### Cover Page



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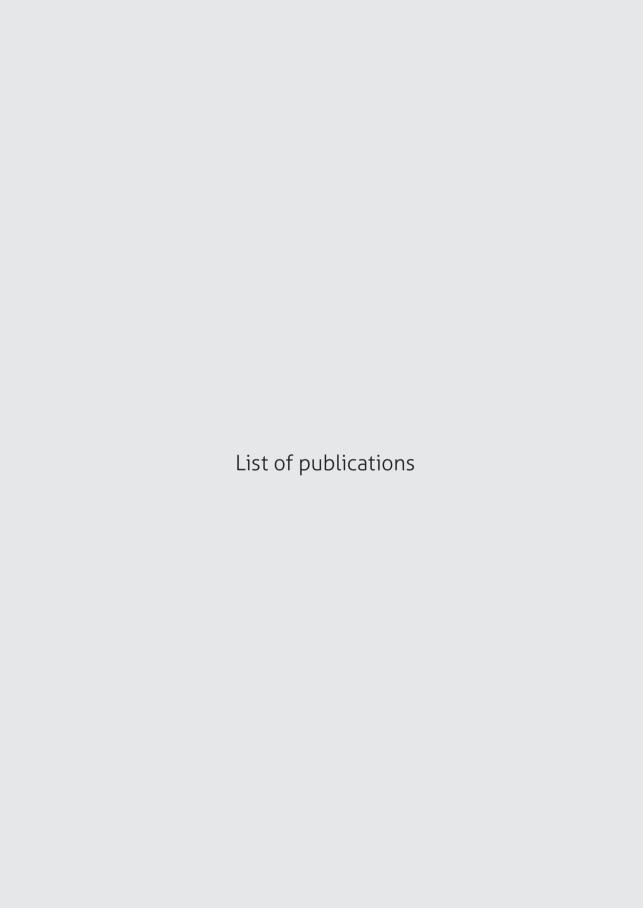
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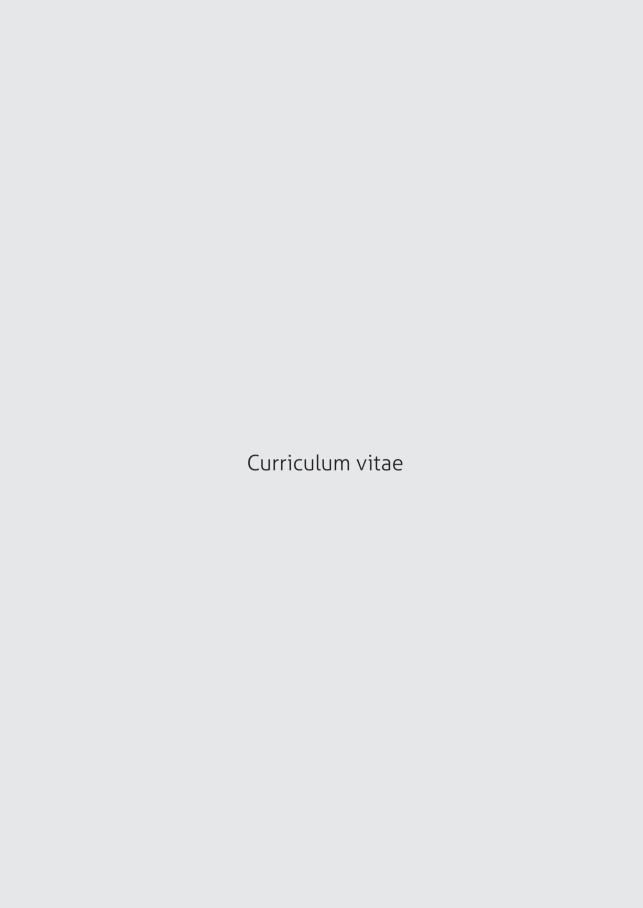
## LIST OF PUBLICATIONS

