Curriculum Vitae

Marco Moscarelli, M.D. (IT), Ph.D, M.Res. (NHLI, UK)



1. PERSONAL DETAILS

Date and place of birth	15.02.1977, Palermo, Italy
Nationality	Italian
Language	English, Italian
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Websites:
https://profiles.imperial.ac.uk/m.moscarelli/publications

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RESEARCH GATE ID	https://www.researchgate.net/profile/Marco_Moscarelli
SYMPLECTIC ELEMENTS (Imperial College London)	https://www.imperial.ac.uk/SymplecticElements/default.html

UK General Medical Council specialist registration n° 6161556

Ordine dei Medici di Roma OMCEO RM M52268

2. SHORT BIOGRAPHY

I am a Consultant Cardiac Surgeon with a particular interest in catheter-based procedures and a Senior Scientific Researcher at GVM Care & Research, Palermo, Italy. I serve as certified proctor for Abbott TAVI and act as solo implanter for Medtronic TAVI.
I am also Honorary Senior Lecturer at Imperial College London, Dept. of Surgery & Cancer, UK https://profiles.imperial.ac.uk/m.moscarelli/publications.

I completed my undergraduate studies and earned my medical degree at the University of Rome, Tor Vergata, in 2001. I subsequently completed my residency and qualified in Cardiac Surgery at the same university in 2010.

From 2010 to 2015, I joined Hammersmith Hospital/National Heart and Lung Institute (NHLI), London, UK, as a Clinical and Research Fellow. During this time, I registered for a Doctorate of Medical Research (MD(Res)) at Imperial College London, working on a project investigating ischemic remote preconditioning (RIPC) in collaboration with the University of Bristol.
During my time in London, I acquired extensive experience in evidence-based medicine, meta-analyses, biostatistics, and clinical trial design, with a particular focus on translational medicine. I was also actively involved in all aspects of cardiac surgery procedures and took responsibility for the training and teaching of senior house officers at Imperial College.

In 2016, I returned to Italy to join the GVM Care & Research group, one of the largest cardiac surgery networks in Europe, with the aim of establishing a multicentric research group. Since then, I have been leading a multidisciplinary team and have carried out and published numerous studies and clinical trials in translational medicine and evidence synthesis.

In the same year, I was appointed Scientific Secretary of the Mitral Academy (www.mitralacademy.it) and organizer of the Mitral Conferences (MICS Congress).
In 2017, I established a short Master's course in biostatistics (based on the R programming language) in collaboration with the University of Bari.
In 2018, I successfully defended and was awarded the MD(Res) degree by Imperial College London for my research on ischemic remote preconditioning.

I serve as Associate Editor for the *Journal of Cardiac Surgery* (JOCS) and am a board member of the *European Journal of Cardio-Thoracic Surgery* (EJCTS). I also act as a statistical consultant for both EJCTS and *Interdisciplinary CardioVascular and Thoracic Surgery* (ICVTS).

In January 2021, I was appointed to lead the "Research and Methodology" Task Force of the Italian Society for Cardio-Thoracic Surgery (SICCH) and oversee research activities for GIROC (Italian Group of Research and Outcomes in Cardiac Surgery).
In 2021, I secured a €2.9 million European grant to investigate early predictors of biological tissue dysfunction (www.endotavi.it).

In May 2022, I obtained the Italian National Scientific Qualification (Abilitazione Scientifica Nazionale) as Associate Professor (II Fascia).
In February 2023, I successfully defended and was awarded a PhD on "Advancements in Minimally Invasive Cardiac Surgery" by Maastricht University, the Netherlands.

Since 2023, I have been affiliated with Imperial College London as an Honorary Senior Lecturer in the Department of Surgery and Cancer.

In addition to my clinical and academic work, I have a strong interest in medical device development. I am the founder of *LetLeaf*, a MedTech startup dedicated to innovation in the field of cardiovascular technologies.

a. Qualifications

1. Giulio Cesare High School – Rome, Italy (1990-1995)

2. Tor Vergata University of Rome Medical School Primary Medical Qualification cum laude (1995-2001)

3. General and Cardiac Surgery Residency, Department of Cardiac Surgery Tor Vergata - University of Rome (2001-2010) (MD It) (Certificate of completion of training)

4. MD(Res) Doctor of Medicine Research (2018), Imperial College, National Heart Lung Institute, London UK.

5. Senior scientific officer, GVM Care&Research, Cotignola, Maria Cecilia Hospital (RA), Italy.

6. PhD, 'Advancement in Minimally Invasive Cardiac Surgery' (2023), University of Maastricht, the Netherland.

b. Clinical practice

Surgical Performance

Year	CABG isolated n (%)	AVR isolated n (%)	AVR + Combined n (%)	Mitral isolated n (%)	Mitral + Combined n (%)	Ascending Aorta/Root n (%)	Other n (%)	Aortic Dissection n (%)	Total N
2016	51 (43.6%)	15 (12.8%)	10 (8.5%)	12 (10.3%)	8 (6.8%)	7 (6.0%)	4 (3.4%)	10 (8.5%)	117
2017	60 (41.7%)	20 (13.9%)	14 (9.7%)	14 (9.7%)	10 (6.9%)	9 (6.2%)	5 (3.5%)	12 (8.3%)	144
2018	74 (41.3%)	25 (14.0%)	20 (11.2%)	18 (10.1%)	12 (6.7%)	10 (5.6%)	5 (2.8%)	15 (8.4%)	179
2019	67 (40.6%)	22 (13.3%)	18 (10.9%)	16 (9.7%)	10 (6.1%)	11 (6.7%)	6 (3.6%)	15 (9.1%)	165
2020	61 (43.0%)	18 (12.7%)	15 (10.6%)	12 (8.5%)	8 (5.6%)	9 (6.3%)	5 (3.5%)	14 (9.9%)	142
2021	64 (42.1%)	21 (13.8%)	17 (11.2%)	14 (9.2%)	10 (6.6%)	11 (7.2%)	5 (3.3%)	10 (6.6%)	152
2022	61 (42.4%)	20 (13.9%)	16 (11.1%)	13 (9.0%)	10 (6.9%)	10 (6.9%)	4 (2.8%)	10 (6.9%)	144
2023	59 (41.3%)	19 (13.3%)	17 (11.9%)	13 (9.8%)	10 (7.0%)	9 (6.3%)	6 (3.5%)	10 (7.0%)	143
2024	54 (39%)	20 (13.6%)	16 (11.7%)	13 (9.5%)	9 (6.6%)	10 (7.3%)	5 (3.6%)	9 (6.6%)	136

