

**COURSE DATA****Data Subject**

Code	36317
Name	Cardiac image
Cycle	Grade
ECTS Credits	4.5
Academic year	2019 - 2020

Study (s)

Degree	Center	Acad. year	Period
1204 - Degree in Medicine	Faculty of Medicine and Odontology	4	First term

Subject-matter

Degree	Subject-matter	Character
1204 - Degree in Medicine	18 - Optional subjects	Optional

Coordination

Name	Department
BODI PERIS, VICENTE JOSE	260 - Medicine

SUMMARY

A global overview of the main invasive and non-invasive cardiac imaging techniques will be presented. Regarding each technique, a brief exposition of its technical foundations, an approach to the images in healthy patients, the contributions of the technique in the most prevalent cardiac pathologies and how to indicate their performance in an appropriate and individualized way to reach the correct diagnosis through a reasoned use of resources. The implications of each technique will be addressed in the prognostic evaluation, treatment and prevention of complications of the most frequent heart diseases.

Seminars will be held that will include the discussion of real clinical cases of patients studied with cardiac imaging techniques, the decision processes involved in choosing each technique.



PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

There are no specified enrollment restrictions with other subjects of the curriculum.

Other requirements

Dirigida a estudiantes de cuarto y quinto curso de Grado de Medicina

COMPETENCES (RD 1393/2007) // LEARNING OUTCOMES (RD 822/2021)

1204 - Degree in Medicine

- Students must be able to apply their knowledge to their work or vocation in a professional manner and have acquired the competences required for the preparation and defence of arguments and for problem solving in their field of study.
- Students must have the ability to gather and interpret relevant data (usually in their field of study) to make judgements that take relevant social, scientific or ethical issues into consideration.
- Understand and recognise the effects, mechanisms and manifestations of diseases over the structure and function of the human body.
- Know how to use IT in clinical, therapeutic and preventive activities, and those of research.
- Proper organisation and planning of the workload and timing in professional activities.
- Team-working skills and engaging with other people in the same line of work or different.
- Criticism and self-criticism skills.
- Capacity for communicating with professional circles from other domains.
- Acknowledge diversity and multiculturality.
- Consideration of ethics as a fundamental value in the professional practise.
- Working capacity to function in an international context.

LEARNING OUTCOMES (RD 1393/2007) // NO CONTENT (RD 822/2021)

- Students will acquire an overall vision of the main techniques for heart imaging, both invasive and non-invasive. They will reach an approximation to imaging in healthy patients, the technical contributions in the most prevalent cardiac pathologies, and how to indicate their execution in a proper and individualised way, in order to reach the correct diagnosis through a rational use of resources. They will understand the implications of each technique in the prognostic evaluation will be addressed, as well as in the treatment and prevention of complications in the most frequent heart diseases.
- Students will be able to discuss real clinical cases of studied patients through heart imaging techniques, decision-making processes regarding the selection of techniques, differential diagnosis, prognostic stratification and the treatment of patients, highlighting the important role of anamnesis and physical examinations as first steps for an adequate selection of the most appropriate imaging technique. Students will also develop skills to do a presentation and discuss practical assignments related to heart imaging.



- Students will acquire the necessary skills for preparing several practical activities in this subject. They will be able to access bibliography and different websites regarding scientific societies constantly updated, in which students will revise lots of real clinical cases of heart imaging and their explanations. This will allow students make progress in an autonomous and steady way during knowledge acquisition of heart imaging techniques, both in the lessons and in the future. Also, it will help them do the practical work and prepare for their assessment.

DESCRIPTION OF CONTENTS

1. THEORY

We will address the following issues during the on-site theoretical activities:

1. Introduction to cardiac imaging techniques
2. Doppler echocardiography. Technical principles and basic images
3. Echocardiography in emergency situations
4. Echocardiography in acute and chronic ischemic heart disease
5. Echocardiography in heart failure and cardiomyopathies
6. Echocardiography in congenital heart diseases and pulmonary hypertension
7. Transesophageal echocardiography and stress echocardiography
8. Echocardiography in diseases of the valves and the aorta
9. Echocardiography and myocardial diseases
10. Bases of angio-CT and cardiac resonance
11. Angio-CT in Cardiology
12. Cardiac magnetic resonance in ischemic heart disease
13. Cardiac magnetic resonance in other heart diseases
14. Cardiac catheterization. Basic principles. Non-ischemic heart disease
15. Cardiac catheterization. Ischemic heart disease
16. Nuclear cardiology. Current clinical applications

2. PRACTISE

Attendance at on-site practical activities will be mandatory. To pass the subject, the student enrolled for the first time must attend at least 80% of the on-site practical activities.

