

Research Centre for Dyspnoea and Pulmonary Hypertension

Director: Prof. Sergio Caravita

Specialised Research Centre afferent to the Cardiology Research Laboratory

Research Group Members

Sergio Caravita, MD, PhD; Claudia Baratto, MD, PhD candidate;

Gianfranco Parati MD, FESC

RESEARCH ACTIVITIES

- Hemodynamic and cardiorespiratory manifestations of diseases
- Advanced hemodynamics combined with advanced echoardiography and cardiopulmonary exercise test
- Pathophysiological mechanisms of dyspnea
- Clinical trials on HFpEF
- Hypoxia

DISEASES ON WHICH RESEARCH IS FOCUSED

- Pulmonary hypertension
- Heart failure (with a special focus on heart failure with preserved ejection fraction or HFpEF)
- Cardiomyopathies
- Valvular heart diseases

RESULTS OF PARTICULAR IMPORTANCE

Publications, last 5 years

1. Caravita S, Baratto C, Filippo A, Soranna D, Dewachter C, Zambon A, Perego GB, Muraru D, Senni M, Badano LP, Parati G, Vachiéry JL, Fudim M. Shedding light on latent pulmonary vascular disease in heart failure with preserved ejection fraction. *JACC Heart Fail* 2023, accepted for publication
2. Baratto C, Faini A, Gallone GP, Dewachter C, Perego GB, Bondue A, Muraru D, Senni M, Badano LP, Parati G, Vachiéry JL, Caravita S. Pulmonary Artery Wedge Pressure and Left Ventricular End-Diastolic pressure during exercise in patients with dyspnea. *ERJ Open Res* 2023, doi: 10.1183/23120541.00750-2022
3. Baratto C, Caravita S, Corbetta G, Soranna D, Zambon A, Dewachter C, Gavazzoni M, Heilbron F, Tomaselli M, Radu N, Perelli FP, Perego GB, Vachiéry JL, Parati G, Badano LP. Impact of severe secondary tricuspid regurgitation on rest and exercise hemodynamics of patients with heart failure and a preserved left ventricular ejection fraction. *Front Cardiovasc Med.* 2023 Mar 1;10:1061118. doi: 10.3389/fcvm.2023.1061118.
4. Sisinni A, Taramasso M, Praz F, Metra M, Agricola E, Margonato A, Fam N, Estevez-Loureiro R, Latib A, Messika-Zeitoun D, Conradi L, von Bardeleben RS, Sorajja P, Hahn RT, Caravita S, Maisano F, Adamo M, Godino C. Concomitant Transcatheter Edge-to-Edge Treatment of Secondary Tricuspid and Mitral Regurgitation: An Expert Opinion. *JACC Cardiovasc Interv.* 2023 Jan 23;16(2):127-139. doi: 10.1016/j.jcin.2022.11.022. PMID: 36697147.

