CUSTOMER EXPERIENCE

TOMTEC at Northwestern Memorial Hospital: Where RV-analysis is only a few mouse clicks away

Dr. Akhil Narang is a cardiologist at Northwestern Memorial Hospital in Chicago with a focus on cardiac imaging including echocardiography. Moreover, he is a fan of modern and innovative diagnostic technologies and how to transform their use to aid in patient care. Working with TOMTEC software provides many opportunities to incorporate this technology in his everyday routine. This includes in depth evaluation of the right ventricle and further research of the use of Virtual Reality together with TOMTEC.

Dr Akhil Narang, MD is a cardiologist at Northwestern Medicine and Assistant Professor of Medicine at Northwestern University Feinberg School of Medicine

The right ventricle is a peculiar structure even for routine cardiologists. Its interior position within the chest wall makes it challenging to image from an echocardiographic standpoint in comparison to the left ventricle. Evaluation of left ventricular size and function can easily be assessed with three or four views. "The right ventricle is trickier. You have to use a combination of multiple 2D echo views that need to be put together in your mind to be able to understand the size and function. So ideally, with 3D RV-echo, Artificial Intelligence (AI) and/or Virtual Reality (VR), we can more easily and with better understanding quantify the size and function of the right ventricle," Dr. Narang explains.

RV function: TOMTEC spotlights the overlooked chamber

For a long time cardiologists did not pay as much attention to the right ventricle. One reason may be because of the difficulty to display optimal views. "But today we recognize that the right ventricle is not a passive bystander of the left ventricle. Many conditions depend on RV-function. We already know, for example, that the RV-function is a predictor of outcomes for all sorts of cardiac diseases and conditions. Moreover, there are different diseases that primarily impact the right ventricle including certain cases of cardiomyopathy or genetically driven heart failure. This makes it so important to look closely at the right side of the heart," Dr. Narang reports.

Dr. Narang feels fortunate that the cardiology department at Northwestern Memorial Hospital is working with TOMTEC. The software is one of the first systems offering 3D echocardiography and post processing that enables doctors to really understand the three dimensional assessment of the right ventricle. In addition, TOMTEC software offers options to easily assess right ventricle strain.

PIONEER WORK

VR is transforming from a toy to a tool – Dr. Akhil Narang is part of the first group who comprehensively did a joint work study with TOMTEC and a team of researchers utilizing Virtual Reality. The results were published in the Journal of American Society of Echocardiography, Sept. 24, 2020, "Virtual Reality Analysis of Three-Dimensional Echocardiographic and Cardiac Computed Tomographic Data Sets", shown that VR is transforming from a toy to a tool with clinical impact. A proof of concept was demonstrated that you can take a 3D echocardiographic dataset and convert into a VR model within seconds. So, with VR you can quickly analyze and perform accurate measurements that are reproducible.

Dr. Narang: "The software is easy to use and gives us step by step instructions on how to set the landmarks to be able to analyze the RV. Doing so, I am not only getting the size and the function but also the shape of the right ventricle. The entire RV-assessment is only a few mouse clicks away. Another thing TOMTEC is great for is free wall 2D strain analysis which is also an important marker that is shown in a lot of data for analyzing RV function."

Another important point, the cardiologist stressed, is the excellent reproducibility of the analysis due to the high level of automation. Not only for the chamber quantification but also for valve analysis. The same analysis can be performed repeatedly with the results being consistent each time. This provides confidence when following-up with patients who have a special diagnosis requiring repeated evaluation over time.

VR: From toy to tool

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We really could show that VR is transforming from a toy to a tool with clinical impact. What we demonstrated was a proof of concept that you can take a 3D echocardiographic dataset and convert into a VR model within seconds. So, with VR you can quickly analyze and perform accurate measurements that are reproducible - even in critical structures. I think VR can become a very powerful tool," Dr. Narang is predicting.

But as with any new technology it takes time to adapt within a clinical environment. A possible workflow could start at the routine workstation with the 3D dataset and with a push of a button and applying VR glasses a new analysis environment can be seen. The hope is to not need specialized software or headsets. The VR setting would allow cardiologists to perform measurements directly on a specific structure that is stored within appropriate databases.

Of course, this process will take time - hopefully not as long as some might think. TOMTEC has made rapid progress with this technology which will help speed up the process. Also, it is important to note that equipment prices have decreased tremendously which makes it more affordable and accessible for many different uses.

DR. AKHIL NARANG IS EXPERIENCED IN THE FOLLOWING TOMTEC APPLICATIONS:

2D STRAIN[1]
4D CARDIO-VIEW[1,2]
4D LV-ANALYSIS[1]
4D MV-ASSESSMENT[1]
4D RV-FUNCTION[1]

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