The following issues will be addressed during on-site practical activities:

1. Echocardiography and valve diseases
2. Echocardiography in pericardial effusion and endocarditis
3. Echocardiography and ischemic heart disease
4. Echocardiography in pericardial diseases and cardiac masses
5. Echocardiography and heart failure
6. Cardiac magnetic resonance, angio-CT and workup of chest pain
7. Cardiac magnetic resonance and acute myocardial infarction



8. Cardiac magnetic resonance and non-ischemic heart disease
9. Cardiac catheterization in non-ischemic heart disease
10. Cardiac catheterization in ischemic heart disease
11. Nuclear cardiology
12. Review of images
13. Discussion of online questionnaires
14. Clinical practices in form of discussion of clinical cases of cardiac imaging.

WORKLOAD

ACTIVITY	Hours	% To be attended
Seminars	20,00	100
Theory classes	19,00	100
Clinical practice	6,00	100
Development of group work	4,00	0
Development of individual work	4,00	0
Study and independent work	25,00	0
Readings supplementary material	10,00	0
Preparation of evaluation activities	10,00	0
Preparing lectures	5,00	0
Preparation of practical classes and problem	5,00	0
Resolution of online questionnaires	4,50	0
TOTAL	112,50	

TEACHING METHODOLOGY

The teaching methodology is based on the development of three types of activities:

- **Theoretical activities** in which a global vision of the main invasive and non-invasive cardiac imaging techniques will be presented. Regarding each technique, a brief exposition of its technical foundations, an approach to the images in healthy patients, the contributions of the technique in the most prevalent cardiac pathologies and how to indicate their performance in an appropriate and individualized way to reach the correct diagnosis through a reasoned use of resources. The implications of each technique will be addressed in the prognostic evaluation, treatment and prevention of complications of the most frequent heart diseases.

- **Practical activities** in which seminars will be held that will include the discussion of real clinical cases of patients studied with cardiac imaging techniques, the decision processes involved in choosing the performance of each technique, the differential diagnosis, the prognostic stratification and the treatment of patients, underlining the relevant role of the anamnesis and physical examination as initial steps for an appropriate choice of the most appropriate cardiac imaging technique. Clinical practices will be carried out in the form of discussion of clinical cases in the classroom.



- **Non on-site activities.** Preparation of theoretical and practical on-site activities, practical work (individually or in groups) and practical and final evaluation. The recommended references and different web pages of scientific societies will be provided with constant updates where students will be able to review a multitude of real clinical cases of reasoned cardiac imaging. This will allow them to advance autonomously and continuously in the knowledge of cardiac imaging techniques both during the teaching period and in the future, it will help them to carry out practical work and prepare the evaluation. On-line questionnaires related to some of the on-site activities and additional information with a mainly practical nature ("E-learning activities") that the students will be able to solve and follow online will be proposed (the access code will be provided at the proper time).

EVALUATION

EVALUATION OF THE FIRST CALL:

-Theoretical evaluation: 50% of the final mark. Maximum score that can be obtained from this section: 50 points. The exam is the same for all students of the subject. There will be a test with 25 multiple choice questions based on the general contents taught in the theoretical activities as well as in the on-site and non on-site practical activities. There will be 4 possible answers to each question. Each correct answer is worth 2 points. The wrong or blank answers do not subtract.

-Practical evaluation: 50% of the final mark. It will consist of 4 sections:

1) Multiple choice questions. 20% of the final mark. Maximum score that can be obtained from this section: 20 points. The exam is the same for all students of the subject. It will be based on clinical cases and / or images focused on the different cardiac imaging techniques addressed during teaching. A test with 10 multiple-choice questions will be proposed based on images related to the general contents taught in theoretical activities as well as on-site and non on-site practical activities. There will be 4 possible answers to each question. Each correct answer is worth 2 points. The wrong or blank answers do not subtract.

The theoretical evaluation and this first part of the practical evaluation will be carried out jointly by means of a multiple choice exam with 35 questions in total (25 theoretical, 10 practical). There will be 4 possible answers to each question. Each correct answer is worth 2 points. The wrong or blank answers do not subtract. The duration of this exam will be 90 minutes.