5. Muraru D, Baldea SM, Genovese D, Tomaselli M, Heilbron F, Gavazzoni M, Radu N, Caravita S, Baratto C, Perelli F, Curti E, Parati G, Badano LP. Association of outcome with left ventricular volumes and ejection fraction measured with two- and three-dimensional echocardiography in patients referred for routine, clinically indicated studies. *Front Cardiovasc Med.* 2022 Dec 22;9:1065131. doi: 10.3389/fcvm.2022.1065131. PMID: 36620642; PMCID: PMC9815115.
6. Baratto C, Caravita S, Soranna D, Dewachter C, Bondue A, Zambon A, Badano LP, Parati G, Vachiéry JL. An updated meta-analysis of hemodynamics markers of prognosis in patients with pulmonary hypertension due to left heart disease. *Pulm Circ.* 2022 Oct 1;12(4):e12145. doi: 10.1002/pul2.12145. PMID: 36568693; PMCID: PMC9768568.
7. Gavazzoni M, Heilbron F, Badano LP, Radu N, Cascella A, Tomaselli M, Perelli F, Caravita S, Baratto C, Parati G, Muraru D. The atrial secondary tricuspid regurgitation is associated to more favorable outcome than the ventricular phenotype. *Front Cardiovasc Med.* 2022 Nov 29;9:1022755. doi: 10.3389/fcvm.2022.1022755. PMID: 36523369; PMCID: PMC9744784.
8. Caravita S, Baratto C. Understanding mechanisms of Fontan failure: exercise haemodynamics to unmask diastolic dysfunction, again! *Eur J Heart Fail.* 2023 Jan;25(1):26-29. doi: 10.1002/ehf.2756. Epub 2023 Jan 4. PMID: 36519686.
9. Caravita S, Faini A, Vignati C, Pelucchi S, Salvioni E, Cattadori G, Baratto C, Torlasco C, Contini M, Villani A, Malfatto G, Perger E, Lombardi C, Piperno A, Agostoni P, Parati G. Intravenous iron therapy improves the hypercapnic ventilatory response and sleep disordered breathing in chronic heart failure. *Eur J Heart Fail.* 2022 Jul 22. doi: 10.1002/ehf.2628. PMID: 35867685.
10. Baratto C, Dewachter C, Caravita S, Zambon A, Bondue A, Parati G, Vachiéry JL. Impact of COVID-19 lockdown on exercise capacity in PAH patients. *Pulm Circ.* 2022 Jul 1;12(3):e12089. doi: 10.1002/pul2.12089. eCollection 2022 Jul.
11. Caravita S, Picariello C, Garascia A, Misuraca L, De Tommasi E, Imbalzano E, Enea I, Roncon L, Vatrano M, on behalf of the Area Malattie del Circolo Polmonare ANMCO. Pulmonary Hypertension, pre- or post-capillary? The role of the provocative tests in the cath lab. *G Ital Cardiol (Rome).* 2022 Jul;23(7):533-541. doi: 10.1714/3831.38171
12. Baratto C, Caravita S, Soranna D, Dewachter C, Bondue A, Zambon A, Badano LP, Parati G, Vachiéry JL. Exercise haemodynamics in heart failure with preserved ejection fraction: a systematic review and meta-analysis. *ESC Heart Fail.* 2022 Jun 24. doi: 10.1002/ehf2.13979. Epub ahead of print. PMID: 35748109.
13. Tomaselli M, Badano LP, Menè R, Gavazzoni M, Heilbron F, Radu N, Caravita S, Baratto C, Oliverio G, Florescu DR, Parati G, Muraru D. Impact of correcting the 2D PISA method on the quantification of functional tricuspid regurgitation severity. *Eur Heart J Cardiovasc Imaging.* 2022 Jun 23;jeac104. doi: 10.1093/ehjci/jeac104. Epub ahead of print. PMID: 35734964.
14. Vicenzi M, Caravita S, Rota I, Casella R, Deboeck G, Beretta L, Lombi A, Vachiery JL. The added value of right ventricular function normalized for afterload to improve risk stratification of patients with pulmonary arterial hypertension. *Plos One* 2022, accepted for publication
15. Naeije R, Caravita S. CPET for Long COVID-19. *JACC Heart Fail.* 2022 Mar;10(3):214-215. doi: 10.1016/j.jchf.2022.01.008. PMID: 35241250; PMCID: PMC8884263.
16. Florescu DR, Muraru D, Volpato V, Gavazzoni M, Caravita S, Tomaselli M, Ciampi P, Florescu C, Bălșeanu TA, Parati G, Badano LP. Atrial Functional Tricuspid Regurgitation as a Distinct Pathophysiological and Clinical Entity: No Idiopathic Tricuspid Regurgitation Anymore. *J Clin Med.* 2022 Jan 13;11(2):382. doi: 10.3390/jcm11020382. PMID: 35054074; PMCID: PMC8781398.
17. Florescu DR, Muraru D, Florescu C, Volpato V, Caravita S, Perger E, Bălșeanu TA, Parati G, Badano LP. Right heart chambers geometry and function in patients with the atrial and the ventricular phenotypes of functional tricuspid regurgitation. *Eur Heart J Cardiovasc Imaging.* 2021 Nov 8;jeab211. doi: 10.1093/ehjci/jeab211. Epub ahead of print. PMID: 34747460.
18. Caravita S, Figliozzi S, Florescu DR, Volpato V, Oliverio G, Tomaselli M, Torlasco C, Muscogiuri G, Cernigliaro F, Parati G, Badano L, Muraru D. Recent advances in multimodality imaging of the tricuspid valve. *Expert Rev Med Devices.* 2021 Nov;18(11):1069-1081. doi: 10.1080/17434440.2021.1990753. Epub 2021 Oct 27. PMID: 34617481.
19. Lang M, Paéz V, Maj G, Silva-Urra J, Labarca-Valenzuela C, Caravita S, Faini A, Cantuarias J, Perez O, Bilo G, Parati G. Blood Pressure Response in Miners Exposed to Chronic Intermittent Hypoxia in Chile. *Front Cardiovasc Med.* 2021 Aug 12;8:701961. doi: 10.3389/fcvm.2021.701961. PMID: 34458335; PMCID: PMC8387657.

