Nottingham EP Lab leads on radiation safety innovation

Philips AlluraClarity enables EP cardiology team to lower dose while maintaining optimal image quality

Nottingham University Hospitals NHS Trust
Nottingham University Hospitals NHS Trust is one of the largest acute teaching trusts in the UK and a major centre for research. Nottingham City Hospital (NCH) is the planned care site, where specialist services including cardiology are based. This was the first AlluraClarity system in the UK.

Challenge
To reduce radiation dose and its associated risks to patients and staff during complex procedures, whilst maintaining image quality and improving outcomes.

Solution
Philips Allura Xper FD10 model AlluraClarity with EP cockpit, 3D-ATG, EP navigator

Since the Philips Allura Xper system was upgraded towards the AlluraClarity with ClarityIQ technology system at NHC, staff have been surprised to discover how dramatically they have been able to reduce dose, without affecting the image quality.

Dramatic dose reduction

"The dose reduction is much greater than I would have expected," said, consultant EP Cardiologist, Tim Robinson. "We have compared data from patients done when the lab was first built with patient data since the AlluraClarity upgrade and the radiation dose is lower than what we had previously"

One of the most demanding procedures carried out in the EP lab is atrial fibrillation (AF) ablation, which takes several hours, with up to an hour of screening time. "AF ablation is a long procedure," explained Tim Robinson. "The main benefit of the AlluraClarity upgrade is that cumulative radiation dose is being reduced within the whole discipline."

Exceptional image quality

Andrew Staniforth, also a consultant EP cardiologist, highlighted the fact that the AlluraClarity has maintained the exceptional image quality needed for precise catheter navigation. He said: "There is a low dose for patients, a lower dose for us and no loss of image quality. It's as simple as that."

Andy Rogers, Head of Radiation Physics

Specialist radiographers Chantel Brooks and Kelly Finley have been keeping track of the improvements, both in dose reduction and screening quality. Between 12 and 15 procedures are performed each week in the EP Lab using AlluraClarity. "We use AlluraClarity for all our imaging as standard now," said Kelly. "I have played around with different settings to test out the image quality. I expected the lower dose image to produce a lower quality image but that's not the case. In the past we have struggled with larger patients but now the Clarity and non-Clarity images look the same but the Clarity images are at much lower dose."

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In one recorded case study, Chantel even claimed the team had done, "twice as many runs and screened for eight minutes more than usual'," on a challenging patient, and still managed to reduce the dose by a third whilst maintaining image quality".

Improving staff safety

As Radiation Protection Supervisor for Cardiology, Chantel monitors the exposure of the whole team on a monthly basis.

As well as taking radiation data from the five badges worn by each doctor, Chantel has the added assistance of the Philips DoseAware system, which gives real-time data throughout every procedure.

She said: "In the middle of an operation, dose is often the last thing on the doctor's mind but the DoseAware's traffic light display system helps to remind us to take care."

Measuring Impact

With a strong reputation for research at Nottingham, the EP Cardiology team is keen to put the AlluraClarity through its paces and get a clinical trial underway as soon as possible. Head of Radiation Physics, Andy Rogers, is excited about the potential for improving outcomes. "Dose reduction requires teamwork," he explained, "but early evidence shows we have already hit rock bottom doses with the AlluraClarity system here in electrophysiology. What I hope to do next is get an impression of the real impact of that reduction."

From left to right, specialist radiographers Kelly Finley and Chantel Brooks are impressed with the dose reduction

"There is a low dose for patients, a lower dose for us and no loss of image quality."