2) Practical exam of cardiac imaging cases. 10% of the final mark. Maximum score that can be obtained from this section: 10 points. Each student will comment orally 1 real case based on cardiac images. For this exam the group will be divided into 2 subgroups that will carry out the exam in 2 simultaneous sessions (1 hour each). Students will remain in the classroom until the whole group has completed the exam. The professor will briefly discuss with each student the exposed case.

3) Preparation of a practical work individually or in groups (up to 3 students) focused on cardiac imaging techniques addressed during the teaching period. 10% of the final mark. Maximum score that can be obtained from this section: 10 points. It can be a clinical case or a review of the value of one or several cardiac imaging techniques in the diagnosis and management of a specific pathology. The written memory will be delivered through the virtual classroom at most on the day prior to the moment when the practical examination of cardiac imaging cases is performed. As an orientation, the written memory will consist of 10 pages, on one side, double spaced and will include a title, summary, introduction, work development, conclusions, bibliography and figures. Students who wish to do so may present their work



orally apart from delivering the written memory. The fact of presenting orally the practical work will be taken into account in the final mark of this part of the evaluation. Only students who perform the oral presentation will be able to obtain the maximum score (10 points, 10% of the final mark) in this section.

4) Participation and results obtained in the different on-line activities and on-line questionnaires ("E-learning") for continuous evaluation. 10% of the final mark. Maximum score that can be obtained from this section: 10 points. On-line questionnaires will be proposed in relation to the theoretical and practical activities carried out throughout the teaching period. They can be solved during specific time periods through the internet (the appropriate time, the access code and other relevant information will be provided at proper time). In the on-line questionnaires, 4 possible answers to each question will be proposed. The wrong or blank answers do not subtract. The correct answers obtained will be added throughout the course. The topmark (of all students) will equal 10 points (10% of the final mark); the rest of marks will be adjusted proportionally to this topmark.

- Requirements to pass the subject:

It is not necessary to pass the theoretical and practical evaluations separately.

It is not necessary to pass all sections listed above separately.

The requirement to pass the subject is to obtain a total of at least 50 points (sum of all sections).

To pass the subject, students enrolled for the first time must attend at least 80% of the practical on-line activities.

-EVALUATION OF THE SECOND CALL:

-The mark obtained in the first call in the practical work, the exam of practical cases and in the on-line activities (30% of the total, sections 2, 3 and 4 of the practical evaluation listed previously) will be maintained for the second call.

-The multiple choice exam of the second call will represent 70% of the mark in this call and will have the same characteristics as in the first call (theoretical evaluation and section 1 of the practical evaluation listed previously).

In this subject students will not be allowed to write their test (on even take it before the agreed date) if they have not completed their training (internship).

REFERENCES



Basic

- Bodí Peris V, Chorro Gascó FJ (eds): Imagen cardiaca. Valencia. Universidad de Valencia, 2015.
- Chorro Gascó FJ (ed.): Ecocardiografía-Doppler. Valencia, Universidad de Valencia, 2011.

Additional

- Chorro Gascó FJ, García Civera R y López Merino V (eds.): Cardiología Clínica. Valencia, Universidad de Valencia, 2007.
- Mann DL, Zipes DP, Libby P, Bonow RO (eds): Braunwalds Heart Disease. A Textbook of Cardiovascular Medicine. Elsevier, 10ª edición, 2015.

Foro de técnicas de imagen

<http://www.secardiologia.es>

<http://www.ecocardio.com/index.asp>

Foro de casos de ecocardiografía

<http://www.ecosiac.org/casos.php>

Foro de casos de resonancia magnética cardiaca

<http://www.scmr.org/navigation/CMR-in-specific-circumstances.html>

<http://www.scmr.org/caseoftheweek.html>

Foro de casos cateterismo cardiaco

<http://www.pcronline.com/Clinical-cases>

Foro de cardiología nuclear

<https://www.asnc.org/content.asp?admin=Y&contentid=353>

<https://humanhealth.iaea.org/HHW/NuclearMedicine/CardiovascularandPulmonary/TeachingCases/index.html>

ADDENDUM COVID-19

This addendum will only be activated if the health situation requires so and with the prior agreement of the Governing Council

English version is not available