AVR: Aortic valve replacement. CABG: Coronary artery bypass grafting

∞ Refers to unadjusted mortality (overall, including in-hospital mortality beyond 30 days and aortic dissection)

TAVI are excluded from the surgical performance table

Surgical Performance – Mortality

Year	Total N	Mortality n (%)
2016	117	2 (1.7%)
2017	144	3 (2.1%)
2018	179	3 (1.7%)
2019	165	3 (1.8%)
2020	142	2 (1.4%)
2021	152	2 (1.3%)
2022	144	3 (2.1%)
2023	143	2 (1.4%)
2024	136	2 (1.5%)

AVR: Aortic valve replacement. CABG: Coronary artery bypass grafting

Refers to unadjusted mortality (overall, including in-hospital mortality beyond 30 days and aortic dissection)

TAVI are excluded from the surgical performance table

In my role as Clinical Consultant, I perform the full spectrum of adult cardiac surgery procedures, including off-pump coronary artery bypass grafting (OPCAB), totally arterial revascularization, and minimally invasive aortic valve replacement via mini-sternotomy. The majority of my coronary artery bypass grafting (CABG) procedures include double internal mammary artery grafting (Y/T graft configuration).

I have a particular interest in catheter-based and hybrid procedures, with a strong focus on wire skills. I perform transcatheter aortic valve replacement (TAVR) as first operator, using self-expandable prostheses (Evolut R,PRO- Portico/Navitor) via transfemoral and trans-subclavian access routes, as well as ECMO-assisted TAVR in selected cases. I currently perform more than 80 TAVR procedures per year.

I also perform the highest number of complex redo surgeries in my unit, including redo mitral, tricuspid, and aortic valve surgeries.

Additionally, I lead the minimally invasive atrial fibrillation bipolar ablation component of our hybrid surgical-electrophysiology program and actively participate in the acute aortic dissection service.

I am responsible for the training of junior surgeons in the unit, with a focus on core surgical training in CABG and aortic valve replacement (AVR).

3. ACADEMIC ROLE/ACHIEVEMENTS

-From 2010 to 2015, I worked at Hammersmith Hospital as a Clinical and Research Fellow in the Vascular Science Section of the National Heart and Lung Institute (NHLI), Faculty of Medicine, London, UK. I conducted extensive research on the effect of ischemic remote preconditioning (RIPC) in cardiac surgery and participated as a local investigator in the UK-led ERICCA trial ("Remote Ischemic Preconditioning and Outcomes of Cardiac Surgery").

-In collaboration with Hammersmith Hospital and the Bristol Heart Institute, I carried out a clinical and translational trial funded by the British Heart Foundation, investigating the effect of RIPC on left and right ventricular metabolites ("A multi-centre randomised controlled trial investigating the effect of RIPC on blood and myocardial biomarkers of stress and injury-related signalling in patients undergoing CABG and AVR using CPB"; ISRCTN 33084113 - UKCRN ID 13672). This work formed the basis of my MD(Res) thesis ("A trial on the effect of remote preconditioning on blood, myocardial, and biomarkers of injury-related signaling"), awarded by Imperial College London in 2018. Results were presented at the 32nd EACTS Annual Meeting and published in the *European Journal of Cardio-Thoracic Surgery* (EJCTS).

-In 2015, I was appointed Lead of the Research Unit at GVM Care & Research, Italy — one of the largest cardiac surgery providers in Europe (11 centers, approximately 5,000 cardiac surgical cases and 750 TAVR procedures annually) — with the objective of expanding research output and fostering collaborations with national and international institutions.

-In collaboration with Pasquinucci Hospital, Massa (Italy), I conducted the MINI-SEVO trial ("A Trial of Two Anaesthetic Regimes for Minimally Invasive Mitral Valve Repair"; NCT02551328),

investigating continuous sevoflurane infusion versus propofol as conditioning agents in isolated non-ischemic minimally invasive mitral surgery. The results were presented at the 2017 AATS Mitral Conclave and published in the *Journal of Cardiothoracic and Vascular Anesthesia*(2018).

-In 2016, I co-founded the Mitral Academy and established the biannual MICS (Minimally Invasive Cardiac Surgery) Congress, an internationally recognized meeting attracting experts in minimally invasive mitral and aortic valve surgery (www.mitralacademy.it).

-At GVM Care & Research, I lead the PROphylactic triCuspID Annuloplasty (PROCIDA) trial (NCT03129737), investigating the impact of prophylactic tricuspid annuloplasty during mitral valve surgery (ongoing).

-My research also explores the impact of frailty on cardiac surgical outcomes and its relationship with postoperative quality of life. In collaboration with Hammersmith Hospital, GVM Care & Research, and Pasquinucci Hospital, I conducted the multicenter "Frailty Study" ("Using quality of life and frailty as predictors of recovery in cardiac surgery patients"). We demonstrated that minimally invasive approaches (aortic/mitral) were particularly beneficial compared to sternotomy in frail individuals. Results ("A Multi-centric study comparing the effect of minimally invasive and sternotomy surgery on physical activity and quality of life") were presented at the 2019 EACTS Annual Meeting in Lisbon and published in *Heart Lung and Circulation* (2020).