- 1. **Debonnaire P**, Van Rillaer O, Arts J, Ramboer K, Tubbax H, Van Hootegem P. Primary aorto enteric fistula: report of 18 Belgian cases and literature review.\_*Acta Gastroenterol Belg.* 2008 Apr-Jun;71(2):250-258.
- 2. Van Rillaer O, **Debonnaire P**, Ramboer K. Primary iliac arterioenteric fistula. *JBR-BTR*. 2009 May-Jun;92(3):176-177.
- 3. **Debonnaire P**, Coussement P, Schepens M. A vascular tangle on coronary angiography. *Acta Cardiol.* 2010 Aug;65(4):481-482.
- 4. **Debonnaire P**, De Backer O, De Geeter F, Delanote J, Vandekerckhove Y, Muyldermans L. Multimodality imaging of cardiac involvement in neurofibromatosis. *J Am Coll Cardiol*. 2011 Apr 26;57(17):e209.
- 5. **Debonnaire P**, Onsea K, Desmet W. Straddling thrombus through a patent foramen ovale secondary to saddle embolism. *Acta Clin Belg.* 2011 May-Jun;66(3):243.
- 6. De Backer O, **Debonnaire P**, Muyldermans L, Missault L. Tako-tsubo cardiomyopathy with left ventricular outflow tract (LVOT) obstruction: case report and review of the literature. *Acta Clin Bela*. 2011 Jul-Aug;66(4):298-301.
- 7. **Debonnaire P**, Bammens B, Blockmans D, Herregods MC, Dubois C, Voigt JU. Multimodality imaging of giant coronary artery aneurysms in immunoglobulin G4-related sclerosing disease. *J Am Coll Cardiol*. 2012 Apr 3;59(14):e27.
- 8. **Debonnaire P**, Palmen M, Marsan NA, Delgado V. Contemporary imaging of normal mitral valve anatomy and function. *Curr Opin Cardiol*. 2012 Sep;27(5):455-464.
- 9. Witkowski TG, Thomas JD, **Debonnaire P**, Delgado V, Hoke U, Ewe SH, Versteegh MI, Holman ER, Schalij MJ, Bax JJ, Klautz RJ, Marsan NA. Global longitudinal strain predicts left ventricular dysfunction after mitral valve repair. *Eur Heart J Cardiovasc Imaging*. 2013 Jan;14(1):69-76.
- 10. **Debonnaire P**, Katsanos S, Delgado V. Computed tomography to improve TAVI outcomes. *EuroIntervention*. 2012 Sep;8(5):531-533.
- 11. **Debonnaire P**, De Backer O, Orlent H, Vandevelde K. One for the road... *Eur Heart J.* 2013 Aug;34(32):2500.
- 12. **Debonnaire P**, Van Herck PL, Katsanos S, van der Kley F, de Weger A, Palmen M, Marsan NA, Schalij MJ, Delgado V. How should I treat acute aortic annulus rupture during transcatheter aortic valve implantation? *EuroIntervention*. 2013 Jan 22;8(9):1103-1109.
- 13. Al Amri I, **Debonnaire P**, Witkowski T, van der Kley F, Palmen M, de Weger A, Klautz RJ, Bax JJ, Schalij MJ, Ajmone Marsan N, Delgado V. Mitral valve geometry and hemodynamics after surgical mitral valve annuloplasty and implications for percutaneous treatment of patients with recurrent mitral regurgitation. *Am J Cardiol*. 2013 Sep 1;112(5):714-719.
- 14. **Debonnaire P**, Leong DP, Witkowski TG, Al Amri I, Joyce E, Katsanos S, Schalij MJ, Bax JJ, Delgado V, Marsan NA. Left atrial function by two-dimensional speckle-tracking echocardiography in patients with severe organic mitral regurgitation: association with guidelines-based surgical indication and postoperative (long-term) survival. *J Am Soc Echocardiogr.* 2013 Sep;26(9):1053-1062.
- 15. Katsanos S, Ewe SH, **Debonnaire P**, van der Kley F, de Weger A, Palmen M, Scholte AJ, Schalij MJ, Bax JJ, Marsan NA, Delgado V. Multidetector row computed tomography parameters associated with paravalvular regurgitation after transcatheter aortic valve implantation. *Am J Cardiol*. 2013 Dec 1;112(11):1800-1806.

