



Lower dose, better visualization

In the last few years Computed Tomography (CT) has gained importance in coronary artery disease detection and CT technology is being used for important cardiac applications such as planning percutaneous coronary interventions (PCI) and preablation planning for atrial fibrillation. At this year's European Society of Cardiology congress (ESC), Philips presented the latest cardiac developments for the Brilliance family of CT scanners, aimed at reducing radiation dose, simplifying the CT evaluation and increasing the accuracy of interventional procedures.

With the new Step & Shoot cardiac imaging – a prospective, ECG-gated scanning mode – the Brilliance 64 CT scanner

provides high-quality images of the coronary arteries and heart anatomy at low dose levels. In addition, a shorter breath hold increases patient comfort during the imaging exam. Based on technological innovations such as arrhythmia rejection and proprietary thin-slice axial reconstruction algorithms, X-rays are turned on only during the physiologic phase of interest. The technology produces cardiac CTA scans at an effective radiation dose of 2–5 mSv – nearly the same as annual background radiation exposure. According to a study of the Wisconsin Heart Hospital¹, Step & Shoot Cardiac's effective radiation dose is approximately 80% lower than spiral retrospective scans without ECG-based dose modulation.

“We have striven for a reduction in dose not only with Step & Shoot but also with a new analysis tool and with our CT TrueView application,” says Dr. Gerald Pötzsch, Manager Business Unit CT, Germany. “With these innovations, dose reduction goes hand in hand with better visualization. CT TrueView even enables the visualization of target segments at bifurcations.” Based on total heart segmentation, the Comprehensive Cardiac Analysis (CCA) application provides entire coronary tree visualization, ventricular functional analysis and 3-D heart chamber and valve morphology. CT TrueView uses this 3-D CT segmentation to select and visualize the best 2-D C-arm projections for planning PCI procedures, such as planning stent placement for bifurcations and chronic total occlusions.

From planning to procedure

The Philips Brilliance CT is integrated with the Philips Xcelera image management solution, importing images directly into the catheterization lab. “With CCA and CT TrueView, a cardiologist can plan the optimal projection angle during the intervention. The additional information provided by CT thus helps reduce radiation dose during the complete cardiac care cycle – from planning to procedure,” says John Steidley, Vice President of CT Global Marketing for Philips Medical Systems. “What's more, simplifying the cardiac CT evaluation will eventually lead to faster clinical results.”

CT also helps reduce procedure times in the electrophysiology (EP) lab. An EP planning application supports assessment of the pulmonary vein, left atrial and appendage anatomy and helps to quickly identify anatomy that may complicate the EP procedure. Prior to ESC, the heart centre at the University of Leipzig, Germany, unveiled its hands free catheter ablation solution. Combining pre-interventional Philips 3D CT images with live X-ray fluoroscopy catheter position information, physicians can navigate more easily through the heart during complex procedures. Cardiologists use a mouse and a joystick to remotely control two magnets that guide catheters to and inside the patient's heart, where they ablate abnormal tissue areas that cause atrial fibrillation. The solution is based on the Philips EP Navigator, the Stereotaxis Magnetic Navigation System Niobe and 3D location sensing technology by Biosense Webster. “We now get instant confirmation of the position of all catheters in a single image,” says cardiologist Prof. Dr. Gerhard Hindricks from the University of Leipzig. “Since we started using this system, we have seen an efficiency increase of 13–17%.”

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According to Prof. Hindricks, cardiologists at the University of Leipzig can now treat cardiac rhythm disorders much more efficiently and safely than ever before. <

¹ Study led by Dr. Samuel Wann and Shelly Deleeuw at Wisconsin Heart Hospital from April – September 2007.