-In 2017, I established the first Short Master's Course in Biostatistics and Research Methodology, in collaboration with the University of Bari.

-I have maintained a strong focus on translational research. I led the ENDO-TAVI study ("The effect of transcatheter vs. surgical aortic valve replacement on endothelial function"), investigating macro- and microvascular markers of endothelial dysfunction post-intervention. This project was awarded a European grant of €2.9 million (Principal Investigator, 2022–2025; www.endotavi.it).

-I have a particular interest in cardiopulmonary bypass (CPB) systems. I am the local investigator for the COMICS trial ("Conventional vs. Miniaturised Cardiopulmonary Bypass Circuit in Patients Undergoing Cardiac Surgery"; ISRCTN92590475) and contributed to recruiting over 100 patients,

establishing one of the largest mini-CPB practices in Italy. I have conducted several additional studies aimed at optimizing and reducing the impact of CPB in cardiac surgery.

-I serve as Associate Editor of the *Journal of Cardiac Surgery* (since 2019) and as a Board Member and Statistical Consultant for the *European Journal of Cardio-Thoracic Surgery* (since 2022).

-I am also a local investigator in the ROMA trial ("Randomized Comparison of the Clinical Outcome of Single vs. Multiple Arterial Grafts"; ClinicalTrials.gov Identifier: NCT03217006).

-Since 2020, I have been leading the Methodological Task Force of the Italian Society for Cardiac Surgery (SICCH) and supervising research activities within GIROC (Italian Group of Research and Outcomes in Cardiac Surgery).

-I maintain affiliations as an Honorary Lecturer with both Imperial College London and the University of Bristol.

a. Research focus

- Translational Research: Investigation of ischemic remote preconditioning (RIPC) and general ischemic conditioning strategies, with a particular emphasis on endothelial function related to surgical and endovascular interventions, including the detection of micro- and macrovascular markers of endothelial dysfunction.

- Minimally Invasive Extracorporeal Circulation Technologies (MIECT): Optimization of minimally invasive cardiopulmonary bypass circuits and advanced anesthesiology techniques to reduce the impact of CPB on postoperative outcomes.

- Evidence Synthesis, Decision Models, Meta-Analysis, and Cost-Effectiveness: As first author and in collaboration with international groups, I have published several meta-analyses (including RCTs, observational studies, and patient-level meta-analyses) evaluating the efficacy of minimally invasive approaches in cardiac surgery.

- Patient Risk Assessment: My group has conducted multiple analyses assessing the accuracy and precision of existing risk scores (EuroSCORE, STS) and their validation in the context of minimally invasive cardiac surgery.

- Medical Device Innovation: I am the inventor and patent holder of a novel percutaneous device to correct mitral regurgitation (*MITBITE*; www.mitbite.it). In addition, I founded *LetLeaf*, a startup focused on developing innovative solutions in the field of cardiovascular medical devices.

- Artificial Intelligence and Advanced Imaging: I have established a dedicated research group focusing on multiparametric advanced imaging analysis (using Slicer 3D) for the evaluation of hypoattenuated valvular lesions (both leaflet and perivalvular) to enable early diagnosis of prosthetic valve disease.

b. International/national collaboration

I actively collaborate with the research team at Hammersmith Hospital/National Heart and Lung Institute (NHLI), London, including Professors T. Athanasiou, R. Casula, P. Punjabi, and C. Emanueli, as well as with the University of Bristol, working with Professors G.D. Angelini and S. Suleiman.

In collaboration with Cornell University (Professor Mario Gaudino), I have published several patient-level analyses focused on the use of the radial artery and conducted evidence synthesis research on coronary bypass surgery and quality of life outcomes
(*JAMA* 2021, *JAHA* 2020, *JACC* 2019).

Additionally, I collaborate with the Department of Biomedical Sciences at The Ohio State University (Columbus, Ohio, USA) and the Department of Biomedical Engineering at Georgia Institute of Technology and Emory University (Atlanta, Georgia, USA) on multiparametric imaging analysis of hypoattenuated lesions following aortic valve replacement.

4. CONTRIBUTION IN TEACHING

a) During my period in London, I was responsible to supervise Senior House Officer (SHO) (London Deanery) for surgical training and teaching. I also regularly supervised students for the MSc projects (cardiovascular - modules) at Imperial.
As part of my role at Imperial, I gave regular lectures about all the aspects of cardiac surgery and research methodology.

b) At GVM Care&Research, I provide clinical teaching and coaching to trainees (both cardiologist / cardiothoracic), preparing them for the next level of clinical responsibility and offering them the opportunity to be trained in modern and minimally invasive surgical techniques.
I have particular interest in surgical simulators.
I designed a low-fidelity simulator for minimally invasive mitral valve surgery, with the vision to facilitate learning (right mini thoracotomy). The video tutorial and full description on how to assemble the model are describe in the MMCTS website: https://mmcts.org/author/1268

Tutorials:



How to assemble a low-fidelity simulator for minimally invasive mitral valve surgery

Marco Moscarelli, Nicola Di Bari, Raffaele Bonifazi, Massimo Salardino, Teresa De Donatis, Giuseppe Nasso, Giuseppe Speziale
April 26, 2019 | 6 mins | Cardiac (Mitral Valve) | Advanced

Simulators play an important role in improving surgical skills and dexterity. Our low- fidelity, low- cost MIMVS simulator can made from components that are available in any operating room.

I regularly organize courses / wet lab on behalf of the Mitral Academy, aiming to provide the fundamental skills for mitral valve management and repair, via both conventional sternotomy and minimally invasive https://www.mitralacademy.it/en-us/news/first-course-in-mitral-valve-surgery-en.

c) In Palermo, I regularly supervise bachelor student for MD project in vascular and cardiology.

