10.2. Echocardiography in Exotic Animals
  - 6.10.2.1. Rabbits
  - 6.10.2.2. Ferrets
  - 6.10.2.3. Rodents
- 6.10.3. Others

Module 7. Acquired Heart Diseases Chronic Mitral and Tricuspid Valve Disease Endocarditis Pericardial Alterations Cardiac Masses

7.1. Chronic Degenerative Valve Disease (I): Etiology
- 7.1.1. Valvular Anatomy
- 7.1.2. Etiology
- 7.1.3. Prevalence

7.2. Chronic Degenerative Valve Disease (II): Pathology
- 7.2.1. Pathophysiology
- 7.2.2. Staging and Classification

7.3. Chronic Degenerative Valve Disease (III): Diagnosis
- 7.3.1. History and Exploration
- 7.3.2. Radiology
- 7.3.3. Electrocardiogram (ECG)
- 7.3.4. Echocardiography
- 7.3.5. Biochemical Tests
- 7.3.6. Differential Diagnoses

7.4. Chronic Degenerative Valve Disease (III): Echocardiographic Assessment
- 7.4.1. Valvular Anatomy
  - 7.4.1.1. Appearance and Movement
  - 7.4.1.2. Degenerative Lesions
  - 7.4.1.3. Prolapses
  - 7.4.1.4. Ruptured Chordae Tendineae
- 7.4.2. Dimensions and Functionality of the Left Ventricle
- 7.4.3. Quantification of Regurgitation
- 7.4.4. Echocardiographic Staging
  - 7.4.4.1. Cardiac Remodeling
  - 7.4.4.2. Regurgitation Flows and Fraction
  - 7.4.4.3. Left Atrial Pressures
  - 7.4.4.4. Pulmonary Hypertension

7.5. Chronic Degenerative Valve Disease (IV): Progression and Decompensation Risk Analysis
- 7.5.1. Risk Factors for Progression
- 7.5.2. Decompense Prediction
- 7.5.3. Particularities in the Evolution of Tricuspid Pathology
- 7.5.4. Owner's Role
- 7.5.5. Periodicity of Revisions

7.6. Chronic Degenerative Valve Disease (V): Therapy
- 7.6.1. Medical Treatment
- 7.6.2. Surgical Management

7.7. Chronic Degenerative Valve Disease (VI): Complicating Factors
- 7.7.1. Arrhythmias
- 7.7.2. Pulmonary Hypertension
- 7.7.3. Systemic Arterial Hypertension
- 7.7.4. Renal Insufficiency
- 7.7.5. Atrial Rupture

7.8. Infectious Endocarditis
- 7.8.1. Aetiology and Pathophysiology of Bacterial Endocarditis
- 7.8.2. Diagnosis of Bacterial Endocarditis
- 7.8.3. Treatment of Bacterial Endocarditis

7.9. Pericardial Alterations
- 7.9.1. Pericardium Anatomy and Physiology
- 7.9.2. Pathophysiology of Pericardial Tamponade
- 7.9.3. Diagnosis of Pericardial Tamponade
- 7.9.4. Types of Pericardial Alterations
  - 7.9.4.1. Hernias and Defects
  - 7.9.4.2. Spills or Effusions (Types and Origins)
  - 7.9.4.3. Masses
  - 7.9.4.4. Constrictive Pericarditis
- 7.9.5. Pericardiocentesis and Action Protocol

7.10. Cardiac Masses
- 7.10.1. Aortic Base Tumors
- 7.10.2. Hemangiosarcoma
- 7.10.3. Mesothelioma
- 7.10.4. Intracavitary Tumors
- 7.10.5. Clots: Atrial Rupture

Module 8. Acquired Heart Disease. Cardiomyopathies

8.1. Primary Canine Dilated Cardiomyopathy
- 8.1.1. Definition of Primary Dilated Cardiomyopathy (DCM) and Histological Features
- 8.1.2. Echocardiographic Diagnosis of DCM
- 8.1.3. Electrocardiographic Diagnosis of Occult DCM
  - 8.1.3.1. Electrocardiogram (ECG)
  - 8.1.3.2. Holter
- 8.1.4. RCM Therapy
  - 8.1.4.1. Hidden Phase
  - 8.1.4.2. Symptomatic Phase

8.2. Secondary Canine Dilated Cardiomyopathy
- 8.2.1. Etiological Diagnosis of Dilated Cardiomyopathy (DCM)
- 8.2.2. DCM Secondary to Nutritional Deficiencies
- 8.2.3. DCM Secondary to Other Causes
  - 8.2.3.1. Endocrine Disorders
  - 8.2.3.2. Toxins
  - 8.2.3.3. Others

8.3. Tachycardia-Induced Cardiomyopathy (TICM)
- 8.3.1. Electrocardiographic Diagnosis of TICM
  - 8.3.1.1. Electrocardiogram (ECG)
  - 8.3.1.2. Holter
- 8.3.2. TICM Therapy
  - 8.3.2.1. Pharmacotherapy
  - 8.3.2.2. Radiofrequency Ablation

8.4. Arrhythmogenic Right Ventricular Cardiomyopathy (ARVC)
- 8.4.1. Definition of ARVC and Histological Features
- 8.4.2. Echocardiographic Diagnosis of ARVC
- 8.4.3. Electrocardiographic Diagnosis of ARVC
  - 8.4.3.1. ECG
  - 8.4.3.2. Holter
- 8.4.4. ARVC Therapy

8.5. Feline Hypertrophic Cardiomyopathy (HCM) (I)
- 8.5.1. Definition of HCM and Histological Features
- 8.5.2. Echocardiographic Diagnosis of HCM Phenotype
- 8.5.3. Electrocardiographic Findings at HCM

8.6. Feline Hypertrophic Cardiomyopathy (HCM) (II)
- 8.6.1. Etiological Diagnosis of HCM
- 8.6.2. Hemodynamic Consequences of HCM
- 8.6.3. Staging of HCM
- 8.6.4. Prognostic Factors in HCM
- 8.6.5. HCM Therapy
  - 8.6.5.1. Asymptomatic Phase
  - 8.6.5.2. Symptomatic Phase

8.7. Other Feline Cardiomyopathies (I)
- 8.7.1. Restrictive Cardiomyopathy (RCM)
  - 8.7.1.1. Histological Characteristics of RCM
  - 8.7.1.2. Echocardiographic Diagnosis of RCM Phenotype
  - 8.7.1.3. Electrocardiographic Findings in RCM
  - 8.7.1.4. RCM Therapy
- 8.7.2. Feline Dilated Cardiomyopathy
  - 8.7.2.1. Histological Features of Feline Dilated Cardiomyopathy (DCM)
  - 8.7.2.2. Echocardiographic Diagnosis of the DCM Phenotype
  - 8.7.2.3. Etiologic Diagnosis of Feline DCM

8.8. Other Feline Cardiomyopathies (II)
- 8.8.1. Feline Dilated Cardiomyopathy (DMC) (cont.)
  - 8.8.1.1 Therapy of Feline DCM
- 8.8.2. End-Stage Cardiomyopathies
  - 8.8.2.1. Echocardiographic Diagnosis
  - 8.8.2.2. Therapy of End-Stage Cardiomyopathy
- 8.8.3. Hypertrophic Obstructive Cardiomyopathy (HOCM)