- 16. Hoogslag GE, Thijssen J, Höke U, Boden H, Antoni ML, **Debonnaire P**, Haeck ML, Holman ER, Bax JJ, Ajmone Marsan N, Schalij MJ, Delgado V. Prognostic implications of left ventricular regional function heterogeneity assessed with two-dimensional speckle tracking in patients with ST-segment elevation myocardial infarction and depressed left ventricular ejection fraction. *Heart Vessels*. 2014 Sep;29(5):619-628.
- 17. Nazeri I, Abdi S, Mandegar MH, Naemi S, Roshanali F, Tehrai M, Shahabi P, **Debonnaire P**, van der Kley F, Katsanos S, Delgado V, Van Mieghem NM. How should I treat acute left main coronary obstruction after transapical aortic valve implantation? *EuroIntervention*. 2013 Oct;9(6):761-764.
- 18. Joyce E, Hoogslag GE, Leong DP, **Debonnaire P**, Katsanos S, Boden H, Schalij MJ, Marsan NA, Bax JJ, Delgado V. Association between left ventricular global longitudinal strain and adverse left ventricular dilatation after ST-segment-elevation myocardial infarction. *Circ Cardiovasc Imaging*. 2014 Jan;7(1):74-81.
- 19. Joyce E, Leong DP, Hoogslag GE, van Herck PL, **Debonnaire P**, Abate E, Holman ER, Schalij MJ, Bax JJ, Delgado V, Marsan NA. Left ventricular twist during dobutamine stress echocardiography after acute myocardial infarction: association with reverse remodeling. *Int J Cardiovasc Imaging*. 2014 Feb;30(2):313-322.
- Debonnaire P, Thijssen J, Leong DP, Joyce E, Katsanos S, Hoogslag GE, Schalij MJ, Atsma DE, Bax JJ, Delgado V, Marsan NA. Global longitudinal strain and left atrial volume index improve prediction of appropriate implantable cardioverter defibrillator therapy in hypertrophic cardiomyopathy patients. *Int J Cardiovasc Imaging*. 2014 Mar;30(3):549-558.
- 21. Kamperidis V, Joyce E, **Debonnaire P**, Katsanos S, van Rosendael PJ, van der Kley F, Sianos G, Bax JJ, Ajmone Marsan N, Delgado V. Left ventricular functional recovery and remodeling in low-flow low-gradient severe aortic stenosis after transcatheter aortic valve implantation. *J Am Soc Echocardiogr.* 2014 Aug;27(8):817-825.
- 22. **Debonnaire P**, Delgado V, Bax JJ. Potential role of fibrosis imaging in severe valvular heart disease. *Heart*. 2015 Mar;101(5):397-407.
- 23. Cottens D, Corteville B, Vanvinckenroye A, Schepens M, Missault L, **Debonnaire P**. Moderate gradient with disproportional dyspnoea: multimodality imaging of funnel-shaped subaortic membrane. *Eur Heart J.* 2015 Mar 7;36(10):583.
- 24. Katsanos S, van Rosendael P, Kamperidis V, van der Kley F, Joyce E, **Debonnaire P**, Karalis I, Bax JJ, Marsan NA, Delgado V. Insights into new-onset rhythm conduction disorders detected by multi-detector row computed tomography after transcatheter aortic valve implantation. *Am J Cardiol*. 2014 Nov 15;114(10):1556-1561.
- 25. De Backer O, **Debonnaire P**, Gevaert S, Missault L, Gheeraert P, Muyldermans L. Prevalence, associated factors and management implications of left ventricular outflow tract obstruction in takotsubo cardiomyopathy: a two-year, two-center experience. *BMC Cardiovasc Disord*. 2014 Oct 22;14:147.
- 26. Katsanos S, **Debonnaire P**, van der Kley F, van Rosendael PJ, Joyce E, de Graaf MA, Schalij MJ, Scholte AJ, Bax JJ, Ajmone Marsan N, Delgado V. Position of Edwards SAPIEN transcatheter valve in the aortic root in relation with the coronary ostia: implications for percutaneous coronary interventions. *Catheter Cardiovasc Interv.* 2015 Feb 15;85(3):480-487.
- 27. **Debonnaire P**, Al Amri I, Leong DP, Joyce E, Katsanos S, Kamperidis V, Schalij MJ, Bax JJ, Marsan NA, Delgado V. Leaflet remodelling in functional mitral valve regurgitation: characteristics, determinants, and relation to regurgitation severity. *Eur Heart J Cardiovasc Imaging*. 2015 Mar;16(3):290-299.

