

CUSTOMER REPORT

TOMTEC-ARENA at Imperial College London – Shaping the future of cardiac diagnostics

Imperial College London



Petros Nihoyannopoulos,
Professor of cardiology

Petros Nihoyannopoulos, Professor of Cardiology at Imperial College London and Hammersmith Hospital, is no doubt a pioneer in ultrasound assessment of ventricular function. In the early 1980s he was among the first ones in the UK to use stress echocardiography. And his pioneering spirit is unabated: Today, he focuses on the 3D analysis of the right ventricle and speckle tracking. Forward-looking ideas alone, however, are not enough to shape the future of cardiac diagnostics. Innovative technologies are required that enable the scientific vision to become reality. This is why Petros Nihoyannopoulos prefers IT solutions by TOMTEC.

"I have been working with TOMTEC solutions since the beginning of transoesophageal diagnostics. The innovative potential is convincing and the solutions are vendor-neutral – which is a huge advantage. Moreover, the company is constantly updating the software so that users really benefit from state-of-the-art technology and can perform pioneering research and exams," says Petros Nihoyannopoulos, explaining why he is an avid fan of TOMTEC's IT solutions.

Improved assessment of ventricular function

Currently, the research team around Professor Nihoyannopoulos is focussing on the diagnostic potential of speckle tracking for image-based assessment of myocardial deformations. While ejection fraction continues to be the diagnostic tool of choice in clinical settings the cardiologist underlines that "ejection fraction is very variable and not that accurate to assess the cardiac function. Thus, speckle tracking has become the new ejection fraction. But further research is required to confirm the superior performance of this method compared to others." The team uses 2D CPA^{®1} for speckle tracking, a measurement tool that offers automated left ventricular function analysis of all three apical long axis views. The software provides not only automated but also reproducible results that allow analysis and monitoring of subclinical changes over time.

Exactly this monitoring function is essential for the research team at Imperial College since the scientists evaluate the benefit of speckle tracking to assess left ventricular function in patients who undergo chemotherapy or who have other diseases.

INSTITUTION

- 16,882 students and 7,547 staff
- Focus on four main disciplines of science, engineering, medicine and business
- High-impact research
- Prof. Nihoyannopoulos is clinical leader for treating patients with a range of heart diseases as well as lead researcher in a variety of research programs

Right ventricular analysis and Ejection Fraction calculation with 3D echocardiography

Another research highlight at Imperial College is right ventricular analysis using 3D echocardiography – an important area in cardiac diagnostics. Right ventricular function affects the outcomes for patients with left heart diseases and for those who suffer from pulmonary hypertension. Currently Ejection Fraction calculation uses the biplane Simpson’s rule but has more than 10 percent variability in the best hands. Conversely, EF calculation using 3D it is only about 5 percent,” Petros Nihoyannopoulos summarizes his research results and adds that “3D echocardiography is probably the best method at present for assessing the right ventricle in patients with pulmonary hypertension. We have already published our research showing the 3D evaluation of the RV function is very close to that using MRI. And TOMTEC is the only independent vendor offering a software solution for 3D analysis.”

With their findings, the team at Imperial College is paving the way for clinical routine. Although the guidelines for assessing ventricular volume do recommend 3D echocardiography, so far there are only a handful of institutions that in fact use 3D ultrasound. As for the speckle tracking, the time aspect remains an obstacle for clinical routine. “In daily practice we need quick and easy evaluations. Speckle tracking calculations still takes a significant amount of time to add on to the routine clinical examination. Thus, at the moment we meticulously select the patients for these investigations – mainly for research purposes. But of course ultimately the patients will benefit. Right now, we focus on collecting data, producing results and publish them,” the cardiologist describes his work going forward.

KEY FOCUS AND MODULES IN USE

- Focussing on diagnostic potential of speckle tracking for image-based assessment of myocardial deformations
- Right ventricular analysis using 3D echo in clinical routine

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2D CPA MR^{®1}

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Dr. Petros Nihoyannopoulos

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