8.9. Myocarditis
- 8.9.1. Clinical Diagnosis of Myocarditis
- 8.9.2. Etiologic Diagnosis of Myocarditis
- 8.9.3. Non-Etiologic Therapy of Myocarditis
- 8.9.4. Chagas Disease

8.10. Other Myocardial Alterations
- 8.10.1. Atrial Standstill
- 8.10.2. Fibroendoelastosis
- 8.10.3. Cardiomyopathy Associated with Muscular Dystrophy (Duchenne)
- 8.10.4. Cardiomyopathy in Exotic Animals

Module 9. Congenital Heart Disease

9.1. Patent Ductus Arteriosus (PDA) (I)
- 9.1.1. Embryological Mechanisms that Give Rise to PDA
- 9.1.2. Anatomical Classification of PDA
- 9.1.3. Echocardiographic Diagnosis

9.2. Patent Ductus Arteriosus (II)
- 9.2.1. Pharmacotherapy
- 9.2.2. Interventional Therapy
- 9.2.3. Surgical Therapies

9.3. Pulmonary Stenosis (PS) (I)
- 9.3.1. Anatomical Classification of PS
- 9.3.2. Echocardiographic Diagnosis of PS
- 9.3.3. Pharmacotherapy

9.4. Pulmonary Stenosis (II)
- 9.4.1. Interventional Therapy
- 9.4.2. Surgical Therapies

9.5. Aortic Stenosis (AS) (I)
- 9.5.1. Anatomical Classification of AS
- 9.5.2. Echocardiographic Diagnosis of AS
- 9.5.3. Pharmacotherapy

9.6. Aortic Stenosis (II)
- 9.6.1. Interventional Therapy
- 9.6.2. Screening Program Results

9.7. Ventricular Septal Defects (VSD)
- 9.7.1. Anatomical Classification of VSD
- 9.7.2. Echocardiographic Diagnosis
- 9.7.3. Pharmacotherapy
- 9.7.4. Surgical Therapies
- 9.7.5. Interventional Therapy

9.8. Interatrial Septal Defects (ISD)
- 9.8.1. Anatomical Classification of ISD
- 9.8.2. Echocardiographic Diagnosis
- 9.8.3. Pharmacotherapy
- 9.8.4. Interventional Therapy

9.9. Atrioventricular Valve Dysplasia
- 9.9.1. Tricuspid Dysplasia
- 9.9.2. Mitral Dysplasia

9.10. Other Congenital Defects
- 9.10.1. Tetralogy of Fallot
- 9.10.2. Persistent Left Cranial Cava Vein
- 9.10.3. Double Chamber Right Ventricle
- 9.10.4. Aorto-Pulmonary Window
- 9.10.5. Persistent Right Fourth Aortic Arch
- 9.10.6. Cor Triatrium Dexter and Cor Triatrium Sinister
- 9.10.7. Common Atrioventricular Canal

Module 10. Pulmonary and Systemic Hypertension, Systemic Diseases with Cardiac Repercussions and Anesthesia in the Cardiac Patient

10.1. Pulmonary Hypertension (PH) (I)
- 10.1.1. Definition of PH
- 10.1.2. Echocardiographic Diagnosis of PH
- 10.1.3. HP Classification

10.2. Pulmonary Hypertension (II)
- 10.2.1. Additional Diagnostic Protocol in Animals Suspected of PH
- 10.2.2. PH Treatment

10.3. Systemic Hypertension (I)
- 10.3.1. Methods for Blood Pressure Measurement
- 10.3.2. Diagnosis of Hypertension
- 10.3.3. Pathophysiology of Systemic Hypertension
- 10.3.4. Assessment of Target Organ Damage
- 10.3.5. Hypertensive Cardiomyopathy

10.4. Systemic Hypertension (II)
- 10.4.1. Patient Selection for Hypertension Screening Programs
- 10.4.2. Treatment of Systemic Hypertension
- 10.4.3. Monitoring of Treatment and Additional Target Organ Damage

10.5. Filariasis
- 10.5.1. Etiological Agent
- 10.5.2. Diagnosis of Filarial Infection
  - 10.5.2.1. Physical Methods
  - 10.5.2.2. Serological Methods
- 10.5.3. Pathophysiology of Filarial Infestations
  - 10.5.3.1. Dogs
  - 10.5.3.2. Cats
- 10.5.4. Findings in Echocardiograms
- 10.5.5. Treatment of Filariasis
  - 10.5.5.1. Medical Treatment
  - 10.5.5.2. Interventional Treatment

10.6. Endocrine Diseases Affecting the Heart (I)
- 10.6.1. Hyperthyroidism
- 10.6.2. Hypothyroidism
- 10.6.3. Hyperadrenocorticism
- 10.6.4. Hypoadrenocorticism

10.7. Endocrine Diseases Affecting the Heart (II)
- 10.7.1. Diabetes
- 10.7.2. Acromegaly
- 10.7.3. Hyperaldosteronism
- 10.7.4. Hyperparathyroidism

10.8. Other Systemic Alterations Affecting the Cardiovascular System (I)
- 10.8.1. Pheochromocytoma
- 10.8.2. Anemia
- 10.8.3. Uremia
- 10.8.4. Toxics and Chemotherapeutics
- 10.8.5. Shock

10.9. Other Systemic Alterations Affecting the Cardiovascular System (II)
- 10.9.1. Gastric Dilatation/Torsion
- 10.9.2. Splenic Splenitis/Neoplasia
- 10.9.3. Hypercoagulable State and Thrombosis
- 10.9.4. Conditions Causing Hypo- or Hypercalcemia
- 10.9.5. Conditions Causing Hypo- or Hyperkalemia
- 10.9.6. Conditions Causing Hypo- or Hypermagnesemia

10.10. Anesthesia in Cardiac Patients
- 10.10.1. Pre-Surgery Evaluation
- 10.10.2. Hemodynamic and Surgical Factors Involved in the Choice of Hypnotics
- 10.10.3. Anesthetic Monitoring

Module 11. Cardiac Embryology, Anatomy and Physiology in Large Animals: Equidae, Ruminants and Swine

11.1. Embryology I. Cardiac Tube and Cardiac Loop Formation
- 11.1.1. Cardiac Tube Formation
- 11.1.2. Cardiac Loop Formation

11.2. Embryology II. Formation of Cardiac Septa and Major Blood Vessels, Fetal and Transitional Blood Circulation
- 11.2.1. Cardiac Septa Formation
- 11.2.2. Major Blood Vessel Formation

11.3. Embryology III. Fetal and Transitional Blood Circulation
- 11.3.1. Fetal and Transitional Blood Circulation

11.4. Cardiac Anatomy I. Key Aspects
- 11.4.1. General Data
- 11.4.2. Orientation in the Thoracic Cavity
- 11.4.3. Pericardium