- 29. Joyce E, Ninaber MK, Katsanos S, **Debonnaire P**, Kamperidis V, Bax JJ, Taube C, Delgado V, Ajmone Marsan N. Subclinical left ventricular dysfunction by echocardiographic speckle-tracking strain analysis relates to outcome in sarcoidosis. *Eur J Heart Fail*. 2015 Jan;17(1):51-62.
- 30. **Debonnaire P**, Fusini L, Wolterbeek R, Kamperidis V, van Rosendael P, van der Kley F, Katsanos S, Joyce E, Tamborini G, Muratori M, Gripari P, Bax JJ, Marsan NA, Pepi M, Delgado V. Value of the "TAVI2-SCORe" versus surgical risk scores for prediction of one year mortality in 511 patients who underwent transcatheter aortic valve implantation. *Am J Cardiol*. 2015 Jan 15;115(2):234-242.
- 31. Kamperidis V, van Rosendael PJ, Ng AC, Katsanos S, van der Kley F, **Debonnaire P**, Joyce E, Sianos G, Marsan NA, Bax JJ, Delgado V. Impact of flow and left ventricular strain on outcome of patients with preserved left ventricular ejection fraction and low gradient severe aortic stenosis undergoing aortic valve replacement. *Am J Cardiol*. 2014 Dec 15;114(12):1875-1881.
- 32. **Debonnaire P**, Katsanos S, Joyce E, van den Brink OV, Atsma DE, Schalij MJ, Bax JJ, Delgado V, Marsan NA. QRS Fragmentation and QTc Duration Relate to Malignant Ventricular Tachyarrhythmias and Sudden Cardiac Death in Patients with Hypertrophic Cardiomyopathy. *J Cardiovasc Electrophysiol.* 2015 May;26(5):547-555.
- 33. van Rosendael PJ, Joyce E, Katsanos S, **Debonnaire P**, Kamperidis V, van der Kley F, Schalij MJ, Bax JJ, Ajmone Marsan N, Delgado V. Tricuspid valve remodelling in functional tricuspid regurgitation: multidetector row computed tomography insights. *Eur Heart J Cardiovasc Imaging*. 2015 Jun. *E-Pub ahead of print*.
- 34. Joyce E, **Debonnaire P**, Leong DP, Abate E, Katsanos S, Bax JJ, Delgado V, Ajmone Marsan N. Differential response of LV sublayer twist during dobutamine stress echocardiography as a novel marker of contractile reserve after acute myocardial infarction: relationship with follow-up LVEF improvement. Eur Heart J Cardiovasc Imaging. 2015 Jul. E-Pub ahead of print.
- 35. Joyce E, Hoogslag GE, Al Amri I, **Debonnaire P**, Katsanos S, Bax JJ, Delgado V, Marsan NA. Quantitative Dobutamine Stress Echocardiography Using Speckle-Tracking Analysis versus Conventional Visual Analysis for Detection of Significant Coronary Artery Disease after ST-Segment Elevation MyocardialInfarction. *J Am Soc Echocardiogr.* 2015 Aug. *E-Pub ahead of print*.
- 36. Al Amri I, Debonnaire P, van der Kley F, Schalij MJ, Bax JJ, Marsan NA, Delgado V. Acute effect of MitraClip implantation on mitral valve geometry in patients with functional mitral regurgitation: insights from three-dimensional transoesophageal echocardiography. Euro-Intervention. 2015 Sep. E-Pub ahead of print.
- 37. Gheorghiade M, Greene SJ, Butler J, Filippatos G, Lam CS, Maggioni AP, Ponikowski P, Shah SJ, Solomon SD, Kraigher-Krainer E, Samano ET, Müller K, Roessig L, Pieske B; SOCRATES-REDUCED Investigators and Coordinators. Collaborators: ..., **Debonnaire P**, et al. Effect of Vericiguat, a Soluble Guanylate Cyclase Stimulator, on Natriuretic Peptide Levels in Patients With Worsening Chronic Heart Failure and Reduced Ejection Fraction: The SOCRATES-REDUCED Randomized Trial. *JAMA*. 2015 Dec;314(21):2251-2262.