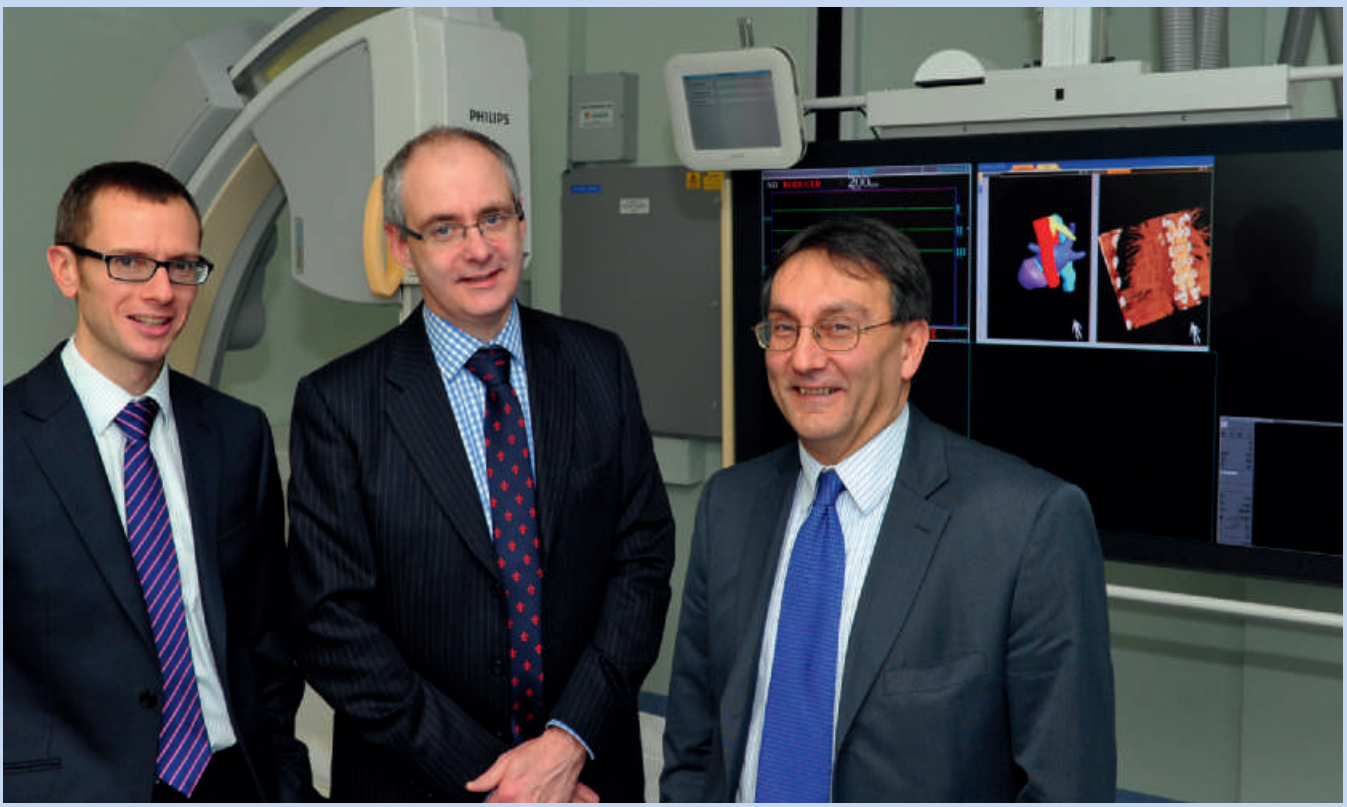
The team at NCH have begun to collate data and plan the details of their research. "Random elements mean that there is a variation in dose reduction," said Andy Rogers, "so the more cases we collect the better precision we can have with our numbers." The excellent image quality, even with low dose, is enabling NCH's EP team to develop its own image quality metrics system to discover the optimum lowest dose for each aspect of a procedure. Consultants will use a scoring system with criteria including: static image quality of structures of the heart, catheters and wires; and the dynamic image quality of moving structures, and the end of the wire when it is being positioned.

Enabling innovation

The AlluraClarity has really opened up chances to develop new things," said Andy Rogers, "and I would really like to work with Philips on these." He added: "Traditionally in the NHS we don't sell ourselves on the basis of low radiation dose but the independent sector is doing just that. We just see it as part of the overall effort to improve quality NHS work and we should probably blow our own trumpet a bit more."

Collaborating for the Future

EP consultant cardiologist Arif Ahsan claims the whole team have benefitted from a good relationship with Philips. "We have a good rapport," he said, describing the company as "very helpful and responsive."



From left to right; consultants Tim Robinson, Andrew Staniforth and Arif Ahsan say the large FlexVision monitors have changed the way they work.

Enhancing the working environment

All of the EP Cardiologists at NCH claim the extra large adjustable FlexVision monitor has made a big difference to the way they work. Splitting the screen enables them to view a live 3D atriograph next to previously fused CT or MRI images. Colour-coding these scans allows clinicians to strip away superfluous information, so that they can interpret pulmonary vein anatomy of the left atrium in isolation. "The new system is fantastic," said consultant Arif Ahsan, "particularly the large screen. We can zoom in and the images are still great. It makes a real difference to the working environment. The physiologists can be more involved too, as they can see better what is going on."

Tim Robinson described how colleagues from other disciplines had admired the new set-up enviously. "Everyone has been really impressed with the FlexVision," he said. "Instead of having to peer at a tiny screen with our specs clouding up, we are able to step back and view these enormous images. It makes long procedures much less of a strain."

Andy Rogers explained the collaboration. "We've had a long relationship with Philips Healthcare in the UK and we are working closely with them. The Philips team has been very much involved in putting their suggestions into the clinical trial and we can go straight to Philips' scientists with ideas of our own, on how to improve EP labs in the future. As a group of scientists we want to work with Philips to see what we can really do with the AlluraClarity. There are some really exciting projects we could do."

"We want to look at the options for using a higher frame rate for images. In the past people said you shouldn't do this but if those pulses are now a much lower dose then we can stay within existing dose levels. This could potentially improve hand-eye coordination. You won't get the Charlie Chaplin jerky effect of a lower frame rate. We hope to utilise the ClarityIQ aspect for these purposes and get better outcomes overall. All of this research is genuinely about doing things better and the consultants are really enthused about it all."

From left to right; Chantel and Kelly with the AlluraClarity

From left to right; Consultants Andrew Staniforth, Arif Ahsan and Tim Robinson have a good relationship with the Philips team.

"We have hit rock bottom dose with the AlluraClarity here in electrophysiology."

This product is not available in the United States

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