11.5. Cardiac Anatomy II. Heart and Coronary Blood Vessels: Atria, Ventricles and Conduction System
- 11.5.1. Heart and Coronary Blood Vessels
- 11.5.2. Atria and Ventricles
- 11.5.3. Conduction System

11.6. Cardiac Physiology I. Cardiac Cycle, Cardiac Metabolism, Cardiac Muscle
- 11.6.1. Cardiac Cycle
- 11.6.2. Cardiac Metabolism
- 11.6.3. Ultrastructure of Cardiac Muscle

11.7. Cardiac Physiology II. Systolic Heart Function I
- 11.7.1. Preload
- 11.7.2. Afterload

11.8. Cardiac Physiology III. Systolic Heart Function II
- 11.8.1. Contractility
- 11.8.2. Hypertrophy
- 11.8.3. Wall Stress Curves

11.9. Cardiac Physiology IV. Flows and Neurohormonal Control of Circulation
- 11.9.1. Blood Flow
- 11.9.2. Coronary Flow
- 11.9.2. Neurohormone Control of Circulation

11.10. Cardiac Physiology V. Ion Channels and Action Potentials
- 11.10.1. Ion Channels
- 11.10.2. Action Potential

Module 12. Cardiovascular Pathophysiology and Pharmacology in Large Animals: Equidae, Ruminants and Swine

12.1. Pathophysiology of Arrhythmias
- 12.1.1. Arrhythmogenic Mechanisms

12.2. Syncope Pathophysiology
- 12.2.1. Collapse and Syncope
- 12.2.2. Mechanisms Involved in Syncope
- 12.2.3. Types of Syncope According to the Mechanism Involved

12.3. Heart Failure Pathophysiology
- 12.3.4. Definition
- 12.3.5. Mechanisms Involved

12.4. Types of Heart Failure
- 12.4.1. Systolic and Diastolic
- 12.4.2. Left and Right
- 12.4.3. Acute and Chronic

12.5. Compensatory Mechanisms in Heart Failure
- 12.5.6. Sympathetic Response
- 12.5.7. Endocrine Response
- 12.5.8. Neurohumoral Response

12.6. Cardiovascular Pharmacology I. Diuretics and Vasodilators
- 12.6.1. Diuretics
- 12.6.2. Vasodilators

12.7. Cardiovascular Pharmacology II. Calcium Channel Blockers and Digitalis
- 12.7.1. Calcium Blockers
- 12.7.2. Digitalis

12.8. Cardiovascular Pharmacology III. Adrenergic and Dopaminergic Receptor Agonists
- 12.8.1. Adrenergic
- 12.8.2. Dopaminergic

12.9. Antiarrhythmics I
- 12.9.1. Class I
- 12.9.2. Class II

12.10. Antiarrhythmics II
- 12.10.1. Class III
- 12.10.2. Others

Module 13. General Examination of Large Animals with Cardiovascular Pathology: Equidae, Ruminants and Swine

13.1. Medical History, General and Specific Clinical Examination in Equidae
- 13.1.1. Anamnesis
- 13.1.2. General Physical Examination
- 13.1.3. Cardiovascular System Examination

13.2. Anamnesis, General and Specific Clinical Examination of Ruminants and Camelids
- 13.2.1. Ruminants
  - 13.2.1.1. Anamnesis
  - 13.2.1.2. General Physical Examination
  - 13.2.1.3. Cardiovascular System Examination
- 13.2.2. Camelids
  - 13.2.2.1. Anamnesis
  - 13.2.2.2. General Physical Examination
  - 13.2.2.3. Cardiovascular System Examination

13.3. General Auscultation of Heart Sounds
- 13.3.1. Interpretation of Normal Heart Sounds
- 13.3.2. General Characteristics of Heart Murmurs
- 13.3.3. Physiological Murmurs
- 13.3.4. Differential Diagnosis of Physiological Murmurs

13.4. Auscultation of Murmurs and Arrhythmias
- 13.4.1. Systolic Pathological Murmurs
- 13.4.2. Diastolic Pathological Murmurs
- 13.4.3. Continuous Murmurs
- 13.4.4. Irregular Rhythms

13.5. Blood Pressure Measurement
- 13.5.1. Role of Systemic Arterial Pressure
- 13.5.2. Reference Values
- 13.5.3. Alterations in Systemic Arterial Blood Pressure
- 13.5.4. Methods for Measuring Systemic Blood Pressure

13.6. Cardiac Output Measurement
- 13.6.1. Definition and Regulation of Cardiac Output
- 13.6.2. Monitoring
- 13.6.3. Indications for Monitoring

13.7. Interpretation of Blood Analysis I
- 13.7.1. Blood Count
- 13.7.2. Leukogram
- 13.7.3. Platelet Disorders
- 13.7.4. Biochemistry

13.8. Interpretation of Blood Analysis II
- 13.8.1. Electrolyte Disorders
- 13.8.2. Troponin, BNP and ANP

13.9. Clinical Approach to Animals with Heart Murmur or Arrhythmias
- 13.9.1. Interpretation of Clinical Signs and Assessment of Clinical Significance
- 13.9.2. Prognosis

13.10. Clinical Approach to Syncope
- 13.10.1. Interpretation of Clinical Signs and Assessment of Clinical Significance
- 13.10.2. Prognosis

Module 14. Complementary Non-Invasive Cardiovascular Tests in Large Animals: Equidae, Ruminants, Swine

14.1. General Echocardiography Concepts
- 14.1.1. Ultrasound Characteristics
- 14.1.2. Ultrasound-Tissue Interaction
- 14.1.3. Ultrasound Imaging Formation
- 14.1.4. Equipment Features

14.2. Basic Ultrasound Modes
- 14.2.1. M-Mode Ultrasound
- 14.2.2. Two-Dimensional Ultrasound
- 14.2.3. Doppler Technique
- 14.2.4. Speckle Tracking

14.3. Special Ultrasound Modes and Cardiac Formulas
- 14.3.1. Contrast Ultrasound
- 14.3.2. Stress Ultrasound
- 14.3.3. Transesophageal Ultrasound
- 14.3.4. Fetal Cardiac Ultrasound
- 14.3.5. Cardiac Formulas

14.4. Ultrasound Views
- 14.4.1. Right Hemithorax Views
- 14.4.2. Left. Hemithorax Views

14.5. Electrocardiogram Interpretation
- 14.5.1. Assessing Cardiac Function
- 14.5.2. Assessment of the Structure and Dimensions of the Chambers

14.6. What is an Electrocardiogram?
- 14.6.1. Anatomical and Electrophysiological Foundations
- 14.6.2. What Is It and How Does It Originate?