- 38. Haeck MLA, Hoogslag GE, Boden H, Velders MA, Katsanos S, al Amri I, **Debonnaire P**, Schalij MJ, Bax JJ, Ajmone Marsan N, Delgado V. Prognostic implications of elevated pulmonary artery pressure after ST-segment elevation myocardial infarction. *Submitted*.
- 39. Joyce E, Kamperidis V, Ninaber MK, Katsanos S, **Debonnaire P**, Schalij MJ, Taube C, Bax JJ, Delgado V, Ajmone Marsan N. Diagnosis of Early Right Ventricular Dysfunction in Sarcoidosis: Prevalence. Correlates and Association with Clinical Outcome. *Submitted*.
- 40. Joyce E, Hoogslag GE, Kamperidis V, **Debonnaire P**, Katsanos S, Ajmone Marsan N, Bax JJ, Delgado V. Relationship between Myocardial Function, Body Mass Index and Outcome after ST-segment Elevation Myocardial Infarction: Insights into the Obesity Paradox from Longitudinal Strain. Submitted.
- 41. Joyce E, Katsanos S, Kamperidis V, Ninaber MK, **Debonnaire P**, Schalij MJ, Taube C, Bax JJ, Delgado V, Ajmone Marsan N. Left Ventricular Function in Sarcoidosis as assessed by Speckle Tracking Strain Echocardiography: Relationship to Disease Severity and Evolution over Time. *Submitted*.
- 42. Abate E, Hoogslag GE, Al Amri I, **Debonnaire P**, Wolterbeek R, Bax JJ, Delgado V, Ajmone Marsan N. Time Course, Predictors and Prognostic Implications of Significant Mitral Regurgitation After ST-Segment Elevation Myocardial Infarction. *Submitted*.
- 43. Katsanos S, van Rosendael P, **Debonnaire P**, Kamperidis V, van der Kley F, Joyce E, Karalis I, Palmen M, Bax JJ, Ajmone Marsan N, Delgado V. Quantitative analysis of changes in mitral regurgitation after transcatheter aortic valve implantation. *Submitted*.
- 44. Katsanos S, van Rosendael P, van den Brink O, **Debonnaire P**, Joyce E, van der Kley F, Ajmone Marsan N, Bax JJ, Delgado V. Fate of transcatheter valve-in-valve implantation and redo cardiac surgery for failing bioprosthetic valves in patients with high operative risk. *Submitted*.
- 45. **Debonnaire P**, Joyce E, Atsma DE, Schalij MJ, Bax JJ, Delgado V, Ajmone Marsan N. Left atrial size and function in hypertrophic cardiomyopathy patients and risk of new onset atrial fibrillation. *Submitted*.
- 46. Van De Heyning CM, Bertrand PB, **Debonnaire P**, De Maeyer C, Vandervoort PM, Coussement P, Paelinck BP, De Bock D, Vrints CJ, Claeys MJ. Mechanism of symptomatic improvement after MitraClip therapy for secondary mitral regurgitation: the role of improved resting and exercise hemodynamics. *Submitted*.