20. Naeije R, Caravita S. Phenotyping long COVID. *Eur Respir J*. 2021 Aug 26;58(2):2101763. doi: 10.1183/13993003.01763-2021. PMID: 34244323; PMCID: PMC8287735.
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22. Baratto C, Caravita S, Parati G. Heart failure with preserved ejection fraction and COVID-19: which comes first, the chicken or the egg? Letter regarding the article 'Heart failure with preserved ejection fraction according to the HFA-PEFF score in COVID-19 patients: clinical correlates and echocardiographic findings'. *Eur J Heart Fail*. 2021 Dec;23(12):2091-2092. doi: 10.1002/ehf.2273. Epub 2021 Jun 28. PMID: 34145704; PMCID: PMC8426970.
23. Lang M, Bilo G, Caravita S, Parati G. Presión arterial y altitud: respuestas fisiológicas y manejo clínico [Blood pressure and high altitude: physiological response and clinical management]. *Medwave*. 2021 May 13;21(4):e8194. Spanish. doi: 10.5867/medwave.2021.04.8194. PMID: 34037579.
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29. Baratto C, Caravita S, Battista Perego G, Badano LP, Vachiéry JL, Parati G. Systemic Sclerosis and Pulmonary Hypertension: The Great Masquerader. *Circ Heart Fail*. 2021 Feb;14(2):e007554. doi: 10.1161/CIRCHEARTFAILURE.120.007554. Epub 2021 Jan 28. PMID: 33504158.
30. Caravita S, Senni M, Parati G. Reply to: 'The hyperdynamic circulatory profile of patients with COVID-19-related acute vascular distress syndrome. Letter regarding the article Haemodynamic characteristics of COVID-19 patients with acute respiratory distress syndrome requiring mechanical ventilation. An invasive assessment using right heart catheterization'. *Eur J Heart Fail*. 2021 Jan 21. doi: 10.1002/ehf.2105. Epub ahead of print. PMID: 33480144.
31. Caravita S, Baratto C, Di Marco F, Calabrese A, Balestrieri G, Russo F, Faini A, Soranna D, Perego GB, Badano LP, Grazioli L, Lorini FL, Parati G, Senni M. Haemodynamic characteristics of COVID-19 patients with acute respiratory distress syndrome requiring mechanical ventilation. An invasive assessment using right heart catheterization. *Eur J Heart Fail*. 2020 Dec;22(12):2228-2237. doi: 10.1002/ehf.2058. Epub 2020 Dec 7. PMID: 33200458; PMCID: PMC7753704.
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55. Caravita S, Dewachter C, Soranna D, Carolino D'Araujo S, Khaldi A, Zambon A, Parati G, Bondue A, Vachiéry JL. Haemodynamics to predict outcome in pulmonary hypertension due to left heart disease: a meta-analysis. *Eur Respir J.* 2018 Feb 8. pii: 1702427. doi: 10.1183/13993003.02427-2017

Awards and recognitions

Prof Caravita has been nominated member of the coordinating committee of the Working Group on Pulmonary Vascular Diseases (ANMCO) during 2017-2018, member of the scientific committee during 2019-2020, and medical writer during 2022-2023

The publication "Impact of COVID-19 on exercise pathophysiology. A combined cardiopulmonary and echocardiographic exercise study" has been chosen as "paper of the year 2021" (Journal of Applied Physiology)

Dr Caravita has received the Award "Digital ANMCO 2022" – 53° National Congress ANMCO

Dr Caravita has received the Grant SIC-PIAM Pharma 2021, 82° National Congress SIC

Dr Baratto has received the Research Grant ESC 2020

Dr Caravita has received the 2nd Prize "Vera Srebot" 2018, Fondazione CNR/Regione Toscana per la Ricerca Medica e di Sanità Pubblica

MAIN COLLABORATIONS IN NATIONAL AND INTERNATIONAL RESEARCH NETWORKS

The pulmonary haemodynamics during exercise – research network (PEX-NET) ERS Clinical Research Collaboration

Pulmonary Hypertension and Heart Failure Clinic, Hopital Erasme, Brussels, Belgio (Prof JL Vachiéry)

Duke University, NC, USA (Prof M Fudim)