14.7. Recording Techniques
- 14.7.1. Einthoven's Classical System
- 14.7.2. Base-Apex Systems and Handheld Devices
- 14.7.3. Electrocardiogram Acquisition Modes

14.8. Electrocardiogram Interpretation
- 14.8.1. Normal Electrocardiogram
- 14.8.2. Determining Heart Rate
- 14.8.3. Interpreting Heart Rate
- 14.8.4. Electrocardiogram Waveform Interpretation

14.9. Electrocardiogram Abnormalities
- 14.9.1. Artefacts
- 14.9.2. Wave Morphological Abnormalities

14.10. How to Deal with an Electrocardiogram
- 14.10.1. Reading Protocol
- 14.10.2. Tricks

Module 15. Structural Cardiac Pathologies in Large Animals: Equidae, Ruminants and Swine

15.1. Congenital Cardiac Alterations I. Ventricular Septal Defect
- 15.1.1. Definition, Prevalence and Etiology
- 15.1.2. Pathophysiology
- 15.1.3. Diagnosis
- 15.1.4. Necessary Complementary Tests
- 15.1.5. Treatment
- 15.1.6. Clinical and Prognostic Relevance

15.2. Congenital Cardiac Disorders II. Tetralogy/Pentalogy of Fallot
- 15.2.1. Definition, Prevalence and Etiology
- 15.2.2. Pathophysiology
- 15.2.3. Diagnosis
- 15.2.4. Necessary Complementary Tests
- 15.2.5. Treatment
- 15.2.6. Clinical and Prognostic Relevance

15.3. Congenital Cardiac Disorders III. Patent Ductus Arteriosus
- 15.3.1. Definition, Prevalence and Etiology
- 15.3.2. Pathophysiology
- 15.3.3. Diagnosis
- 15.3.4. Necessary Complementary Tests
- 15.3.5. Treatment
- 15.3.6. Clinical and Prognostic Relevance

15.4. Congenital Cardiac Disorders IV. Rare Abnormalities
- 15.4.1. Patent Ductus Arteriosus
- 15.4.2. Atrial Septal Defect
- 15.4.3. Atrioventricular Valve Dysplasia
- 15.4.4. Pulmonary Stenosis

15.5. Acquired Cardiac Diseases I. Aortic Insufficiency
- 15.5.1. Definition, Prevalence and Etiology
- 15.5.2. Pathophysiology
- 15.5.3. Diagnosis
- 15.5.4. Necessary Complementary Tests
- 15.5.5. Treatment
- 15.5.6. Clinical and Prognostic Relevance

15.6. Acquired Cardiac Diseases II. Mitral insufficiency
- 15.6.1. Definition, Prevalence and Etiology
- 15.6.2. Pathophysiology
- 15.6.3. Diagnosis
- 15.6.4. Necessary Complementary Tests
- 15.6.5. Treatment
- 15.6.6. Clinical and Prognostic Relevance

15.7. Acquired Cardiac Diseases III. Tricuspid Regurgitation
- 15.7.1. Definition, Prevalence and Etiology
- 15.7.2. Pathophysiology
- 15.7.3. Diagnosis
- 15.7.4. Necessary Complementary Tests
- 15.7.5. Treatment
- 15.7.6. Clinical and Prognostic Relevance

15.8. Acquired Cardiac Diseases IV. Pulmonary Insufficiency and Pulmonary Hypertension
- 15.8.1. Definition, Prevalence and Etiology
- 15.8.2. Pathophysiology
- 15.8.3. Diagnosis
- 15.8.4. Necessary Complementary Tests
- 15.8.5. Treatment
- 15.8.6. Clinical and Prognostic Relevance

15.9. Acquired Cardiac Diseases V. Aorto-Cardiac and Aorto-Pulmonary Fistulas
- 15.9.1. Definition, Prevalence and Etiology
- 15.9.2. Pathophysiology
- 15.9.3. Diagnosis
- 15.9.4. Necessary Complementary Tests
- 15.9.5. Treatment
- 15.9.6. Clinical and Prognostic Relevance

15.10. Heart Failure
- 15.10.1. Definition, Prevalence and Etiology
- 15.10.2. Pathophysiology
- 15.10.3. Diagnosis
- 15.10.4. Treatment
- 15.10.5. Clinical and Prognostic Relevance

Module 16. Arrhythmias in Large Animals: Equidae, Ruminants and Swine

16.1. Sinus Rhythm
- 16.1.1. Features
- 16.1.2. EKG Recognition

16.2. Respiratory Sinus Arrhythmia, Bradycardia and Tachycardia Sinus Arrhythmias
- 16.2.1. Definition, Prevalence and Etiology
- 16.2.2. Pathophysiology
- 16.2.3. Diagnosis
- 16.2.4. Necessary Complementary Tests
- 16.2.5. Treatment
- 16.2.6. Clinical and Prognostic Relevance

16.3. Premature Supraventricular Complexes and Atrial Tachycardia
- 16.3.1. Definition, Prevalence and Etiology
- 16.3.2. Pathophysiology
- 16.3.3. Diagnosis
- 16.3.4. Necessary Complementary Tests
- 16.3.5. Treatment
- 16.3.6. Clinical and Prognostic Relevance

16.4. Atrial Fibrillation
- 16.4.1. Definition, Prevalence and Etiology
- 16.4.2. Pathophysiology
- 16.4.3. Diagnosis
- 16.4.4. Necessary Complementary Tests
- 16.4.5. Treatment
- 16.4.6. Clinical and Prognostic Relevance

16.5. Premature Ventricular Complexes and Ventricular Tachycardia
- 16.5.1. Definition, Prevalence and Etiology
- 16.5.2. Pathophysiology
- 16.5.3. Diagnosis
- 16.5.4. Necessary Complementary Tests
- 16.5.5. Treatment
- 16.5.6. Clinical and Prognostic Relevance

16.6. Non-Pathological Conduction Disorders
- 16.6.1. Sinus Block and Second-Degree Atrioventricular Block
  - 16.6.1.1. Definition, Prevalence and Etiology
  - 16.6.1.2. Pathophysiology
  - 16.6.1.3. Diagnosis
  - 16.6.1.4. Necessary Complementary Tests
  - 16.6.1.5. Treatment
  - 16.6.1.6. Clinical and Prognostic Relevance

16.7. Pathological Conduction Disorders
- 16.7.1. Advanced Second-Degree and Third-Degree Atrioventricular Block
  - 16.7.1.1. Definition, Prevalence and Etiology
  - 16.7.1.2. Pathophysiology
  - 16.7.1.3. Diagnosis
  - 16.7.1.4. Necessary Complementary Tests
  - 16.7.1.5. Treatment
  - 16.7.1.6. Clinical and Prognostic Relevance
- 16.7.2. Sick Sinus Syndrome
  - 16.7.2.1. Definition, Prevalence and Etiology
  - 16.7.2.2. Pathophysiology
  - 16.7.2.3. Diagnosis
  - 16.7.2.4. Necessary Complementary Tests
  - 16.7.2.5. Treatment
  - 16.7.2.6. Clinical and Prognostic Relevance

16.8. Supraventricular Beats and Escape Rhythms
- 16.8.1. Definition, Prevalence and Etiology
- 16.8.2. Pathophysiology
- 16.8.3. Diagnosis
- 16.8.4. Necessary Complementary Tests
- 16.8.5. Treatment
- 16.8.6. Clinical and Prognostic Relevance

16.9. Ventricular Beats and Escape Rhythms
- 16.9.1. Definition, Prevalence and Etiology
- 16.9.2. Pathophysiology
- 16.9.3. Diagnosis
- 16.9.4. Necessary Complementary Tests
- 16.9.5. Treatment
- 16.9.6. Clinical and Prognostic Relevance