Tutoring for students and preparation of degree / specialization theses (School of Specialization in Cardiology (Prof. S. Novo / Prof. G. Novo / Prof. Alfredo Galassi), Department of Internal Medicine and nephro-urological and cardiovascular diseases. University of Palermo):

- Il ruolo dei seni di Valsalva nella trombosi subclinica post TAVI. AA: 2020-2021. Dr Rosa Prestera. Supervisor: Prof. Egle Corrado, Co-supervisor: Prof. Khalil Fattouch – Marco Moscarelli.

- Stent-frame decoupling following self-expandable transcatheter aortic valve replacement. AA: 2021-2022. Dr. Emanuele Lentini. Supervisor: Prof. A.R. Galassi, Co-supervisor: Marco Moscarelli.

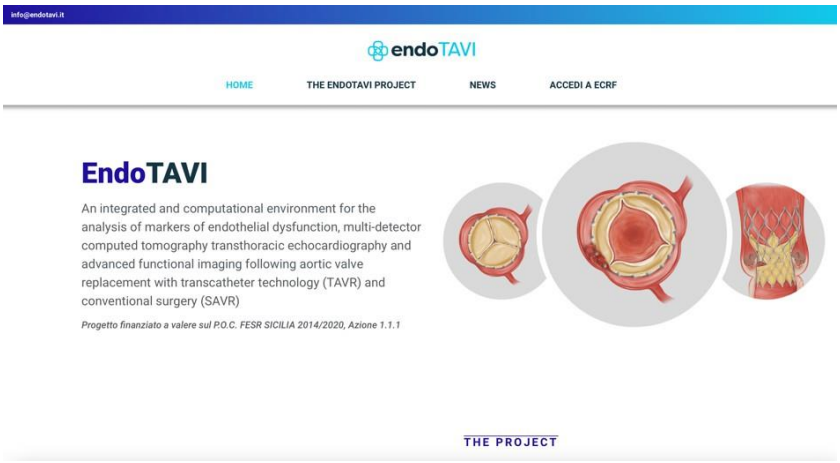
- Il ruolo della dimensione dei seni anatomici nella trombosi subclinica dei lembi e nella performance valvolare dei pazienti sottoposti a TAVI. AA: 2021-2022. Dr. Federico Cuffari. Supervisor Prof. G. Tanzilli, Co-supervisor: Marco Moscarelli.

- Localizzazione delle lesioni ipoattenuate dopo impianto transcatetere di valvola aortica. AA: 2021-2022. Dr. Benjamin De Ornelas. Supervisor: Prof. Khalil Fattouch, Co-supervisor: Marco Moscarelli.

- Scuola di Medicina e Chirurgia Scuola di specializzazione in Radiodiagnostica Dipartimento BIND – Biomedicina, Neuroscienze e Diagnostica avanzata Sezione Scienze Radiologiche Direttore Professore Giuseppe Brancatelli. Valutazione mediante TC della correlazione tra Self-Expandable Prosthesis Valve Adaptation ed insorgenza di Hypoattenuated Leaflet Thickening in pazienti sottoposti a TAVI con Evolut R di nuova generazione. Dr.ssa. Giulia Sollami. AA: 2022-2023. Supervisor: Prof. Ludovico La Grutta, Co-supervisor: Marco Moscarelli.

5. CURRENT PROGRAM GRANTS

"The Effect of Surgical Versus Transcatheter Aortic Valve Replacement on Endothelial Function" (European Funds, POR Sicilia ESF).
Awarded €2,900,000; Principal Investigator (2022–2025).
In collaboration with the University of Palermo and GVM Care & Research Eleonora Hospital (Palermo), this project aims to investigate micro- and macrovascular markers of endothelial dysfunction following aortic valve intervention.

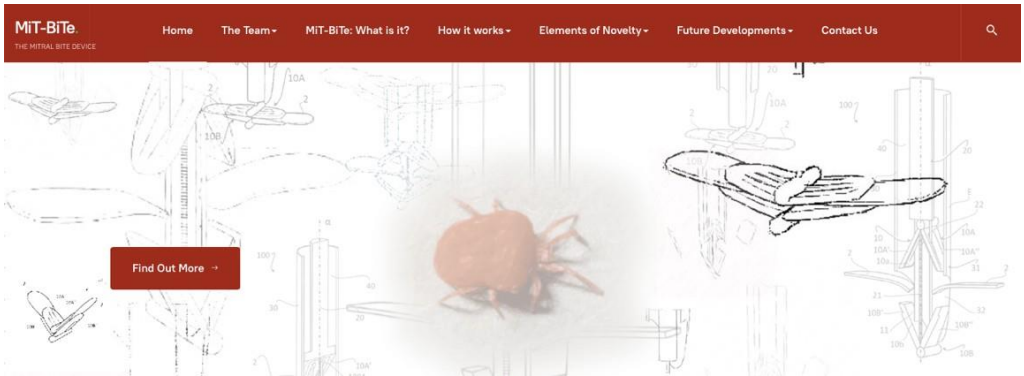


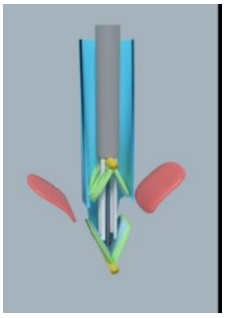
6. ORIGINAL / PERSONAL INNOVATIONS IN CARDIAC SURGERY

