UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

SYLLABUS DEL CORSO

Internship in Pulmonary Vascular Disease and Heart Failure

2526-3-H4102D136

Aims

This internship aims at exposing students to the diagnostic and therapeutic algorithm of pulmonary vascular diseases and heart failure.

In particular, it aims at:

1. providing the basis for understanding clinical manifestations and potential presentations of pulmonary vascular diseases and heart failure
2. exposing the student the diagnostic algorithm focused based on clinical context and pre-test probability of disease and positioning the role of basic and advanced echocardiography, natriuretic peptides, probability diagnostic scores for HFpEF, right heart catheterization, and stress tests (exercise echocardiography, cardiopulmonary exercise test)
3. exposing the stundent to the treatment algorithm of pulmonary vascular diseases and heart failure
4. acquiring the skills for autonomous management of the diagnostic and therapeutic algorithm in simulated cases

Contents

Dyspnea: a multifaceted symptom
Heart failure with preserved ejection fraction: risk factors, clinical presentations, complications, codified and experimental treatments
Pulmonary hypertension: a multifaceted condition
Pulmonary arterial hypertension: risk factors, clinical presentations, complications, risk stratification, therapeutic algorithms
Chronic thromboembolic pulmonary hypertension: risk factors, clinical presentations, complications, therapeutic algorithms
Complex multicomorbid cases with overlap of different diseases

Basis of focused echocardiography and of advanced echocardiography
Cardiopulmonary exercise test: basis of interpretations and significance of pivotal variables
Exercise stress echocardiography: what it adds to cardiopulmonary exercise test
Right heart catheterization: pre- vs post-capillary pulmonary hypertension; role of provocative tests

Detailed program

The student will assist to the outpatient clinical activity of the Dyspnea and Pulmonary Hypertension Center, including first evaluations of referred patients as well as re-evaluations of chronic patients.
The student will be offered to assist to the diagnostic tests provided within the clinical activity, including cardiopulmonary exercise test, exercise stress echocardiography and right heart catheterization.

Importance will be given to patients' assessment through clinical history collection, acknowledging the importance of specific risk factors, of symptoms and clinical presentation, of bedside echocardiography and of the definition of the following diagnostic pathway, up to the diagnosis and therapeutic decisions. Didactic material will be provided to further contextualize the above mentioned topics. With the final aim to provide the student autonomous approach to the individual case, that might be simulated.

Basis for the understanding the utility and the interpretation of second- and third- level diagnostic tests (including cardiopulmonary exercise test, exercise stress echocardiography, right heart catheterization) will be provided.

Prerequisites

Notions of physiology and cardiology

Teaching form

Non frontal lectures.
Attendance to outpatient activity
Attendance to inpatient activity (right heart catheterization)
Revision and discussion of clinical cases

Textbook and teaching resource

Humbert M, Kovacs G, Hoeper MM, Badagliacca R, Berger RMF, Brida M, Carlsen J, Coats AJS, Escribano-Subias P, Ferrari P, Ferreira DS, Ghofrani HA, Giannakoulas G, Kiely DG, Mayer E, Meszaros G, Nagavci B, Olsson KM, Pepke-Zaba J, Quint JK, Rådegran G, Simonneau G, Sitbon O, Tonia T, Toshner M, Vachiery JL, Vonk Noordegraaf A, Delcroix M, Rosenkranz S; ESC/ERS Scientific Document Group. 2022 ESC/ERS Guidelines for the diagnosis and treatment of pulmonary hypertension. Eur Respir J. 2023 Jan 6;61(1):2200879. doi: 10.1183/13993003.00879-2022. PMID: 36028254.

Kovacs G, Bartolome S, Denton CP, Gatzoulis MA, Gu S, Khanna D, Badesch D, Montani D. Definition, classification and diagnosis of pulmonary hypertension. Eur Respir J. 2024 Oct 31;64(4):2401324. doi:

10.1183/13993003.01324-2024. PMID: 39209475; PMCID: PMC11533989.

Maron BA, Bortman G, De Marco T, Huston JH, Lang IM, Rosenkranz SH, Vachiéry JL, Tedford RJ. Pulmonary hypertension associated with left heart disease. Eur Respir J. 2024 Oct 31;64(4):2401344. doi: 10.1183/13993003.01344-2024. PMID: 39209478; PMCID: PMC11525340.

Dardi F, Boucly A, Benza R, Frantz R, Mercurio V, Olschewski H, Rådegran G, Rubin LJ, Hoeper MM. Risk stratification and treatment goals in pulmonary arterial hypertension. Eur Respir J. 2024 Oct 31;64(4):2401323. doi: 10.1183/13993003.01323-2024. PMID: 39209472; PMCID: PMC11525341.

Hemnes AR, Celermajer DS, D'Alto M, Haddad F, Hassoun PM, Prins KW, Naeije R, Vonk Noordegraaf A. Pathophysiology of the right ventricle and its pulmonary vascular interaction. Eur Respir J. 2024 Oct 31;64(4):2401321. doi: 10.1183/13993003.01321-2024. PMID: 39209482; PMCID: PMC11525331.

McDonagh TA, Metra M, Adamo M, Gardner RS, Baumbach A, Böhm M, Burri H, Butler J, ?elutkien? J, Chioncel O, Cleland JGF, Coats AJS, Crespo-Leiro MG, Farmakis D, Gilard M, Heymans S, Hoes AW, Jaarsma T, Jankowska EA, Lainscak M, Lam CSP, Lyon AR, McMurray JJV, Mebazaa A, Mindham R, Muneretto C, Francesco Piepoli M, Price S, Rosano GMC, Ruschitzka F, Kathrine Skibelund A; ESC Scientific Document Group. 2021 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure. Eur Heart J. 2021 Sep 21;42(36):3599-3726. doi: 10.1093/eurheartj/ehab368. Erratum in: Eur Heart J. 2021 Dec 21;42(48):4901. doi: 10.1093/eurheartj/ehab670. PMID: 34447992.

Verwerft J, Bertrand PB, Claessen G, Herbots L, Verbrugge FH. Cardiopulmonary Exercise Testing With Simultaneous Echocardiography: Blueprints of a Dyspnea Clinic for Suspected HFpEF. JACC Heart Fail. 2023 Feb;11(2):243-249. doi: 10.1016/j.jchf.2022.11.004. PMID: 36754531.

Maron BA, Cockrill BA, Waxman AB, Systrom DM. The invasive cardiopulmonary exercise test. Circulation. 2013 Mar 12;127(10):1157-64. doi: 10.1161/CIRCULATIONAHA.112.104463. PMID: 23479667.

Semester

4th year, second semester

Assessment method

Autonomous discussion and interpretation of clinical cases, both on heart failure and on pulmonary vascular diseases

Office hours

tuesday 12-13 AM

Sustainable Development Goals

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