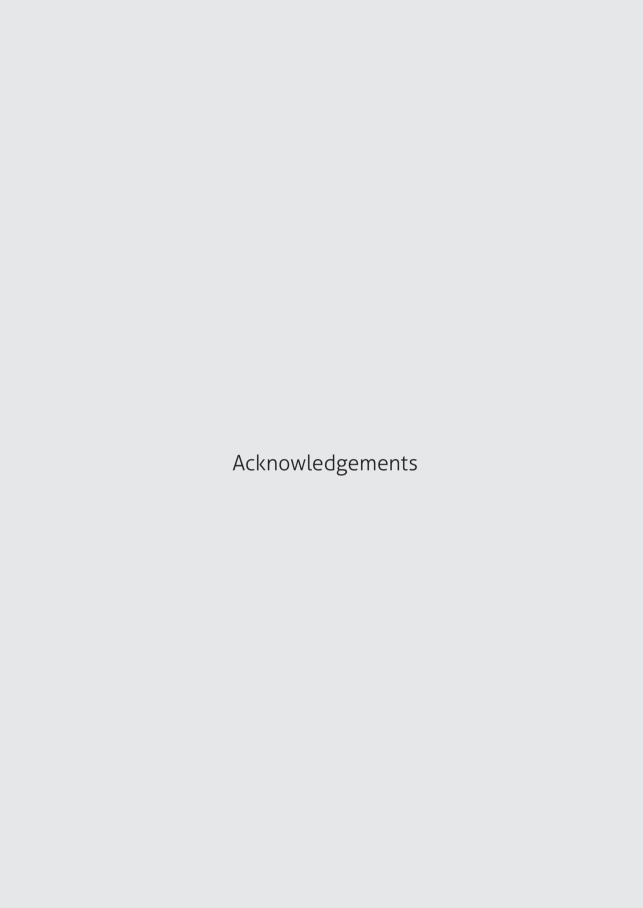


### **CURRICULUM VITAE**

Philippe Debonnaire was born on October 2nd 1980 in Turnhout (Belgium). He graduated from Sint-Jozefcollege high school in 1998 and subsequently studied Medicine at the Catholic University of Leuven in Belgium. In 2005 he obtained his Medical Degree, magna cum laude. After a period of 6 years training in internal medicine and cardiology at the University Hospital of Leuven, he became cardiologist in 2011. During that period he obtained an additional degree in Sports Medicine, magna cum laude, at the Catholic University of Leuven.

In 2011 he moved with his family to Leiden where he completed a 2-year research fellowship in advanced non invasive cardiac imaging (3D and deformation echocardiography, computed tomography, magnetic resonance imaging) for structural heart disease at the Leiden University Medical Center (LUMC) in Leiden, the Netherlands, promoted by Prof. dr. Jeroen J. Bax and co-promoted by dr. Victoria Delgado and dr. Nina Ajmone Marsan. His research was supported by a Research Grant of the European Association of Cardiovascular Imaging (EACVI), obtained in 2013. He received EACVI accreditation for echocardiography in 2012 and won the Meda Pharma best abstract presentation award at the Belgian Heart Rhythm Association congress in 2013.

In October 2013 he joined the cardiology faculty of Sint-Jan Hospital in Bruges, Belgium, where he is working as staff cardiologist since. His main field of interest lies in advanced echocardiographic imaging (3-dimensional, deformation, stress) in patients with valvular heart disease, various cardiomyopathies and structural heart interventions. Philippe Debonnaire is faculty member of Crossroads (Abott Vascular), an educational network to train centers for Mitra-Clip therapy, imaging proctor for MitraClip therapy (Abbott Vascular), board member of the Belgian Working Group of Non Invasive Cardiac Imaging (BWGNICI) and was awarded Scientific Fellow of the European Society of Cardiology (FESC) in 2015.



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