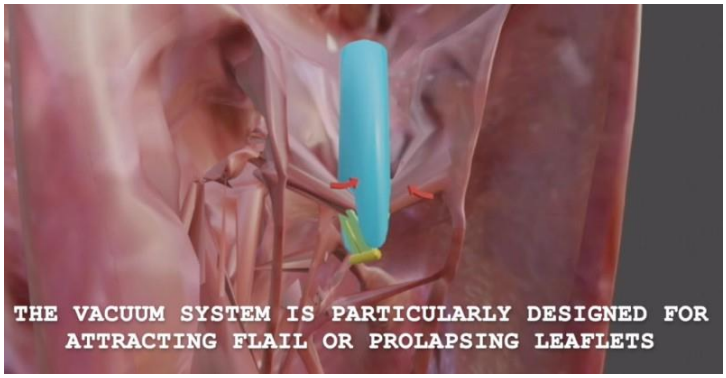
1) I designed a percutaneous device named 'MiTBiTe' (The Mitral Bite: www.mitbite.com) that allows the correction of mitral and or tricuspid regurgitation via femoral vein access and trans-atrial approach. The MiTBiTe has an innovative mechanism of suction (ECG gated - vacuum) that attracts the leaflets and secure them with a specific bite.

(Patent International Application Number: PCTB2019/05987).

The MiTBiTe device was awarded at the Italian 'start-cup' competition 2020 (runner up - 2020).

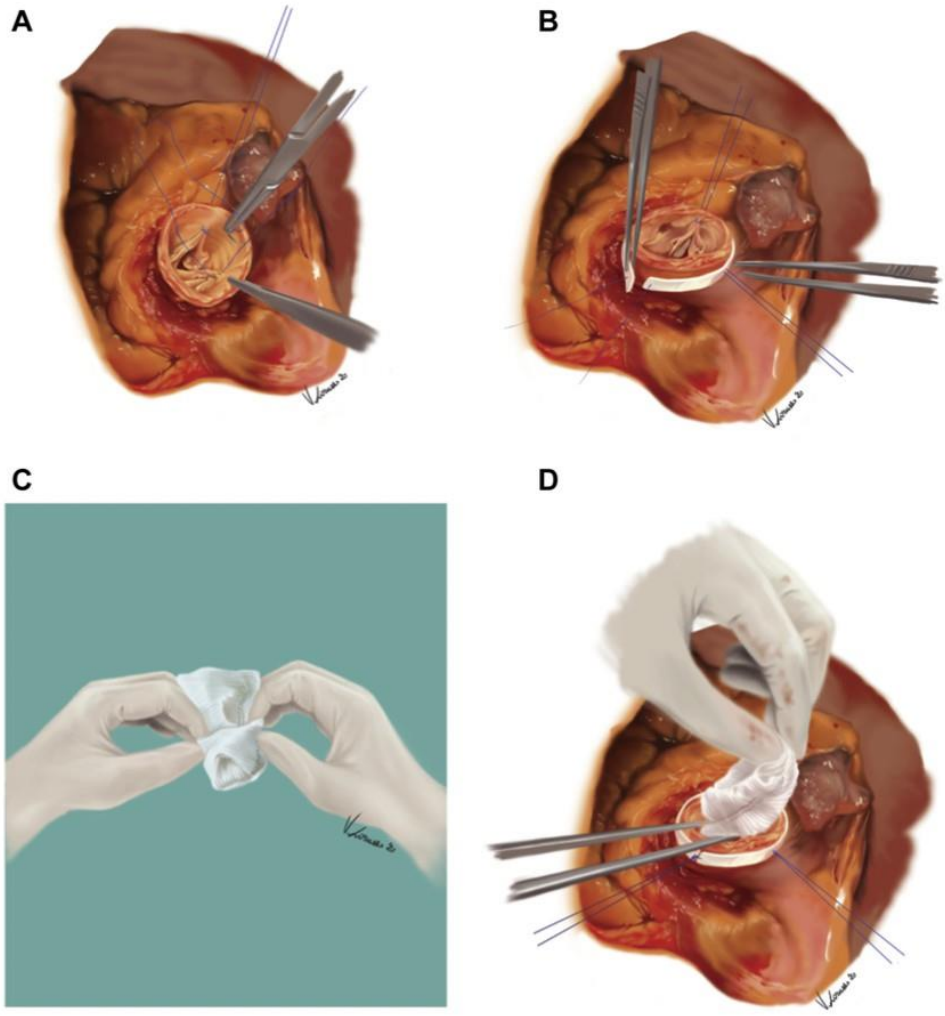






Full video description at www.mitbite.com

2) I described a technique for ascending aorta replacement and sino-tubular junction (STJ) reconstruction and stabilization that contribute to address dystrophic aortic regurgitation. This technique can also be associated to external subaortic ring (Annals of Thoracic Surgery 2020).

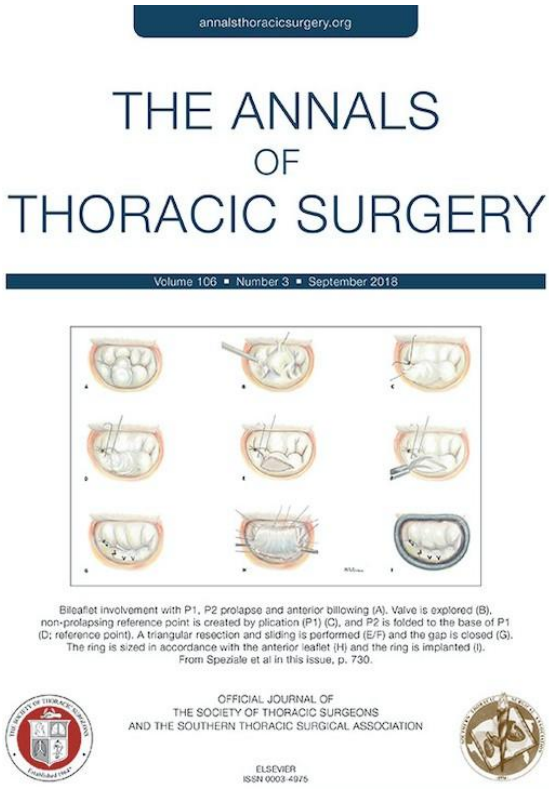


The video tutorial of the technique is published in Multimed Man Cardiothorac Surg. 2021 May 6;2021. doi: 10.1510/mmcts.2021.028. PMID: 34019746

3) I described a novel technique to treat prosthetic mechanical valve thrombosis (aortic / mitral) with the aid of high flow CO2. High-flow CO2 stream may reach the prosthesis hinges, near-hinges and subvalvular area, removing micro-thrombus formation from zones otherwise difficult to reach with surgical instruments. Such approach may be used in high-risk patients or when removing the valve can be technical challenging. Eur J Cardiothorac Surg. 2020).

