



A new view

Enhanced coronary angiography with dual-axis rotation

Who/where

Centre Cardiologique du Nord (CCN)
St. Denis, France

Challenge

CCN cardiologist Dr. Philippe Guyon was interested in alternatives to conventional coronary angiography which is performed in multiple stationary views at different angles around the patient. Usually around seven static views are taken, and while these provide useful diagnostic information to the cardiologist, they do subject the patient to a relatively high X-ray dose and high contrast load.

Solution

Philips' dual-axis rotational angiography (XperSwing) in which the rotating C-arm follows a curved trajectory around the patient, allowing all desired anatomical views to be imaged in a single run. The CCN study resulted in significant reductions in both X-ray dose and contrast agent loading for the patient and produces high-quality images of the coronary arteries that can be used for diagnosis.

For the past year, cardiologist Dr. Philippe Guyon of the Centre Cardiologique du Nord, St. Denis, France, has been working with Philips on the development of the new dual axis rotational angiography functionality for the Allura Xper FD systems. This functionality will be introduced under the name XperSwing. These study results show that XperSwing allows cardiologists to obtain valuable diagnostic information while subjecting patients to lower contrast media and X-ray radiation doses in comparison to standard angiography.

Established more than 30 years ago, the Centre Cardiologique du Nord (CCN) has a well-earned reputation for its innovative approach to the treatment of heart disease. Located in St. Denis, North of Paris, the hospital is the principal referral center for cardiac patients in the north of the French capital. Its relationship with Philips Healthcare is also well established and many innovative techniques that have now become accepted clinical practice were first evaluated there.

"The results we're getting now and the future potential of the system are very exciting"

The XperSwing is being developed in close cooperation between Philips and CCN. "We started working together with Philips on rotational angiography around three years ago. Since then, we've passed through a steady incubation period towards the latest dual-axis system which I believe is the first



Dr. Philippe Guyon, interventional cardiologist

system of its kind to be installed in Europe. I have to say that the results we're getting now and the future potential of the system are very exciting," says Dr. Guyon.

PHILIPS



The Philips Allura Xper FD10 with XperSwing at the CCN Hospital

A new twist on an established practice

Standard practice is to perform coronary angiography by taking multiple stationary acquisitions at different angles around the patient, each acquisition being made in a separate X-ray run with injection of an iodine contrast agent. Usually around six or seven static views are taken. Many cardiologists, including Dr. Guyon, however, have been exploring rotational angiography as an alternative to the static approach.

"We've worked closely with Philips engineers and clinical scientists to perfect the system's operation"

"For some years at CCN we have been looking into rotational angiography but many existing systems have disadvantages of their own," points out Dr. Guyon. "These systems

usually rotate around a single axis and require two separate rotations to image the left and right coronary arteries. These single axis rotations help to reduce X-ray radiation and contrast dose, so we were convinced that this would be a good route to follow."

"The savings on the costs of contrast agent are good news for healthcare budgets"

That route has been taken to the next logical stage by the Philips dual-axis rotation, developed over the past three years in close collaboration with institutions such as CCN. In this system, the rotating C-arm follows a curved trajectory around the patient, allowing all desired anatomical views to be imaged in a single run. The trajectories are preprogrammed and are optimized to provide clinical information while staying

within boundaries to avoid any collisions. Philips provides dedicated trajectories for the left and the right coronary arteries.

"About a year ago we started a close cooperation with Philips engineers and clinical scientists to perfect the dual axis rotation," explains Dr. Guyon.

Providing the best of all worlds

Tests conducted at CCN clearly show significant reductions in both X-ray dose and contrast agent loading.

"The real benefits come from the quality of the images"

"These reductions in X-ray radiation and contrast dose are good news for patients, and the savings on the costs of contrast agent are good news for healthcare budgets,"

says Dr. Guyon. “But the real benefits as far as cardiologists are concerned come from the quality of the images. Because we can generate very complex rotations with the XperSwing, it is easier to develop a coronary angiogram using this type of approach.

“The 3-D perspective gives us the ability to analyze the images far more reliably”

We not only produce better images, but the 3-D perspective gives us the ability to analyze the images far more reliably.”

Dr. Guyon points out that one of the difficulties with making assessments based on normal acquisitions comes from the visual foreshortening of coronary arteries that do not lie completely within the plane of the image. “Looking at stenosis, it’s difficult with standard views to determine the length of a stenosis, which, of course is essential information for performing catheterization. The images provided by XperSwing make this far easier. However, for added confidence at present we still like to combine these images with MSCT images.”

This also applies to some other procedures such as catheter navigation through the coronary arteries, which today may benefit from combining CT information with live acquisition within the catheterization lab. Dr. Guyon is confident that in the future it will be possible to perform these procedures

within the catheterization lab, without any need for MSCT information. “We’re currently evaluating 3-D modeling software developed by Philips to generate virtual images of the coronaries using the data set acquired in the dual-axis acquisition,” he explains. “Today this software operates offline to produce images of the arteries similar to those obtainable from CT. But in the future, it should be possible to generate these virtual images in real time, eliminating the need for supplementary information from MSCT.”

“The XperSwing will become the standard way to explore the coronaries in the future”

A vision of the future

Dr. Guyon: “Further clinical evidence will probably be needed to convince the broader population of cardiologists of the clinical added value provided by the XperSwing. I have no doubt that they will be convinced just as I have been, and that the XperSwing will become the standard way to explore the coronaries in the future.”



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Royal Philips Electronics**

How to reach us

www.philips.com/healthcare

healthcare@philips.com

fax: +31 40 27 64 887

Asia

+852 2821 5888

Europe, Middle East, Africa

+49 7031 463 2254

Latin America

+55 11 2125 0764

North America

+ 1 425 487 7000

800 285 5585 (toll free, US only)

Philips Healthcare

Global Information Center

P.O. Box 1286

5602 BG Eindhoven

The Netherlands



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