16.10. Accelerated Idioventricular Rhythm and Ventricular Preexcitation Syndrome
- 16.10.1. Definition, Prevalence and Etiology
- 16.10.2. Pathophysiology
- 16.10.3. Diagnosis
- 16.10.4. Necessary Complementary Tests
- 16.10.5. Treatment
- 16.10.6. Clinical and Prognostic Relevance

Module 17. Pathologies of the Endocardium, Myocardium, Pericardium and Vascular System in Major Species: Equidae, Ruminants and Swine

17.1. Pericardial Disorders
- 17.1.1. Pathophysiology of Pericarditis
- 17.1.2. Physical Examination and Clinical Signs
- 17.1.3. Diagnostic Tests
- 17.1.4. Treatment Options and Prognosis

17.2. Myocardial Disorders
- 17.2.1. Pathophysiological Causes of Myocarditis
- 17.2.2. Clinical Signs
- 17.2.3. Treatment Options

17.3. Intoxications Affecting the Myocardium
- 17.3.1. Ionophore Poisoning
- 17.3.2. Poisoning by Ingestion of Toxic from Plants

17.4. Hypoglycine A Myopathy
- 17.4.1. Pathogenesis
- 17.4.2. Clinical Signs
- 17.4.3. Diagnosis
- 17.4.4. Treatment and Prognosis

17.5. Endocarditis
- 17.5.1. Pathophysiology
- 17.5.2. Diagnosis
- 17.5.3. Prognosis

17.6. Thrombophlebitis and Aortoiliac Thromboses
- 17.6.1. Thrombophlebitis
- 17.6.2. Aortoiliac Thrombosis

17.7. Vasculitis
- 17.7.1. Infectious and Non-Infectious Causes
- 17.7.2. Diagnosis
- 17.7.3. Treatment and Prognosis

17.8. Vascular Lesions Caused by Parasites and Vascular Neoplasms
- 17.8.1. Strongilus Vulgaris
- 17.8.2. Hemangiosarcoma and Hemangioma
- 17.8.3. Lymphangioma and Lymphangiosarcoma

17.9. Vascular Ruptures
- 17.9.1. Aortocardiac and Aortopulmonary Fistulas
- 17.9.2. Pulmonary Artery Rupture
- 17.9.3. Congenital Problems Causing Vascular Lesions and Other Causes of Rupture

17.10. Cardiomyopathies
- 17.10.1. Pathophysiology
- 17.10.2. Diagnosis
- 17.10.3. Prognosis

Module 18. Cardiac Response to Exercise, Sports Performance and Sudden Death in Sports Horses

18.1. The Cardiovascular System
- 18.1.1. Anatomical Review
- 18.1.2. Blood
- 18.1.3. Cardiovascular Function During Exercise
- 18.1.4. Cardiovascular Response to Exercise

18.2. Energy Production During Exercise
- 18.2.1. ATP
- 18.2.2. Metabolic Routes
- 18.2.3. Anaerobic Threshold
- 18.2.4. Interrelation of the Different Energy Systems
- 18.2.5. Oxygen Consumption

18.3. Practical Aspects of Physical Preparation
- 18.3.1. Basic Principles
- 18.3.2. Cardiovascular Fitness

18.3.3. Cardiovascular Overtraining
18.3.4. Cardiovascular Detraining
18.4. Discipline-Specific Cardiovascular Fitness Training
18.4.1. Dressage
18.4.2. Jump
18.4.3. Full Competition
18.4.4. Raid
18.4.5. Racing
18.4.6. Polo
18.5. Cardiovascular Fitness Assessment Test
18.5.1. Test Under Controlled Conditions
18.5.2. Field Test
18.6. Complementary Tests to Assess Clinical Relevance Cardiac Pathologies During Exercise
18.6.1. Exercise Electrocardiography
18.6.2. Post-Exercise Echocardiography
18.7. Laboratory Analysis for Cardiac Pathology Evaluation
18.7.1. Respiratory System Samples
18.7.2. CK
18.7.3. Troponins
18.7.4. BNP
18.7.5. ANP
18.8. Cardiac Pathologies Affecting Sports Performance
18.8.1. Arrhythmias
18.8.2. Structural Pathologies
18.9. Sudden Death
18.9.1. Definition and Prevalence
18.9.2. Clinical Assessment of Sudden Death Risk
18.10. Cardiac Pathologies Related to Sudden Death
18.10.1. Arrhythmias
18.10.2. Structural Pathologies

Module 19. Systemic Disorders and Specific Situations Affecting the Heart in Large Animals: Equidae, Ruminants and Swine

19.1. Potassium-Associated Electrolyte Abnormalities
19.1.1. Pathophysiology of Potassium
19.1.2. Effect of Potassium Disorders on the Heart
19.1.3. Treatment
19.2. Calcium-Associated Electrolyte Disorders
19.2.1. Pathophysiology of Calcium
19.2.2. Effect of Potassium Disorders on the Heart
19.2.3. Treatment
19.3. Magnesium-Associated Electrolyte Disorders
19.3.1. Pathophysiology of Magnesium
19.3.2. Effect of Potassium Disorders on the Heart
19.3.3. Treatment
19.4. Metabolic Syndrome
19.4.1. Etiology and Prevalence
19.4.2. Pathophysiology
19.4.3. Effects on the Heart
19.4.4. Treatment
19.5. Cushing's Syndrome and Pheochromocytoma
19.5.1. Etiology and Prevalence
19.5.2. Pathophysiology
19.5.3. Effects on the Heart
19.5.4. Treatment
19.6. Renal Insufficiency
19.6.1. Etiology and Prevalence
19.6.2. Pathophysiology
19.6.3. Effects on the Heart
19.6.4. Treatment
19.7. Intoxications
19.7.1. By Natural Products
19.7.2. By Artificial Products

19.8. Parasitic Infections
- 19.8.1. Etiology and Prevalence
- 19.8.2. Pathophysiology
- 19.8.3. Effects on the Heart
- 19.8.4. Treatment

19.9. Shock
- 19.9.1. Endotoxic Shock
- 19.9.2. Hypovolemic Shock

19.10. Anesthetic Drugs
- 19.10.1. Sedatives
- 19.10.2. Hypnotics

Module 20. Advanced Cardiac Procedures: Interventionism, Minimally Invasive Surgery and Cardiopulmonary Resuscitation in Large Animals: Equidae, Ruminants and Swine

20.1. Anesthesia in Cardiac Interventions and Minimally Invasive Surgery
- 20.1.1. Monitoring
- 20.1.2. General Anesthesia in Non-Critically Ill Patients
- 20.1.3. General Anesthesia in Critically Ill Patients
- 20.1.4. Anesthesia for On-Station Procedures

20.2. Endomyocardial Biopsy
- 20.2.1. Instruments
- 20.2.2. Technique
- 20.2.3. Indications for Use
- 20.2.4. Associated Complications