4) I contributed to describe a technique for repairing complex mitral valve regurgitation in the context of minimally invasive mitral surgery.

The case series was published in The Annals of Thoracic Surgery, and the technique illustration was selected as the cover page of the month.



5) I contributed to describe a novel technique for atrial fibrillation ablation (the 'Bachman line'). We currently use this technique as part of hybrid approach in my Institution (GVM Anthea, Bari) (J Card Surg. 2020)

7. PRACTICE AND RESEARCH ON CATHETER BASED INTERVENTION

Maria Eleonora Hospital is high volume TAVR center with more than 150 self-expandable prosthesis implanted per year. I implant more than 50 TF-TAVR per year as primary operator. I also perform procedure ECMO assisted and trans-axillary access.
I received a grant to investigate the effect of transcatheter vs. surgical aortic valve replacement on markers of endothelial functions. Specific macro-markers are: flow mediated dilation (FMD); and micro-markers: apoptotic rate in the human umbilical vein endothelial cells (HUVEC).

I participate to the HORizontal aorta in transcatheter Self-Expanding valve (HORSE) multicenter registry of patients who underwent transfemoral TAVR with Evolut R/PRO or Acuarte NEO, that aim to investigate the influence of aortic angulation on TAVR success (AA) and predictors for horizontal aorta (HA) (Moscarelli and the HORSE registry: 'Aortic angle distribution and predictors of horizontal aorta in patients undergoing transcatheter aortic valve replacement', Int J Cardiol. 2021).

8. SPECIFIC RESEARCH ON CARDIAC SURGERY AND COVID-19

-I published the first case series of patients with peri-operative COVID-19 infection and the effect on post-operative outcome (J Thorac Cardiovasc Surg. 2020).

-In order to investigate Hospital Acquired/Associated COVID-19 infection (HAC) in the context of cardiac surgery, I organized a European collaboration (6 centers, 2 in the UK) with the vision to share data of patients that tested positive with COVID-19 after surgery. We collected data from 87 patients, that make this case series the largest reported so far. We were able to demonstrate that late HAC (COVID-19 infection diagnosed 7 days after index surgery) had less detrimental effect on clinical outcome than early HAC (COVID-19 infection diagnosed <7 days after index surgery) (Ann Thorac Surg. 2022 doi: 10.1016/j.athoracsur.2022.05.034).

9. META ANALYTIC EVIDENCE SYNTHESIS AND INTERNATIONAL COLLABORATION

During my period at the Hammersmith Hospital, I gained significant knowledge on meta-analyses (pairwise /pooled/patients' level). I performed several meta-analytic investigations with particular emphasis on the effect of minimally invasive access in high-risk patients.
My group published the first research that evaluated the benefits of minimally invasive mitral valve surgery in high-risk / elderly patients.

In 2022 I completed the course 'Statistical Analysis with R for Public Health' based on four domains: 1) Linear regression and non-linear regression 2) Generalized linear models 3) Survival analysis and non-parametric method 4) Statistics for public health.

I used R-project/studio (package 'meta') in association with ggplot2 to visually present Meta-analytic evidences.

a. Five selected meta-analyses

1: Creber RM, Dimagli A, Spadaccio C, Myers A, Moscarelli M, Demetres M, Little M, Fremes S, Gaudino M. Effect of coronary artery bypass grafting on quality of life: a meta-analysis of randomized trials. Eur Heart J Qual Care Clin Outcomes. 2021 Oct 13:qcab075. doi: 10.1093/ehjqcco/qcab075 .
2: Gaudino M, Benedetto U, Fremes S, Ballman K, Biondi-Zoccai G, Sedrakyan A, Nasso G, Raman J, Buxton B, Hayward PA, Moat N, Collins P, Webb C, Peric M, Petrovic I, Yoo KJ, Hameed I, Di Franco A, Moscarelli M, Speziale G, Puskas JD, Girardi LN, Hare DL, Taggart DP; RADIAL Investigators. Association of Radial Artery Graft vs Saphenous Vein Graft With Long-term Cardiovascular Outcomes Among Patients Undergoing Coronary Artery Bypass Grafting: A Systematic Review and Meta-analysis. JAMA. 2020 Jul 14;324(2):179-187.
3: Moscarelli M, Fattouch K, Gaudino M, Nasso G, Paparella D, Punjabi P, Athanasiou T, Benedetto U, Angelini GD, Santarpino G, Speziale G. Minimal Access Versus Sternotomy for Complex Mitral Valve Repair: A Meta-Analysis. Ann Thorac Surg. 2020 Mar;109(3):737-744.
4: Moscarelli M, Fattouch K, Speziale G, Nasso G, Santarpino G, Gaudino M, Athanasiou T. A meta-analysis of the performance of small tissue versus mechanical aortic valve prostheses. Eur J Cardiothorac Surg. 2019 Sep 1;56(3):510-517.