20.3. Pacemaker Implantation
- 20.3.1. Instruments
- 20.3.2. Technique
- 20.3.3. Indications for Use
- 20.3.4. Associated Complications

20.4. Septal Occlusion with Amplatzer Devices for Interventricular Communication
- 20.4.1. Instruments
- 20.4.2. Technique
- 20.4.3. Indications for Use
- 20.4.4. Associated Complications

20.5. Septal Occlusion of Aorto-Cardiac Fistulas with Amplatzer Devices
- 20.5.1. Instruments
- 20.5.2. Technique
- 20.5.3. Indications for Use
- 20.5.4. Associated Complications

20.6. Endovenous Electrical Cardioversion
- 20.6.1. Instruments
- 20.6.1. Technique
- 20.6.2. Indications for Use
- 20.6.3. Associated Complications

20.7. Electrophysiological Mapping
- 20.7.1. Instruments
- 20.7.2. Technique
- 20.7.3. Indications for Use
- 20.7.4. Associated Complications

20.8. Ablation of Supraventricular Arrhythmias
- 20.8.1. Instruments
- 20.8.2. Technique
- 20.8.3. Indications for Use
- 20.8.4. Associated Complications

20.9. Pericardiectomy by Thoracoscopy
- 20.9.1. Instruments
- 20.9.2. Technique
- 20.9.3. Indications for Use
- 20.9.4. Associated Complications

20.10. Cardiopulmonary Resuscitation
- 20.10.1. In Foals
- 20.10.2. In Adults

06

Methodology

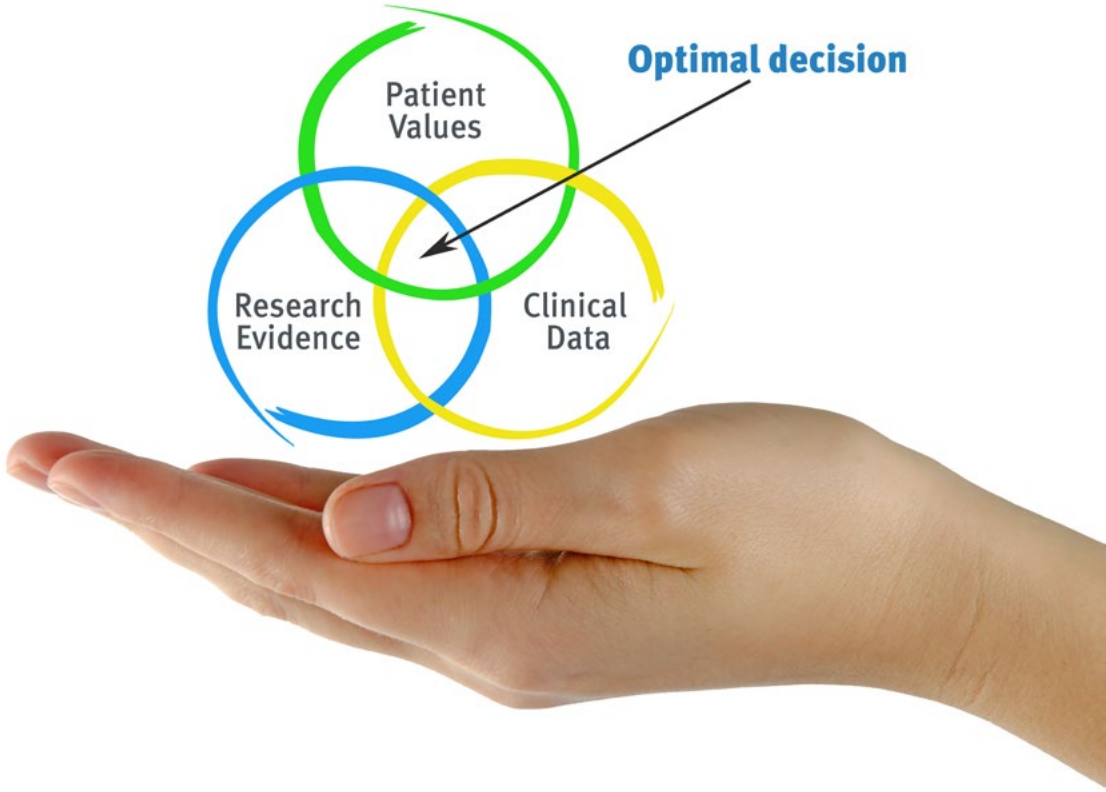
This academic program offers students a different way of learning. Our methodology uses a cyclical learning approach: **Relearning.**
This teaching system is used, for example, in the most prestigious medical schools in the world, and major publications such as the **New England Journal of Medicine** 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 you will be presented with multiple simulated clinical cases based on real patients, where you will have to investigate, establish hypotheses and, finally, 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, in an attempt to recreate the actual conditions in a veterinarian'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:

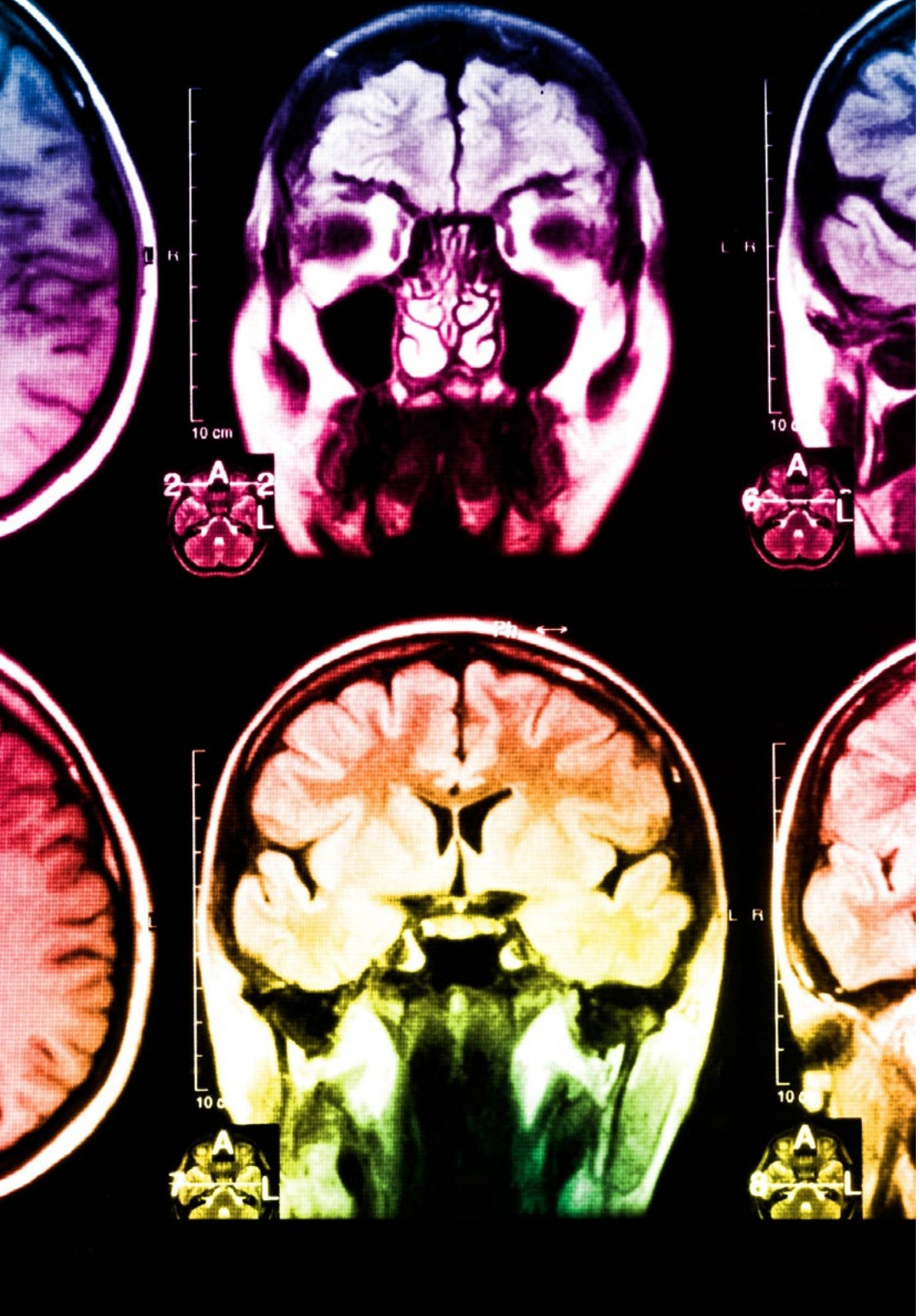
1. Veterinarians who follow this method not only manage to assimilate concepts, but also develop their mental capacity through exercises to evaluate real situations and knowledge application
2. Learning is solidly translated into practical skills that allow the student to better integrate into the real world.
3. Ideas and concepts are understood more efficiently, given that the example situations are based on real-life.
4. The feeling that the effort invested is effective becomes a very important motivation for veterinarians, which translates into a greater interest in learning and an increase in the 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.

Veterinarians 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 65,000 veterinarians have been trained with unprecedented success in all clinical specialties, regardless of the surgical load. Our teaching method is developed in a highly demanding environment, where the students have a high socio-economic profile and an average age of 43.5 years.

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

Latest Techniques and Procedures on Video

TECH introduces students to the latest techniques, the latest educational advances and to the forefront of current and procedures of veterinary 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.

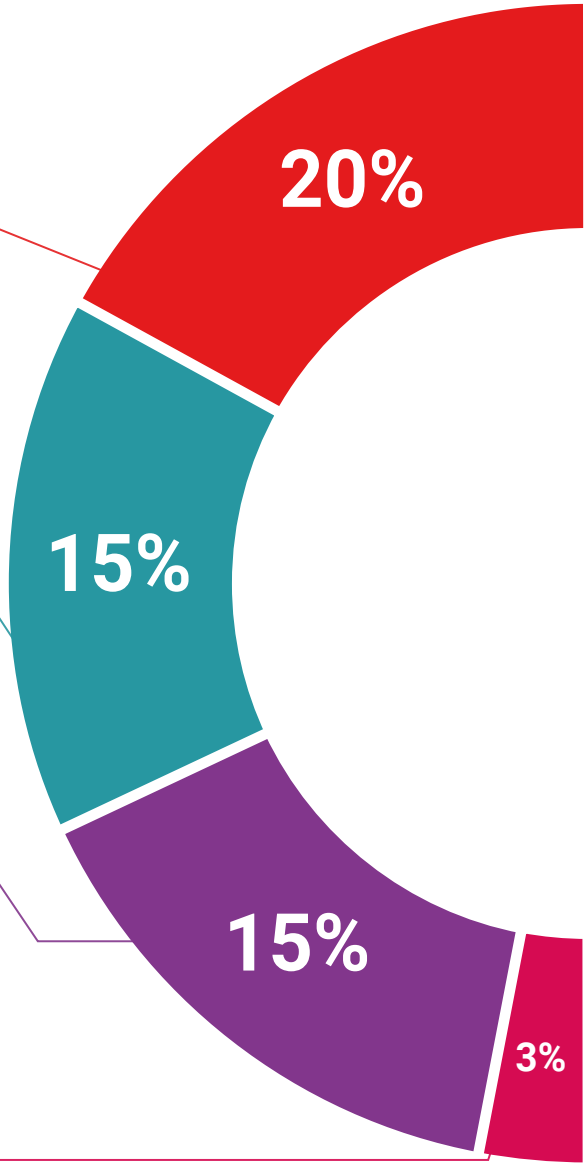
Interactive Summaries

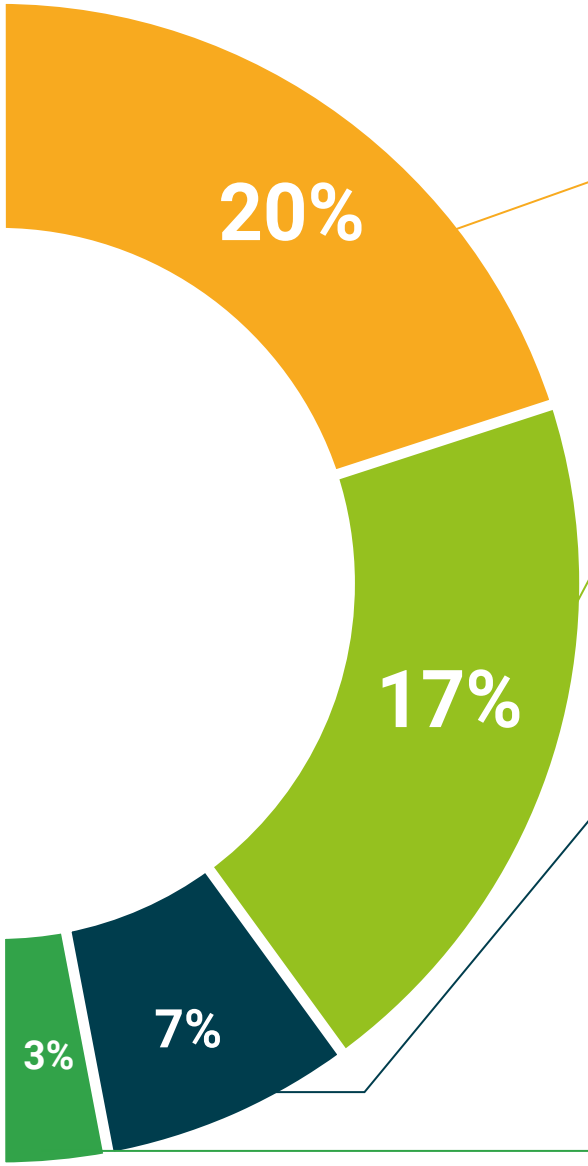
The TECH team presents the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

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 suggesting that observing third-party experts can be useful.

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 Advanced Master's Degree in Veterinary Cardiology guarantees, in addition to the most rigorous and up-to-date education, access to a Advanced Master's Degree issued by TECH Technological University.