5: Moscarelli M, Fattouch K, Casula R, Speziale G, Lancellotti P, Athanasiou T. What Is the Role of Minimally Invasive Mitral Valve Surgery in High-Risk Patients? A Meta-Analysis of Observational Studies. Ann Thorac Surg. 2016 Mar;101(3):981-9.

b. Meta-analysis with international collaboration in press

- Effect of Coronary Artery Bypass Grafting on Quality of Life: A Meta-analysis of Randomized Trials, Gaudino, Moscarelli et al. European Heart Journal Quality of Care & Clinical Outcomes.

This study is the first of this kind to pools and aggregates data from all the RCT to assess the level of quality of life after coronary artery bypass grafting.

10. GOVERNANCE / QUALITY ASSESSMENT IN CARDIAC SURGERY

GVM Care&Research is one of the largest cardiac surgery and cardiology providers in Italy (Public / Private partnership). GVM accounts for 11 centers in different part of Italy.
All centers input cardiac surgery-related data into a common registry that is subject to review by the centralized Clinical Governance Unit, which check data for accuracy and completeness on a monthly basis.

I was instrumental in proposing a modified statistical process chart (exponentially weighted moving average chart) to assess and identify mortality trend among the GVM center, and the model (Semin Thorac Cardiovasc Surg. 2016).

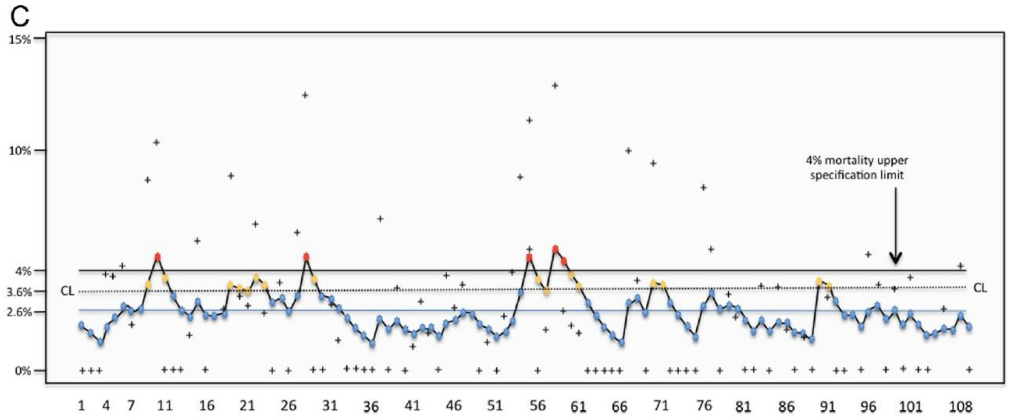


Figure 2. (A) "Flow of production"—modified EWMA showing calendar year 2013-2014 mortality rate fluctuation of 9 cardiac centers GVM Care & Research considered as "one large factory" producing the goods "cardiac surgery." *X*-axes—months (12 months "sentinel point" each of the 9 center, 108 points of observation; eg, 1-9 represents January, 10-18 February and so on). *Y*-axes—mortality frequencies (%). Continuous blue line: indicates the center = 2.6% (mean = 2012-2013 mortality which was the lowest mortality observed in GVM Care & Research group since 2012, hence was use as benchmark). Arrow shows the 4% upper specification limit, established by the Italian Ministry of Health as maximum mortality rate limit permitted. Red-dots—major (above 4% specification level) out-of-control process. Blue-dots—process below the upper specification limit of 4%. (B) CL—control limit (dotted line) set as 3.6% that represent 1.5 SD below the upper specification level of 4%. Yellow-dots—minor (between CL and 4% specification level) out-of-control process. (C) "+ marks" = represents superimposed *x*-bar chart or nonweighted mortality. (Color version of figure is available online.)

GVM has one of the largest registries with cardiac surgery related data in Europe. Significant part of my research focused on the analysis of the GVM registry, with the aim to assess patients' outcome particularly in relation to surgical access (minimally invasive vs. sternotomy).

More recently we investigated the effect of surgical vs. transcatheter aortic valve replacement stratified by level of surgical risk.

11. INVOLVMENT OF PATIENTS AND PUBLIC RESEARCH

I strongly believe in involving patients as advocates in my research work. Most of my clinical studies involve a quality-of-life component. I have given public interviews and aim to simplify cardiovascular care and basic science for the general public https://www.youtube.com/watch?v=9zryfDmlIUc.

13. TEXTBOOK

I have co-authored the following chapters in the above textbooks:

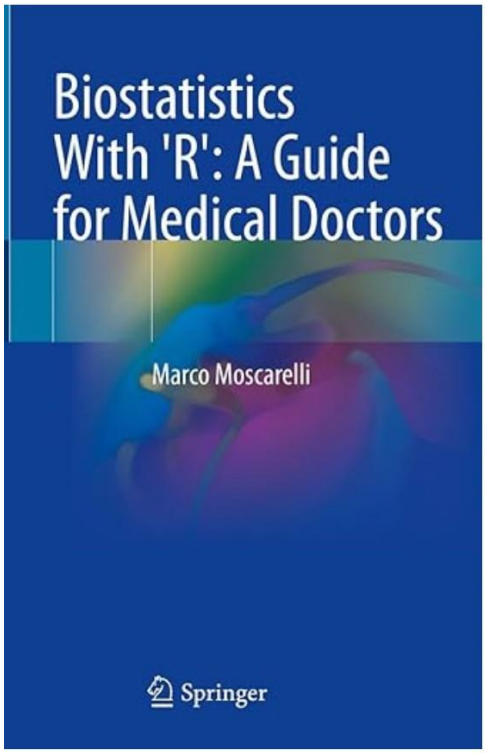
- Chapter 9. Fiorella De Vito, Marco Moscarelli, Marco Matteo Ciccone, Paola Rizzo, Roberto Ferrari, and Giuseppe Speziale. The Impact of Surgical and Trans-Catheter Aortic Valve Replacement on Endothelial Function: New Markers Ahead. Springer International Publishing AG 2018, Advances in Treatments for Aortic Valve and Root Diseases.
- Chapter 1. Fattouch K, Moscarelli M. Anatomical changes associated with secondary mitral regurgitation: Difference between ischemic and idiopathic cardiomyopathy. Secondary mitral valve regurgitation. Springer 2015 ISBN 978-1- 4471-6488-3 (Editors: Fattouch K, Lancellotti P, Angelini G).
- Chapter 2. Fattouch K, Moscarelli M. Anatomical changes associated with secondary mitral regurgitation: Difference between ischemic and idiopathic cardiomyopathy. Secondary mitral valve regurgitation. Springer 2015 ISBN 978-1- 4471-6488-3 (Editors: Fattouch K, Lancellotti P, Angelini G).
- Chapter 24. Punjabi P, Moscarelli M: 'Predictors of recurrent mitral regurgitation after mitral valve repair surgery. Secondary mitral valve regurgitation. Springer 2015 ISBN 978-1-4471-6488-3 (Editors: Fattouch K, Lancellotti P, Angelini G).

Hillecke M, Moscarelli M, Sutaria N, Angelini G, Bello F. Computer-assisted surgical planning for mitral valve repair using 4D echocardiograms. 2014 6th International Symposium on Biomedical Simulation (ISBMS), Publisher: SPRINGER INT PUBLISHING AG, Pages: 163-172, ISSN: 0302-9743.

Chapter 1. Moscarelli M, Patel N, Angelini GD. Indication and contraindication for off-pump coronary artery bypass grafting. In Off-pump Coronary Artery Bypass Grafting: Outcomes, Concerns, Controversies. Raja SG (ed) m. 2012. Novapublisher, London.

Moscarelli M, Punjabi P. Thoracotomy Surgery. 2011 May;29(5):242-243.

- I have authored the book Biostatistic with 'R': A guide for Medical Doctors (Springer 2023)



14. PARTECIPATION TO RELEVANT NATIONAL/INTERNATIONAL MEETING AS SPEAKER/INVITED SPEAKER/ MODERATOR (since 2015)

2015

"Minimally Invasive Mitral Valve Repair for Degenerative Disease. A Multicentric Propensity Score Matching Analysis"; Amsterdam, EACTS Annual Meeting 2015 03-10-2015 / 05-10-2015

2016

"Role of Papillary Muscle Relocation in Ischemic Mitral Valve Regurgitation"; TCT 2016 Washington scientific symposium 30-10-2016 - 30-10-2016.

"Surgical and Transcatheter Mitral Valve Repair or Replacement for Patients With Heart Failure and Primary and Secondary MR: Magnitude of Benefit and Prediction of Responder" TCT 2016 scientific symposium 31-10-2016 / 31-10-2016

Faculty Member MICS 2016, Rome, The First Mitral Conferences promoted by the Mitral Academy 17-06-2016 - 18-06-2016

2017

"Minimally Invasive Mitral Valve Repair: Results from a Prospective Randomized Trial on Two Anesthetic Preconditioning Regimes"; AATS Mitral Conclave 2017 - 27-04-2017 al 28-04-2017

"Mitral Valve surgery: toward 100% minimally invasive repair" GISE Milan, 2017 dal 13-10-2017 / 13-10-201

2018

"A two-centre randomised controlled trial investigating the effect of remote ischemic preconditioning (RIPC) on cardiac injury and energetics, and inflammatory markers in patients undergoing isolated CABG and AVR"; EACTS Milan Annual Meeting 2018 19-10-2018 / 19-10-2018

"The effect of surgical vs. transcatheter aortic valve replacement on markers of endothelial function"; EACTS Milan Annual Meeting 2018 19-10-2018 / 19-10-2018

Faculty Member MICS 2018, Rome The Mitral Conferences promoted by Mitral Academy 08-06-2018 - 09-06-2018

2019

"Small valve for a small root. Is it worth?" EuroValve 2019 Madrid 25-04-2019 - 25-04-2019
Faculty Member and Discussant EuroValve Congress 2019 Madrid 25-04-2019 - 26-04-2019

"A Low-Cost Low-Fidelity Easily Assembled Simulator for Minimally Invasive Mitral Valve Repair"; AATS Mitral Conclave 2019 02-05-2019 / 03-05-2019

"Minimally Invasive Versus Sternotomy for Complex Mitral Valve Repair – a Meta-Analysis" AATS

Mitral Conclave 2019 02-05-2019 / 03-05-2019

"A Multi-centric study comparing the effect of minimally invasive and sternotomy surgery on physical activity and quality of life" EACTS Annual Meeting 2019 Lisbon, Portugal.

2020

“Early safety performance of a modified technique for ascending aorta replacement with sino-tubular junction stabilization” EACTS Annual Meeting (virtual) Barcelona, 2020, Spain.

2021

“Effect of hospital-associated COVID-19 infection in cardiac surgery. A multicentric study”. Accepted to the next EACTS Annual meeting (Barcelona).

“Retrograde autologous priming for minimally invasive mitral valve surgery”.
Accepted to the next EACTS Annual meeting (Barcelona).

“The lesson from Mitral and Coapt in transcatheter edge-to-edge mitral repair”. SICCH 2021, Rome.
“Can we trust evidences? An update of trials comparing CABG and PCI”. SICCH 2021, Rome.

2022

“Trustworthiness of current guidelines in valve diseases: another EXCEL case? ”. SICCH 2022, Rome.

2023

“Incidence and implication of self-expandable transcatheter aortic valve non-uniform expansion”. EACTS 2023, Wien.

2024

“ Transcatheter aortic prosthesis durability” . SICCH 2024, Rome.

"Statistical primer for observational studies". SICCH 2024, Rome.

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