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

This **Advanced Master's Degree in Veterinary Cardiology** contains the most complete and up-to-date scientific program on the market.

After the student has passed the assessments, they will receive their corresponding **Advanced 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 Advanced Master's Degree, and meets the requirements commonly demanded by labor exchanges, competitive examinations, and professional career evaluation committees.

Title: **Advanced Master's Degree in Veterinary Cardiology**

Official Nº of hours: **3,000 h.**

tech technological university

Awards the following

DIPLOMA

to

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

For having successfully passed and accredited the following program

ADVANCED MASTER'S DEGREE

in

Veterinary Cardiology

This is a qualification awarded by this University, equivalent to 3,000 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

Unique TECH Code: AFWORD23S techtitute.com/certificates

Advanced Master's Degree in Veterinary Cardiology

General Structure of the Syllabus

Year	Subject	Hours	Type
1º	Cardiac Embryology, Anatomy, Physiology and Pathophysiology	150	CO
1º	Heart Failure Cardiac Pharmacology	150	CO
1º	Anamnesis and Cardiovascular Examination	150	CO
1º	Complementary Tests. Diagnostic Imaging	150	CO
1º	Complementary Tests. Electrocardiogram	150	CO
1º	Complementary Tests. Echocardiography	150	CO
1º	Acquired Heart Diseases. Chronic Mitral and Tricuspid Valve Disease. Endocarditis. Pericardial Alterations. Cardiac Masses	150	CO
1º	Acquired Heart Disease. Cardiomyopathies	150	CO
1º	Congenital Heart Disease	150	CO
1º	Pulmonary and Systemic Hypertension, Systemic Diseases with Cardiac Repercussions and Anesthesia in the Cardiac Patient	150	CO
2º	Cardiac Embryology, Anatomy and Physiology in Large Animals: Equidae, Ruminants and Swine	150	CO
2º	Cardiovascular Pathophysiology and Pharmacology in Large Animals: Equidae, Ruminants and Swine	150	CO
2º	General Examination of Large Animals with Cardiovascular Pathology: Equidae, Ruminants and Swine	150	CO
2º	Complementary Non-Invasive Cardiovascular Tests in Large Animals: Equidae, Ruminants, Swine	150	CO
2º	Structural Cardiac Pathologies in Large Animals: Equidae, Ruminants and Swine	150	CO
2º	Arrhythmias in Large Animals: Equidae, Ruminants and Swine	150	CO
2º	Pathologies of the Endocardium, Myocardium, Pericardium and Vascular System in Major Species: Equidae, Ruminants and Swine	150	CO
2º	Cardiac Response to Exercise, Sports Performance and Sudden Death in Sports Horses	150	CO
2º	Systemic Disorders and Specific Situations Affecting the Heart in Large Animals: Equidae, Ruminants and Swine	150	CO
2º	Advanced Cardiac Procedures: Interventionism, Minimally Invasive Surgery and Cardiopulmonary Resuscitation in Large Animals: Equidae, Ruminants and Swine	150	CO

Tere Guevara Navarro
Dean

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*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-

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Advanced Master's Degree
Veterinary Cardiology

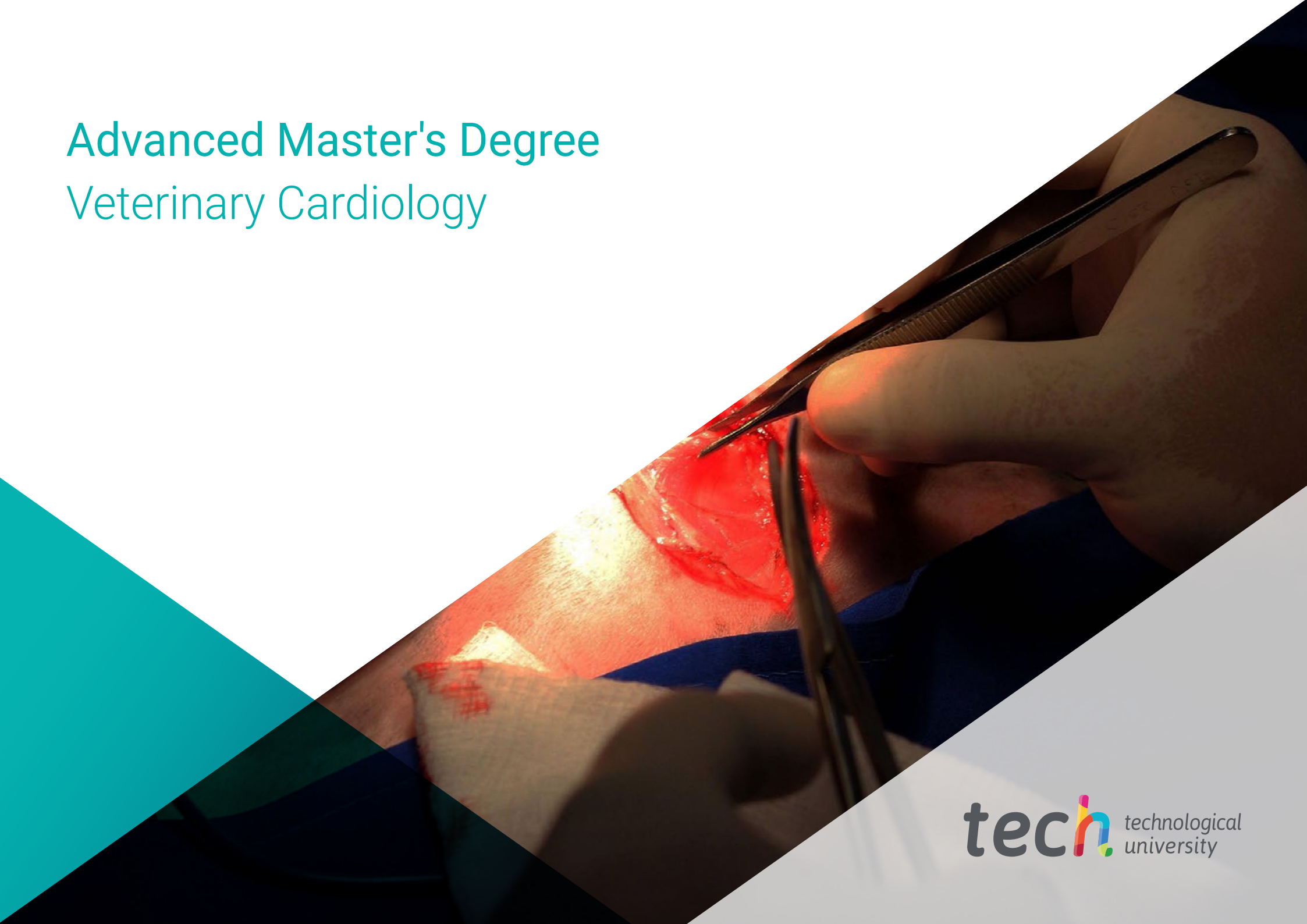
Course Modality: **Online**

Duration: **2 years**

Accreditation: **TECH Technological University**

Official Nº of hours: **3,000 h.**

Advanced Master's Degree
Veterinary Cardiology



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